ADDIS ABABA UNIVERSITY
SCHOOL OF INFORMATION SCIENCE
AND
SCHOOL OF PUBLIC HEALTH

IMPROVING DATA QUALITY AND INFORMATION USE OF TUBERCULOSIS PROGRAM IN ALERT HOSPITAL

By

ABEBA SORI

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A Project Submitted to Addis Ababa University School of Information science and School of Public Health in Partial Fulfillment of the Requirements for the Degree of Master of Science in Health Informatics

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DECLARATION

I declare that the project *"IMPROVING DATA QUALITY AND INFORMATION USE OF TUBERCULOSIS PROGRAM IN ALERT HOSPITAL"* is my original work and has not been presented for a degree in any other university.

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This project has been submitted for examination with my approval as university advisor.

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DEDICATION

This work is dedicated to my beloved husband Ato Endale Zemene whose encouragement and support gave me strength to successfully finish this course. I would also like to dedicate this paper to my children Haymanot Endale and Natnael Endale who didn't have their Mother's follow-up during my study.

ACKNOWLEDGEMENTS

First of all I would like to thank the almighty God who gave me the courage and power to finish this paper. My deepest gratitude goes to my advisors Dr. Wubegzier Mekonnen from School of Public Health (SPH) and Dr. Dereje Teferi from faculty of informatics. I cannot have sufficient words to thank you for your dedicated and highly qualified support, swift feedback, friendliness, patience and understanding. Your advice and encouragement gave me confidence to think critically. Without your close guidance, it would have been difficult to accomplish this work.

I am grateful to Addis Ababa University School of Information Science and School of Public Health for their support in funding my project work.

My appreciation also extends to ALERT hospital for sponsoring me and its willingness to participate in the study. My sincere gratitude goes to all data collectors and study participants whose contributions were vital to go through the data collection work.

I wish to thank my whole family for constant moral support specially my brother Melaku for his support during the project work.

Finally, I would like to thank my friends and others who participated in this study.

Table of Contents

List of Figures

List of Tables

List of Annexes

Acronyms

ALERT: All Africa Leprosy and Tuberculosis Rehabilitation Training Center

CSA: Central Statistical Agency

DHIS: District Health Information System

DOTS: Directly Observed Treatment Short course

DQA: Data Quality Audit

HEP: Health Extension Program

HMIS: Health Management Information System

HMN: Health Metrics Network

HSDP: Health Sector Development

HIV/ ADIS: Human Immune virus/Acquired Deficiency Immune Syndrome

ICT: Information communication technology

IT: Information Technologies

MDG6: Millennium Development Goal 6

MDR/TB: Multi Drug Resistance Tuberculosis

M&E: Monitoring and Evaluation

MOH: Ministry Of Health

OBAT: The Organizational and Behavioral Assessment Tool

PRISM: Performance of Routine Information System Management

PMTCT: Prevention of Mother to Child Transmission

RDQA: Routine Data Quality Assessment tool

RHIS: Routine Health Information System

TB: Tuberculosis

TB/HIV: Tuberculosis with Human Immune virus

WHO: World Health Organization

Abstract

Introduction: The development of comprehensive health and management information systems are increasingly becoming important for measuring and improving the quality and coverage of health services. Many developing countries including Ethiopia have made efforts to strengthen their national health information systems to provide information for decision-making in managing health care services. However, ensuring data quality is a critical factor in the delivery of medical care. Poor data quality can have far reaching social and economic consequences. **Objective:** To improve data quality, information use and develop standard database for tuberculosis HMIS in ALERT hospital.

Methodology: This project employed quantitative methods to assess factors influencing the performance of HMIS in the department and qualitative methods to assess data quality and information use by using the adopted performance evaluation tool of the PRISM package. The tool used for data collection were in depth interview, self-administered questionnaire, and document review that were collected in the last two quarters (July 2006-December 2007 E.C). The study participants were health care professionals who were working in TB and MDR/TB department of ALERT hospital for the last two quarters, department heads, TB focal person, and HMIS focal persons of the hospital. The data collected was analyzed by using MS-Excel to identify issues such as level of data quality and information use through quantitative method. Open source software used to analyze qualitative data was used to identify the associated factors.

Results: The finding of this assessment shows that there is data quality problem related to TB HMIS in ALERT hospital. There is also insufficient practice of data use for planning and decision making to improve the health interventions. The data quality issues are discussed with concerned bodies to avoid future data quality problems. A Microsoft Access database is also developed to avoid error commuted during recording and reporting which resulted in data quality problem.

Conclusion: The recording and reporting of the TB program needs to obtain high attention from the HMIS unit and the management for future improvement. The computer based database should be implemented to support the TB focal person to properly record and report and so data quality is improved.

Chapter one

1. Introduction

1.1 Background

Tuberculosis is an infectious disease caused by the bacillus Mycobacterium tuberculosis which typically affects the lungs but can also affect other parts of the body. The disease spreads through air when a patient expels bacteria. In general relatively small proportion of people infected with mycobacterium tuberculosis will develop TB disease. People who have much higher chance of developing the disease are those infected with human immune-deficiency virus. Tuberculosis is also more common among men than women, and affects mostly adults in the productive age groups; around two-thirds of cases are estimated to occur among people aged 15-59 years (1).

The WHO coordinates global TB activities, including the development of new tools, prevention strategies, and treatment guidelines. The Stop TB Partnership operates as an independent coordinating body within the WHO with a mission to guide the strategic direction of the global fight against TB. The program aims to advance TB care through a comprehensive set of technical guidelines focused on prevention, treatment, and response. This global leadership provides technical and financial support to national programs to implement TB control strategies, monitor progress, and translate research into practice. These core components also align with Millennium Development Goal 6 (MDG6), to halt and begin to reduce the burden of TB by 2015. This goal calls for a 50% decline in the number of incident TB cases from 1990s levels, as well as improving both the case detection rate to 70% and treatment success rate to 85% by 2015.To meet these needs, countries need strong monitoring and evaluation (M&E) systems to report accurate, timely and comparable data that can be used to strengthen programs and gain financial support (2).

Data collection and reporting are essential to Control TB worldwide. In 2005G.C, the Stop TB Partnership led an iterative strategy to develop recommendations for TB forms and registers that involved field-testing and surveys in 105 countries. Field-testing resulted in consensus on the minimum data requirements to ensure all components of the Stop TB Strategy were implemented. These recommendations were released in 2005. The revised forms included updates for data capture on TB/HIV activities, diagnostics, and TB resistance testing.

Furthermore, Stop TB developed a standard training protocol and provided funding to countries for implementation. By using standardized registers, Stop TB has an improved platform for responding to changes in epidemiological trends, informing the development of new strategies, and setting policy guidelines in order to effectively control TB. To effectively monitor the standardized registers that were implemented, Stop TB worked with international partners to agree upon a core set of indicators to minimize reporting burden (3).

Tuberculosis (TB) remains a major public health problem claiming the lives of thousands of Ethiopians every year. Cognizant of the huge burden of TB in the country, the Government of Ethiopia has given due attention to the control of TB and included the prevention and control of TB among the priority health programs in the country's Health Sector Development Program (HSDP) aligning with the globally recommended Stop TB Strategy. Much focus has been given to the implementation of community based TB care and control interventions with the maximum use of the Health Extension Program (HEP). TB/HIV collaborative activities are fully integrated in the general health services to address the dual TB/HIV epidemics; and the initiative to prevent and control the spread of MDR TB has been taken. Despite these progresses, there remain much more problems and challenges related to initiative implementation, TB data management, resource and stakeholder involvement are emerging in the country (4).

The reformed HMIS was launched in Ethiopia on June 8, 2007 with the goal of creating comprehensive and standardized national HMIS for evidence based planning and management of health services as well as decision making at all levels-community, health facility, Woreda, regional and federal levels. The new HMIS program focuses on information use, data quality, data burden, human resource, information communication technology (ICT) and financial resource. The limited use of electronic TB HMIS at Woreda/subcity, regional/zonal, and federal levels, it minimize the MOH's ability to transfer data quickly, accurately, and efficiently (5).

1.2 Statement of the Problem

Accurate, timely and accessible health care data play a vital role in the planning, development and maintenance of health care services. Quality improvement and the timely dissemination of quality data are essential if health authorities wish to maintain health care at an optimal level. In recent years, data quality has become an important issue, not only because of its importance in promoting high standards of patient care, but also because of its impact on government budgets for the maintenance of health services (6).

HMIS attempt to produce timely and quality information about what is happening in the health sector organization to measure their performance. HMIS performance should be measured by the level of data quality and continuous use of information generated by the system. Ideally this information is then used to guide day to day operations, monitor performance, learn from past results, and improve accountability. However, the system designed to track health data often fall short of this ideal. As a result HMIS often do not provide the information needed to improve health system performance. This is because of the poor overall success of health information system in terms of production of quality data and continuous use of information for decision making depends on factors far beyond the technical capabilities, such as organizational commitment to culture of information use, skills of the staff responsibility for data collection, motivation and understanding of staffs about the importance of data collection and reporting (7).

In many cases there is lack of the most elementary data in databases especially in developing countries. Those available data are also not sufficient to provide quality health information for health care planners and decision maker about the trends of TB. In Ethiopia, the practical challenge for health care providers, planners, and policy makers working in primary health care prevention and control activities is lack of timely and reliable health information on the health status of defined population groups (8).

Although Ethiopia is moving towards greater decentralization of the health care system, many aspects of hospital management, which are integral to hospital quality and efficiency, are largely still under the responsibility of government agencies at the regional and federal levels. The current key performance indicator data is inaccurate as all hospitals have not been trained on data collection, analysis and reporting nor has the reported data been audited in any way (8).

Therefore, the purpose of this project is to develop a computerized database system which can improve the data quality and information use as well as provide easy access for data manipulation, retrieval, and report generation etc. of the available tuberculosis data in ALERT hospital.

Implementing this project in ALERT hospital TB and MDR/TB department could increase the level of data quality and information use. In addition, it will be a good practice for other departments of the hospital in motivating health professionals to use data for service delivery improvement at the site of collection.

This project aims to answer the following questions.

1. What is the level of data quality in terms of accuracy, completeness, and timeliness in the TB and MDR/TB department?
2. Is information properly utilized for decision making in the TB and MDR/TB departments?
3. What are the significant factors that affect data quality and information use in TB and MDR/TB department?

1.3 Objectives

1.3.1 General Objective

The general objective of this project is to improve data quality and information use of tuberculosis program in ALERT hospital.

1.3.2 Specific Objectives

To achieve the stated general objective, the following specific objectives are drawn.

1. To assess the level of data quality in terms of completeness, accuracy, and Timeliness in TB and MDR/TB department of ALERT hospital.
2. To assess the utilization of information for decision making in TB and MDR/TB department of ALERT hospital.
3. To identify the technical, organizational, and behavioral factors affecting data quality and information use.
4. Develop a database for easy access and manipulation of TB data in the hospital.

1.4 Significance of the Project

This project is primarily aimed at fulfilling the academic requirement. At the same time, it contributes to the TB and MDR/TB department by enabling the health care professionals to adapt a culture of information use in accomplishing the daily activities to maximize the effectiveness and efficiency of the work. It can also serve as a good starting point to initiate further data quality and information use improvement in other departments of the Hospital. Finally, the findings and recommendations of the project would contribute towards the ongoing efforts of developing better health management information system in the country at large.

The project is hoped to:

- Improve the recording and reporting system of tuberculosis program in ALERT Hospital
- Enhance evidence based decision making ability of the department.
- Add knowledge to the existing literature and the developed database can be used as a baseline for the hospital especially for TB clinic case team workers to store their future data concerning the TB patients detail information.

1.5 Scope of the project

This project is carried out in ALERT hospital TB and MDR/TB department. The last two quarters (from July 1, 2014up to December 30, 2014) data is used in this project. Other departments are not included because of time constraints. The projects also concentrated on the technical assessment of the HMIS in the TB program particularly with data quality in terms of accuracy, completeness, and timeliness, from registers, forms and also information flow to the higher level for decision making. In addition, the project assesses factors that affect data quality and information use. Finally, access database is developed to improve data quality and demonstrate results.

Chapter Two

2. Literature Review

2.1 General Literature

2.1.1 Burden of tuberculosis

Tuberculosis is still one of the major public health problems in the World. In 2012, there were 8.6 million incident cases of TB; 1.1 million cases are among people living with HIV/ ADIS and 2.9 million were women. In the same year, about 1.3 million people died from TB and about 320 000 of which are among people who were HIV positive. TB mostly occurs in men but it is also among the three top killers of women worldwide. There were an estimated 410 000 TB deaths among women in 2012, including 160 000 among HIV-positive women. Half of the HIV-positive people who died from TB in 2012 were women (9).

Africa has the highest number of TB cases due to its poverty, high population and high HIV cases which are aggravating the burden of disease in the continent. In 2012 out of the total 8.6 million incident cases globally, 27% of the cases are in the African region. About 37% of TB cases in Africa were estimated to be co-infected with HIV, which accounted for 75% of the global TB cases among people living with HIV (9).

The incidence and prevalence of TB in Ethiopia is estimated to be 261 and 394 per 100 000 population, respectively. TB was the third leading cause of hospital admissions and a leading cause of inpatient deaths in 2008-2009. These high mortalities are associated with a high TB/HIV co-infection rate (15%) and the emergence of multidrug resistant TB. The country has made significant progress in increasing the number of detected TB cases from 71331 in 1999 to 153194 in 2011 (10).

2.1.2Theoretical concepts of Health Management Information System

“An HMIS is an organized system of record keeping, reporting, processing analysis, use and feedback of information which is designed to provide different level of beneficiaries (clients, community, service providers, managers, planners and policymakers) with timely and relevant information necessary to formulate policy, plan, implement, monitor, supervise and evaluate health programmers”. Effective and efficient HMIS would provide district health manager with the information required to make effective strategic decision that are the vehicle for district

performance and sustainability in those decentralized health system. Planning and system management HIS resource includes the policy, legislative, regulatory, management and financial environment that must be in place; and the infrastructure and resources required to ensure a fully functional health information system (11).

The desired HMIS will meet two performance criteria: consistent production of quality data and continuous use of information.

2.1.3 Routine data quality assessment

The Secretariat of the Global Fund to Fight AIDS, Tuberculosis and Malaria, the WHO Stop TB Department, the International Union against Tuberculosis and Lung Disease (the Union) collaborated to develop a Data Quality Audit (DQA) tool for TB what we call "Routine Data Quality Assessment tool (RDQA)". This tool is intended to verify reported program data and to strengthen monitoring and reporting systems. This tool is the backbone of the TB data collection system at country level allowing partners to collect, report, monitor, and analyze TB data. It facilitates the monitoring of the six components of the Stop TB Strategy (12).

As shown in (12) RDQA tool for TB is intended (i) to assess and measure rapidly the quality of data recording and reporting systems on a regular basis; and (ii) to monitor and improve data recording and reporting systems. It provides self-assessment by program; measures the quality of the data collection system; and offers flexible use for monitoring and supervision or to prepare for an external audit. Generally, the quality of reported data is dependent on the underlying data management and reporting systems; stronger systems should produce better quality data. The RDQA tool has five attributes that build one indicator for the quality of the TB recording and reporting system: *accuracy–reliability* (data measure what they are intended to measure and measures do not change according to who is using them and when or how often they are used); *completeness* (all inclusive and not partial); *timeliness* (up-to-date and available on time); *availability* (the data collection system has the necessary source documents and details, including a written procedure); and *integrity/spot check*(no deliberate bias or manipulation). Data quality issues have been at the heart of many practitioners and researchers for a long period. In other words, quality of the data should be 'good enough' for its intended purpose.

2.1.4 Tuberculosis HMIS

Recording and reporting of data is a fundamental component of care of patients with tuberculosis (TB) and control of the disease. Data recording and reporting is necessary to monitor trends in the TB epidemic at global, national and sub-national levels; to monitor progress in the treatment of individual patients and groups of patients and ensure continuity of care when patients are referred between health-care facilities; and to plan, raise funds for, implement and evaluate programmatic efforts to control TB, including forecasting the numbers of cases and the associated requirements for staffing, medicines and laboratory supplies; and analyzing treatment outcomes. When high-quality data are available, successes can be documented and corrective actions taken to address problems that are identified (13).

Recording and reporting data about people who have TB symptoms and those who are diagnosed with TB is, nonetheless, a data-intensive process. Treatment regimens span many months (or years in some cases), and patients need to take anti-TB drugs at least a few times a week and often daily. Compliance with treatment must be recorded regularly (daily for drug-resistant treatment and weekly for drug-sensitive treatment). The results of laboratory tests are needed for the microbiological diagnosis of TB; to determine the susceptibility of *Mycobacterium tuberculosis* isolates to anti-TB drugs; to monitor patient response to medication; and to determine cure or failure of treatment. There is a strong tradition of recording and reporting in TB care and control (14).

A standardized system for *paper-based* recording and reporting of the number of cases diagnosed with TB and their treatment outcomes was rolled out worldwide from the mid-1990s as one of the five elements of the World Health Organization's (WHO) DOTS strategy. DOTS – the internationally recommended strategy for TB control until 2006 – remain the first component and foundation of its successor, the Stop TB Strategy (15).

2.1.5 Factors impeding data quality

Ensuring data quality has been a concern of those dealing with information systems. Techniques and procedures have been developed to ensure that the data required possesses an appropriate level of quality.

There are many factors that can impede data quality. These are:-

- Inadequate management structures for ensuring complete data
- Untimely reporting of data
- Inaccurate reporting of data
- Inadequate rules, training and procedure guidelines for those involved in data collection (16).

2.1.6 Information use

Although the term use of information‖ has been extensively used in the health care context, there has never been a clear definition of what information use means. But in general terms, it refers to the use of information for planning and monitoring health services. In developing countries, various studies have established that the use of information for such purposes in general is low and is something that needs to be cultivated over time (17).

The health management use information is vital at each level of the health service. Availability of reliable, relevant, complete, and timely health information is usually recognized and expressed as essential for any public health intervention, including Antenatal care activities. Several factors influence use of information for action. The major factors that affect information use include the characteristics of the data quality in terms of relevance, reliability, and timeliness; characteristics of the required decision and communication gap between data collectors and decision-makers; and lack of motivation of the staff. In addition, use of monitoring information at the site where it is collected aid health care professionals and managers to monitor their performance (18).

2.1.7 PRISM Framework

The Performance of Routine Information System Management (PRISM) framework is conceptual framework that helps to measure the performance of health information system. It is developed by MEASURE Evaluation and John Snow, Inc. which shows how the routine health information system operates (19).

PRISM utilizes three key determinants to assess routine health information systems. These include behavioral, technical and organizational determinants**.** The behavioral determinants refer to the knowledge/skills, attitudes, values and motivation of the people who collect and use the data. The technical determinant implies data collection forms, processes systems and methods

while the organizational determinant involves information culture, structure, resources, and roles and responsibilities of key contributors at each level (20).

2.1.8 PRISM tools

The PRISM tools identify data quality and information use as two important performance indicators in the improvement of HMIS. Based on the PRISM framework, a set of tools has been adapted to measure the HMIS performance output, processes, and determinants as well as their relationships to assess the quality of data and information in its routine health information system (21). Four PRISM tools are used to measure RHIS performance, processes and determinants and their relationships described under the PRISM framework.

A. RHIS performance Diagnostic Tool: This tool collects information from departments, health facilities and district health offices on RHIS data quality and information use, supervision, information technology and user friendliness of data collection registers and reporting forms. This tool consists of a review of documents and observations of resources and display of HMIS data.

B. Facility checklist: The facility checklist collects existing information on technical determinants from departments/facilities on availability of resources and equipment through interview and observation.

C. The RHIS Management Assessment Tool: This tool collects information through a review of documents from health care facilities on a range of management support services, including planning, training, supervision, use of performance tool, and financial resources.

D. Organizational and Behavioral Assessment Tool (OBAT): This is a self-administered questionnaire completed by health workers on their perceptions of behavioral and organizational factors to influence RHIS performance. The behavioral factors include; HMIS knowledge, HMIS tasks competence, problem solving skills, confidence in carrying out RHIS tasks (self-efficacy) and motivation. The organizational factors include different questions used to assess the promotion of a culture of information within the department.

2.1.9 ICT in health care

In health information systems, when discussing information technologies (IT), usually the discussion is about the use of computers in health information systems. Research suggest that, “the creative use of microcomputer technology is one of the most promising means of improving

the quality, timeliness, clarity, presentation, and use of relevant information for primary health care" (22).

Some of the benefits of using computers in health information systems are:

- To improve health system efficiency by processing and analyzing large amounts of data quickly.
- To produce a wide variety of outputs and feedback reports targeted for many levels of the health system from a single data set or by combining data set.
- To reduce the duplication of work, this is typically seen in many hierarchical data collection systems.
- To improve the quality of data collection through automatic validation during data entry and automatic preparation of immediate feedback reports on errors for individual health facilities.
- To improve analysis and information presentation to facilitate data interpretation and use for decision-making.
- To improve data dissemination

2.2 Related Works.

A study was conducted to assess PMTCT data completeness and accuracy at primary healthcare level to district level in order to assist with the improvement of the PMTCT data recording. It was found that data were complete for less than a quarter of the time for most of the antenatal indicators (0.5% – 44%) and almost 11% for the maternity indicators. Data inaccuracy was a result of recording of data values in the District Health Information System (DHIS) which were not within 10% of the data values recorded in the case registers. The results show that data were missing from the case registers, monthly summary sheets and DHIS between 30% and 99% of the time and those data elements had values recorded in the DHIS which were > 10% (23).

In a study to assess the accuracy of administrative data in health information systems in three general internal medicine outpatient clinics, it was found that there are significant inaccuracies in administrative data as correct primary diagnosis was recorded for 57% of visits. Many contributing factors caused these errors including incorrectly entered data (22%) physician diagnosis error 13% and missing encounter forms (8%).These inaccuracies are not only costly to

heath systems but also affect the quality of health care provision. Although inaccuracies in administrative data are common they can easily be rectified (24).

Sullivan and Wilson conducted a study to determine the completeness and accuracy of the process of patient record transfer between practices using paper record and a parallel electronic record system. The study assessed the accuracy of information transferred and further analysis of discrepancies was conducted and found that only 46% of the practices transfer the complete record compared to the 85% expected (25).

A study conducted on the actual and potential usage of information and communication technology at District and Province levels in Mozambique with a focus on the health sector revealed the existence of many problems, such as: poor feedback routines from province to district and from district to health facilities, limited local use of information for action, and lack of training and support. Similarly, an assessment of the infectious diseases surveillance systems in Tanzania conducted in year 1999, revealed poor and untimely reporting system. For example, Brown *et al*. (1999) reported that only one quarter of the health facilities visited in the 1999 study to have had submitted complete reports in all the four periods of the year. A review by the Ministry of Health in Tanzania, to assess the performance of Health Management Information System in Tanzania, reported a series of problem issues in the HMIS. These problems included "information efforts seen as a burden to the health workers, inadequate access to health data, poor preparation of data for use, weak analysis of health data, and some information bypassing decision makers**" (**26).

A survey done to assess the HMIS performance in Mexico revealed gaps between respondents' perception of the promotion of a culture of information and their actual competence and knowledge of HMIS tasks. On average, 70%of respondents believed strongly that the MOH promotes checking data quality but only 57% of the respondents could describe at least two ways of checking data quality. Seventy one percent of respondents believed strongly that the MOH promotes problem solving skills but only 23% of the respondents demonstrate skills in defining and solving problems. Moreover, 72% respondents believed strongly that the MOH promotes use of HMIS information but only 52% of the respondents showed how to use HMIS information (27).

RHIS performance evaluation study conducted in South Africa using PRISM tools also revealed that data accuracy was only 43% and the information use level was 65%. With regard to the underlying determinants of RHIS performance, 83%, 76%, and 78% of respondents strongly believed the department promotes checking data quality, problem solving and use of information, respectively. These perceptions were coupled with a perception high level of confidence in carrying out HMIS tasks: On average 74%, 77%, 75% of respondents perceived that they had confidence in their ability to check data quality, solve problems, and use information, respectively. In contrast, only 0.6%, 12% and 28% of the respondents showed HMIS task competence for checking data quality, problem solving and use of information, respectively (27).

The study conducted on the HMIS in Tanzania indicated that, HMIS has successfully been rolled out across the entire country and health workers have been trained at all levels. In addition, computerization is complete and includes all of the regions. However, in spite of those substantial gains, the use of data generated through the system is insufficient to allow managers and policy makers to make informed decisions either at the district or national level. This is due in part to incompleteness of reporting, data inaccuracy, lack of timeliness and combined with insufficient analysis. To date, considerable investment in HMIS in Tanzania has taken place. Urgent action is now required to ensure that the cumulative resource investment is not further jeopardized (22).

2.2.1 HMIS in Ethiopia

The Ethiopian HMIS is implemented by the Federal Ministry of Health (FMOH). Meanwhile, the Central Statistical Agency (CSA), a division of the Ethiopian government, manages "population –based health information sources" - censuses, ad hoc surveys, and registering vital events. The HMIS was established to support informed strategic decision-making by providing quality data that help managers and health workers plan and manage the health service system. In an effort to improve the performance of the HMIS, Ethiopia contracted with the consulting firm John Snow, Inc. (JSI) in 2006 to perform an evaluation and redesign of the HMIS. As of 2008, a comprehensive electronic HMIS has been developed in conjunction with doctors associated with Tulane University and is now being deployed to health facilities in several regions of the country, with an eventual nationwide rollout eventually slated to occur (28).

In addition to the 2006 reform of the HMIS, Ethiopia completed an assessment of the HMIS under the auspices of the Health Metrics Network, HMN in 2007. This assessment found the HMIS to be "cumbersome and fragmented". Among the major HMIS challenges and weakness were the absence of an implementation strategy and guidelines; the shortage of human resources and high staff turnover; inadequate skills for gathering and analyzing in a compromised ability to make informed decisions; fragmented information flow, including parallel reporting system channels causing increased workload. It would appear from the HMN assessment that the 2006 reform of the HMIS, while perhaps effective to some degree, did not address all issues necessary for an effective national HIS. The 2006 reform addressed only minimal changes to routine practice in the health system, namely, reduction of indicators and redesign of forms. However, the reform failed to encourage behavioral changes amongst managers and administrators in the HMIS as a result that would have required substantially more resources and a more coordinated effort (28).

2.2.2 Related works on Ethiopia's HMIS Implementation

Assessment done on utilization of HMIS at district level on HIV/AIDS program in North Gondar showed that, among 84.3% data collected daily only 22.5% of them utilized. Also out of 45 units of HIV/AIDS in the study area, only 17.7% changed their data into information at District and facility level and utilized it for immediate decision making. From the whole study units only 13.2% appropriately documented their reports and registration books in the year 2005 to 2006. In the first quarter of 2006, about 34.7% of the study units were supervised once and 12.2% of them had given feedbacks (29).

The study conducted by Tilahun A., on the assessment of new implementation status of HMIS in Addis Ababa Health Facilities in 2010 showed that a large number of respondents were participating in the manual base HMIS activities through a well-designed data collection and reporting format, short period on job- training, absence of incentive, motivation and lack of management support lead to poor information use culture that limited mainly sending purpose. HMIS implementation suffered from ownership, follow-up, communication and leadership (30).

At the national level of planning and programming department MOH Ethiopia 2004/2005, HSDP report indicated that challenges faced in the country with in health management information system are lack of coordination efforts, leadership, and lack of strategy and policy shortage of

skilled human resources and lack of guideline. The timeliness and completeness of HMIS reporting remains poor and such delays contribute to the failure to use data as the basis for informed decision making in planning and management at all level of health sectors (31).

A systemic review to improve evidence carried out by FMOH and WHO on data quality and information use of HMIS in Ethiopia indicated that the completeness and reporting timeliness were low for the selected indicators. Accuracy of reported data was also indicated. Over reporting was a common finding in almost all reporting level. Feedback reports based on HMIS data was observed only in 35.3% of intermediate aggregate levels. Furthermore, the study observed a limited culture of using information for decision-making in planning and management of implementing programs (32).

Assessment on HMIS at public hospitals by Meseret in 2009 also pointed out that the processes of data collection; storage and dissemination on the supply side and provision of resource, regular supervision and feedback on the demand side were weak. Those resulted due to the organizational, technical and behavioral determinants. There was low commitment of decision making bodies in allocating resource (human, material, financial), developing human skill and infrastructure (33).

Chapter Three

3. Methodology

3.1 Project area

ALERT is a medical facility specializing in Hansen's disease, also known as "leprosy". It was originally the All Africa Leprosy Rehabilitation and Training Center, but the official name is now expanded to include tuberculosis: All Africa Leprosy, Tuberculosis and Rehabilitation Training Centre. ALERT's activities focus on its hospital, rehabilitation of leprosy patients, training programs for leprosy personnel from around the world, and leprosy control (administration of the Ethiopian Ministry of Health's regional leprosy control program). From the beginning, ALERT provided leprosy training for medical students from Addis Ababa University. ALERT is the Armauer Hansen Research Institute, founded in 1970, specializing in leprosy research. There is currently a 240-bed teaching hospital, which includes dermatology, ophthalmology, and surgery departments, also an orthopedic workshop, and a rehabilitation program. ALERT is the continuation and expansion of the leprosy hospital originally built by Dr. Thomas Lambie in 1922, which was later named the Princess ZänäbäWärq Hospital. A memorandum to found ALERT was signed Dec. 11, 1965 by representatives of the Ministry of Health, Addis Ababa University, the International Society for the Rehabilitation of the Disabled, The Leprosy Mission, and Dr. Eugene Kellersberger of the American Leprosy Mission, who had had the vision for establishing such a multifaceted center and had been the main promoter of the project. It has a total of 1067 staffs and provides service for 1.5 million populations (34).

3.2 Project Design and period

This project used cross sectional descriptive study design employing quantitative methods to assess the factors influencing the performance of HMIS in the department. A qualitative methods is also used to assess data quality and information use by using in depth interview for selected study participants and adopted performance evaluation tool of the PRISM package conducting document review, and observation; Whereas a self-administered questionnaire completed by health care professionals on their perceptions of behavioral and organizational factors to influence HMIS performance.

HMIS performance determinants (behavioral and organizational) were measured through continuous or likert scale of 1-7 (one- very weak to seven-very strong) indicators.

Finally based on the finding and the result of the project, corrective action was performed to improve the data quality.

A project is conducted from February up to June 2015 E.C. Moreover, system development approaches were also employed for the development of the database.

3.3 Study participants

In quantitative study,16 health professionals who were working in TB and MDR/TB department of ALERT hospital for the last two quarters, 2 department heads ,and 1 TB focal person, 1 HMIS unit staff were involved which was a total of 20. In qualitative study, an in depth interview was conducted with eleven candidates who were purposively selected nine health professionals from the above mentioned participant, 1 TB focal person,1 HMIS focal person and saturation was reached. Records of documents: registers, tally sheets, meeting minutes, and other documents were tracked to examine the department's routine performance monitoring practice.

Inclusion criteria

- ✓ The last two quarter data of TB and MDR/TB (from July 1, 2006 up to December 30, 2007) is assessed
- ✓ Only staffs who were working for the last two quarter in the TB and MDR/TB department (from July 1, 2006 up to December 30, 2007) are involved in the project

Exclusion criteria

- ✓ Recorded data other than the last two quarter
- ✓ Data other than the TB and MDR/TB
- ✓ New staff members who are working TB and MDR/Tb department (less than two quarters)

3.4 Data collections tools and techniques

Three data collection methods were employed in this study. Quantitative data is collected through self-administered organizational and behavioral assessment tool to capture data relating to background of respondents, data quality checks, perceptions on data quality, and factors contributing to data quality and information use. Then, qualitative method was used to further explore the results found from the quantitative data using in depth interview with selected participants, review of documents with the help of adapted PRISM performance evaluation tool:

and besides observation of daily registers, compiling tools, and reporting formats for data accuracy, completeness, and timeliness is undertaken using adapted PRISM check list.

3.5 Sampling procedures and sample size

Since the project scope is limited to TB and MDR/TB department and the total number of the health professional working in the department were small. All health professionals who were working in the TB department for the last two quarters, department head, TB focal person, and HMIS focal person were all involved in the study. Therefore the total numbers of study participants were 20.

3.6 Data analysis

The collected data is manually checked for its completeness and/or the responses are clearly written before conducting data entry.

A data entry template was developed for the quantitative data using MS-Excel and data cleaning, verification and validation is made after the data entry to ensure that the data collected and the data in the MS-excel template are the same or there is no error committed during the data entry.

The qualitative data collected were entered into open source software and a thematic approach was employed to summarize the findings.

3.7 Data quality control

- Training is given to the data collectors for two days about the content of the questionnaire and frequent supervision was done.
- Properly designed questionnaires and interview guideline is prepared. Moreover, pretest is done prior to final distribution and interview of the study and appropriate corrections were made.
- The qualitative data collection is conducted by the researcher for smooth communication; this clarified many ‘vague’ issues which might be misunderstood or misrepresented by some other person other than the researcher.
- The collected data is checked for completeness, accuracy and consistency by the researcher every day. Anything, which is unclear and ambiguous is corrected immediately.
- The data entry and cleaning is done by the researcher.

3.8 System development methodology

A database is developed by employing a standard database development methodology which is access relational database software was used due to its ease of implementation.

3.9 Method of dissemination of results

The result of this project is disseminated to ALERT hospital, Federal Ministry of Health, and other partners which are working on TB and MDR/TB. The final report of the project is submitted to Addis Ababa University School of information science and school of public health in soft and hard copies.

3.10 Operational Definition

- **Data -** A collection of raw facts that need to be transformed in to information for decision-making.
- **Data quality** -The state of completeness, accuracy, timeliness, validity, consistency, and reliability that makes data appropriate for a specific use.
- **Information -** is an organized data used for decision making at all units and departments.
- **Information use –**use of information for planning, budget allocation, monitoring and Evaluation of programs.
- **Accuracy-** Also known as validity. Accurate data are considered correct: the data measure what they are intended to measure. Accurate data minimize errors (e.g., recording or interviewer bias, transcription error, sampling error) to a point of being negligible.
- **Completeness -** Completeness means that an information system from which the results are derived is appropriately inclusive: it represents the *complete* list of eligible persons or units and not just a fraction of the list.
- **Timeliness -** Data are timely when they are up-to-date (current), and when the information is available on time. Timeliness is affected by: (1) the rate at which the program's information system is updated; (2) the rate of change of actual program activities; and (3) when the information is actually used or required.
- **HMIS - i**s simply a process for collecting, processing, and disseminating information in a health system.
- **Indicators -**are variables that help to measure changes, directly or indirectly.

- **Database -** is a collection of structure and related record (information) stored somewhere or some location for easy retrieval and exploration. Database is designed in order to assist in eliminating unnecessary data and to minimize duplication of data.
- **Routine health information system (RHIS) performance-**is defined as improving data quality and continuous use of information.
- **Behavioral determinants-** factors affecting RHIS performance that are related to individual behavior, such as motivation, attitude, empowerment, and confidence.
- **Organizational determinants-** refers to all those factors that are related to organizational structure, resources, producers, support services, and culture to develop, manage, and improve HMIS processes and performance.
- **Technical determinants-** refers to all factors affecting RHIS performance which are related to system components such as indicators, personal training, technology, forms, data submission, and reporting.
- **Neutral response:** replay given to a question without taking side.

3.11 Ethical Clearance

The study was carried out after getting permission from the ethical clearance committee of Addis Ababa University, School of information science and School of Public Health. Data was collected after getting written permission from ALERT hospital. Informed consent of study participants were obtained before conducting the interview. Furthermore the study participants are reassured of the confidentiality of the information obtained from them. This study involves review of registers in TB and MDR/TB clinic. Therefore it did not involve direct contact with human beings thus no potential for inconveniencing patients by providing personal information. Nonetheless, all the necessary ethical precautions to protect privacy and confidentiality of personal information are followed.

Chapter Four

4. Results and Discussion

This chapter present the results obtained from the data collection and discusses their interpretation.

4.1 Results

The following are results obtained using the different data collection methods discussed in chapter three.

4.1.1 Characteristics of the respondents

A total 20 staffs participated in assessing the organizational and behavioral characteristics of HMIS data quality and information use particularly on TB and MDR-TB program. The respondents were selected from TB clinic, MDR TB clinic and HMIS unit and majority (13) of the study participants had educational level diploma in Nursing while 5 study participants had BSC in Nursing and only 1 of the respondents was from Health officer background. Respondents were also asked about their years of experience and their level of IT training. Majority of the respondents had no IT training and half of the respondents has less or equal to two years of experience.

Figure 1: The educational background of the respondents

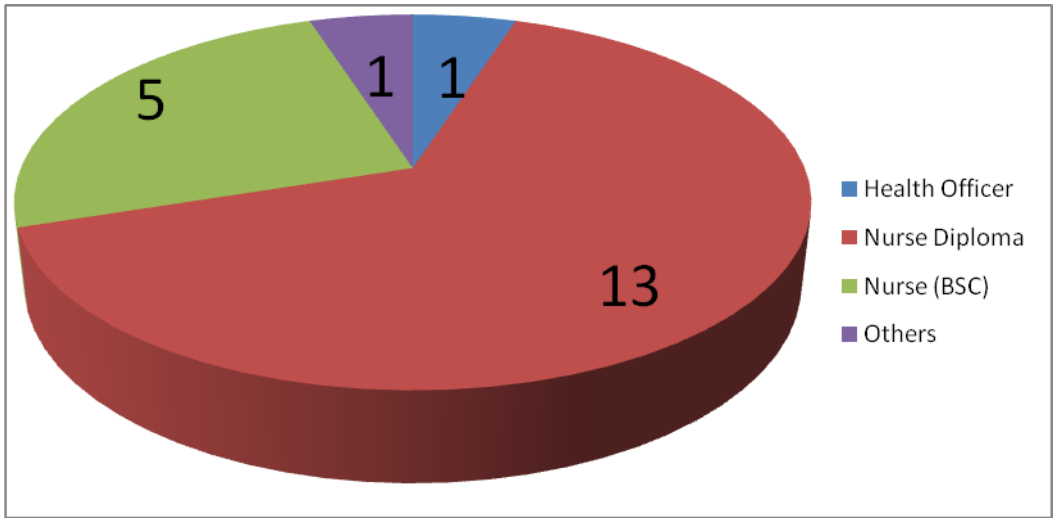


Table 1: Respondents year of experience and IT background

Characteristics		N
Did you receive any training in IT?	Yes	7
	No	13
Years of experience	<=2 years	10
	> 2 years	10

4.1.2 Data Quality

Data Quality is a major recording and reporting problem for developing countries. Lack of skilled personnel, data management facilities including computers and software were the main problems identified in this study. Data Quality assessment tools were used to assess the level of the tuberculosis HMIS data quality and find out for the possible factors. The three main data quality dimensions completeness, Accuracy and timeliness are considered and assessed in this project.

Data Recording and Record Keeping

One of the data management issues of HMIS is copies of report submitted should be documented at the reporting department for future review and data transfer to the next staff assigned to the department in case of staff turnover. It is also important to document what is reported for further data quality assessment by higher level and reviewing the performance over a period to see the trends of the case detection and treatment outcome. The availability of copies on monthly and quarterly report at TB clinic, MDR-TB clinic and HMIS unit are assessed. It was found that there is no practice of documenting copies of report at TB clinic or not a single copy of report documented at TB clinic is found. Whereas at MDR-TB clinic and HMIS unit, all copies of report are properly documented.

Neatness and readability of records and reports records

The neatness, readability of the records and the reports are assessed by observing the contents of the registers, monthly and quarterly reports. It is found that there is a neatness and readability problem of the unit TB register at TB clinic. The records of patients at the unit TB register for some patients' lacks neatness and readability. Some of the record values are not placed in their appropriate variable and some others are not clearly spelled.

4.1.2.1 Data completeness

Data completeness is one dimension to assess the data quality of a program. The completeness of the recording and reporting of a program is an important element for proper monitoring and evaluation of the program intervention and reporting to higher level. The completeness of the unit TB register and the reports both at TB and MDR/TB departments were assessed in the study area. A total of 147 cases that are registered in the study period and 89 cases registered during last year of the study period for the treatment outcome were reviewed to see the completeness of the unit TB Register. On the other hand records of 84 MDR TB cases were reviewed from the MDR TB register.

It was found that there is a lack of completeness at TB clinic on both the unit TB registers and the reports submitted to the HMIS unit. Some important variables in the registers were not recorded as if they are not supposed to be there. Some general information of the TB patients like age, unit TB number and patients contact information, TB-HIV activities (HIV testing result for TB patients), and the treatment outcome of the patients who already has completed the period of treatment were missed for some patients files. It was found that at least one important variable is missed for most of the patients registered during the study period. Discussion with the assigned TB focal person revealed that he is assigned as a TB focal person without training and orientation on how to properly record the TB patient's information and so he used the usual trend that those variables which were not previously recorded were not recorded as he thought that they are not important and so he left them blank.

At MDR clinic, the completeness of both the registers and the reports were assessed. It was found that completeness of the register and reports at the MDR-TB clinic is very good. The registration of the MDR-TB patients' information and the HMIS reports are done by the trained data clerk who is employed and supervised by a non-governmental organization called TB-CARE.

Table 2: Result of data completeness at TB Clinic for the first and second quarter of 2007

Indicator		% completeness
Total # of TB cases registered during the first and second quarter of 2007 EFY	147	65.31% (96/147*100%)
Total number TB cases all **general information** is recorded first and second quarter of 2007 EFY	96	

Total # of TB cases registered during the first and second quarter of 2006 EFY	136	65.44%
Total number TB cases with **treatment outcome** is recorded first and second quarter of 2006 EFY	89	
Total Number of quarter reports available for first and second quarter of 2007 EFY	0	0%
Total Number of quarter reports supposed to be documented first and second quarter of 2007 EFY	2	
Total Number of monthly reports available for first and second quarter of 2007 EFY	0	0%
Total Number of monthly reports supposed to be documented first and second quarter of 2007 EFY	6	

Table 3: Result of data completeness at MDR-TB clinic for the first and second quarter of 2007

Indicator		% completeness
Total # of MDR-TB cases registered during the first and second quarter of 2007 EFY	43	93.02% (40/43*100%)
Total number TB cases all **general information** is recorded first and second quarter of 2007 EFY	40	
Total # of TB cases registered during the first and second quarter of 2006 EFY	41	100%
Total number TB cases with **treatment outcome** is recorded first and second quarter of 2006 EFY	41	
Total Number of quarter reports available for first and second quarter of 2007 EFY	2	100%
Total Number of quarter reports supposed to be documented first and second quarter of 2007 EFY	2	

4.1.2.2 Data Accuracy

The data accuracy of both the registers and reports in both TB and MDR-TB clinic were checked through reviewing the data values. The data accuracy of the register is assessed by observing the appropriateness of the records filled for each patient. A total 89 TB cases record were reviewed to assess the level of data accuracy. It was found that at TB-clinic there is lack of accuracy of the records in the unit TB registers. Some of the records were not recorded in their appropriate place, for example HIV status of the patients is recorded in the variable date of CPT start. The outcome for some of the SM+ cases is incorrectly recorded that a patients is both treatment completed and cured which can led to error while compiling the monthly and quarterly report. Regarding the

accuracy of the MDR-TB register, all the register data values are checked by comparing the recorded value with the record in both MDR-TB treatment card and laboratory results, it was found that almost all the records are accurate.

The other way of verifying data accuracy is by checking the accuracy of the report, i.e. what is recorded in the register is similar with the report submitted to the higher level (HMIS unit and/or FMOH). To do this, list of major indicators were selected from both TB and MDR-TB program and checked the data values both at the register and reports. The ratio of reported over recounted multiplied by hundred were computed to see the level of the data accuracy. The finding shows that, there is a data accuracy problem both on the register and reports at TB-clinic while the data accuracy at MDR-TB clinic is in the acceptable range.

Table 4 and table 5 show the data accuracy (reported /recounted) both at TB clinic, MDR TB clinic and HMIS units.

Table 4: Result of data accuracy at TB Clinic for the first and second quarter of 2007

S/N	Indicators	Q1_2007			Q2_2007		
		Register	**Report**	**% accuracy (reported/ recounted)**	**Register**	**Report**	**% accuracy (reported/recounted)**
	Case Finding						
1	SM+ Cases	6	6	100%	6	36	600%
2	All forms of TB	69	71	102.9%	74	65	87.84%
	Treatment outcome						
3	SM+ cases Cured	8	6	75%	0	3	300%
4	SM+ cases treatment completed	6	6	100%	0	0	100%
	TB/HIV						
5	Number of TB patients tested for HIV	0	0	100%	0	0	100%

- *The zero values in Q2_2007 are due to improper recording of the treatment outcome and TB/HIV. None of the patients' treatment outcome and TB/HIV is registered.*

Table 5: Result of data accuracy at MDR-TB clinic for the first and second quarter of 2007

S/N	Indicators	Q1_2007		% accuracy (reported/recounted)	Q2_2007		% accuracy (reported/recounted)
		Register	Report		Register	Report	
	MDR-TB enrollment						
1	MDR-TB cases enrolled	31	33	106.45%	12	10	83.33%
2	MDR-TB New	9	9	100.00%	2	2	100.00%
3	MDR TB previously treated with SLDs	1	2	200.00%	0	0	100.00%
4	MDR-TB previously with FLDs	21	24	114.29%	10	10	100.00%
	MDR-TB Final Outcome						
5	MDR-TB cases enrolled	21	21	100.00%	20	20	100.00%
6	MDR-TB cases Cured	12	12	100.00%	3	3	100.00%
7	MDR_TB cases treatment completed	4	4	100.00%	7	7	100.00%
8	MDR-TB cases died	1	1	100.00%	4	4	100.00%
9	MDR TB cases failed	0	0	100.00%	1	1	100.00%
10	MDR TB cases defaulted	4	4	100.00%	0	0	100.00%

4.1.2.3 Data timeliness

The timeliness of the reports from TB clinic, MDR/TB clinic and HMIS unit are checked by observing the date recorded on the reports for date of data compilation and reporting to the next level and by interviewing the focal persons on their practice in meeting the deadline of the HMIS report schedule set by the federal ministry of health. It was found that both the TB clinic and MDR-TB clinics compile reports one week beyond the deadline of HMIS reporting schedule. None of the reports during the first and second quarters meet the deadline of the HMIS reporting schedule. Similarly, the reports from HMIS unit shows that they were submitted to the federal ministry of health ten days later than the schedule time for reporting the HMIS data.

4.1.3 Information use

Use of information for planning and decision making is an important element of HMIS objectives for improving the program quality at the health facilities. Health facilities are expected

to use the data they generated for planning, monitoring and evaluating their activities so that their decisions are evidence based and the services they provide could be improved based on the gaps identified and follow up actions developed and monitored to improve the identified gaps.

The level of information use in the hospital is assessed through reviewing documents like minutes discussed during performance review meeting, conducting key informant interview at different level and observing plans and performance monitoring charts, tables and graph at different levels.

Key informants from TB clinic, MDR-TB clinic and HMIS units were asked to explain their experience in using the information they generated for planning and decision making. Almost all of the key informants reported that they only use the data for reporting to the higher level than using it for improving the TB or MDR TB services through identifying the gaps and weakness based on the HMIS information generated.

One way to insure the information use for program monitoring is tracking the program targets over time using regularly updated table, graph and/or charts displayed on the wall.

The availability of the performance monitoring charts and/or graph and plans were checked at the walls of the TB clinic, MDR-TB clinic and at HMIS office, none of the offices had up dated plans and performance monitoring graphs, tables and/or charts displayed at the wall of their office.

Another way of practicing information use is through organizing regular performance review meeting which should be organized based on evidences/information collected/generated through the HMIS. The program performance was then checked against plans and targets to see whether the interventions are on the right track to solve the health problem of the community.

The practice of regular review meeting and the minute's documents are checked at the TB clinic, MDR TB clinic and HMIS units using the observation checklist and key informant interview. It was found that the practice is there but it is not conducted on regular bases. The documented minutes are reviewed to see if the review meetings are based on the performance data obtained through the HMIS. It was found that the performance review meetings are not conducted based on reviewing the performance data or by analyzing the HMIS data to see the performance of

each department. Some of the performance review meetings conducted by HMIS does not even address the TB or MDR/TB performances and data quality issues in the specified departments.

4.1.4 Determinant factors that affect data quality and information use

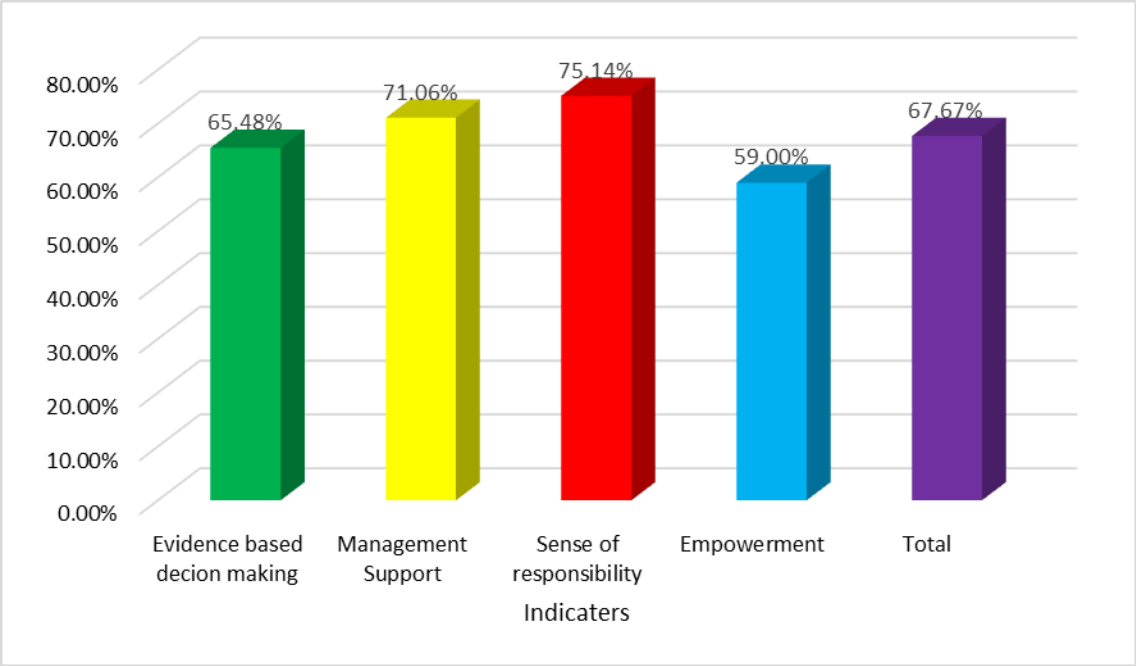
There are different factors which affects the data quality and information use in health facilities. Organizational, behavioral, and technical factors are then major determinant that affects the level of data quality and information use in health facilities. The organizational and behavioral factors are assessed using a self-administered questionnaire using a Likert scale agreement ranging one to seven with a meaning very week through very strong respectively. The rating of the responses are then added together, divided by the total number of study participants and multiplied by hundred to obtain the overall rating score.

4.1.4.1 Organizational Determinants

4.1.4.1.1 Promotion of culture of information use

Promotion of culture of information use is an important factor that needs to be considered to improve the information use for planning and decision making at different level of health program for improving the program quality and developing an effective and efficient health intervention. The level of promotion of culture of information use was assessed through four dimensions which addresses issues whether the hospital management emphasize management support (generation of quality of data, use of information and feedback from the staff or clients) to the staff, promote evidence based decision making , support sense of responsibility and empower staff to carry out their tasks. Staffs from TB clinic, MDR-TB clinic and HMIS units were asked different questions which addresses the four dimensions of promotion of culture of information use. The finding of the assessment shows that the overall level of promotion of culture of information use in the hospital was found to be 67.67%. The overall level of evidence based decision making in the hospital was 65.48%, Management Support 71.06%, Sense of responsibility 75.14%, and that of empowerment was found to be 59.00%.

Figure 2: Level of Promotion of culture of information use in ALERT Hospital



4.1.4.1.1 .1 Evidence based decision making

Study participants were also asked about different question to know whether decisions are made based on evidence. The overall use of information for decision making was found to be 65.48%.

Respondents were asked whether they made decision based on Personal preference/favoritism, Superior's directives, Evidence/facts, Political interface, Comparing data with set health objectives and Actual health needs. The following table shows the level of each components of information use for decision making.

Table 6: Results of evidence based decision making in ALERT Hospital

Indicator	%
Personal preference/favoritism	46.43%
Superior's directives	73.57%
Evidence/facts	62.86%
Political interface	57.86%
Comparing data with set health objectives	75.00%
Actual health needs	77.14%
Total	**65.48%**

4.1.4.1.1 .2 Management support

Management support is an important factor for the success of the effective and efficient implementation of any health information system. Hospital staffs working at the TB clinic, MDR TB clinic and HMIS unit needs to have the necessary management support to discharge their duties and responsibilities in general and improving the recording, reporting and information use of TB and MDR TB programs. Study participants were asked different questions to see whether they are obtaining the management support or not. They were asked questions such as seeking information from concerned persons, emphasizing data quality in monthly reports, discussing conflicts openly to resolve them, checking the data quality regularly and provide feedback to staff regularly. The finding of the assessment shows that 71.06% of the respondents believed that they obtained enough management support to discharge their duties effectively.

Table 7: Results of the level of assessment of the level of management support in ALERT Hospital.

Indicator	%
Seek feedback from concerned/affected staff	63.16%
Emphasize data quality in monthly reports	77.14%
Discuss conflicts openly to resolve them	68.57%
Seek feedback from concerned community	74.29%
Use HMIS Data for setting targets & monitoring	75.71%
Check data quality (validation) regularly	72.14%
Provide feedback to staff regularly	66.43%
Total	71.06%

4.1.4.1.1 .3 Sense of responsibility

The sense of responsibility of the staffs in the hospital is an important determinant for the successful implementation of the HMIS and therefore for an improved data quality and information use for decision making for the quality health interventions. The respondents were asked about their punctuality, whether they are documenting their activities regularly, their commitment to discharge their responsibilities, they set appropriate and realistic goals for themselves and weather they feel guilty for not accomplishing their goals. About three fourth the

staffs believe that they have sense of responsibility for their work. The table below show respondents attitude toward each indicator of sense responsibility to their work.

Table 8: Result of the sense of assessment of the sense of responsibility in ALERT Hospital

Indicator	%
Are punctual	70.71%
Document their activities and keep records	83.57%
Feel committed to discharge their responsibility	85.00%
Set appropriate and realistic goals for themselves	76.43%
Feel guilty for non-accomplishing set goals	60.00%
Total	**75.14%**

4.1.4.1.1 .4 Empowerment of staff

Health workers like any other workers should have the power/capacity to perform their daily activities. Health system is a dynamic system that there is a frequent update in the way that the health care is provided and the health information should be collected and utilized to improve the services. The study participants were asked about their attitudes and practices weather the hospital management rewards them for their good achievements, they are empowered to make appropriate decisions, they can freely say 'NO' to supervisors for decisions not supported by evidence, they are made accountable for their poor performance and admit mistakes for taking corrective actions. About sixty percent (59%) of the respondents believe that they are empowered to perform their daily activities. The following table shows the level of staff empowerment to each of the indicators in the Hospital.

Table 9: Result of assessment of the empowerment of staff to discharge their responsibility in ALERT Hospital.

Indicator	%
Get reward for good work	56.43%
Are empowered to make decisions	61.43%
Can able to say freely 'NO' to superiors for decisions not supported by evidence	50.00%
Are made accountable for poor performance	60.00%
Admit mistakes for taking corrective actions?	67.14%
Total	**59.00%**

4.1.4.1.2 Management Functions

Key informants were asked about the support they obtain from the management to enable them implement the HMIS, most of them have reported that the management is willing to support the system but there is shortage of resources like budget that is allocated to implement the HMIS including organizing training to update the health workers as the number of staff in the hospital is very large.

4.1.4.2 Behavioral Determinants

4.1.4.2.1 Confidence level for HMIS related tasks

Hospital staffs that have relation to the TB and MDR-TB HMIS were asked about their self-confidence on different HMIS related tasks. They rated from one indicating that they are not confident through seven indicating they have full confidence to perform specified task. It was found that 69.49% of the study participants have self-confidence to perform HMIS tasks. Eighty percent of the respondents had self-confidence that they can check data accuracy while only 65.71% of the respondents had self-confidence to compute trends from bar charts. The following table shows the level of confidence of staffs to conduct HMIS related selected activities/indicators.

Table 10: Result of assessment of confidence level of staff for HMIS related tasks in ALERT Hospital

Indicator	**%**
I can check data accuracy	80.00%
I can calculate percentages/rates correctly	65.71%
I can plot data by months or year	68.57%
I can compute trends from bar charts	65.71%
I can explain findings & their implications	68.57%
I can use data for identifying gaps and setting targets	66.43%
I can use data for making various types of decisions and providing feedback	71.43%
Total	**69.49%**

4.1.4.2.2 Motivation of staff

Staff motivation is also an important determinant factor that influences the level HMIS data quality and information use in health facilities. Respondents were asked about their motivation towards implementing HMIS related activities. The finding of this assessment shows that only 54.05% of the staff has an overall motivation to perform HMIS related activities. About half of the respondents believe that collecting information is forced on them. The table below shows the level of motivation of staff to HMIS related tasks.

Table 11: Result of assessment of the level of staff motivation in ALERT Hospital

Indicator	%
Collecting information which is not used for decision making discourages me	63.57%
Collecting information bores me	40.71%
Collecting information is meaningful to me	51.43%
While recording data am contributing to the monitoring of health service deliver	72.14%
Collecting information is forced on me	50.00%
Data collection is a burden! Am busy with my job	46.43%
Total	**54.05%**

4.1.4.3 Technical Determinants

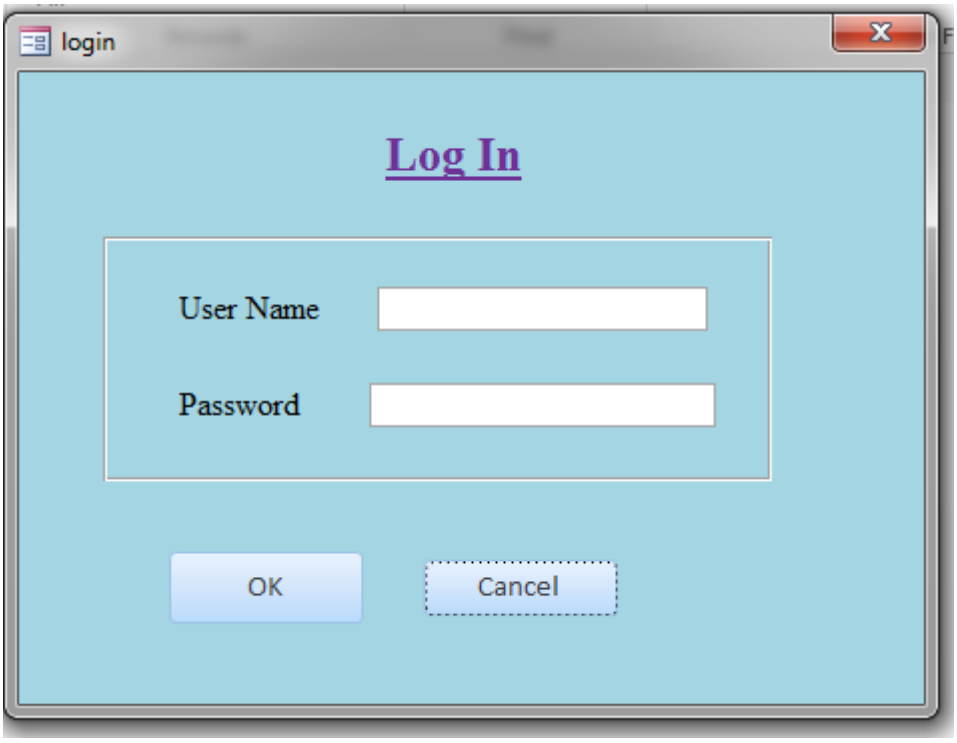
The HMIS technical issues are assessed using the document review tool and key informant interviews on selected health workers who are working on HMIS particularly on TB and MDR-TB HMIS. The respondents were asked about the user-friendliness of the HMIS manuals, registers and reporting formats. The availability of office facilities and checklist for implementing HMIS are assessed using an observation checklist. It was found that almost all of the staffs interviewed agreed that the HMIS manuals, registers and reporting formats are user friendly and if someone is oriented on the tools he/she can easily understand the contents and can easily use them for recording and reporting of the program activities. Regarding the availability of facilities and checklist it was found that there is no shortage of manuals, registers and reporting formats in TB clinic, MDR-TB clinic and HMIS unit. Computers, Data back-up units, UPS and internet are available in both MDR-TB and HMIs unit. They also have computer software for record keeping and report compilation for the monthly and quarterly reports. But, TB clinic lacks all the above mentioned resources to make the recording and reporting system computerized so that report compilation would not be an easy task.

4.1.5 Database development

A computer based database is an important component of data management which strengthens the manual based recording and reporting system by improving data quality and reducing the manual calculation and easily writing of reports. It helps the person managing the data easily identify cases with a specific criteria and review records of many cases at a time. It also helps document records of large number of patients without losing the information as time goes which is not the case in the manual based in which records are lost as the papers torn and faded due to old age.

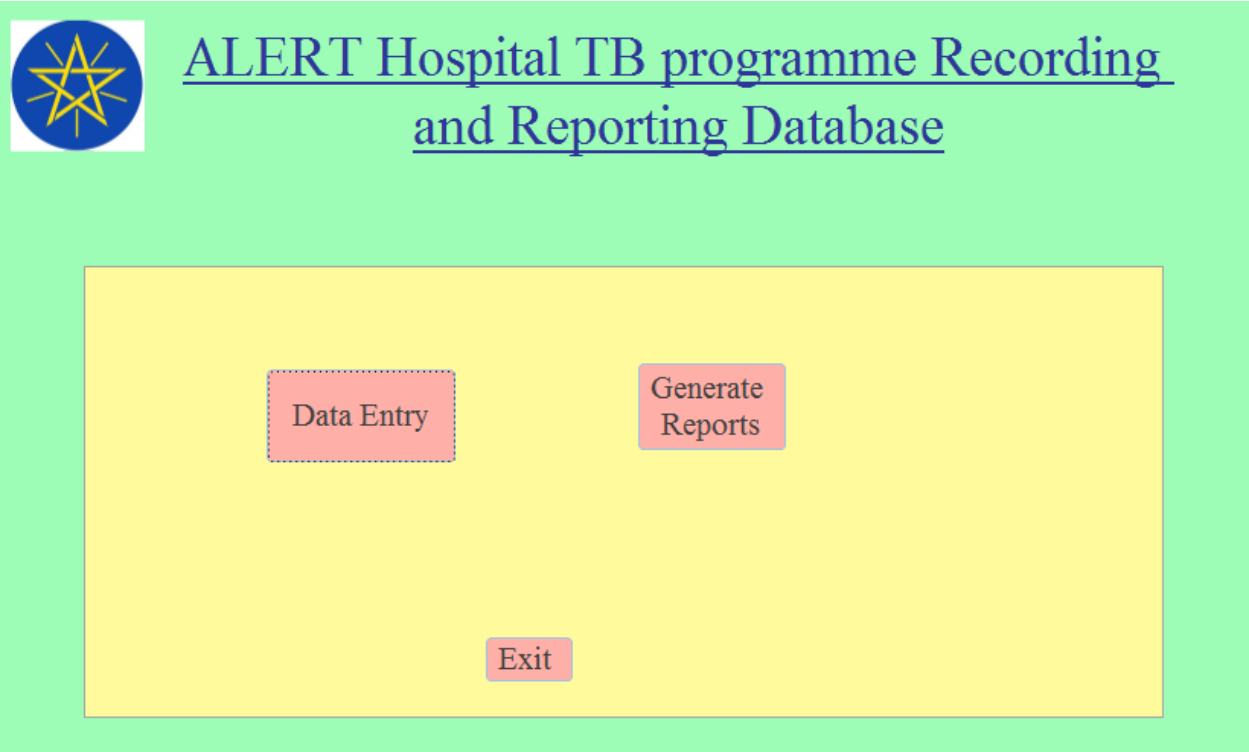
In this project, database is developed using Microsoft access for the TB program in ALERT hospital to be used by the TB focal person to help him/her avoid recording the data in their inappropriate place and generating incorrect report due to manual calculation of cases and dates of reporting. It also supports the manual based registration of patients through easily identifying /searching the patients with specific criteria. The database also enhances the data use in the hospital through facilitating easily generation of information for planning and decision making process.

1. **Log in**



This is the first thing that appears when we open the database. It is a security lock of the database that restricts users with user name and password. This will help the database not to be manipulated by other users of the computer who are not authorized to see and manipulate the database information.

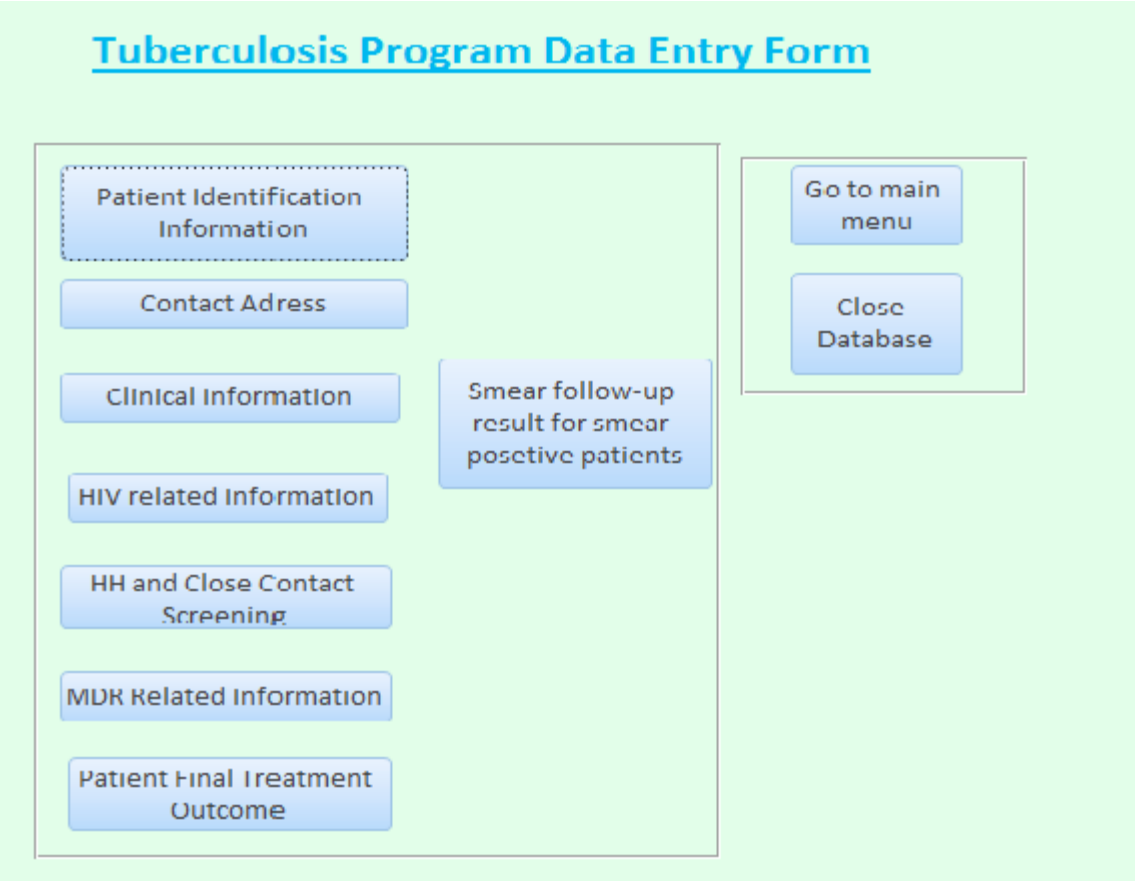
2. **Main Form**



This is the part of the database immediately after we enter the appropriate login information. It a menu in which we choose what we want to do in the database. Once we entered into the database we either enter data or generate a report from it. If we want to enter the database we need to click the '**Data Entry**' menu while if want to generate a report we click on the **'Generate Report'** tab, otherwise we click on '**Exit'** tab to exit from the main form.

3. Data Entry Forms/ Templates Menu

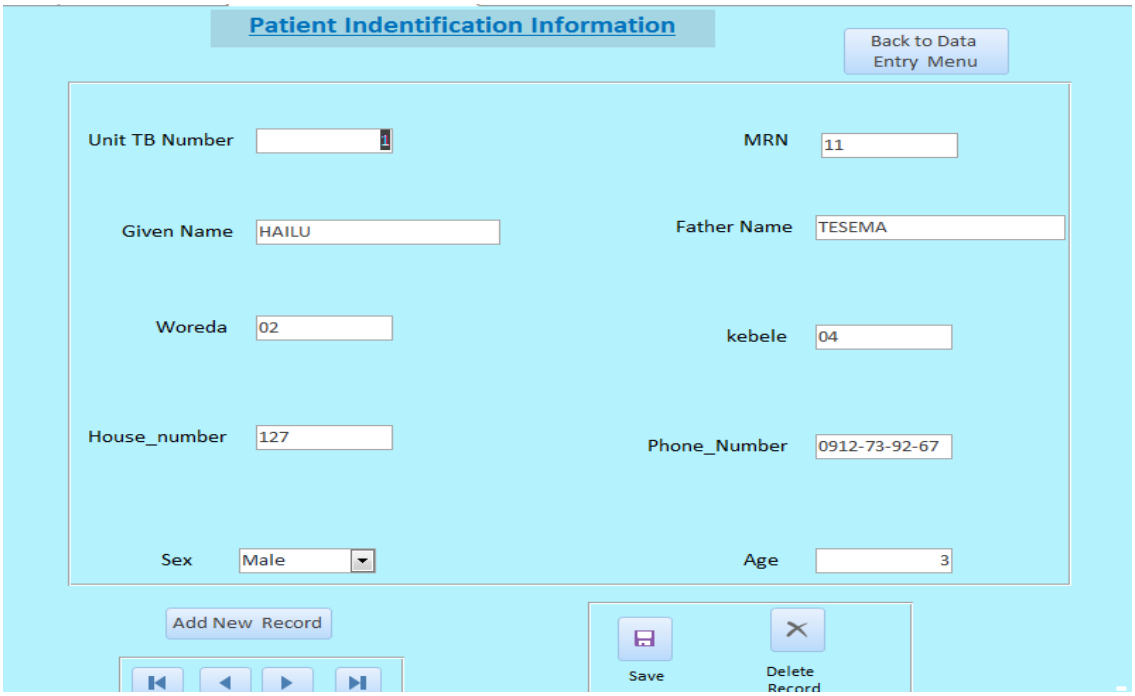
This is a place in the database where we choose patients information we enter into the database. There are different tabs which allow us to choose whatever the patient information has to be entered into the database. For example if we want to enter the patients' identification information we click on the data '**Patients Identification Information'** tab and enter the data and if we want to enter the HIV related information of the TB patients we click on **'HIV related Information'** tab and enter the data.



4. Data Entry Forms/Templates

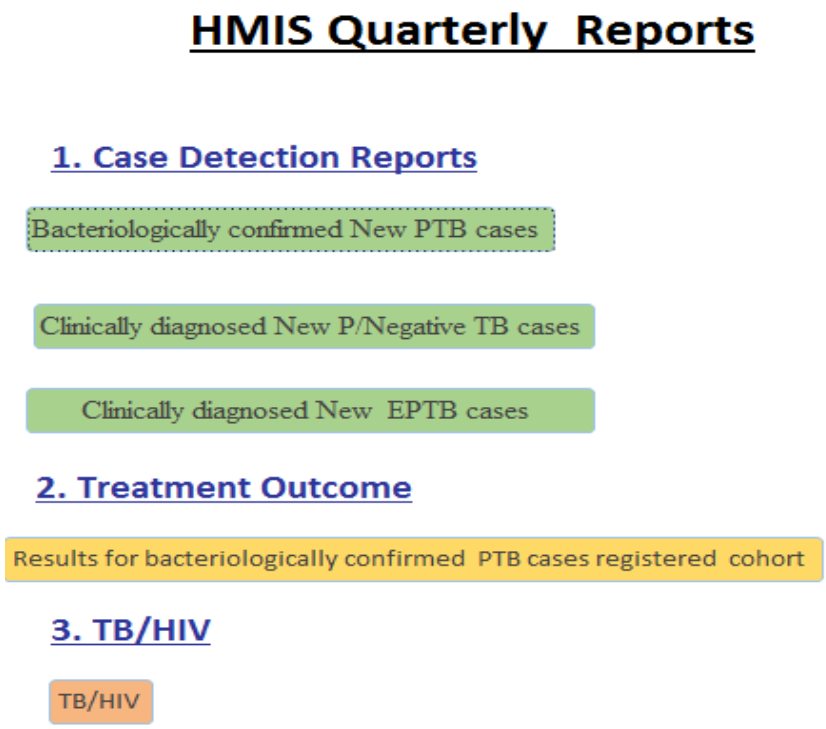
This is the place in the database where we conduct data entry of patients' information. If we want to enter data for an additional TB case we click on **'Add New Record'.** If we want to navigate between records we need to use the navigation arrows at the bottom of the data entry form to whatever record we want to go. If we want to save or delete record use the tabs with save or delete symbols at the bottom right part of the forms.

Sample data entry form: patient identification information data entry form



5. Report Menu

This is the part of the database which appears immediately after we click on the 'Generate Report' from the main menu form of the database. It is the menu from which we choose what type of report we wanted to generate from the database. It has three parts, case detection report, treatment outcome report and TB/HIV report which are the usual type of report required for reporting through the HMIS.



6. Reports

These are the information automatically generated from the database for reporting to the higher level and use for local planning and decision making. It is generated immediately we choose the report type from the report menu. The reports generated from the database are cases in number rather than percentages.

Sample report: Bacteriologically confirmed new PTB cases

HEALTH CENTER / CLINIC / HOSPITAL QUARTERLY SERVICE DELIVERY REPORT FORM:

Woreda 10 Health Facility Name ALERT

Type of Health Facility Hospital Ownership of the Health Fa Public (MOH)

Number of bacteriologically confirmed New PTB cases detected in the quarter

0-4 years : males	2
females	1
5-14 years : males	0
: females	0
15-24years : males	0
: females	0
25 -34 years : males	0
: females	0
35 – 44 years: males	0

4.2 Discussions

In an effort to strengthen the country health information system, Ethiopia has undertaken an extensive reform and re-design of the health management and information systems. The reform has taken major steps in response to the lack of accurate, timely and complete data that consequently affected the quality of care, planning and management systems as well as the decision making by the managers at all levels in the health care systems. The main aim has been to ensure better measurement, through strengthening health information and data management systems that is standardized and that ensures better data – better decision –better health systems performance and improved health status (32).

To this effect, Ethiopia started implementation of the newly designed HMIS in all regions. The basis has been to ensure that the country will have timely, reliable and accessible quality health service data for informed decision making in order to maximize utilization of scarce resources in the health sector.

The results of the study shows that the hospital under study does not meet the aim of the HMIS including addressing data quality and information use for decision making in the effort in improving the quality of care and for the effective and efficient use of resources. This is due to the fact that the finding of the study shows that the level of data quality and information use is not implemented as per the HMIS guideline.

It was found that the problem is higher in the TB clinic than MDR-TB clinic and HMIS unit. The data accuracy and data completeness is very low in TB clinic. This finding is similar with a study conducted in 2010 about performance Assessment of the Implementation of the Health Information Management System in terms of Data Management, Reporting Systems, Data Quality and Information Use in Ethiopia (30). There are different possible reasons for this, Organizational and behavioral factors are the major determinants.

The finding of this assessment also shows that the reports generated at every level did not meet the deadline for reporting set by the federal ministry of health. This shows that the reports are not timely reviewed by the FMOH for timely feedback and use.

The level of information use in the hospital was found to be very low as hospital staffs are utilizing the data they generated through the HMIS only for reporting to the higher level and they are not utilizing the data for decision making process. Absence of performance monitoring tables, graph and charts in the wall of each department indicates that the hospital staffs are not utilizing the information for monitoring and evaluating of their performance against the plans or targets. The irregular performance review meeting and not based on reviewing/analyzing the performance data against the HMIS guideline for conducting regular review meeting and based on evidences generated through the HMIS data. This low practice for information use is similar with the finding of a study conducted in Mozambique on Determinants of Information Use in Nathenje Health Area of Liongwe District, (26) which shows information use in health facilities is very low.

Staff empowerment, management support and sense of responsibilities are important components that enable the hospital staff to address data quality issues and information use. The finding of this project shows that the level of staff empowerment, management support and sense of responsibility are not up to the desired level. The finding from the assessment level shows that staffs have low confidence to perform HMIS related tasks. It was found that the overall level of confidence of staffs to perform HMIS related tasks is 69.49% which needs to be improved for better HMIS data quality and information use practices in the hospital. Therefore, hospital staffs require capacity building including trainings on HMIS and TB and/or MDR-TB trainings. Staffs should also get management support to implement the HMIS effectively and efficiently. The TB HMIS data has been managed manual by the TB focal person and the electronic based database is being in place to support and strengthen the existing manual based data management system.

Chapter Five

5. Conclusions and Recommendations

5.1 Conclusions

This project was conducted with the aim of improving data quality and information use of TB HMIS in ALERT hospital by assessing the weakness and strength of HMIS performance and its major barriers grouped under organizational, behavioral, and technical factors and come up with database development to address the identified problems in the department.

In Ethiopia, the practical challenge for health care providers, planners, and policy makers is lack of complete, accurate, timely and reliable health information on the health status of defined population groups (8). In this project data quality is assessed in terms of completeness, accuracy, timeliness. It was found that there is lack of completeness at TB clinic on both the unit TB registers and the reports submitted to the HMIS unit which is some general information of the TB patients like age, unit TB number and patients contact information, TB-HIV activities (HIV testing result for TB patients), and the treatment outcome of the patients who already has completed the period of treatment were missed for some patients files. This is due to low management support, lack of TB HMIS manipulation skilled personnel, lack of training, lack of continuous feedback, low Staff motivation to perform HMIS related tasks and absence of computers and software especially. On the other hand the completeness of the register and reports at the MDR-TB clinic is very good. The registration of the MDR-TB patients' information and the HMIS reports are done by the trained data clerk who is employed and supervised by a non-governmental organization called TB-CARE.

The data accuracy of both the registers and reports in both TB and MDR-TB department were assessed by observing the appropriateness of the records filled for each patient and accuracy of the report. It was found that at TB-clinic there is lack of accuracy of the records in the unit TB registers and the report submitted to the HMIS unit. Some of the records were not recorded in their appropriate place, for example HIV status of the patients is recorded in the variable date of CPT start, the outcome for some of the SM+ cases is incorrectly recorded that a patients is both treatment completed and cured which can led to error while compiling the monthly and quarterly report. Regarding the accuracy of the MDR-TB register, almost all the records are accurate and the report also in the acceptable range.

The timeliness of the reports from TB clinic, MDR/TB clinic and HMIS unit are checked by observing the date recorded on the reports for date of data compilation and reporting to the next level. It was found that both the TB clinic and MDR-TB clinics compile reports one week beyond the deadline of HMIS reporting schedule. Similarly, the reports from HMIS unit shows that they were submitted to the FMOH ten days later than the schedule time for reporting the HMIS data.

Use of information for planning and decision making is another important element of HMIS objectives for improving the program quality at the health facilities. Key informants from TB clinic, MDR-TB clinic and HMIS units were asked to explain their experience in using the information they generated for planning and decision making. Almost all of the key informants reported that they only use the data for reporting to the higher level than using it for improving the TB or MDR TB services through identifying the gaps and weakness based on the HMIS information generated. The availability of the performance monitoring charts and/or graph and plans were checked at the walls of the TB clinic, MDR-TB clinic and at HMIS office, none of the offices had updated plans, performance monitoring graphs, tables and/or charts displayed at wall their office.

There are different factors which affects the data quality and information use. Organizational, behavioral, and technical factors are then major determinants that affect the level of data quality and information use in health facilities. The level of promotion of culture of information use was assessed through four dimensions which address issues related with organizational factors. The finding of the assessment shows that the overall level of promotion of culture of information use in the hospital was found to be 67.67%. Behavioral Determinants was also checked by self-administered questioner to assess self-confidence and motivation of staffs towards implementing HMIS related activities. It was found that 69.49% and 54.05% respectively to perform HMIS tasks.

The HMIS technical issues are assessed using key informant interviews about the user-friendliness of the HMIS manuals, registers and reporting formats and through reviewing the availability of office facilities. It was found that almost all of the staffs can easily use them for recording and reporting of the program activities. Regarding the availability of facilities and checklist it was found that there is no shortage of manuals, registers and reporting formats in TB

clinic, MDR-TB clinic and HMIS unit. They also have computer software for record keeping and report compilation for the monthly and quarterly reports. But, TB clinic lacks computer to make the recording and reporting system computerized.

Therefore, a Microsoft Access based database is developed for the TB program in ALERT hospital to be used by the TB focal person to help him/her avoid recording the data in their inappropriate place and generating incorrect report due to manual calculation of cases and dates of reporting. It also supports the manual based registration of patients through easily identifying /searching the patients with specific criteria. The database also enhances the data use in the hospital through facilitating easily generation of information for planning and decision making process.

5.2 Recommendations

The following recommendations are forwarded based on the findings of the study:

- ✓ The HMIS unit of the hospital in collaboration with MOH needs to organize HMIS refreshment trainings to capacitate and motivate staffs.
- ✓ Regular supportive supervision by the MOH is recommended especially on checking the data quality issues and information use through tables, graphs and/or charts and regular review meeting based on information generated on HMIS data.
- ✓ The developed computer database system needs to be tested and used to improve the recording and reporting system by avoiding manual data entry.
- ✓ The HMIS unit of ALERT hospital should develop standard operating procedures (SOP) to be implemented at all departments for improving quality of care and reporting.
- ✓ Other researcher/student may further develop the prototype system with additional features.

6. References

1. WHO, “World tuberculosis report; in Global Tuberculosis control”, 2011.
2. WHO, “A guide to monitoring and evaluation for collaborative TB/HIV activities; Stop TB Partnership”, United States Presidents' Emergency Plan for AIDS Relief and the Joint United Nations Program on HIV/AIDS, 2009.
3. Norval, P.Y., E. Heldal, R. L'Herminez, K. Laserson and A. Godfrey, "Revising the tuberculosis recording and reporting information system", Int J Tuberc Lung Dis, 2008.
4. FMOH, “Why TB? Evaluating the National TB Control Program; Challenges and ways forward”, disease prevention and control directorate, October 2014.
5. Tullen University supported, “HMIS Implementation program training manual”, Addis Ababa, 2009.
6. WHO, “Improving Data Quality: A Guide for Developing Countries”, 2003.
7. Measure Evaluation, “performance of Routine Information System Management”, four tools to improve quality and use of routine data, June 2013.
8. Federal Ministry of Health, “Health Management Information System (HMIS) / Monitoring and Evaluation (M&E) Strategic Plan for Ethiopian Health Sector”, HMIS Reform Team, January 2008.
9. WHO, “Global Tuberculosis Report; Global Tuberculosis Program”, Geneva, Switzerland, November 2013.
10. WHO Regional Office for Africa, “WHO Country Cooperation Strategy” 2012-2015 Ethiopia”, 2013.
11. WHO, “Assessment of Ethiopia National Health Information System”, Final Report, 2007.
12. “Manual on use of routine data quality assessment (RDQA) tool for TB monitoring”, World Health Organization Stop TB Department, Geneva, 2011.
13. WHO, “Revised TB recording and reporting forms and registers”, version 2006, Geneva, 2006.
14. Murray CJ., Styblo K., Rouillon A., “Tuberculosis in developing countries: burden, intervention and cost”, *Bulletin of the International Union against Tuberculosis and Lung Disease*, 1990.

15. Raviglione MC., Uplekar MW., "WHO's new Stop TB Strategy" *Lancet*, 2006.
16. "Military Health Systems Data Quality", mission needs statement for Data Quality Integrated Program Team (IPT), 1998.
17. Williamson L., Stoops L., "Using information for health", *South African Health Review*, 2001.
18. Levis M. "Information Quality Training Requirement Analysis Guide line Demonstrated in a Health care Context", A dissertation presented in Fulfillment of the Requirements for PhD, Dublin City University, January 2011.
19. WHO, Regional Office for the Western Pacific, "Developing Health Information Management Systems", a Practical Guide for Developing Countries, WHO, 2004.
20. WHO, "Framework and Standards for country information system", Geneva, 2008.
21. Hiwot B., Lippeveld T., "Inventory of PRISM Framework and Tool: Application of PRISM Tools and Intervention for Strengthening Routine Health Information System Performance", June 2013, p29.
22. Juma Hemed Lungo, "Data Flows in Health Information Systems", UNIVERSITY OF OSLO, Department of Informatics, Master Thesis, May 2003.
23. Motlatso G. Mlambo, Karl Peltzer, Annariina Koivu, "Prevention of Mother-to-Child Transmission of HIV data completeness and accuracy assessment in health facilities of the Nkangala District", vol 19, South Africa, 2014.
24. Peabody JW, Luck J, Jain S, Bertenthal D, Glassman P, "Assessing the accuracy of administrative data in health information systems", Med Care, Nov 2004.
25. Sullivan F, Wilson P., "The completeness and accuracy of patient record transfer between practices", Health Bull (Edinburgh), Jan 1997.
26. Kimaro H and Nhampossa J., "The challenge of sustainability of health information system in developing countries: Comparative case studies of Mozambique and Tanzania; in proceeding of the 12th European conference on information system", 14-16; Turku, Finland, June 2004.
27. MEASURE Evaluation PRISM case studies, "strengthening and Evaluation RHIS", 2008.
28. Efigênia Cardoso and Nacles Bernardino of Camacari, Vital Wave Consulting, "Health Information System In developing Countries", 2009.

29. Gashaw Andargie, “assessment of utilization of health information system at district level with particular emphasis to HIV/AIDS program in north Gondar zone amhara national regional state” master thesis, A.A, June 2006.
30. Tilahun A., “Assessment of the new health management information system implementation in public health facility and institutions in Addis Ababa”, Master Thesis in Health Informatics, Addis Ababa University program, 2010.
31. MOH, “Ethiopian health sector development program II”, 2002/03-2004/05.
32. Gebrekidan M., Hajira M., Habtamu T., Neguse W., Dereje M., Nafo-Traore F., “Data quality and information use: A systematic Review to Improve Evidence”, Ethiopia, 2012.
33. Meseret A., “Assessment of health management information system at public Hospital in Addis Ababa”, Master Thesis in Health Informatics, Addis Ababa University Program, 2009.
34. Unseth Peter, "ALERT", *Encyclopaedia Aethiopica*, vol. 1, edited by Siegbert Uhlig, p. 194,195, 2003.

7. Annex

Part one

Participant Information Sheet

1. Information

Project Title: improving data quality and information use of TB program in ALERT Hospital

Affiliation: Addis Ababa University School of Information Science and School of Public Health

Background and Aims of the Study

This study examines the level of data quality problem and find out the factors contributing for the poor data quality problem in ALERT Hospital. This study will be interviewing the health workers working on TB/MDR-TB and HMIS focal persons who are directly or indirectly have contribution for the recording and reporting of TB HMIS.

The objective of this project is to:

5. To assess the level of data quality in terms of completeness, accuracy, and Timeliness in tuberculosis clinic of ALERT hospital.
6. Assess the utilization of information for decision making in TB clinic of ALERT hospital.
7. To identify the technical, organizational, and behavioral factors affecting data quality and information use.
8. Improve the data quality and prepare the data for the database
9. Develop a database for easy access and manipulation of TB data in the hospital.

What is required of me?

If you decide to be involved in this study you will be asked a number of questions that will take about 25 min of your time.

What is the procedure of the study?

The principal investigator will approach you at your working station to describe the purpose of study and obtain your consent for your voluntary participation. If you are selected for the study

interview you will be interviewed by the principal investigator which takes about 25 minutes. On the other hand if you are assigned under the self-administered group a questionnaire which includes 44 questions will be given to you which you will give your answers on

What are the possible benefits and risks of taking part?

Whilst there may be no personal benefits to your participation in this study, the information you provide can contribute to the future development of tuberculosis program. There is no any risk due to participating in this research.

Confidentiality

All information you provide to us will be kept confidential. Your name will not be written on the survey so there will be no possibility to identify you.

Contact person:

Abeba Sori Kitila (Principal Investigator) Tell: 0911-01-46-56

AAERC Tell: 0111348352

2. Consent Form

Title of the study: "Improving data quality and information use of tuberculosis program in ALERT hospital"

I the participant, after reading the information sheets or listing to someone reading agreed to participate in this study by understanding the study procedures and my participation rights listed below

1. I understand that the study involves in-depth interview, self-administered questionnaire and document review and if I am selected for the in-depth interview I will agree to participate in the study.

   Yes ☐ No ☐

2. I understand that there will not be any risk and discomfort associated with this study and my data I provide will be kept confidential

   Yes ☐ No ☐

3. I understand that I can withdraw from participating in this study at any time point during the study;

   Yes ☐ No ☐

I hereby .Signed on this form to confirm my agreement to participate in this study

Participant's name: _____

Signature: _____ Date: _____ / _____ / _____

Investigator's name: _____

Signature: _____ Date: _____ / _____ / _____

<u>የጥናቱ፡ተሳታፊዎች፡የመረጃ፡መስጫ፡</u>

<u>የፕሮጀክቱ፡ዐርዕስት፤</u>የቲቢን፡ፕሮግራም፡በተመለከተ፡የመረጃ፡ጥራትን፡ማሻሻልና፡የመረጃ፡አጠቃቀምን፡ማሻሻል

<u>የትምህርት፡ቤቱ፡ስም፤</u>አዲስ፡አበባ፡ዩንቨርሲቲ፡የመረጃ፡ሳይንስ፡እና፡የማህበረሰብ፡ጤና፡ሳይንስ፡ትምህርት፡ክፍል

<u>የፕሮጀክቱ፡መገቢያና፡ዐላማ</u>

ይህ፡ፕሮጀክት፡የቲቢ፡መረጃን፡በተመለከተ፡ያለዉን፡የጥራት፡ችደርንና፡የችግሩ፡መንስኤ፡የሆኑትን፡ምክንያቶችን፡በመለየት፡የመረጃዉን፡ጥራት፡ለማሻሻል፡አስፈላጊዉን፡ተገባር፡ይፈጽማል፡፡ለዚህ፡ፕሮጀክት፡ግብሀት፡የሚሆነዉን፡መረጃ፡የሚሰበሰበዉ፡በቲቢ፡ክፍል፡መዳኒቱን፡በ ተላመደ፡የቲቢ፡ክፍል፡እና፡HMIS ክፍል፡ባለሙያዎችን፡በመጠየቅ፡ነዉ፡፡

የዚህ፡ፕሮጀክት፡ዐላማ፡የሚከተሉት፡ናቸዉ፡

1. የመረጃ፡ጥራቱን፡ደለጃ፡መገምግም
   መረጃን፡ለዉሳኔ፡ሰጪነት፡የመጠቀም፡ልምድን፡ይገመግማል
2. የመረጃ፡ጥራት፡እንዳይኖር፡የሚያደርጉ፡ምክንያቶችን፡ይለያል
3. የመረጃ፡ጥራት፡ችግሮቹን፡ያሻሽላል
4. የመረጃ፡ማጠራቀሚያ፡ቦት፡ያዘጋጃል

ከኔ፡ምን፡ይጠበቃል

በዚህ፡ጥናት፡ለመሳተፍ፡ፈቃደኛ፡ከሆኑ፡ወደ፡ 25፡ደቂቃ፡ገደማ፡የሚፈጅ፡የተወሰኑ፡ጥያቄዎችን፡ይጠየቃ፡፡

<u>የጥናቱሂደትምንይመስላል?</u>

የጥናቱአለማለማብራራትእናበፍቃደኝነትላይየተመሰረተተሳትፎንለመጠየቅያነጋግሮታል፡፡ቃለመጠይቅእንዲደረግላቸውከተመ ደቡየጤናባለሙያዎችመካከልከሆኑ፤ 25 ደቂቃየሚፈጅቃለመጠይበዋናተመርማሪዋይደረግሎታል፡፡ነገርግንበግልየሚሞላጥያቄከሚሞሉትየጤናባለሙያዎችጋርከተመደ ቡ 44 ጥያቄዎችየያዘመጠይቅበግሎትእንዲሞሉይሰጦታል፡፡

በዚህ፡ጥናት፡በመሳተፍዎ፡የሚያገኙት፡ጥቅምና፡የሚደርስብዎት፡ጉዳት

በዚህ፡ጥናት፡መሳትፍዎ፡በግልዎ፡የሚያገኙት፡ጥቅም፡የለም፡፡ይሁን፡እንጂ፡የሚሰጡኝ፡መረጃ፡የቲቢ፡ፕሮገራሙን፡ለወደፊቱ፡ለማሻሻል፡በ ጣም፡ጠቃሚ፡ነዉ፡፡በዚህ፡ጥናት፡መሳተፍዎ፡ምንም፡አይነት፡ጉዳት፡አይደርስብዎትም፡፡

ሚስጥር፡ጠባቂነት፡

የሚሰጡኝ፡መረጃ፡ሁሉ፡ሚስጥራዊነቱ፡የተጠበቀ፡ነዉ፡፡የርስዎ፡ስምም፡በዚህ፡ጥናት፡ላይ፡አይመዘገብም፤ስለዚህ፡እርስዎን፡የሚለይ፡ምንም፡ አይነት፡መንገድ፡የለም፡፡

<u>አድራሻ፡</u>

አበባ፡ሶሪ ስልክ፡ 0911-01-46-56

አህሪ አለርት የስነምግባር ኮሚቴ ስልክ፡ 0111348352

<u>የፈቃደኝነት፡መሙያ፡ፎርም</u>

የጥናቱ አርእስት፡

እኔ፤ ከታች ስሜ የተጠቀሰው የጥናቱ ተሳታፊ የመረጃ ቅጽን ካነበብኩኝ/ከተነበበልኝ በኃላ ከዚህ በታች የተዘረዘሩትን የጥናቱ ሂደቶች እና የተሳታፊነት መብቴን ተረድቼ ለመሳተፍ ተስማምቻለሁ

1. ምርምሩ የሚያጠቃልለው ቃለ መጠይቅ፣ በግል የሚሞላ ጥያቄ እና መረጃን መረጃን መመልከት ሲሆን እርሶ ለቃለ መጠይቁ ከተመረጡ 14 መጠይቅ ይቀርብሎታል

   ተረድቻለሁ ☐ አልተረዳሁም ☐

2. ከጥናቱ ጋር ተያይዞ ሊመጣ የሚችል ጉዳት እና እኔ የምሰጠው መረጃ በሚስጢር እንደሚያዝ

   ተረድቻለሁ ☐ አልተረዳሁም ☐

3. ከይናቱ በማንኛውም ጊዜ ተሳታፊነቴን ማቋረጥ እንደምችል

   ተረድቻለሁ ☐ አልተረዳሁም ☐

በመሆኑም በጥናቱ ውስጥ ለመሳተፍ መስማማቴን በፊርማዬ አረጋግጣለሁ

የተሳታፊ ስም: _____

ፊርማ: _____ ቀን: _____

የተመራማሪው/ዋስም _____

ፊርማ: _____ ቀን: _____

Part two

Self-administered structured questioner

INFORMATION SHEET AND CONSENT

1. Information

Dear Sir/madam. My name is Abeba Sori. I am a Masters student in Health Informatics at Addis Ababa University. I am now conducting a project entitled "improving data quality and information use of TB program in ALERT Hospital". The aim of this project knows that you are key personnel to improve TB HMIS, to identify main problems in TB HMIS and create an improved TB HMIS database.

I would like to ask you few questions about TB HMIS and the information you have regarding HMIS specifically on the TB Program part. Your opinions are very important tool for the study. Your answers will be kept confidential and your name will not be written on the survey as well as on the research output. So there will be no possibility to identify you. Your participation in this study is voluntary and you can withdraw from the questionnaire at any moment, declining to participate in this study will not harm any of your benefits that you get in the hospital.

2. Consent form

After I have been briefed on the objectives of the particular study and told my right of declining from filling the questionnaire at any stage;

1. I agree to participate 2. I do not agree to participate

General Information of the respondent

1. Year of experience, _____ Months/Years.

2. Level of Education: A. physician B. Health officer C. Nurse Diploma

D. Nurse (BSC) E. Others (specify) _____

3. Department A.TB B. MDR-TB C. HMIS D. others, Specify_____

4. Your current tittle/position: _____

5. How long have you been in the current position _____

6. Did you receive any training in IT? 1. Yes 2. No

7. Level of IT training _____

To what extent, do you agree with the following on a scale 1-7?

(Please select one answer and encircle the correspond in number)

Personal: (Motivation) about your self

S/N	Questions	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
8.	Collecting information which is not used for decision making discourages me	1	2	3	4	5	6	7
9.	Collecting information bores me	1	2	3	4	5	6	7
10.	Collecting information is meaningful to me	1	2	3	4	5	6	7
11.	While recording data am contributing to the monitoring of health service delivery performance	1	2	3	4	5	6	7
12.	Collecting information is forced on me	1	2	3	4	5	6	7
13.	Data collection is a burden! Am busy with my job	1	2	3	4	5	6	7

Rate your Confidence in accomplishing the following activities

S/N	Questions	Strongly disagree	Dis-agree	Somewhat disagree	Neutral	Somewhat Agree	Strongly Agree
14.	I can check data accuracy	1	2	3	5	6	7

15.	I can calculate percentages/rates correctly	1	2	3	5	6	7
16.	I can plot data by months or year	1	2	3	5	6	7
17.	I can compute trends from bar charts	1	2	3	5	6	7
18.	I can explain findings & their implications	1	2	3	5	6	7
19.	I can use data for identifying gaps and setting targets	1	2	3	5	6	7
20.	I can use data for making various types of decisions and providing feedback	1	2	3	5	6	7

About your department staff and management members

S/N	Questions	Strongly disagree	Dis-agree	Somewhat disagree	Neutral	Somewhat Agree	Strongly Agree
In your department, decisions are based on:							
21.	Personal preference/favoritism	1	2	3	5	6	7
22.	Superior's directives	1	2	3	5	6	7
23.	Evidence/facts	1	2	3	5	6	7
24.	Political interface	1	2	3	5	6	7
25.	Comparing data with set health objectives	1	2	3	5	6	7
26.	Actual health needs	1	2	3	5	6	7
27.	Considering costs	1	2	3	5	6	7
Do Management Members: (Management Support)							
28.	Seek feedback from concerned/affected staff	1	2	3	5	6	7
29	Emphasize data quality in monthly reports	1	2	3	5	6	7
30.	Discuss conflicts openly to resolve them	1	2	3	5	6	7
31.	Seek feedback from concerned community	1	2	3	5	6	7

32.	Use HMIS Data for setting targets & monitoring	1	2	3	5	6	7
33.	Check data quality (validation) regularly	1	2	3	5	6	7
34.	Provide feedback to staff regularly	1	2	3	5	6	7
In your department, the staffs: (Sense of responsibility)							
35.	Are punctual	1	2	3	5	6	7
36.	Document their activities and keep records	1	2	3	5	6	7
37.	Feel committed to discharge their responsibility	1	2	3	5	6	7
38.	Set appropriate and realistic goals for themselves	1	2	3	5	6	7
39.	Feel guilty for non-accomplishing set goals	1	2	3	5	6	7
In your department the staffs (Empowerment)							
40.	Get reward for good work	1	2	3	5	6	7
41.	Are empowered to make decisions	1	2	3	5	6	7
42.	Can able to say freely 'NO' to superiors for decisions not supported by evidence	1	2	3	5	6	7
43.	Are made accountable for poor performance	1	2	3	5	6	7
44.	Admit mistakes for taking corrective actions?	1	2	3	5	6	7

Part three

In-depth Interview Guide

INFORMATION SHEET AND CONSENT

Information

Dear Sir/madam. My name is Abeba Sori. I am a Masters student in Health Informatics at Addis Ababa University. I am now conducting a project entitled "improving data quality and information use of TB program in ALERT Hospital". The aim of this project knows that you are a key personnel to improve TB HMIS, to identify main problems in TB HMIS and create an improved TB HMIS database.

I would like to ask you few questions about TB HMIS and the information you have regarding HMIS specifically on the TB Program part. Your opinions are very important tool for the study. Your answers will be kept confidential and your name will not be written on the survey as well as on the research output. So there will be no possibility to identify you. Your participation in this study is voluntary and you can withdraw from the interview at any moment, declining to participate in this study will not harm any of your benefits that you get in the hospital.

Consent form

After I have been briefed on the objectives of the particular study and told my right of declining from filling the questionnaire at any stage;

1. I agree to participate 2. I do not agree to participate

General Information of the respondent

1. Year of experience, _____ Years

2. Level of Education: A. physician B. Health officer C. Nurse Diploma
   D. Nurse (BSC) E. Others (specify) _____

3. Department A.TB B. MDR-TB C. HMIS D. others, Specify_____

4. Your current tittle/position: _____

5. How long have you been in the current position _____

6. Did you receive any training in IT? 1. Yes 2. No

7. Level of IT training _____

Interview guide for health professionals and HMIS officer

1. Can you tell me how the current HMIS is running in your department/facility? (In terms of data capturing, reporting and information use?)

2. How you use guide line/standards regarding HMIS related information generation, use and reporting?

3. What common tools are used for TB/MDR-TB data collection? Are they correctly and completely filled? Do you employ mechanism to control data quality?

4. How you organize process and analyze TB/MDR-TB data collected to produce relevant, timely and quality information?

5. What comes to your mind when someone says that data from TB/MDR-TBHMIS is of poor quality?

6. What criteria would you use in classifying/analyzing data quality?

7. What are the factors/barriers contributing to poor data quality?

8. What are some of the barriers/ factors that would influence health workers not to use the data in making decisions?

9. How you use the TB/MDR-TB data for planning and decision making? How?

10. How your department track/ monitor performances TB/MDR-TB against plans and targets? Do you have performance monitoring or tracking board / dash board?

11. In your opinion, how can HMIS data specifically on TB and MDR/TB are improved?

12. What are the existing challenges/problems in connection with the current HMIS implementation? How about challenges in TB/MDR-TB recording and reporting?

13. How can these situations be improved? (In terms of better attitude, skill and culture of the staff as well as the management support for HMIS related activities)

14. Do you have any additional comment or remark

_____

_____

_____

Thank you for taking the time to conduct this interview!!

Part four

Document Review

I Quality of data *(Department head only)*

1.1 Data Recording and Keeping

1. Does your Department keep separate record of HMIS related data? 1. Yes 0. No

2. Does your department keep a copy of HMIS monthly reports sent to higher level (HMIS Unit)?

2.1 Soft copies of the reports? (obs,)	1. Yes	0. No
2.2 Hard copy of the report? (Obs.)	1. Yes	0. No

3. If 'yes' to the above question, count the number of HMIS monthly reports kept at the department for the last two quarter (from Hamle 2006-Tahesas 2007):

3.1 Number of soft copies of report documented (observe): _____

3.2 Number of hard copy of reports documented (observe):_____

1.2 Neatness and readability of the records and reports (observation only)

4. Is the TB/MDR TB unit register neat that anyone can read and understand the records? 1. Yes 0. No

5. Are records for each variable written in their appropriate place? 1. Yes 0. No

6. Does the TB/MDR focal use appropriate pen (Red Pen) to record smear positive and HIV + cases?

1. Yes 0. No

7. Are the figures in the report clearly written that anyone can read and understand? 1. Yes 0. No

1.3 Data Completeness

8. What is the number of elements in the HMIS monthly report that has to be reported*? (N.B: See copy of HMIS report Hamle-Tahesas)*----------

9. Count the number of data items that are supposed to be filled by this department but left blank without indicating "0" in the form Hamle2006 to Tahesas2007 reports.

9.1. Hamle 2006 HMIS----------
9.2. Nehase 2006 HMIS----------
9.3. Meskerem 2007 HMIS----------
9.4. Tikimit 2007 HMIS----------
9.5. HIdar 2007 HMIS----------
9.6. Tahesas 2007 HMIS----------

1.4 Timeliness

1. How many monthly reports during the last two quarters are submitted by the declared deadline (*observe the reporting time form the reports*) _____
2. How many quarterly reports of the last two reports are submitted by the declared deadline (*observe the reporting time form the reports*) _____

II. Use of Information

2.1 Guidelines

1. Does your department have the following manuals and guideline? (Hard or Soft Copy)

	In hard copy	**In soft copy**

1.1 HMIS Indicator definition	1. Yes, observe 0.No	1. Yes, observe 0.No
1.2 HMIS Disease classification	1. Yes, observe 0.No	1. Yes, observe 0.No
1.3 HMIS information use guideline	1. Yes, observe 0.No	1. Yes, observe 0.No

2.2 HMIS Report production

2. Does your department produce HIS related report? 1. Yes 0.No
3. Did the department receive any feedback on the report they deliver to higher level (HMIS unit) for the last half year? 1. Yes, observe 0.No
4. If 'YES' to the above question observe the report and write the summary concept.

_____

2.3 Display of Information

5. Does your department has performance monitoring display (graph, Table, chart, Map, Other)? 1. Yes, observe 0.No
6. Please, write type of data displayed and whether the data are updated for EFY Hamle 2006-tahesas 2007.

	Type of data displayed	**1. Type of display (please circle)**	**2. Updates**		**Remark**
1.	Plan VS Performance showing display	Table	1. Yes	0. No	
		Graph/Chart	1. Yes	0. No	
2.	Other service provision showing display (Write if any) _____	Table	1. Yes	0. No	
		Graph/Chart	1. Yes	0. No	

2.4 Performance Review *(HMIS unit)*

7. Does your department have performance review meeting? 1. Yes 0. No
8. How frequently are the performance review meetings supposed to take place?

0. No Schedule 1.Quarterly 2. Monthly 3.Every two weeks 4. Weekly

9. How many times did the performance review meetings take place during first and second quarter of EFY 2006 &2007?

4. More than three times 3. Three times 2. Two times 1. One times 0. None

10. Are minutes of performance review meetings maintained?

1. Yes, Observed 0. No

11. If yes to above question, observe the minutes from July-December and ensure if there is:

11.1 D you have a regular discussion on data quality, reporting, Information use or others?

1. Yes 0. No

11.2 HMIS related issues/problems referred to higher level to for action?

1. Yes 0. No

11.3 Any decisions made based on the discussions of HMIS related issues?

1. Yes 0. No

11.4 Follow-up actions taken on the decisions made?

1. Yes 0. No

11.5 Discussion, on the performance of the department?

1. Yes 0. No

11.6 Any discussions made based on the discussion of the department performance?

1. Yes 0. No

III. Facility /Office checklist

12. Fill the following information technology related questions.

S/N	Items	Total	Remark (status)
1	Computer		
2	Data back-up unit (CD, Data stick, etc)	1. Yes 0. No	
3	Internet/Modems (CDMA/EVDO)		
4	UPS		
5	Any software supporting data collection or analysis (write if any)		

13. Availability of forms and other resources

13.1 Do you have HMIS reporting forms? 2. Yes 1. Yes, but not enough 0. No

13.2 Does the departments have enough registers and tally sheets?

1. Yes 0. No

13.3 Do you have HMIS focal person? 1. Yes 0. No

13.4 Are reporting forms are easy to use and enough space to record data?
1. Yes 0. No

13.5 Explain any other issues_____

V Observation guide and data audit tool

A. Observation guide

1. Assess the overall data collection, processing and usage?
2. Assess the availability of data collection tool
3. How and who compiles and records data
4. Is there an operational HMIS computer?
5. Assess presence of guiding documents in the department
6. Are there records of meeting minutes? Does it include HMIS related activity?
7. Is there performance review and planning exercise?

B. Data Accuracy Check (Data Audit)

Find the following information for the six months in the register retrospectively. Compare the figures with the hospital monthly reports. If there is no register put NA (Not applicable).

TB

S/N	Indicators	Q1_2007		Q2_2007	
		Register	Report	Register	Report
1	SM+ Cases				
2	All forms of TB				
3	SM+ cases Cured				
4	SM+ cases treatment completed				
5	Number of TB patients tested for HIV				

MDR-TB

S/N	Indicators	Q1_2007		Q2_2007	
		Register	**Report**	**Register**	**Report**
	MDR-TB enrollment				
1	MDR-TB cases enrolled				
2	MDR-TB New				
3	MDR TB previously treated with SLDs				
4	MDR-TB previously with FLDs				
	MDR-TB Final Outcome				
5	MDR-TB cases enrolled				
6	MDR-TB cases Cured				
7	MDR_TB cases treatment completed				
8	MDR-TB cases died				
9	MDR TB cases failed				
10	MDR TB cases defaulted				

Part 5 -User interface

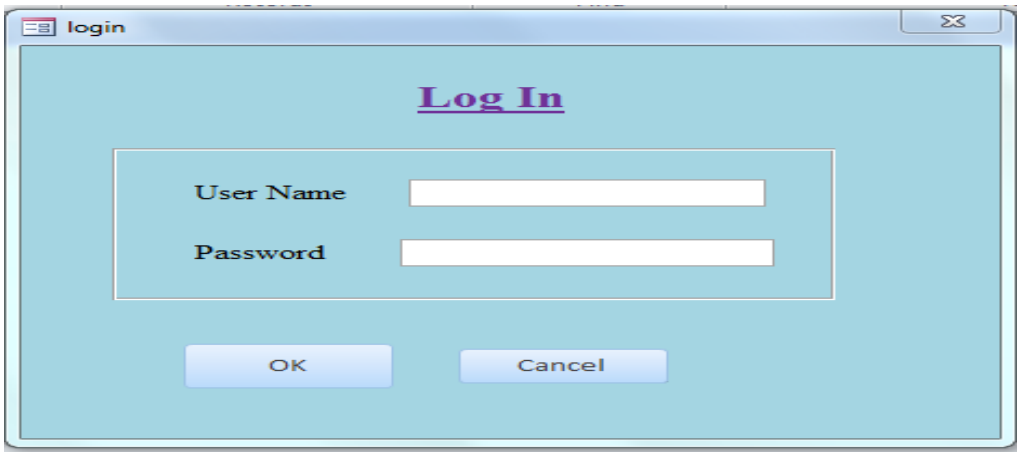


Figure1. User login form

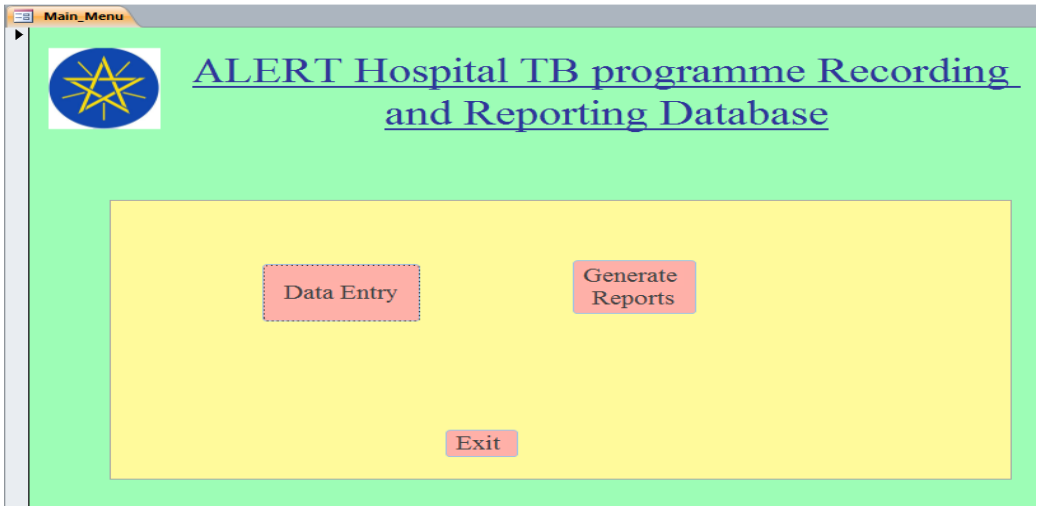


Figure2. Main Menu

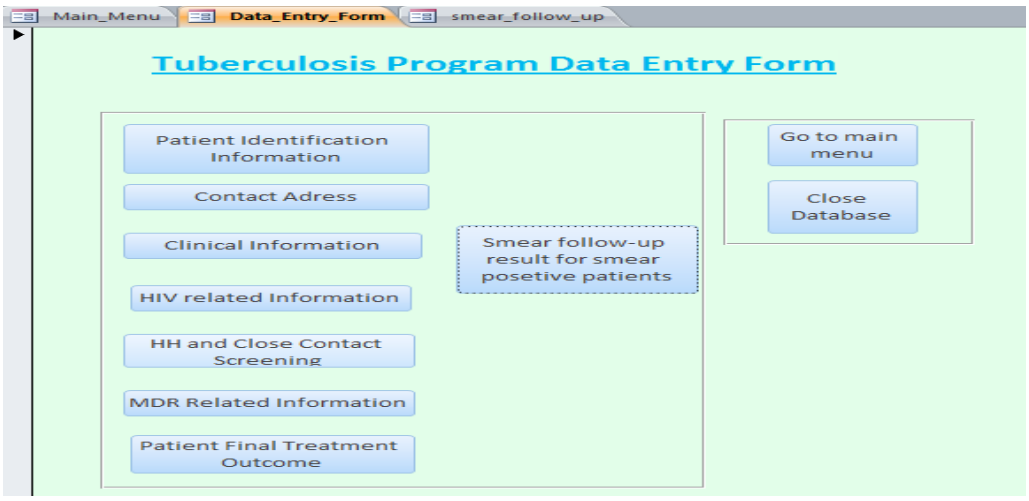


Figure3. Main data entry form

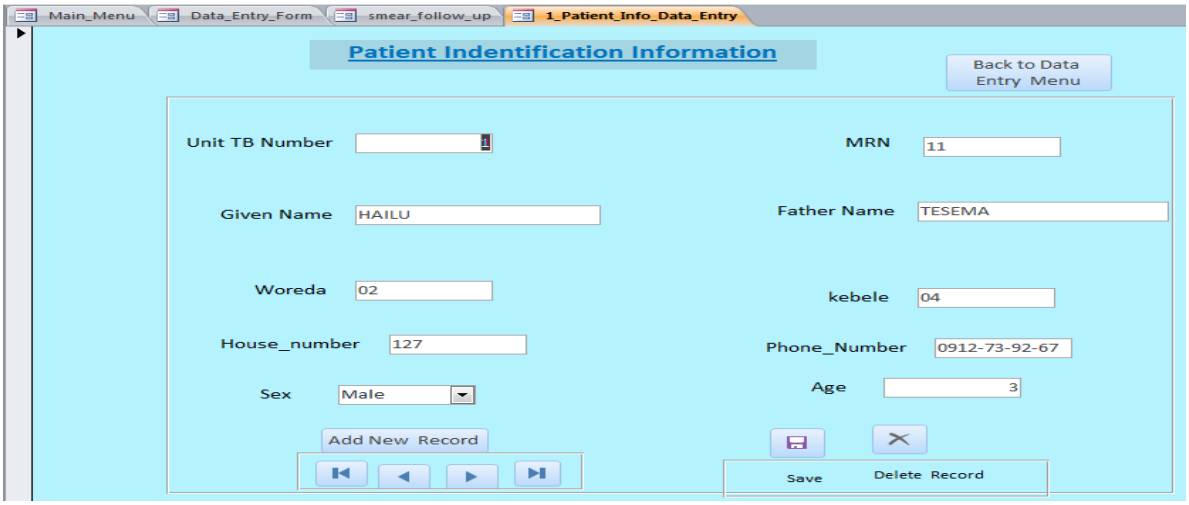


Figure4. Patient identification information form

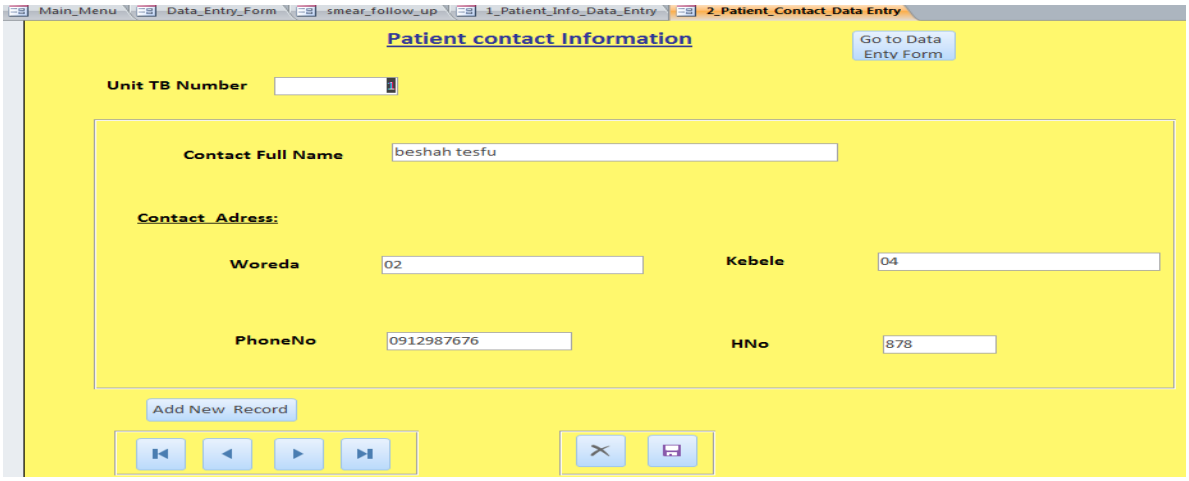


Figure5. Patient contact information form

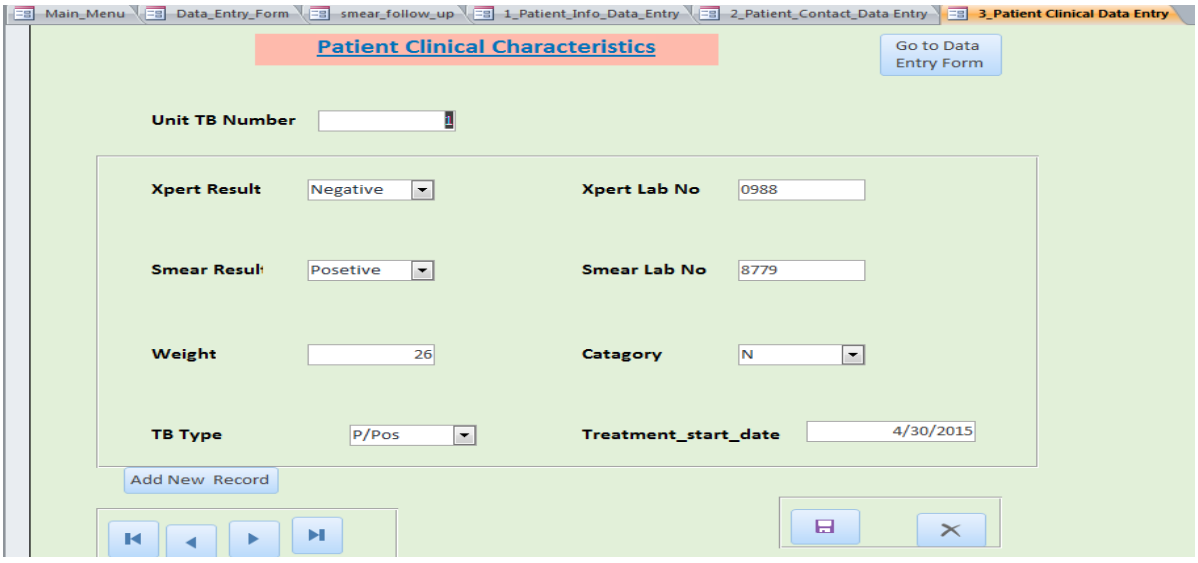


Figure6. Patient clinical characteristics form

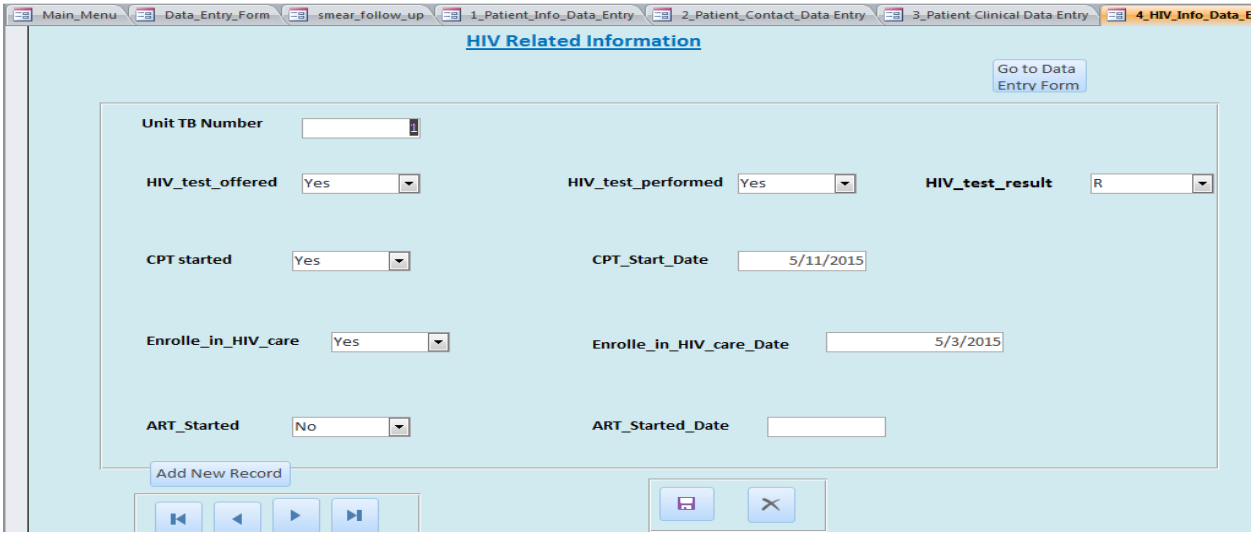


Figure7. HIV related information form

Figure8. HH and/or close contacts information form

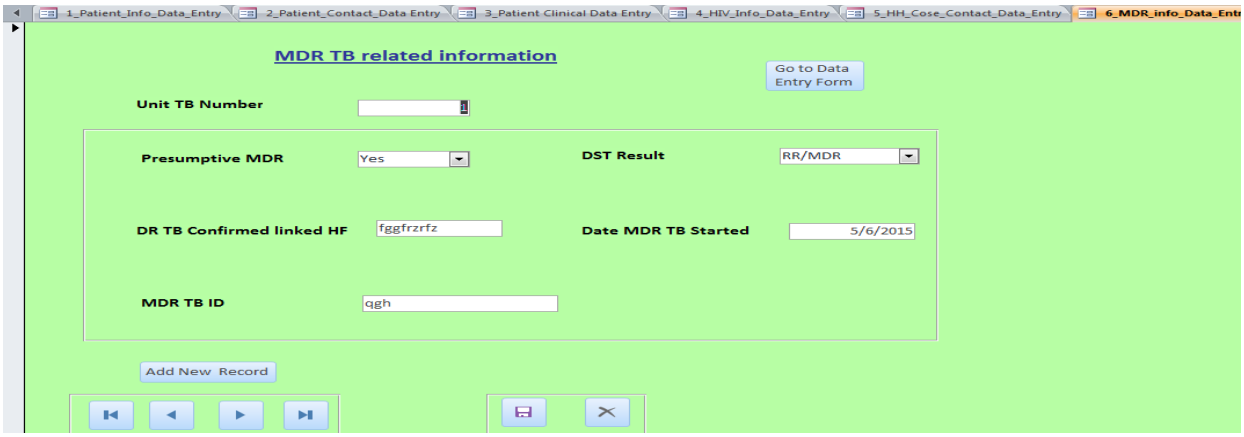


Figure9. MDR TB related information form

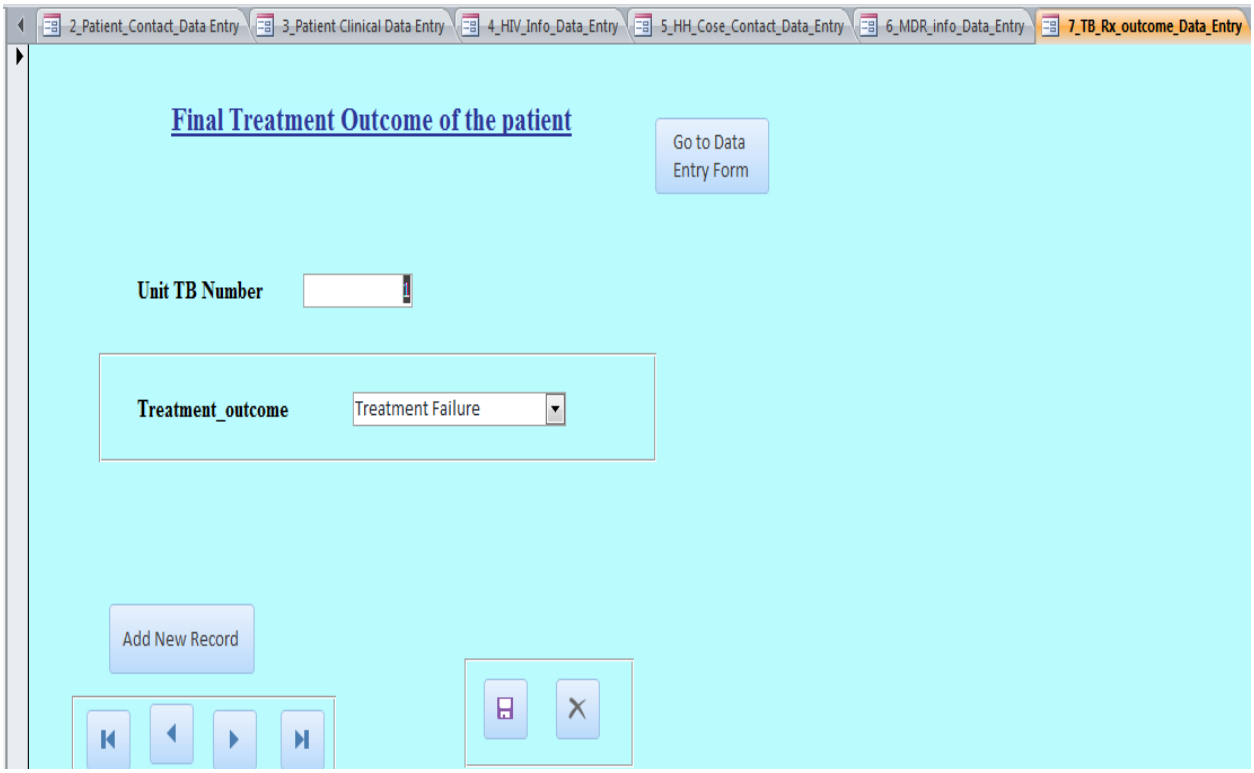


Figure10. Treatment outcome form

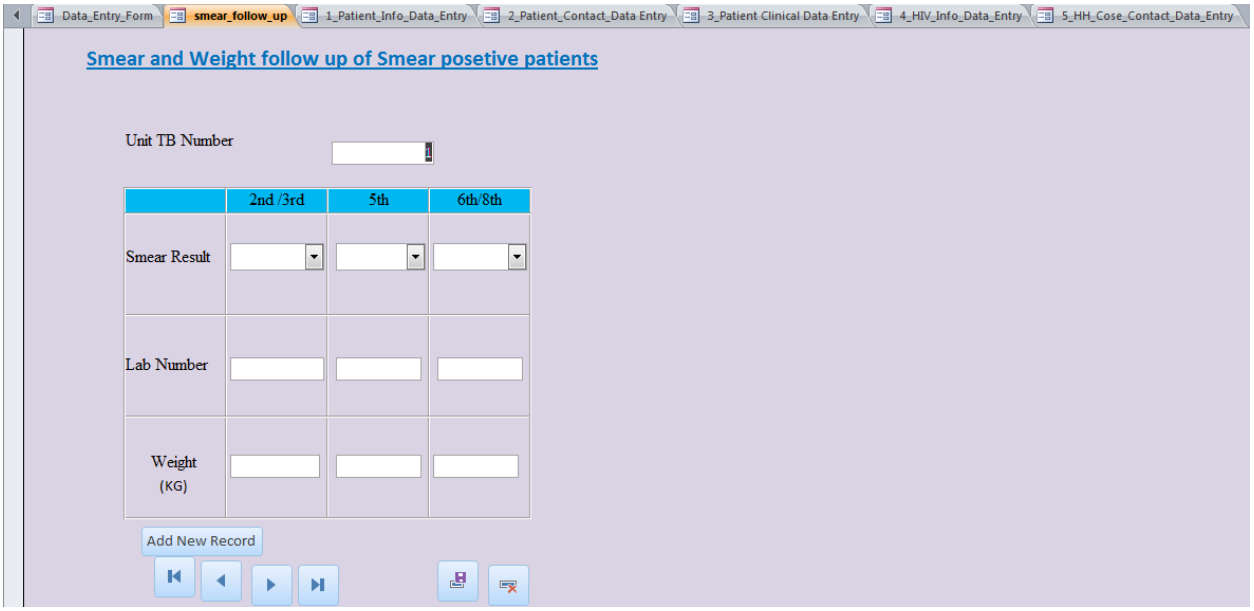


Figure11. Smear and weight follow up form

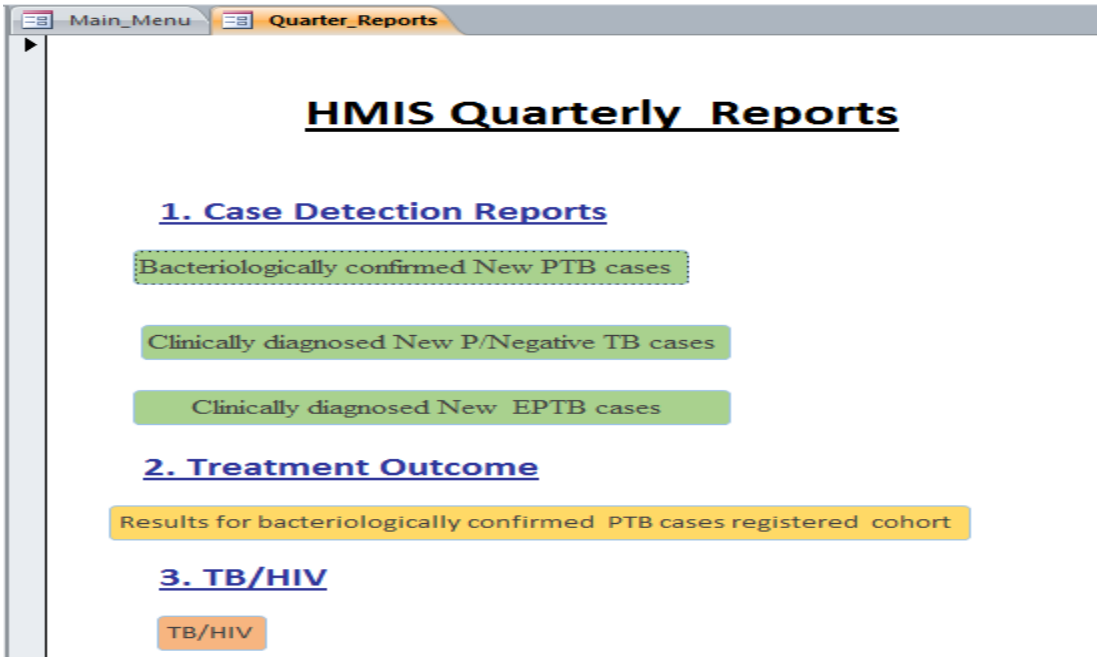


Figure12. Main quarterly report form

Figure13. New PTB cases report form

Figure14. Treatment outcome reporting form

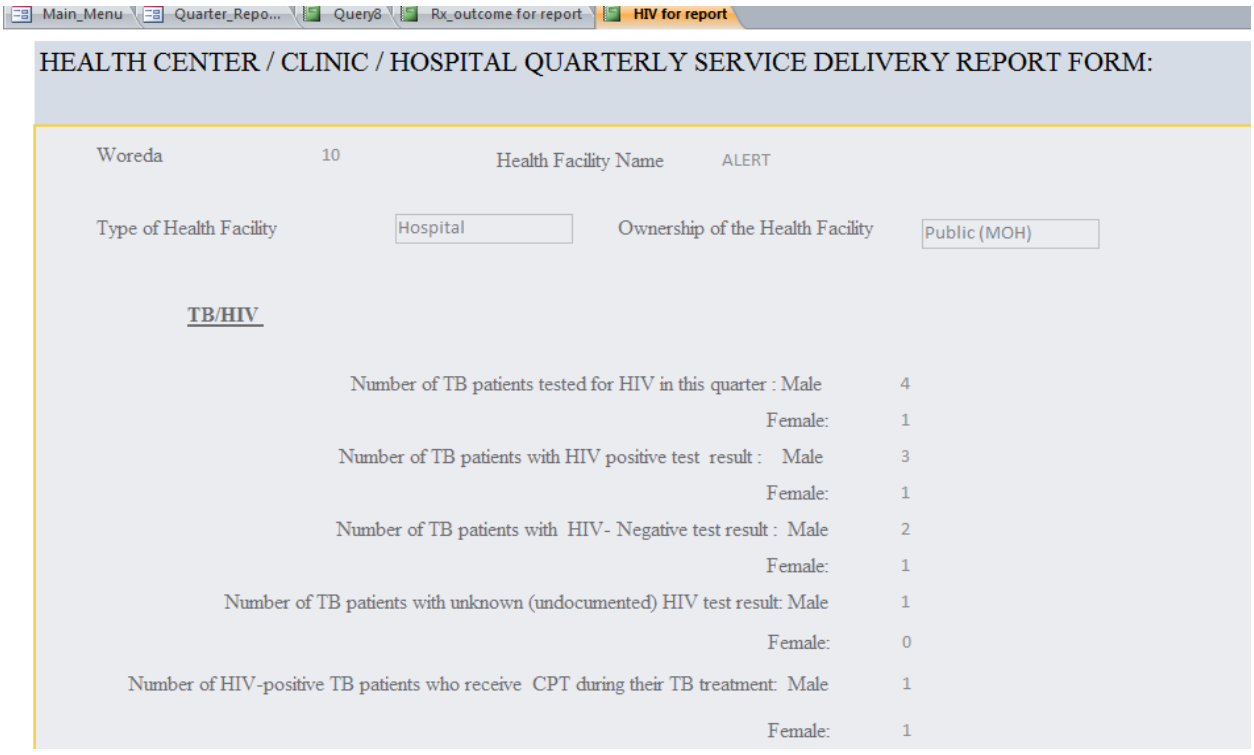


Figure15. TB/HIV reporting form