UNIVERSITY OF NAIROBI

COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCE

SCHOOL OF COMPUTING AND INFORMATICS

STRENGTHENING THE QUALITY OF HIV DATA IN KENYA: TRACING OF PATIENTS LOST TO FOLLOW UP AND REDUCTION OF LOW LINKAGE RATES

BY

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DECLARATION

This research project describes the work undertaken as part of a programme of study at the University of Nairobi, School of Computing and Informatics. The research is my original work and has not been submitted for the award of a degree in any other university.

Sign …………………..…………   Date…………………………

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This research project has been undertaken by the student under my supervision and the submission is hereby made to the University of Nairobi, School of Computing and Informatics with my approval as the student's supervisor.

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ABSTRACT

Introduction: Data quality is the aspect of obtaining accurate and reliable information that can be used by programs for program monitoring as well as patient management effectively. Despite an increase in most private organizations and Ministry of Health clinics dealing with HIV/AIDS ensuring that they have high quality data, little has been done to lower the rates of lost to follow up (LTFU) outcomes and improving HIV testing and counseling outreach linkages to care experience thus reducing stakeholder confidence and support. This project aimed to determine the factors that lead to LTFU and the low rates of linkages to care and also develop a system that has the potential of reducing the rates of LTFU and increasing the rates of linkages into care so as to achieve collection of quality data.

Methods: A survey (where self-administered questionnaires were given) was conducted to gather data from the different HIV/AIDS programs across Nairobi, Kenya to determine how this issue was affecting them. Data was coded in Microsoft Access and pulled in STATA12 for analysis.

Results: Overall, LTFU contributed to 23,531 (37%) of all the clients who had ever started care while 35% of clients did not get linked to care after turning HIV positive in a HIV outreach testing. Reasons that led to LTFU were cited as economy difficulties, felt like they had healed, had gone upcountry, stigma, distance to the clinic, child care commitments and mortality while for low rates of linkages to care were repeat testers, stigma and forgot their unique client number.

Conclusion: Most organizations experience the problem of poor data quality as a result of reporting high rates of LTFU and low rates of linkages to care. These program outcomes may be improved by where most, if not all, programs that deal with HIV/AIDS related issues would adopt an electronic health record (EHR) system that has been integrated with biometric technology to register and serve their clients.

Keywords: Data Quality, Lost to Follow up (LTFU), Linkage to care, Electronic Medical Record (EMR), Electronic Health Record (EHR), Biometric, Fingerprint, HIV counseling and testing (HTC).

ACKNOWLEDGEMENT

DEDICATION

To my Wife,

Martha

And

My Sons, Parents and Sisters

I truly cherish you all.

God bless you.

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List of Abbreviations

Abbreviation	Phrase
AIDS	Acquired Immune Deficiency Syndrome
ANSI	American National Standards Institute
ART	Antiretroviral Therapy
BE	Biometric Encryption
CER	Crossover Error Rate
CHW	Community Health Worker
CITC	Client-initiated HIV Testing and Counseling
DHIS	District Health Information Software
DICOM	Digital Imaging and Communications in Medicine
DNA	Deoxyribo Nucleic Acid
ECR	Electronic Clinical Records
EDARP	Eastern Deanery AIDS Relief Program
EER	Equal Error Rate
EHR.	Electronic Health Records
EMR	Electronic Medical Records
EPR	Electronic Patient Records
FAR	False Accept Rate
FRR	False Reject Rate
FTE	Failure to Enroll
HAART	Highly Active Antiretroviral Therapy
HBTC	Home Based Testing and Counseling
HIV	Human Immunodeficiency Virus
HL7	Health Level Seven
HMIS	Health Management Information Systems
HTC	HIV Testing and Counseling
IDU	Intravenous Drug Users
ISO	International Organization for Standardization
IT	Information Technology
KAIS	Kenya National AIDS & STI Control Programme
LAN	Local Area Network
LTFU	Lost To Follow Up
M&E	Monitoring and Evaluation
MO	Mobile Outreach
MOH	Ministry of Health
MSF	Medecins Sans Frontiers'
MySQL	My Structured Query Language
NASCOP	National AIDS and STIs Control Programme
NEMA	National Electrical Manufacturers Association
PC	Personal Computer
PDA	Personal Digital Assistant
PHP	Hypertext Processor

PITC	Provider-Initiated HIV Testing and Counseling
PK	Primary Key
PLHIV	People Living with HIV
PMTCT	Preventing Mother-to-Child Transmission
TB	Tuberculosis
VB	Visual Basic
WADO	Web Access to DICOM Objects
WAN	Wide Area Network

CHAPTER ONE: INTRODUCTION

1.1   BACKGROUND

Accurate health care data plays a vital role in the preparation, development and maintenance of health care services. Quality improvement and the timely distribution 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 because of its importance in promoting high standards of patient care. Authorities at all levels of health care should be concerned about poor data quality and the impact it has on the quality of health care. In Kenya, facilities are trailed by poor medical record documentation and consumption of accurate and accessible morbidity data. These concerns not only relate to the quality of medical record documentation but also to the collection of health care statistics (used to make informative decisions for planning health care services and allocating resources) at all levels. The accuracy and relevance of the information processed are important in assisting both the facilities and the government with decisions on the provision of health care services locally and nationally (Stoto, 2008).

In Kenya, there are about 1.4 million people aged 15-64 living with Human Immunodeficiency Virus (HIV) (KAIS, 2007), and the prevalent is concentrated in key populations that have a great risk for infection. Numerous sources of material have been used in recent years to understand the region's HIV epidemic and its determinants. Recognizing the crucial value of monitoring and evaluation as the basis for strategic planning there has been an increased emphasis on reporting quality data in the healthcare industry so as to guide the policy makers and HIV programmes in policy formulation (observing emerging trends) and programme planning and improvement of which it is not being achieved fully (Glynn and McKenna, 2006).

Some of the important data quality issues affecting most facilities are the issue of client's losing follow up soon after they start care and also not being able to link clients found reactive in HIV testing outreaches. Various reasons have been noted in studies done as to why this patients get lost to follow up and include patients being intravenous drug users, not having a health insurance cover, living outside the catchment area, treated with a complex initial HAART regiment, increased age, mortality, self-transfer out, economic difficulties related to costs of transport and care and HIV-related stigma (Schepens et al., 2010, Schoni-Affolter et al., 2011). While reasons for HIV reactive client's poor linkages to care included client's just wanting to confirm their HIV status (cases of repeat testers), clients are already in care elsewhere, competing priorities of providing and caring for families, low health literacy, stigma issues of attending clinic within the same locality they live, denial and disbelief about their HIV reactive status, low education level, no health insurance coverage, mistrust issues of the health care system, and reduced trust in health care providers (Aziz and Smith, 2011).

The poor quality data can have a lot of repercussions especially when it comes to making informed decisions on treatment interventions to a specific population and also funds allocation. If data are not accurate, then wrong impressions and information are being conveyed to the stakeholders (Davis and LaCour, 2001). Lack of quality data can force a facility to redirect its resources e.g. time or money, which could have been used for other activities in improving patient care, in correcting data; reduce a stakeholder confidence and support towards the facility due to the inaccurate reports forwarded to them; make the facilities miss opportunities in identifying areas of strength or gaps in program activities; have facilities make inappropriate decisions based on poor quality data.

To address these issues and improve on the quality of data collected and generated, a quality-control measures is taken in form of using an information technology approach that will correctly identify a patient's current status and improve on quality of data.

1.2   PROBLEM STATEMENT

The overall research problem addressed in this study is that despite an increase in most private organizations and Ministry of Health (MOH) clinics managing HIV programmes in Kenya ensuring that they have high quality data, little has been done to lower the rates of lost to follow up (LTFU) outcomes and improve HIV testing and counseling (HTC) outreach linkages to care. With the continuous collection, analysis and interpretation of HIV/AIDS data needed for the planning, application, and evaluation of the health sector, data is provided to be used for observing emerging trends and making intervention decisions.

Various community-based strategies including community support groups, HIV/AIDS education information relayed through the media, facilities having outreach programmes, adherence counseling at the every visit in the clinic, reaching the clients LTFU through their phones, tracing them back to care either through home visits have been explored in order to minimize the high rates of LTFU rates and increase the rates of linkage to care (Caracciolo. et al., 2010). In spite of all this interventions being explored by facilities, studies carried out have shown that roughly 30% - 69% of clients who enroll in pre-ART and 20%-30% who are initiated on ART get LTFU. Of the LTFU on pre-ART, over 50% get LTFU before their second visit (Hassan et al., 2012). Also in recent Home Based Counseling and Testing (HBTC) projects in rural and urban Kenya show that 42–54% of HIV reactive persons were linked to a HIV clinic within one month after HBTC (Dalal et al., 2013, Medley et al., 2013). All this can lead to incomplete study results, intensified donor's scrutiny, longer clinical research trial periods, more monetary expenditures because extra resources may be dedicated to the recruitment efforts and challenges on reporting of ART programmes. These facts also suggest that there is a critical need for increased efforts of having high quality data on HIV/AIDS.

If the issues of poor quality data are not treated with importance it deserves, then it would lead to poor guidance in policy formulation, programme planning and improvement and compromise a patient's safety.

1.3 PROJECT OBJECTIVES

The aim of the project is to show high accountability by organizations in the health sector, comprising and not limited to MOH, non-governmental, faith based organization and private clinics, that they are able to produce quality data. The specific objectives of the project are to:

a. Determine what are the factors that lead to LTFU and the low rates of linkages to care.
b. To develop a system that has the potential to reduce the rates of LTFU and increase the rates of linkages into care.

1.4   PROJECT ASSUMPTIONS

The project assumptions include:

- Health organizations and patients are willing to participate for the purpose of this research
- Proposed technology for reducing LTFU rates and increasing linkages to care rates will be accepted by the stakeholders

1.5   PROJECT JUSTIFICATION

With the health care industry handling a lot of patients, an introduction of the proposed system will enable programmes and staff to follow up on their clients with ease.

There are several pros to the introduction of the system that include:

- Provide decision makers/stakeholders with trustworthy information for planning, resource allocation, program design, program improvement, and effectiveness of program.
- Rapid update of a patient's current status.
- Cost saving.
- Time saving.
- Show accountability and good governance.
- Monitor progress towards meeting established goals and targets.

1.6 DEFINITIONS OF IMPORTANT TERMS

Lost to follow up (LTFU) - patient not seen for 3 months from the last appointment date

Linkage to care - being able to refer a HIV positive client to a certain facility to start care of which the client abides by and goes to the facility

Care - is an approach that improves the quality of life of patients living with HIV facing the problem associated with HIV/AIDS, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.

HIV counseling and testing (HTC) – it is an approach of testing a client for HIV and counsel them on their status.

Data quality – Accurate and reliable information collected through a monitoring and evaluation data management system

A biometric system – is a pattern recognition system that operates by obtaining biometric data from human beings by digging out features from the acquired data, and comparing this feature set against the template set in the database.

Biometric Encryption (BE) – Is a technique for binding a digital key to a biometric image sample to produce a BE template, without having to store the biometric image itself.

Electronic Patient Records (EPR) - is an electronic record of constant health care of a single individual, provided mainly by one institution i.e. more patients centric.

Electronic Medical Records (EMR) – is an electronic version of paper-based in the clinic that contains medical and treatment history of a patient where the information is managed and consulted by certified medical.

Electronic Health Records (EHR) – is a longitudinal electronic record of patient health information created by one or more encounter in any clinical visit – from cradle to grave.

Interoperability of EHR – as the ability of two or more applications being able to communicate in an effective manner without compromising the content of the EHR that is doing the transmission

Human Immunodeficiency Virus (HIV) – The virus that causes acquired immune deficiency syndrome (AIDS); it replicates in and kills the helper T cells

CHAPTER 2: LITERATURE REVIEW

2.1   OVERVIEW

The literature review was based on identifying and accessing various preliminary or primary sources of relevant information such as HIV programmes reports, online books, journals, articles and other professional publications.

Most of the online references, publications and documentaries used also led to the identification of other recommended secondary sources of information including scholarly books. Most data quality literature indicates that data must not only be of high quality so as to be useful i.e. fit to use. The concept of usefulness is built into the very definition of data quality in Wang and Strong's model in which they define data quality as data that is fit for use by data consumers (Wang and Strong, 1996).

2.2   LOST TO FOLLOW-UP (LTFU)

An important data quality issue that health programs face is the increasing rates of clients who get lost to follow-up (LTFU) right after starting care and follow up. LTFU is one of the five outcomes that are looked at in HIV care i.e. active, stopped treatment, transferred out and died.

LTFU definition varies across the different programs and strategies where it has been defined as, if a patients last visit preceded the closure date of the database by nine months or more (Brinkhof et al., 2010); if a patients last clinic visit occurred at least 6 months before the end of the surveillance period (Van Cutsem et al., 2011); if a patient is absent from clinic for more than 6 months if on combination antiretroviral therapy and more than 12 months if not (Braitstein et al., 2011) . Medecins Sans Frontiers' (Doctors without borders) has also defined LTFU as being more than 2 months late for a scheduled appointment (Chi et al., 2010). NASCOP being the main organ responsible for technical co-ordination of HIV and AIDS programmes in Kenya defines LTFU as patient not seen for 3 months from the last appointment date (NASCOP, 2009).

LTFU is most common in low and middle-income countries (Brinkhof et al., 2010) where majority of population are classed. In Uganda, a study done showed that patients LTFU rated from 16%, 30%, and 39% in a span of 1, 2 and 3 years respectively (Geng et al., 2010). In northwest Ethiopia a study conducted at the University of Gondar Hospital showed that 18.3% of patients started on HAART get LTFU with a high number getting LTFU within the first 3 months (MamoWubshet. et al., 2012). With the high percentages of LTFU being experienced in the various programmes it takes a toll on the quality of data and thus might misinform the policy makers and HIV programmes in policy preparation, programme development and improvement.

Case summaries of Lost to Follow Up

Case Study 1:

A study done in sub-Saharan Africa by Martin W. G. Brinkhof (Brinkhof et al., 2010) and others was looking at sensitivity analyses adjusting estimates of cumulative mortality during the first year of ART for the excess risk of death in those LTFU. The study was conducted in Kenya, South Africa, Cote d'Ivoire and Malawi in the low and middle-income areas. They noted that as programmes grow and staff-to-patient ratios decrease the issue of LTFU is growing because staff cannot be involved in finding the patients. Also note that LTFU was a problem when it came to estimating programmes outcome. From the results it showed that 14.3% of the patients in all the

5 programmes were LTFU in their first year of ART. Further analysis done suggested that for each 10% increase in the programme LTFU rate, the odds of deaths amongst patients LTFU was multiplied by 0.67.

It was also shown that in patients LTFU, mortality was increased by 27% to 73% in general, and 26% to 67% in patients at the start of ART, with greater increases in programmes with higher rates of LTFU and after tracing clients, programme mortality increased from 7.1% before to 16.8%. They also indicated that mortality among patients LTFU in ART programmes is high so that deaths reported for patients who remain in care may seriously underestimate mortality among all patients starting ART in a given programme thus increasing bias. When tracing of the LTFU despite efforts by the Health care provider's to trace Deaths among patients LTFU is not a representative of all patients LTFU.

Case Study 2:

A study done in sub-Saharan Africa by Matthias Egger (Egger et al., 2011) and others was looking at how mortality among patients LTFU can be predicted on the basis of studies that traced patients to ascertain their vital status by use of a nomogram and a web-based calculator. The study was conducted in Botswana, Cote d'Ivoire, Kenya, Malawi, Rwanda, Senegal, South Africa, Uganda, Zambia, and Zimbabwe. They developed a nomogram to correct mortality estimates for loss to follow-up, based on the fact that mortality of all patients starting ART in a treatment programme is a weighted average of mortality among patients lost to follow-up and patients remaining in care. They applied the method to 11 ART programmes and of the patients retained in care had a mortality at 1 year of 1.4% to 12.0%; loss to follow-up extended from 2.8% to 28.7%; and the correction factor from 1.2 to 8.0. The absolute difference between uncorrected and corrected mortality at 1 year ranged from 1.6% to 9.8%, and was above 5% in four programmes. The largest difference in mortality was in a programme with 28.7% of patients lost to follow-up at 1 year. They concluded that bias in mortality can be great where LTFU is great thus affecting the decision making of a programs outcome.

Case Study 3:

A study done in South Africa by Gilles Van Cutsem (Van Cutsem et al., 2011) and others were looking at how LTFU is before and after correcting for mortality in a primary care ART programme with linkages to the national vital registration system. In the study patients LTFU with available civil identification numbers were matched with the national vital registration system to ascertain vital status. It was noted that South Africa was the only country in sub-Saharan Africa with a well-functioning vital registration system, with more than 80% of deaths recorded in recent years, thus providing for a unique opportunity to unravel misclassified deaths and true LTFU. Analysis showed that by end of the study period the program had experienced 9.8% LTFU. Of the LTFU only 47% had a civil identification number recorded and 37% of the clients had died after getting LTFU. In conclusion the study demonstrated how the failure to verify deaths in the early months on ART impacts on the reported LTFU on ART.

Studies done have shown that some of the reasons why patients get LTFU are because some patients are (Schepens et al., 2010)

- Intravenous drug users (IDU): this is where clients on care administer, by means of injection, illegal drugs into their bodies through a vein. Studies done have shown that IDU clients were more likely to be LTFU (Mocroft et al., 2008). Some of the clients refer themselves for rehabilitation without informing their current clinics while some might die due to the worsening health conditions.
- Not covered by health insurance: clients who usually pay for their clinic visits services might find that in the long run it being costly. They might give up on coming to the clinics since it's beyond their means or go to other clinics that provide the services free of charge without informing their current clinic.
- Living outside the catchment area: clients who have stigma issues usually come for testing in a clinic that is far from their residence. When they are confirmed HIV reactive, as per protocol they are started on care. But due to the distance between their residence and the clinic and also due to the time of HIV testing, they never disclosed where and why they were coming for testing; they usually do not come back for their scheduled clinics.
- Treated with a complex initial HAART regiment: Some clients who are presented with a complex HAART regimen at time of initiation compared to the clients given simple combination of drugs are 5 times more likely to get LTFU.
- Increased age: due to the increase of responsibilities as one ages, clients are more likely to get LTFU because of the increased responsibilities that go beyond their need of maintaining a healthy life.

Others reasons cited by (Schoni-Affolter et al., 2011) include
- Mortality: Clients with less favorable risk factors at baseline are more likely to be LTFU since when they are diagnosed with HIV as new testers they feel as if they are still doing well. But due to lack of medication their health deteriorates at a faster rate compared to the ones receiving medication and they end up dying.
- Self-transfer out: Most patients who live outside the clinic's catchment area, relocate or go up country, most of the time do not come for an official transfer letter thus for the clinic not to know where exactly the patient is receiving medication. After the stipulated time elapses they are declared LTFU and only after tracking them is when they are reported self-transfer out.
- Economic difficulties related to costs of transport: most of the people living with HIV are within the middle and low class. Some of these patients nearest clinic are not near thus the need of them getting transport to get to the clinic. But due to their financial shortfall, they opt not to come for their clinic visits.
- Care and HIV-related stigma: for clients who live within the clinic's catchment area, sometimes they feel stigmatized and discriminated since they live within the community that the clinic is located. This makes them not to come for clinic visits since the clinic is related with HIV/AIDS.

Various studies have recommended that future research should focus on ways to minimize LTFU rates, as well as on finding factors responsible for the high risk of death in patients who do not remain in care (Brinkhof et al., 2010).

Community-based Interventions have been explored in order to minimize LTFU rates (Caracciolo. et al., 2010).

- Support groups: led by adherence counselors to ensure members were well informed and educated on HIV/AIDS

- Media: Information was communicated in a community radio program about topics of HIV/AIDS and fighting discrimination and stigma associated with HIV/AIDS.

- Outreach programmes: Sensitization programmes in schools and villages on awareness of HIV/AIDS topics. Visited all rural health centers and held educational group health talks

- Community leaders: worked with community leaders (chiefs, village headmen, teachers/lecturers, priests) to disseminate health information.

- Adherence counseling: conducted after pharmacy pickup

Other systems have also been explored in order to reduce LTFU. They include

- Phone calls: being able to print out a list from the database of clients who LTFU and calling them to ascertain their outcomes. Not all patients are tracked down since some of the phone numbers are either not working or the wrong phone number was issued at time of enrollment. As much as the tracing method is effective, the cost per patient returned was high (Rosen and Ketlhapile, 2010).

- Tracing method: tracing patients LTFU either through home visits or linking them through the death registry data to establish the outcome of patients LTFU. It is noted that in many situations, data from dedicated tracing studies are not obtainable and also the national death registers are not filled well.

- Meta method: Mortality among patients LTFU can be calculated using a formula, based on the proportion of patients lost to follow-up in the programme. This is predicted on the basis of published data from similar settings. Brinkhof and colleagues' (Brinkhof et al., 2010) systematic review and meta-regression analysis of studies tracing patients lost to follow-up can be used.

Addressing the LTFU problem

Having the various issues that have been cited in the literature above, this project will create an information system that will address the issues that contribute to LTFU and in the long run improve on data quality. The information system will meet the 7 dimensions of data quality that encompasses also on confidentiality.

The issues will be addressed in the following way:

- For clients who are IDU's, do not have a health insurance, have economic issues in terms of transport, stigma and live outside catchment area, the system will be placed, ideally, in all the health facilities in Kenya so as capture whenever they visits those facilities. These groups of patients mostly self-transfer without a formal transfer letter thus being labeled us LTFU. Since there is no information system linking all this facilities together, the current project will be able to solve this issue.

- For clients who die after being enrolled into care and cannot be traced by facilities to ascertain their vital status, the information system will be placed, ideally, in all mortuaries in Kenya so as to update their current status. This will enable facilities to update outcomes of patients who were presumed LTFU but had died. With the limits of incomplete filled vital registration system (Van Cutsem et al., 2011), the current project will be able to solve this issue by capturing the information real time whenever a body is brought in the morgue.

- Most Electronic Medical Records (EMR) systems have indicators like telephone/mobile number that are collected once a client is enrolled into care. But due to stigma issues, some usually lie and some do

not have a mobile phone or a treatment supporter that you can be able to reach. In case a client gets LTFU it will be impossible to track them. The current project will be able to solve this issue by linking all facilities in Kenya with the information system which will share the necessary information of the said client in case they self-transfer

2.3   LINKAGES TO CARE

HIV counseling and testing (HTC) has been known to reduce the transmission of HIV among individuals diagnosed with the HIV virus and also within discordant couples (Kamenga. et al., 2000, Allen. et al., 1992). In all the facilities that deal with HIV/AIDS this is a point of entry to care and treatment (Wanyenze. et al., 2011). Linkage to care is defined as being able to refer a HIV positive client to a certain facility to start care of which the client abides by and goes to the facility. This is because HTC counselors are not allowed to carry drugs to start the clients from the fields.

There are three different strategies that are used for HTC of which all have high HIV testing acceptance rates

a. Provider-initiated HIV Testing and Counseling (PITC) -

This is a strategy where a health care provider recommends HIV testing and counseling to clients attending the clinic. This strategy has been known to link many HIV positive clients to care since the clients are within the facility. Issues of poor data quality are not experienced using this strategy.

b. Client-initiated HIV Testing and Counseling (CITC) -

This is a strategy where a client is seeking HIV testing and counseling at a clinic. Also this strategy has been known to link many HIV positive clients to care since the clients are within the facility. Issues of poor data quality are not experienced using this strategy.

c. Mobile Outreach (MO) / Home Based Testing and Counseling (HBTC) -

This is a strategy where a health care provider goes for outreaches and to clients home to provide the clients with HIV testing and counseling services. This strategy has a low linkage rate since after a client has been diagnosed HIV positive; they are usually referred to clinics of which they do attend. Most issues in data quality are experienced using this strategy.

Case summaries of Linkages to Care

Case Study 1:

A study done in South Africa by H. van Rooyen (Rooyen et al., 2012) and others were looking at how HBTC could be a platform to achieve high HIV testing coverage, identify HIV reactive persons and actively refer them to HIV care and other outcomes. From the strategy they were able to test 673 adults (inclusion criteria being 18+ years) and 203 were found HIV reactive. The HIV reactive persons were followed up prospectively for a span of 3 months and the counselors were able to link **88%** of the HIV reactive persons to care.

Case Study 2:

A study done in Malawi by Augustine Talumba Choko (Choko et al., 2011) and others were investigating the potential supervised oral HIV self-testing in the HBTC setting. They noted that self-testing raised a number of issues, including the difficulty of successive linkage into HIV/AIDS care. They also noted that the current HTC services in Africa linkages into care are estimated to be less than 50% within 1 year of testing.

Case Study 3:

A study done in Uganda by Henry Tumwebaze (Tumwebaze et al., 2012) and others carried out a study of how HBTC could serve as a platform to provide voluntary testing and awareness of HIV status and achieving linkages to HIV care and evidence-based HIV prevention interventions. They incorporated mobile phone data collection with an electronic triage algorithm to facilitate linkage to HIV prevention and care. In spite of the study experiencing high HIV testing it was noted that HBTC may not be sufficient to inspire early visit in care, and follow-up visits may be needed to facilitate linkages to care.

In terms of data quality, HBTC/MO low linkage to care is viewed as poor data quality since it reflects that not many eligible clients have been started on care yet they were tested HIV reactive and in the long run misinforms decision makers. Facility targets for linking HIV reactive clients are set at 100%.

Reasons given for poor linkages by the Health care provider/counselors include that (Aziz and Smith, 2011):

- Some clients just wanted to confirm their HIV status (cases of repeat testers).
- Some clients are already in care elsewhere.
- Stigma issues of attending clinic within the same locality they live.
- Some clients had competing priorities of providing and caring for families.
- Some clients had low health literacy.
- Some clients were in denial and disbelief about their HIV reactive status.
- Some clients had low education level.
- Some clients had no health insurance coverage.
- Some clients had mistrust issues of the health care system, and a poor trust in health care providers.

Addressing the linkages to care issue

Having the various issues that have been cited in the literature above, this project will create an information system that will address the issues that contribute to low linkages to care and in the long run improve on data quality. The information system will meet the 7 dimensions of data quality that encompasses also on confidentiality.

The issues will be addressed in the following way:

- For clients who pose as new HIV testers and yet in reality they just want to confirm their HIV status and those who are in care elsewhere, the HTC counselor will be having the information system with them for real time data entry and identification of if the client had been tested earlier. This will re-classify them as repeat testers and also be able to link them to the facilities they belong to.

- For clients who go and start care in another facility e.g. Facility B and they had already been tested in another facility e.g. Facility A because of stigma issues, Facility A will be able to know that the said client has started care in Facility B.
- For clients who forget their client unique number that was given at time of outreach testing, the fingerprint template collected at time of outreach registration will automatically identify the client.

2.4   DEFINITION OF DATA QUALITY

Quality is a much more complex term to define than it appears because it depends on the various experts from different fields that do define it. Various definitions have been sited through literature including ISO 8402-1986 standard that defines quality as "the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs" (Arts, 2002). A current ISO Standard for Quality defines quality as "the degree to which a set of inherent characteristics fulfills requirements" (ISO, 2009).

Data is defined as "discrete, objective facts about events" (Davenport and Prusak., 1998).

Data quality refers to accurate and reliable information collected through a monitoring and evaluation data management system.

Data quality is important to HIV/AIDS programs because they are usually results-oriented.

2.5   ABSENCE OF QUALITY DATA

A lack of quality data can hurt a program in several ways. Programs suffering from poor data may:

- Have to use additional resources to correct the data: When clients fail to attend their scheduled clinic and their whereabouts are not known by the Health Care Provider, a Health Care staff will be dedicated to trace down the clients thus buying into their work time and at the point they were supposed to be doing something else. Resources like airtime of making phone calls will be incurred.
- Experience reduced stakeholder confidence and support: Programs have a responsibility of providing different stakeholders e.g. the government, donors, parishes etc. with reports. For reports that are given out to the stakeholders might contain outcomes of patients on care and treatment. If a program has a high rate of lost to follow up it might dent the confidence of the stakeholders.
- Miss opportunities to identify areas of strength or gaps in program activities: With poor data quality, programs will not be able to make informed decisions of their programs. Studies done approximate that 36.9% to 46% of clients traced back are dead (Brinkhof et al., 2010, Van Cutsem et al., 2011). With this they may miss to note that they need to do good health education with the clients and inform them of good adherences on a daily basis.
- Face the undesirable consequences of inappropriate decisions based on poor data.

2.6   DATA QUALITY DIMENSIONS

For the system to be utilized fully with quality data the system should be able to limit the stakeholders to collect information that is regarded as of high quality and also make sure that the systems are well secured. The following dimensions classify data to be of high quality if they are met:

- Accuracy
- Reliability
- Completeness
- Precision
- Timeliness
- Integrity
- Confidential

- Security

2.6.1 Accuracy/Validity

Accuracy refers to "the extent to which data is correct, reliable, and certified free of error" (Wang and Strong, 1996). Data accuracy is the basis of data quality because all the other dimensions matters little if the data is not accurate (E.Olson, 2003). Data considered to be valid have minimal errors and bias.

For example, accuracy can be compromised through transcription errors that can occur if data are inaccurately entered into the system. These are usually accidental mistakes and can occur if someone records information inaccurately or enters the information incorrectly.

Validity can be affected by data that are not whole, timely and exact. Accuracy may be directly affected by manipulation for other aims.

2.6.2 Reliability

Data are reliable when they are measured and collected constantly over time. Reliability of data depends on having a system with consistent protocols and procedures. Reliable data require standardized, written instructions for data collection. A program's data collection procedures should not change according to who is using them, which site is using them, when they are used, or how often they are used. In addition, procedures to correct data errors or deal with missing or incomplete data must be consistent across different sites and time periods.

2.6.3 Completeness

Completeness refers to the "extent to which data is of sufficient breadth, depth, and scope for the task at hand" (Wang and Strong, 1996). For an organization to provide quality services is a function of its ability to achieve the appropriate level of data completeness and in the process fully understand the consumer needs (Brohman et al., 2003).

Completeness means that an information system captures all of the eligible details/variables that are supposed to measure e.g. Gender, Date of birth etc. The resulting data should represent the complete list of all variables and not just a fraction of the list.

Completeness is affected by:

- The extent to which source documents include all relevant and needed information for reporting.
- Timeliness of reports to higher aggregation levels.

Scenario: A program site's data will be incomplete if it does not include information about all of the clients served, all of the services provided to the client, or all of the activities undertaken. A program's aggregate data will not be complete if data from only 90 of 100 sites are included.

2.6.4 Precision

Precision means that data have sufficient detail to measure indicators.

Scenario: A desired indicator could require the number of individuals who received HIV testing by sex of the individual. The information system lacks precision if it is not designed to record the sex of individuals who receive HIV testing.

When data are more detailed, they are more precise which positively impacts data quality in being able to adequately represent program activities.

Precision will also help answer the questions that are important to the stakeholders. This requires that the data collection forms are designed to collect precise data and that the appropriate level of detail is reported to higher levels.

2.6.5 Timeliness

Data are timely when they are reported to the next level in time to meet reporting deadlines. "On time" implies that the data reported were able to be used in the summary report prepared by the next highest reporting level.

Scenario: Reports from programs are due to the intermediate level on the 5th day of the month for the previous month, and the report from the intermediate level is due to the M&E Unit on the 10th day of the month, and the M&E Unit prepares its report by the last day of the month. Each of these deadlines must be met for the data to be timely.

Timeliness is affected by:

      a. The rate at which the program's information system is updated.

      b. The rate of change of actual program activities.

      c. When the information is actually used or required.

Data should become available on a frequent enough basis so that stakeholders can use the information to make management decisions.

2.6.6 Integrity

Data have integrity when the information system is protected from deliberate bias or manipulation for other reasons.

2.6.7 Confidential

Confidentiality means that clients are assured that their data will be maintained according to national and/or international standards. This means that personal information is not disclosed inappropriately, and that data in hard copy and electronic form are treated with appropriate levels of security.

These measures protect the privacy of the clients served.

To maintain confidentiality, programs should:

    a. Keep paper records in locked cabinets.

    b. Protect electronic files and databases with passwords.

    c. Only allow access to personal data for the staff members who need it.

2.6.8 Security / Privacy

Most EHR systems are not integrated with biometric functionality as these projects will, thus the issue of security and privacy should be addressed.

Although biometric information is much less vulnerable to theft than other authentication controls, they are not safe to this danger. When a biometric identity is stolen, it creates a much bigger problem than that created by the theft of a password or a PIN because it cannot be replaced easily compared to the later.

The main problem in the health sectors concerning security of information is the lack of a cohesive security policy and not technology (BARROWS and CLAYTON, 1995). The following areas of policy identify what builds to a secure information system:

- User authentication before accessing the system.
- Enhanced physical security of the data center.
- Access control to the software's that control the information system and data stored in the repository.
- A delegated personnel responsible for data ownership.
- Data protection policies enhanced for data leaving the system.
- Building security in the information system.
- Enhanced security of patient records stored in hard copies.
- Enhanced network security.
- Patients informed consents.

As much as there are policies to be implemented, also the technical point of view should be addressed. Storage and misuse are the most concerns that trouble individuals when it comes to biometric data. These concerns of protecting biometric templates can be addressed by technologies like biometric cryptosystems and cancelable biometrics which in the long run would improve public confidence and acceptance of biometrics.

A compromise of biometric templates results in permanent loss of a subject's biometrics even if biometric characteristics are largely immutable. A comparison of biometric templates in encrypted domain is not supported by standard encryption algorithms thus leaving biometric templates exposed during every authentication attempt (Jain et al., 2008). Numerous algorithms are provided to secure any kind of crucial information by conventional cryptosystems.

Biometric template protection schemes/ helper data-based schemes are commonly categorized as biometric cryptosystems and cancelable biometrics/ feature transformation are designed to meet two major requirements of biometric information protection i.e.

- Irreversibility: It should be tough to reconstruct the original biometric template from the stored biometric template while it should be easy to generate the protected biometric template.
- Unlink-ability: Protected biometric templates can be generated based on the same biometric data while protected templates should not allow cross- matching.

Biometric cryptosystems (encryption) is a technique for binding a digital key to a biometric image sample to produce a BE template, without having to store the biometric image itself. What is stored is the BE template. The digital key is randomly generated during enrolment and can be regenerated several times on presentation of a live sample during verification. The live sample therefore serves as the decryption key, if the sample is correct, a key is generated otherwise no key is generated. The key is completely independent form the biometric image and can be changed. (Cavoukian. and Stoianov, 2009). They require the storage of biometric dependent public information, applied to generate or retrieve keys (helper data) (Jain et al., 2008). Not all biometric extract keys directly. Helper data, which must not expose significant information about original biometric templates, assists in rebuilding keys. Biometric comparisons are accomplished indirectly by verifying key validities, where the output of an authentication process is either a failure message or a key. Since the verification of keys represents a biometric comparison in encrypted domain (Jain et al., 2005), biometric cryptosystems are applied as a means of biometric template protection (Jain et al., 2008), in addition to providing biometric-dependent key release.

Based on how helper data are derived, biometric cryptosystems are classified as:

- Key-generation system: Helper data are derived only from the biometric template. Keys are directly created from the helper data and a given biometric sample while the storage of helper data is not obligatory (Jain et al., 2008). In case of a compromise the keys are not updatable because the helper is not stored.

- Key-binding systems: Helper data are obtained by binding a chosen key to a biometric template (ULUDAG. et al., 2004). As a result of the binding process, a coalition of the secret key and the biometric template is stored as helper data. Cryptographic keys are revocable because they are independent of the biometric features while an update of the key usually requires re-enrollment in order to generate new helper data.

- Key-release schemes represent a loose coupling of biometric authentication and key-release (ULUDAG. et al., 2004). When a successful biometric authentication occurs, a cryptographic key-release mechanism is initiated thus allowing exchange of both components easily. This exchange of components opens up avenues for an attack thus making the key-release schemes not to fit into the requirements of a biometric template protection.

Other approaches have been proposed into the making of a biometric cryptosystems:

- Password hardening – this technique improves the security of password-based applications by incorporating biometric information into the password (Monrose. et al., 1999).

- Bio-Hashing – this technique operates as key-binding scheme, nevertheless, to create biometric hashes secret user-specific tokens (unlike public helper data) have to be presented at authentication. Preceding the key-binding step, secret tokens are combined with biometric data to develop a distorted biometric template (Goh and Ngo, 2003).

- Multi- biometric cryptosystems and hybrid- biometric cryptosystems – this technique involves employing several different biometric traits to generate cryptographic keys.
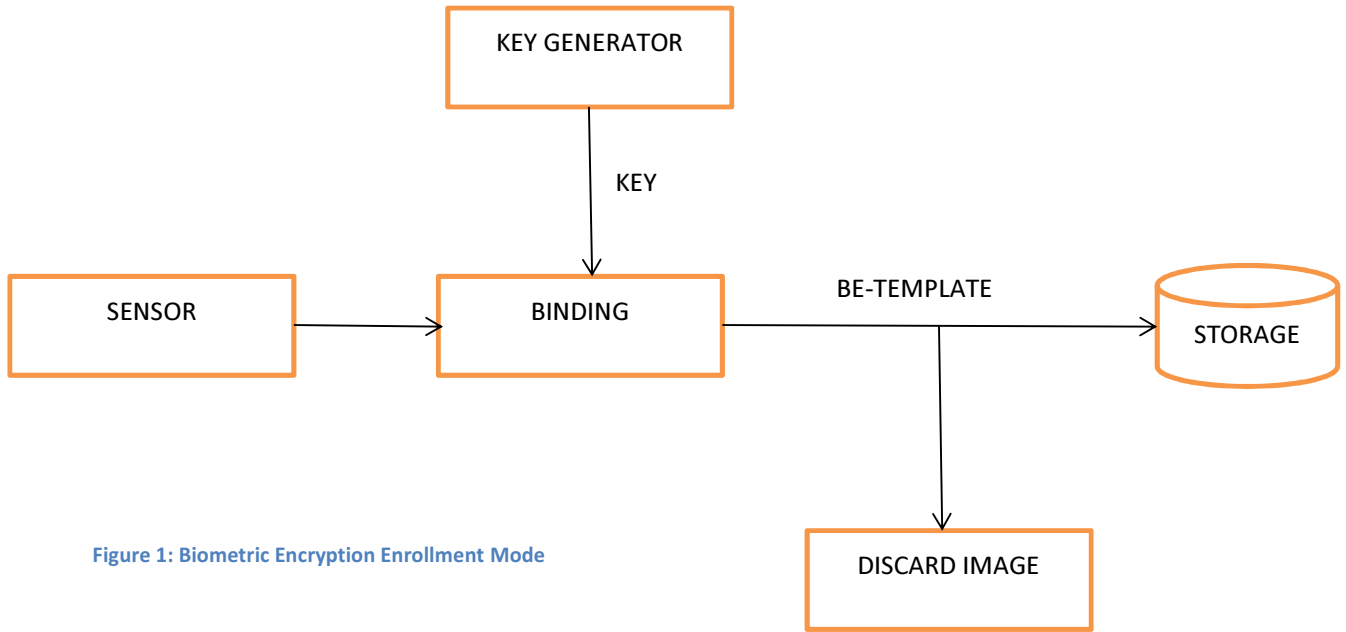
Figure 1: Biometric Encryption Enrollment Mode
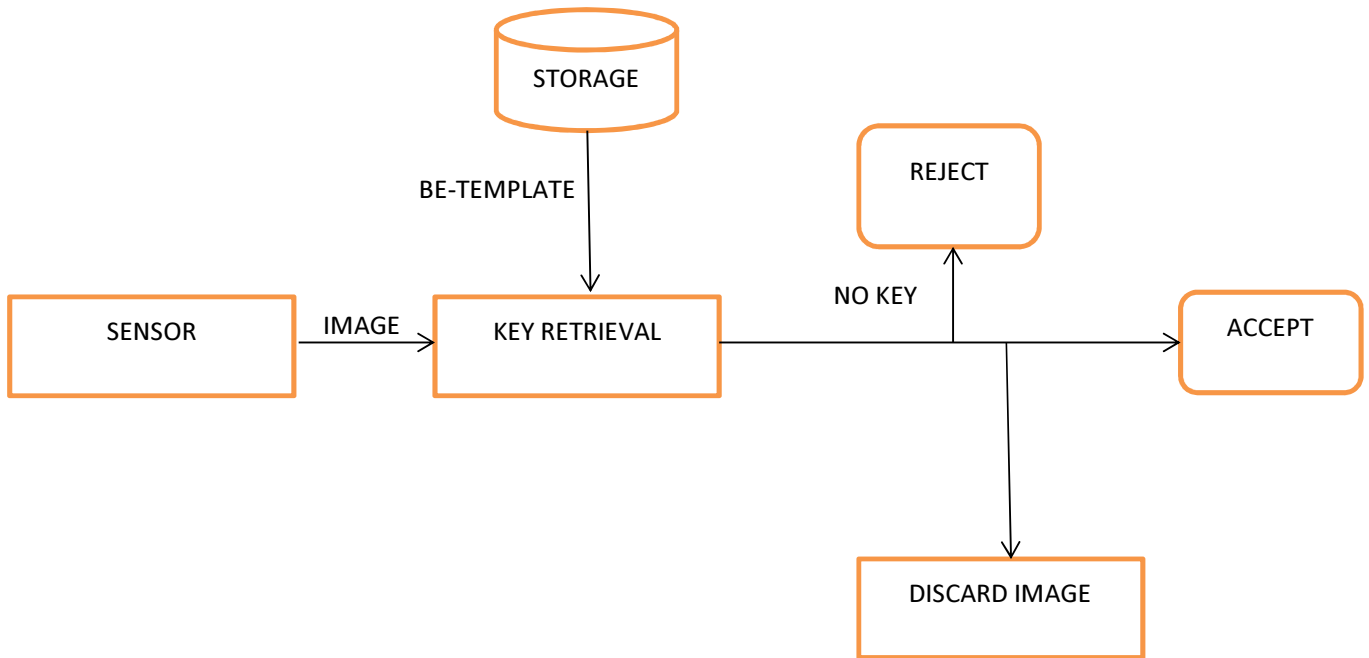
Cancelable biometrics consists of intended, repeatable distortions of biometric signals based on transforms which provide a comparison of biometric templates in the transformed domain (Li and Jain, 2009). The transforms are designed in a way that it should be computationally hard to recover the original biometric data thus making it unlink-able. In case transformed biometric data are compromised, the biometric template is updated. During enrollment, the input biometric image is subjected to a known distortion controlled by a set of distortion parameters. The distortion biometric sample can be processed with standard biometric algorithms, which are unaware that the samples offered to them are distorted. During matching, the live biometric sample must be distorted in exactly the same way; otherwise it cannot match the enrolled sample. This distortion must also fulfill the constraint that multiple distortion profiles cannot match. Thus the cancelable nature of this scheme is provided by the distortion, in that it is not the user actual biometric, which is stored, but simply one of an arbitrarily large number of possible permutations (Li and Jain, 2009).

Cancelable biometrics can be categorized into:

- Biometric salting: this refers to transforms of biometric templates which are selected to be invertible. The parameters of the transform have to be kept secret. While approaches to biometric salting may maintain the recognition performance of biometric systems non-invertible transforms provide higher security (Jain et al., 2008).

- Non-invertible transforms: this technique applies a function of noninvertible to biometric data to transform the data. This technique limits attackers not to reconstruct the entire biometric data even if transforms are compromised unlike the biometric salting technique. This technique though produces a reduction of performance by loss of accuracy (biometric templates are difficult to align).

Cancelable biometrics is similar in some way to biometric encryption, but differs primarily in that the goal of cancelable biometric scheme is a match/non-matching decision, while biometric encryption releases an encoded token or cryptographic key.

Cancelable biometrics has its own pitfalls in spite of its promising approach:
- There is very little work of analyzing their security.
- No detailed proposed scheme has the property of non-invertible distortion.
- It is difficult to implement the scheme in an untrusted scenario for which it has been proposed.
- The security depends on secure management of the distortion parameters and such keys may not be better protected than passwords and PINs.
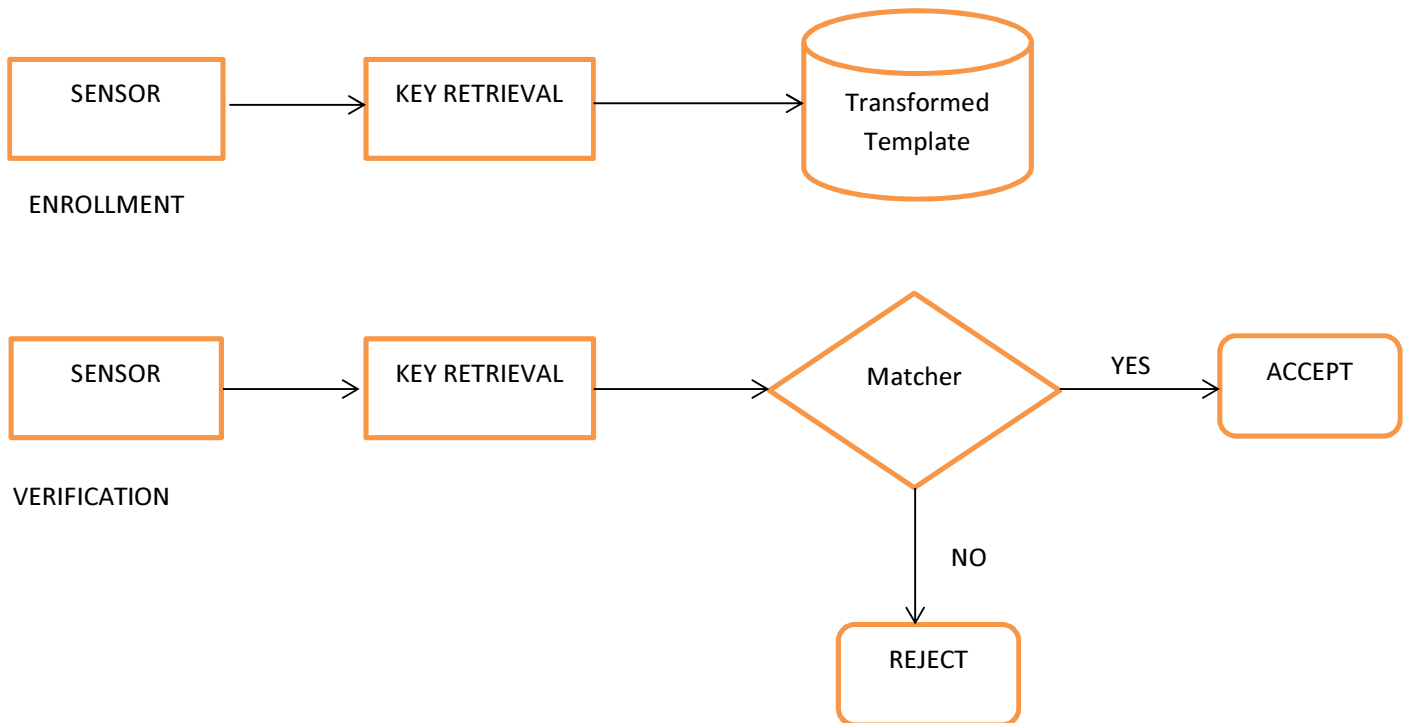
Figure 3: Cancelable biometrics Enrollment and Verification Mode

2.7   PRIVACY AND PERSONAL DATA LAW

Before August 27th, 2010 when Kenya promulgated a new constitution (The Constitution of Kenya, 2010), there was no specific statute in Kenya dealing with data protection or the right of privacy thus sticking to the common law of England which was enforced in 1897. This left a gaping void as far as data protection laws were concerned since the courts had held that there was no common law right to privacy(Kiunuhe, 2010). But with the new constitution, the rights of confidentiality and protection of a person's information have been expressed well. This can be seen under Article 31 where it states "every person has the right to privacy, which includes the right not to have their person, home or property searched; their possessions seized; information relating to their family or private affairs unnecessarily required or revealed; or the privacy of their communications infringed". Also in Article 35, it further states that "every person has the right to the correction or deletion of untrue or misleading information that affects him or her" (Murungi, 2011, National_Council_for_Law_Reporting, 2010). With the stated Articles the key principles that would ensure that confidentiality and protection of a person's information is kept are (Murungi, 2011):

- Purpose and disclosure – personal information should only be used for the purpose for which it has been stated.
- Consent – the information should not be disclosed without the knowledge and consent of the person to whom it relates.
- Access – subjects should be allowed to access their personal information and make corrections to any inaccuracies.
- Accountability – those who collect and manage the information are in an legal relationship with the subjects for which they should be transparent and accountable.
- Security – the information should be kept secure from any potential abuses.
- Notice – persons should be given notice when their data is being collected.

2.8   DATA COLLECTION

Data collection is the process of planning and obtaining useful information on quality indicators that one has chosen. This process helps one to make an informed decision of whether their set objectives are working by looking at the analysis they have analyzed from the data collected. For data to be collected uniformly, the team should come up with a data collection plan that is clearly and explicitly defined before inception of a project. Some of the questions that the plan should answer are:

- Why do we want the data?
- What will we do with the data?
- Where will we collect the data?
- What type of data will we collect?
- Who will collect the data?
- How do we collect the right data?

Data Collection Problems

There are various problems that might be encountered with data collection:

- Not establishing an operational Definitions: Failures to well define what data to collect, when to collect the data, how to collect data and the units of measurement can ruin the whole process of data collection.
- Bias to the process of data collection: The staffs that are collecting data might decide to speed up the collection thus distorting their data and later on return to their old slow ways of collecting data. This data in the long run would be misleading especially when you want to look at a staff's performance.
- Fear: the attitude that data might be used against the staff; they might collect data so as suit their needs.
- Missing data: when collecting data some data might be missed and in the process not recorded in the system.
- Errors in procedures: Staff who does not follow the data collection procedures ends up collecting errors.

Data Collection Methods

There are various types of data collection methods and below is a summary of the description, advantages and disadvantages (Kombo and Tromp, 2006).

Method	Definition	Advantages	Disadvantages
Interviews	Forms which are completed through an interview with the respondent	• Get depth of information • Develop relationships with stakeholders • Can be flexible	• Takes a lot of time • Hard to analyze • Costly • Interviewer bias to responses
Questionnaires, surveys, checklists	Forms which are completed and returned by respondents	• Is confidential • Cheap to administer • Easy to analyze • Administered to many people • Capture lots of data • Adapted into many forms (online, paper, verbal)	• Might not get careful feedback • Bias respondent's answers by question wording • Impersonal • Doesn't always get the full story • Adapting existing surveys takes time
Document review	Collecting data by reviewing existing documents	• Get complete and historical information • Doesn't interrupt strategy or stakeholder's routine in strategy • Information already exists	• Often takes a lot of time • Information can be incomplete • Need to be clear about the data your collecting • Not flexible means to get data
Observation	Direct observing a subject and collecting data on the same so as to understand cause-and-effect relationships	• View operations of a strategy as they are actually occurring • Can adapt to events as they occur	• Can be difficult to interpret seen behaviors • Can be complex to categorize observations • Can influence behaviors of strategy participants • Can be expensive
Focus Groups	A group interview of approximately 6-12 people who share similar characteristics or common interests	• Quickly and reliably get common impressions • Can be efficient way to get a lot of information in a short time • Can produce key information about a strategy	• Can be hard to analyze responses • Need a good facilitator for safety and closure • Difficult to schedule more people together
Case studies	Collecting data about an	• Fully depicts stakeholder's	• Usually quite time consuming

| individual, a small group of participants, or a group as a whole. | experience in strategy input, process and results
 • Powerful means to portray strategy to outsiders | to collect, organize and describe
 • Represents depth of information, rather than breadth. |

Table 1: Data Collection Methods

In health facilities collection of data is a vital activity that has to be undertaken. This will help the facilities in decision making and accountability.

2.9 Electronic Clinical Records Information System (ECR)

Information and Communication Technology (ICT) has improved incredibly in the management of healthcare services. With the large volume of data being produced by clinics, the need of capturing that data electronically would ease their work tremendously. Electronic Clinical Record (ECR) is an electronic way for storing Clinical Information (Nisar and Said, 2011). Most ECR are developed by reflecting to what the paper-based system looks like accumulating all the information. Information collected includes demographic information, such as personal Information for identifying the client, allergies, diagnoses and treatment or medicine. This information can be used in several areas for different purposes.

2.9.1 ECR systems

Electronic Patient Records (EPR)
EPR is an electronic record of constant health care of a single individual, provided mainly by one institution i.e. more patients centric. Most of the EPR systems are not used in hospitals because they are limited.

Electronic Medical Records (EMR)
EMR is an electronic version of paper-based in the clinic that contains medical and treatment history of a patient. This information is managed and consulted by certified medical and staff from a single organization who are involved in the individual's health and care. It is a subset of EHR.

Electronic Health Records (EHR)
EHR is a longitudinal electronic record of patient health information created by one or more encounter in any clinical visit – from cradle to grave. Information collected include a patient's diagnosis, vital signs, problems, past medical history, demographics details, progress details, medications, laboratory results, radiology reports and immunizations. The EHR has the ability to form a full record of a patient encounter, evidence-based decision support and outcomes reporting. It focuses on the total health of the patient i.e. they contain all information from all the physicians that the patient interacts with (data exchange between physicians).

Case summaries of Electronic Health Records
In august 2011 National AIDS & STI Control Programme (NASCOP) carried out a review of EMR systems in Kenya so as to standardize EMR's in Kenya (NASCOP, 2011). They reviewed different EMR's as indicated below

Case Study 1: OpenMRS

The EMR is mainly used in Lumumba Health Center, Rabuor Health Center, Busia District Hospital and Moi Teaching and Referral Hospital just to name a few. OpenMRS was developed by a community of volunteers worldwide from different backgrounds including technology, health care, and international development working to build the world's largest and most flexible technology platform to support delivery of health care in some of the most challenging environments on the planet (OpenMRS, 2013). It was developed as a standalone system using Java-based web application. On the functional area of basic demographics and interoperability OpenMRS scored between 76.2% - 95.2% and 42.5% - 95.2% respectively.

Case Study 2: IQCare

The EMR is mainly used in St. Luke's Hospital, St Joseph Migori Mission Hospital and AIC Kijabe Hospital just to name a few. IQCare is a data capture and reporting system with patient management tools designed to measure patient outcomes, can analyze data and use the resulting analysis to provide improved care (FuturesGroup, 2010). IQCare maintains the dimensions of data quality. It was developed as a standalone system using MS Access. On the functional area of basic demographics IQCare scored 85.7% and 90.3% respectively.

Case Study 3: EDARP HMIS

The EMR is mainly used in Eastern Deanery AIDS Relief Program (EDARP) clinics. EDARP HMIS was developed internally by EDARP's HMIS department to support their HIV treatment projects. It supports clinical care and long-term follow-up of patients, including scheduling of visits; it includes data on medications and investigations and generates reports. It was developed as a standalone system using MS SQL for backend and the VB.net language for frontend. On the functional area of basic demographics and interoperability EDARP HMIS scored 47.6% and 14.3% respectively.

Looking at the different EHR systems that are available in Kenya, their main purpose is to supports clinical care by collection of patents information for decision support of a patient's health as well as the program's progress. They did not score well on the demographics and interoperability functionality, which ideally should be 100%, raising the issues of tracking clients LTFU or not linked to care after testing. This project addresses this issue by incorporating biometrics technology within the EHR system as well as strengthening the interoperability function.

2.9.2 EHR Framework Description

Healthcare generates an enormous volume of data at different clinical environments, at distributed locations and by many different users. In healthcare, it's ideal for a patient care to be shared among several stakeholders/physicians for better and safe management of the particular client of which EHR is the ideal solution (Bisbal and Berry, 2011).

Many approaches have been suggested as to how an EHR must be structured where they do not match especially in their objectives and scope. The most common approach entails a simple EHR that contains a collection of information captured electronically and that can be retrieved for use in a human readable manner (default EHR).

The problem with this approach is that it does not address the shared healthcare issue. The default EHR also has poor standards in terms of data quality, completeness and structure thus the need for a structured approach setup. There are different views in the construction of an EHR system (it's an information system which delivers access to an EHR).

2.9.2.1 Distribution of Data

There are various views in the way data is distributed in the EHR system.

a. Consolidated (Warehouse) approach – it stores all this data in a warehouse which is a part of the EHR. Due to its theoretical simplicity and development sound methodology it is the most commonly used distribution. In spite of its simplicity, the practice has a limitation in that it assumes that the EHR system's own data warehouse will be the only source from which data is distributed from the caregiver. This limitation will hinder the adaptation of this EHR system since the underlying infrastructure will require a lot to be changed in case it has to be adapted. The changes might include wanting to map applications that would allow transfer of data into another warehouse. Other limitations that affect consolidated approach are scalability (in the sense that at time of creating the EHR system, the approach could not scale up in terms of hardware due to the characteristics of clinical data which is heavy e.g. x-ray images) and security (in the sense that it is very risky for confidential data to be located in one system and yet it's being accessed by many users) (ISO, 2004).

b. Federate (virtual) approach – provides a view of the primary data, querying the primary data sources which store all the required information without demanding any changes to the current system. It is a solution to the consolidate approach. The data is updated on a regular basis since it is taken from its primary source. The approach also has limitations since it must address the issue of semantics and syntactic integration and also its performance might be degraded because of the frequent queries to the primary source or data update (ISO, 2004, KOSSMANN, 2000, Zhou et al., 1996).

c. Materialized approach – it is the best approach used that sits in between the federated and consolidated approaches all the data in the EHR is materialized inside its warehouse. It has gained popularity in connection with supporting both single source and integrated source. Comparing to the federated approach, materialized approach can be used especially where connectivity is undependable since response time to queries is high priority (Zhou et al., 1996). This is done by maintaining complex relationships.

For distribution of data, the EHR system can only contain one of the above approaches.

2.9.2.2 Objectives

The following objectives should guide in the making and deployment of an EHR system. The objectives will motivate an organization to implement the system for clinical use:

a. Improved Quality of Care/Patient Safety:
- Overall improved records quality.
- Reduced medical errors e.g. handwriting illegibility.
- Combined patient histories and drug decision support enable clinicians to precisely prescribe and administer medication.
- Enable the clinicians to electronically generate and transmit prescriptions related information.

- Electronic clinical decision support and best practices in the clinician's hands at the point of care facilitate correct diagnoses.
- Automatically generated patient reminders for preventive and follow-up care according to patient references.
- Expanded health promotion, prevention and maintenance activities are possible.
- Enhanced communication with patients.

b. Improved Efficiency:

- Multiple user and location access to patient medical records.
- Time savings - locating, filing and copying requested medical records
- Reduced paperwork and duplicate writing.
- Prompt electronic billing and greater ease in invoicing and payment.
- Enhanced communication.
- It is a secure procedure for saving information and especially through a backup copy.
- It strengthens control system for the clinical record since one can see all the logs of the personnel that are accessing specific records.
- Less administrative work.
- More uniform working practice.

c. Increased Returns:

- Decreased lost returns with accurate coding.
- Removal of medical files storage and medical transcription costs.
- Reduction in paper work purchase.
- Improve services due to health care reminders.
- Increased clinicians productivity that can translate to additional patients seen per day.
- Better control of patient care costs by reducing redundancy of clinical services.
- Office space savings from eliminated files storage.
- Increased staff productivity.

For objectives, the EHR system can contain multiple of the dimensions mentioned above.

2.9.2.3 Model Type

a. Single model approach – this approach is where an EHR system is made from a traditional software methodology e.g. Waterfall to capture clinical data. All the data is captured under one very large data model. The limitation to this approach is that with clinical indicators changing frequently, maintenance becomes an issue to this approach since the upgrade of the system is cumbersome and in the long run the system maybe outdated.

b. Two level/ Adaptive Object Model – this approach encourages a separation between knowledge (this can be formed as an instance of information) and information (this can be represented by a simple data model which is stable over time) instead of capturing all the clinical data in one data model. Since knowledge is an instance of information (reference model – only infers) no changes will be required in case there is a clinical upgrade of the EHR system.

For model type, the EHR system can contain multiple of the dimensions mentioned above.

2.9.2.4 Temporal

As cited earlier, an EHR should show historic and detailed information of a patient i.e. from cradle to grave. This will include

a. Retrospective data – looking back at a patients historical records/data (OxfordDictionary, 2013c)

b. Concurrent data – taking a patient vitals and recording them at the same time i.e. they are being served at the same time (OxfordDictionary, 2013a)

c. Prospective data – expecting to take patient vitals in the future e.g. planned interventions, research (OxfordDictionary, 2013b)

For temporal, the EHR system can only contain one of the above approaches.

2.9.2.5 Organization

There are various ways to structure data in an EHR system.

a. Problem oriented – this model organizes patient data according to the list of clinical problems the patient has. This model is preferred by caregivers.

b. Episode oriented – this model organizes patient data according to time line the patient and the clinician interacted.

c. Specialist oriented – this model organizes patient data according to the department the patient is receiving care.

d. Neutral – this model is more flexible to the users since is up to the users who will define how the data is going to be organized according to their specific needs.

For organization, the EHR system can contain multiple of the dimensions mentioned above.

2.9.2.6 Functionality

A committee of the Institute of Medicine of the National Academies identified a set of care delivery functions that EHR systems should be capable of performing in order to promote greater safety, quality and efficiency in health care delivery (IOM, 2003).

a. Health information and data – An EHR system must comprise of certain patient data e.g. demographics, vitals, medications taken, diagnoses and lab test results.

b. Results management – Electronically managing test results improves quality of care. Easy access of results by clinicians to help in making sound medical judgment.

c. Order Entry/Order Management – electronic order entry can help to eliminate lost orders and reduce ineligible handwriting, prevent duplicate orders and reduce time to fill the order.

d. Decision Support – Reminder systems enhance clinical performance, alerts systems in case a patient has an adverse drug reaction at time of prescribing.

e. Electronic Communication and Connectivity –Emails and chatting utilities is an effective means of communication between the clinicians in case they want to consult each other and also between clinicians and patients.

f. Patient Support –Patient education through a computer has been found to be successful in primary care.

g. Administrative Processes- computerized scheduling systems increase the efficiency of organizations in planning for the upcoming clinics.

h. Reporting and Population Health Management –having automated reports for patient's safety, quality of care and public health.

2.9.2.7 Uses

When an EHR system is being developed, its main objective is that it was going to be used for something. The use to which an EHR system is to be put influences how it is going to be developed.

a. Deliver health care – this is one of the systems main objectives i.e. to provide care to patients. This helps the clinicians to make informed decisions about a patient's healthcare easily by either retrieving past history quickly, knowing if a client has an allergy to specific drugs before prescribing, alerts of if a client has LTFU and needs to be traced etc.

b. Personal health care – this is the approach of giving the responsibility to the patient to manage their own health i.e. health self-management. It has its own limitations in that the data stored in the EHR might not be as valid compared to the data that might have been collected by a profession like a clinician.

c. Research – an EHR can also be used for systematic investigation to establish facts. The data that is stored in the EHR can be analyzed and facts be inferred from the results.

d. Public health and policy – the EHR holds valuable information about population health status that would lead the health policy makers on how to allocate resources in which criteria. The issue of confidentiality should be accounted for before the data is released for public consumption.

e. Administrative purpose – the EHR can be used for organizational reasons in such a way that the administration can countercheck how their employees (clinicians) are attending to the patients. The limitation that this approach receives is that it receives opposition from the clinicians since the EHR is viewed much as an administrative tool than a clinical tool.

2.9.2.8 Interoperability

Interoperability of EHR is defined as the ability of two or more applications being able to communicate in an effective manner without compromising the content of the EHR that is doing the transmission (Begoyan, 2007, Dobrev et al., 2009, Garde et al., 2007, Optum, 2012, Simona et al., 2009). Different literatures have shown that it is important to develop the standards for EHR interoperability so as to be able to

- share patient health information between health professionals in a multidisciplinary shared-care environment
- share patient health information between organizations
- support interoperability between software from different vendors

EHR systems are designed in different ways of interoperability

a. Not interoperable – currently most of the EHR systems in existence do not support interoperability. Their main objective is just to collect medical data and help in making medical and program decisions. This would be a big limitation since if a patient would seek care from another provider then it would be impossible for the providers to exchange electronic data (Bisbal and Berry, 2011).

b. Functional interoperability – deals with the exchange of information between two or more systems in a format that is readable by humans (Begoyan, 2007). HL7 standards represent the approach of functional interoperability. It requires the systems that are exchanging information to agree on the exact structure of exchange and the meaning of the data being exchanged thus functional interoperability might not serve this approach. There is no one single universal standard for exchange of information but HL7v2.x might represent such an approach even though HL7v2.x has vague definitions and

optional information elements. Interoperability should be enforced by agreeing on meaning and by precise document contents.

c. Semantic interoperability – deals with the exchange of information between systems in a format that is computer process-able by the receiving system (Begoyan, 2007). This approach is compared on a qualitative manner because of standardized terminologies.

For interoperability, the EHR system can only contain one of the above approaches.

There are various bodies of EHR interoperability standards:

i. ANSI X12 (EDI) – transaction protocols used for transmitting patient data. Popular in the United States for transmission of billing data.

ii. European Committee for Standardization (CEN) - involved in developing multi-disciplinary standards including health care systems and their interoperability. CEN's TC/251 provides EHR standards in Europe including:

- CEN 13606, communication standards for EHR information. It consists of a Reference Model, an Archetype Interchange Specification, a Reference Archetypes and Term Lists, Security Features, and Exchange Models. The standard defines architecture for communicating part or all of the EHRs of a single patient, making sure that the original clinical meaning intended by the author of the record is preserved and the confidentiality of the data as intended by the author and the patient is not breached. It does not specify the internal structure or database design/schema of the EHR.

- CONTSYS (EN 13940), supports continuity of care record standardization.

- HISA (EN 12967), a services standard for inter-system communication in a clinical information environment.

iii. Continuity of Care Record- ASTM International Continuity of Care Record standard

iv. Digital Imaging and Communications in Medicine (DICOM) - an international communications protocol standard for representing and transmitting radiology (and other) image-based data, supported by NEMA (National Electrical Manufacturers Association). It uses binary encoding with hierarchical lists of data elements identified by numerical tags and a complex DICOM-specific application level network protocol. There are two DICOM-based EHR standards available:

- Web Access to DICOM Persistent Objects (WADO) - standard was created to enable and maintain international standards for the communication of biomedical diagnostic and therapeutic information in disciplines that use digital images and associated data.

- DICOM Structured Reporting - is a general model for encoding medical reports in a structured way. It specifies a document structure along with its class definitions and constraints for different medical applications. It defines templates that need to be used for this purpose. The collection of the standard templates, context groups and codes is called the DICOM Content Mapping Resource.

v. Health Level Seven (HL7) - a standardized messaging and text communications protocol between hospital and EHR systems, and between practice management systems. It covers America, some European and Asian countries and Australia. HL7 standards include

- HL7 Version2 – it is limited to the exchange of messages between EHR systems. It was not developed following any methodology to ensure that all parts of the standard are developed consistently. It is not successful in interoperability because of lack of a precisely defined underlying information model structure, plus definitions for many data fields are vague and overloaded with optional data fields (EICHELBERG et al., 2005). However, they allow greater flexibility. For interoperability, applications participating in communication must have mutual agreements.

- HL7 Version3 – It is an improvement of HL7 version2. It is focused on specific contexts, terminology, models and conceptual definitions and relationships. Its underlying information model, called the Reference Information Model (RIM), is object oriented and the proposal for the Clinical Document Architecture (CDA) for exchanging clinical documents across healthcare systems uses Extensible Markup Language (XML) to encode the documents. Thus the CDA defines the structure and semantics of medical documents that are to be exchanged and CDA documents use data types specified in the HL7 RIM.

vi. International Organization for Standardization (ISO) - produces EHR standards that are limited to the structure and function of the EHR and the system that processes EHR i.e. its main purpose is to achieve interoperability between independent health systems. Within ISO there are various standards that concern the EHR interoperability:

- ISO/TR 20514 - it defines the content of the EHR, its structure and the context in which the EHR is used. It also gives definitions of the terminology used. It allows the broadest applicability of the given EHR structure to a wide range of existing and future types of EHRs and EHR systems.

  The sharing of EHR information can take place at three different levels:

  LEVEL1 is between different clinicians in different fields, who could be using the same application but require different or ad hoc organization of EHRs (Begoyan, 2007, ISO, 2005).

  LEVEL2 is between different applications at a single EHR node.

  LEVEL3 is across different EHR nodes.

  NB: EHR node is a physical location where EHRs are stored and maintained.

- ISO/TS 18308 – It gives requirements for the architecture of EHR systems and not the specification for such architectures. It specifies the assembling and collating of clinical and technical requirements for EHR architecture to support usage, sharing and exchanging of EHRs across different countries, different health sectors and different models of healthcare delivery (Hughes, 2006, Begoyan, 2007, ISO, 2005).

- ISO TR 18307 - It describes the main requirements for achieving interoperability and compatibility in trusted health information interchange between software applications and systems in healthcare. It specifies the interoperability needs of the healthcare community for the subject of care, the healthcare professional, the healthcare provider organization, its business units and the incorporated delivery network. It also provides a criterion for developers and implementers of standards for messaging and communication in the healthcare

domain. It lays down the foundation for the health information interchange to be as trustful as possible (Begoyan, 2007).

In many studies it has been noted that interoperability is the most significant challenge still to be addressed by the research community (Bisbal and Berry, 2011). In the NASCOP report on EMR systems out of the 18 systems that were reviewed, only 6 systems had a score of between 14.3% - 71.4% while the rest scored 0% (NASCOP, 2011). This project will try to address the issue of interoperability so that it can be able to communicate with other systems and be able to produce quality data by means of tracking the patients who are LTFU or not linked to care. As many literatures have cited, it is not good to favor one standard over the other since they are all quite similar in what they cover but HL7 version3 interoperability standard is considered to be the foundation of future integrated healthcare systems of which this project will integrate this in the system.

Views	Choices
Distribution of data	• Consolidated (warehouse) approach • Federate (virtual) approach • Materialized approach
Objectives	• Improved Quality of Care/Patient Safety • Improved Efficiency • Increased Returns
Model type	• Single model approach • Two level/ Adaptive Object Model
Temporal	• Retrospective data • Concurrent data • Prospective data
Organization	• Problem oriented • Episode oriented • Specialist oriented • Neutral
Functionality	• Health information and data • Results management • Reporting and Population Health Management • Administrative Processes • Patient Support • Electronic Communication and Connectivity • Decision Support • Order Entry/Order Management
Uses	• Deliver health care • Personal health care • Research • Public health and policy

	• Administrative purpose	
Interoperability	• Not interoperable	
	• Functional interoperability	
	• Semantic interoperability	

Table 2: EHR framework summary

2.10   BIOMETRICS

Biometrics is supported by nearly 70% of consumers worldwide (Kumar and Ryu, 2009). The biometric technology has been implemented in various places spanning from retail shops in order for consumers to pay for goods and services, schools in order to keep away intruders and also buy food in the cafeteria, companies to clock in and clock out their staff movement and to access buildings, libraries to check out library books and in the health sector to uniquely identify a patient.

A biometric system is a pattern recognition system. It operates by obtaining biometric data from human beings either through behavioral or biologically by digging out features from the acquired data, and comparing this feature set against the template set in the database (Kumar and Ryu, 2009, Kanak, 2004, Matsumoto et al., 2002, Rathgeb and Uhl, 2011).

Biometric modes

A biometric system can operate in either of the following modes

Identification mode: The biometric system recognizes a human being by searching the templates of all the users in the database for a match by conducting a one-to-many comparison to establish an individual's identity or fails without the subject having to claim an identity. There are two types of identification i.e. negative recognition (identification where the system establishes whether the person is who he/she denies to be thus preventing a single person from using multiple identities) and positive recognition (identification where the user is not required to claim an identity by use of PINs, passwords, keys, and tokens) (Kumar and Ryu, 2009).

Verification mode: The biometric system validates a human being by comparing the captured biometric data with the biometric template stored in the database. Identification is done through a PINs, passwords, keys, and tokens, and the system conducts a one-to-one comparison to determine whether the claim is true or not i.e. positive recognition, to avoid multiple people from using the same identity (Kumar and Ryu, 2009).

Biometric System Performance and Accuracy

Parameters that are involved in evaluating biometric system performance and accuracy are:

- False Accept Rate (FAR)/False Match/Type 1 error – this happens when an imposter is mistakenly recognized as genuine (Ashbourn, 2004).
- False Reject Rate (FRR)/ False Non-Match/ Type 2 error – this happens when a genuine individual is mistakenly recognized as an imposter. False non-matches typically result in the user being locked out of the system. These can occur because of changes in a user's biometric data, changes in how the biometric data is presented, and/or changes in the environment. Biometric systems are generally more susceptible to false rejects than they are to false accepts (Ashbourn, 2004).

Other important metrics in the biometric system include:

- Crossover Error Rate (CER)/ Equal Error Rate (EER) – this is the intersection of the False Accept and False Reject rates. A lower CER indicates the biometric device is more accurate and reliable than another biometric device with a higher CER (Prabhakar et al., 2003). Increasing the FAR decreases the FRR and vice versa (Rathgeb and Uhl, 2011).

- Failure to Enroll (FTE) – this is where when an individual is unable to enroll their biometric in order to create a template of suitable quality for subsequent automated operation (Ashbourn, 2004). Common reasons for failure to enroll include physical disability and a user whose physiological/behavioral characteristics are less distinctive than average (Ashbourn, 2004).

- Transaction time – this is a theoretical time taken to match the live template against a reference sample (Ashbourn, 2004).

Types of Biometric Identifiers

There are several human distinguishable traits that fit the definition of biometrics given above. In order to be used for recognizing a person, the human trait needs to be unique and not subject to change. Fingerprints, for example, have been used for over one hundred years and, therefore, are generally well accepted as a recognition technology. Other technologies such as face, hand geometry, speaker and iris recognition are also generally accepted. A biometric that would require giving a blood sample for frequent personal verification would probably not be very well accepted.

Performance considerations are important. No biometrics can guarantee one hundred percent accuracy. A brief introduction of the commonly used biometrics is given below:

a. **Deoxyribo Nucleic Acid (DNA)** is a molecule that encodes the genetic instructions (J.D and F.H.C, 1953, Rohs et al., 2010) of a human being that uniquely identifies an individual. Limitations to the DNA technique are:

- Contamination to the samples.
- Sensitivity to the samples.
- Identical twins have identical DNA patterns.
- Automatic real-time recognition issues.
- Privacy issues.

b. **Ear**: literatures have suggested that the shape of the ear and the structure of the cartilaginous tissue of the pinna are distinctive (Kumar and Ryu, 2009). The technology matches the distance of salient points on the pinna from a landmark location on the ear.

c. **Face Recognition**: this approach consists of capturing the face image using a camera. The technology captures key features from the central portion of a facial image extracting these features from the captured image that do not change over time while avoiding superficial features such as facial expressions or hair (Kumar and Ryu, 2009, Matyáš and Říha, 2011).

Benefits of facial recognition include:

- Non-intrusive.
- Hands-free: It is more hygienic compared to fingerprint scanning; No contact required.

- Provides for continuous authentication.
- Accepted by most users.
- Commonly available sensors (cameras).
- Large amounts of existing data to allow background and/or watch list checks.
- Easy for humans to verify results.

Challenges that are encountered with face technology:

- Face can be obstructed by hair, glasses, hats, scarves, etc.
- Sensitive to changes in lighting, expression, and pose.
- Faces change over time as one ages.
- Propensity for users to provide poor-quality video images yet to expect accurate results.

d. **Fingerprints**: this approach consists of capturing the fingertips friction ridges, pores in the skin of the ridges and classify patterns of minutiae (Kumar and Ryu, 2009, Matyáš and Říha, 2011) through a fingerprint reader device into a database. They the oldest and most widely recognized biometric markers.

Benefits of fingerprint recognition:

- Devices are widely available at a low cost.
- It is easy to integrate the biometric system into other small computer peripheral devices e.g. keyboard.
- The fingers patterns are unique to everybody even to the identical twins unlike the case of DNA identification.
- Subjects have multiple fingers thus increase system accuracy and flexibility.
- Easy to use, with some training.
- Some systems require little space.
- Large amounts of existing data to allow background and/or watch list checks.
- Has proven effective in many large scale systems over years of use.
- Fingerprints are unique to each finger of each individual and the ridge arrangement remains permanent during one's lifetime.
- It can be used in a range of environment.
- It is a mature and proven core technology capable of high level accuracy.

Challenges that are encountered with fingerprint technology (Napua, 2011):

- Individuals that have poorly defined ridges in their fingerprints.
- The fingerprint area gets injured.
- Elderly people.
- Workers in some type of jobs.
- Dry fingers.
- Worn fingers.
- Public Views
  - Privacy concerns of criminal associations.
  - Health concerns with touching a sensor used by countless subjects.

- Collection of high quality nail-to-nail images requires training and skill, but current flat reader technology is very robust.

e. **Gait**: Gait is the peculiar way one walks. In spite of Gait not being very unique, it is sufficiently biased to allow identification of a human being.

Challenges that are encountered with gait biometric technology:

- The feature might not remain constant over a long period of time, due to fluctuations in body weight, injuries involving joints or brain, or due to drunkenness (Kumar and Ryu, 2009).

f. **Hand Geometry**: Hand recognition involves measuring of the physical features of the fingers or the hand such as width, length, thickness and surface area of the hand (Napua, 2011, Kumar and Ryu, 2009). The biometric technology is mostly used for time and attendance systems and general personal authentication applications.

Benefits of hand scanning:

- Easy to capture.
- Believed to be a highly stable pattern over the adult lifespan.

Challenges that are encountered with hand and finger biometric technology:

- Personal jewelry e.g. rings.
- Inflammation of a joint or joints i.e. arthritis.
- User requires some training.
- Not sufficiently distinctive for identification over large databases.
- System requires a large amount of physical space.

g. **Iris**: is a thin, circular structure in the eye, responsible for controlling the diameter and size of the pupil and it is unique in every human being (Kumar and Ryu, 2009, Napua, 2011).

Benefits of iris scanning:

- Easy to detect in a video picture.
- Does not wear out over lifetime.
- Isolated from the external environment by the cornea; less prone to injury.
- Very unique even for identical twins and also for the two eyes of a single individual.
- They are stable throughout life.
- No contact required.

Challenges that are encountered with iris scanning (Napua, 2011):

- Equipment is very expensive to implement.
- Suffers from social resistance since many people do not like things pointed to their eyes.
- The scans take longer to complete.
- Contact lenses or glaucoma may interfere, requiring re-scans.
- Difficult to capture for some individuals.
- Easily obscured by eyelashes, eyelids, lens and reflections from the cornea.
- Public myths and fears related to "scanning" the eye with a light source.
- Acquisition of an iris image requires more training and attentiveness than most biometrics.

- Lack of existing data deters ability to use for background or watch list checks.
- Cannot be verified by a human.

h. **Retinal Scanning**: Retinal scanning technology involves authentication of the vascular patterns of the retina of the eye by use of a low-intensity e.g. infrared light (Kumar and Ryu, 2009, Matyáš and Říha, 2011).

Benefits of retina scanning:

- They are stable throughout life.

i. **Signature Verification**: Signature verification is based on features such as pressure, speed and angle used when a person signs. This has been viewed as a unique trait amongst human beings and is also used for identification especially in the e-business world (Kumar and Ryu, 2009).

j. **Voice Recognition**: Speech recognition uses the acoustic (learned behavioral patterns and anatomy) features of speech that have been found to differ between individuals (Kumar and Ryu, 2009, Matyáš and Říha, 2011).

Benefits of hand scanning:

- Public acceptance.
- No contact required.
- Commonly available sensors (telephones, microphones).

Challenges that are encountered with voice recognition:

- Background noise.
- Change of voice due to person developing cold.
- Difficult to control sensor and channel variances that significantly impact capabilities.
- Not sufficiently distinctive for identification over large databases.
- It is not stable especially to children and adolescents because as they mature they tend to change their voices.

k. **Palm vein biometrics**: involves shining near-infrared light at a patient's palm where it illuminates a person's veins and produces a photograph of the vein pattern of which is unique per person (Napua, 2011). It is as accurate as iris scanning and more accurate than a fingerprint.

Benefits of Palm vein biometrics:

- Ensures almost zero enrollment failure.
- Completely contactless thus hygienic.

Looking at the various types of biometric identification technologies literature agrees that there is no single biometric technology that meets the needs of all potential recognition application, but for this project, fingerprint scanning is standing out as shown in the table below. The following points point to why the fingerprint scanning is ideal for this project:

- It uniquely identifies an individual more accurately compared to DNA (which can be compromised in the case of identical twins), face and voice recognition (which can change as a person ages).

- It can also uniquely identify a dead body in the mortuary which other systems cannot because they are usable when the person is still alive e.g. palm vein, voice, face, signature, retina, gait and iris biometrics.
- It is less expensive compared to the rest of the scanning technologies.
- It can be easily implemented and integrated in the system compared to the rest of the biometrics.
- It requires less training on how to use it compared to the rest of the biometrics.
- The fingerprint scanning's that will be extracted from the sensor tools will occupy less space in the data storage compared to the rest of the biometric data.
- The finger print scanner being very mobile can be carried with ease to outreaches compared to the rest of the biometric scanners.

The fingerprint is unique in that it basically consists of ridges (raised skin) and furrows (lowered skin) that twist to form a distinct pattern (Kumar and Ryu, 2009). Ridges comprise of the inked imprint of a finger while the furrows comprise of the un-inked areas between the ridges. In spite of ridges being distinctive, minutiae are other features of a fingerprint that are unique. Minutiae consisting of terminations or junctions of the ridges
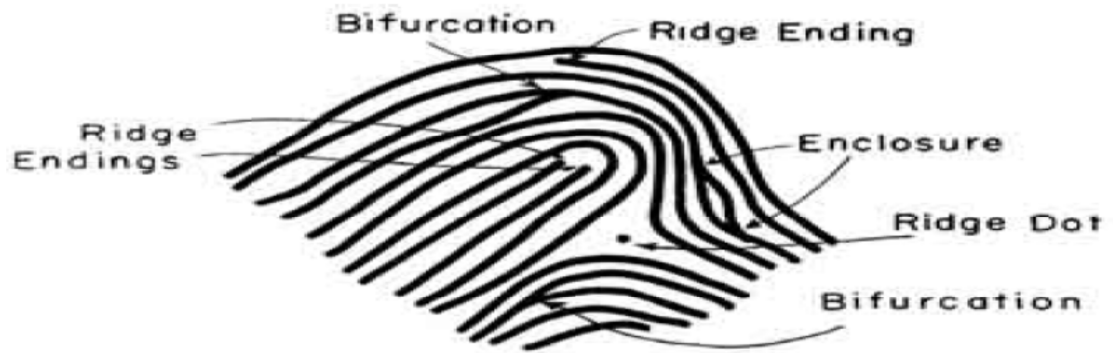
Figure 4: Minutiae example

There are three categories of fingerprints:
- The arch – the pattern is described as where the ridges enter from one side of the finger, rise in the center forming an arc, and then exit the other side of the finger (Lourde and Khosla, 2010).

Figure 5: The arch example

- The loop - the pattern is described as where the ridges enter from one side of a finger, form a curve, and tend to exit from the same side they enter (Lourde and Khosla, 2010).
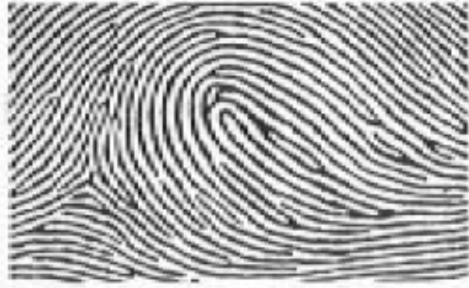
Figure 6: The loop example

- The whorl - the pattern is described as where the ridges form circularly around a central point on the finger (Lourde and Khosla, 2010).

Figure 7: The whorl example

Comparison of Various Biometric Technologies (H = High, M = Medium and L = Low)							
Biometric identifier	Universality	Distinc-tiveness	Perma-nence	Collect-ability	Perfor-mance	Accept-ability	Circum-vention
DNA	H	H	H	L	H	L	L
Ear	M	M	H	M	M	H	M
Face	H	L	M	H	L	H	H
Fingerprint	M	H	H	M	H	M	M
Gait	M	L	L	H	L	H	M
Hand geometry	M	M	M	H	M	M	M
Iris	H	H	H	M	H	L	L
Palm print	M	H	H	M	H	M	M
Retina	H	H	M	L	H	L	L
Signature	L	L	L	H	L	H	H
Voice	M	L	L	M	L	H	H
Source: Anil K. Jain,, "An Introduction to Biometric Recognition," (Jain et al., 2004)							

Table 3: Comparison of Various Biometric Technologies

Biometric Security Threats and Solution

With the level of computer fraud in the increase, the need to solve this issue by a reliable and robust identification, verification or cryptographic techniques is becoming a reality (Alshaikhli and Ahmad, 2011, Kanak, 2004).

Imad F. Alshaikhli analyzed models of biometric security threats as elaborated below and also proposed some solutions to go with it (Alshaikhli and Ahmad, 2011).

a. <u>Threat to biometric input devices</u> – the threat happens at the data capturing stage where an attacker might present a user's biometric templates to fool the system. The attacker must know the user, lift the latent fingerprint from any surface the user touches and accurately make a three-dimensional model of the finger for them to be able to fool the biometric system. Also dead fingers are considered as a threat to the system.
   The solution proposed was
   - A software-based method for fingerprint liveness detection. They used a capacitive sensor and the sole input to the liveness detection module is a 5-second video of the fingerprints. For the static method, the periodicity of sweat pores along the ridges is used for liveness detection. In the dynamic method, sweat diffusion pattern over time along the ridges is measured.
   - For the input and temperature measuring sensors a heart pulses technique to be integrated.

b. <u>Threat to the process of transmitting biometric raw data</u> – the threats occurs when a recorded signal is replayed to the system and resubmitting previously stored digitized biometrics signals bypassing it the data capturing e.g. Presenting of an old copy of a fingerprint image.
   The solution proposed was
   - For validity of biometric data, detection function e.g. encoding should be integrated.
   - Implementing a challenge-response protocol shall be established between the capture device and the signal-processing component in order to detect a replay attack.

c. <u>Threat to the signal-processing component (feature extractor)</u> - the threat occurs when an attacker overrides the feature extraction process by using a Trojan horse. This attack will produce feature sets preselected by the attacker.
   The solution proposed was
   - Introduction of the use of the buffer overflow in the biometric system. Systems that take in data normally buffer its received data to reduce the compromise of the system.

d. <u>Threat to the process of transmitting the extracted biometric template to the comparison component</u> - the threat occurs when an attacker replace the biometric data captured with a fraudulent feature set.
   The solution proposed was
   - Encryption approaches e.g. Sequencing and timestamp

e. <u>Threat to the comparison component (matcher)</u> - The threat occurs when an attacker changes the match score derived from the comparison of the users templates retrieved from the storage component and the data captured of the users template retrieved from the data capturing component in the biometric device.
   The solution proposed was
   - The matcher to reside at a secure location (client side).
   - Match score encryption in the compassion component before transmission.
   - Improve the matching accuracy to help decreasing this attack.
   - Limit attempts prevent this attack effectively.
   - Matching score to be encrypted.

f. <u>Threat to biometric storage component</u> – The threat occurs when an attacker modifies biometric information stored in a server database, which could result either in authorizing a fraudulent individual or denying service to the persons associated with the corrupted template.
   The solution proposed was
   - Have the database resides at a secure location (client side)

- Storing the biometric signal in a long binary data format instead of its original format and template entry is not accessible.

g. <u>Threat to the registration component</u> - The threat occurs when an attacker attacks a registration component by using a Trojan horse, so that it produces feature sets

The solution proposed was

- Introduction of the use of the buffer overflow in the biometric system. Systems that take in data normally buffer its received data to reduce the compromise of the system

h. <u>Threat to the decision component</u> - The threat occurs when an attacker overrides the decision component.

The solution proposed was

- Encrypting the final decision before it is transmitted to the application

i. <u>Threat to the process of transmitting the stored biometric template to the comparison component</u> - The threat occurs when an attacker intercepts and modifies the channel between the stored templates and the comparison

The solution proposed was

- Have the matcher and the database reside at a secure location (client side).
- Encryption approach e.g. Sequencing and timestamp.

j. <u>Threat to the process of transmitting the decision result to an application system</u> - The threat occurs when an attacker intercepts and modifies the channel between the stored templates and the comparison

The solution proposed was

- Encrypting the final decision before it is transmitted to the network

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Design

A research design is defined as an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose (Kombo and Tromp, 2006).

The research design used in this study will be case study as well as a descriptive study. The study aims to collect information from the different programs across Kenya. The research will use both primary and secondary data. Primary data will be collected using questionnaires and interviews while secondary data will be found from the internet through NASCOP and District Health Information Software 2 (DHIS 2) websites. The website will help in knowing the reporting scale of LTFU rates in selected facilities.

For the case study design, an EHR system will be developed and implemented where a small group of participants who are going to use it will double as the system users as well as the clients whose information is collected.

3.2 Target Population

Target population is defined as a selected number of individuals or objects from a population such that the selected group contains elements representative of the population (Kombo and Tromp, 2006).

The target population of this study is the staff members of the hospitals or organizations that deal mainly with HIV/AIDS related programs both in the public and private sectors within Nairobi area. The staff members who will be handed over the questionnaires will include

- The Program managers and/or Monitoring and Evaluation managers of which they will bring insight mainly on how their programs are affected by the issue of poor data quality, figures that can quantify what they are saying as well as other factors.
- The community health workers (CHW) located on the ground will bring insight mainly on how they track clients who have LTFU or have not been linked to care.

3.3 Data Collection Method

Interviews will be conducted with the organizations management so as to gain access to the health facilities to distribute questionnaires. Also the CHW's will be interviewed on how they track clients who have LTFU or have not been linked to care.

Oral discussions will be held to justify the purpose of the project and why the organization should participate.

Self-administered questionnaires will be used for data collection among the Program managers or Monitoring and Evaluation managers. This method was selected because it can reach as many organizations that deal with HIV/AIDS data with ease. The questionnaires will contain qualitative and quantitative questions. Mode of sending the questionnaires will be through emails and also hard copies for the facilities without internet.

3.4 Limitation of the methodology

Most private and Non-Governmental organizations might be reluctant in filling the questionnaires probably because of their confidentiality policies. To solve this issue the organization participating in this project will be educated on the importance of these project, the positive changes it will bring to all the programs if it is implemented and also a confidentiality form will be signed with them of not disclosing any information about their organization when giving out the report.

Also most Government clinics might still be using the MOH registers for recording data and this might pose a problem of knowing exactly which clients are LTFU in case they have not updated the registers. To solve this only facilities with an Electronic Medical Records system will be chosen.

3.5 Data Analysis Method

After the data has been collected through the questionnaires it will be keyed in the Microsoft Access and pulled into STATA 12 for analyses.

3.6 Training of the system users in data collection and management of the EHR

In order to achieve the high data quality, the system users will be trained on how to handle the EHR so that they can be able to use the system to do various data entries.

The activity will be aimed at;

- Providing the necessary skills to the system users in the use of the EHR.

The training will be conducted in one day.

3.7 Implementation of the EHR system
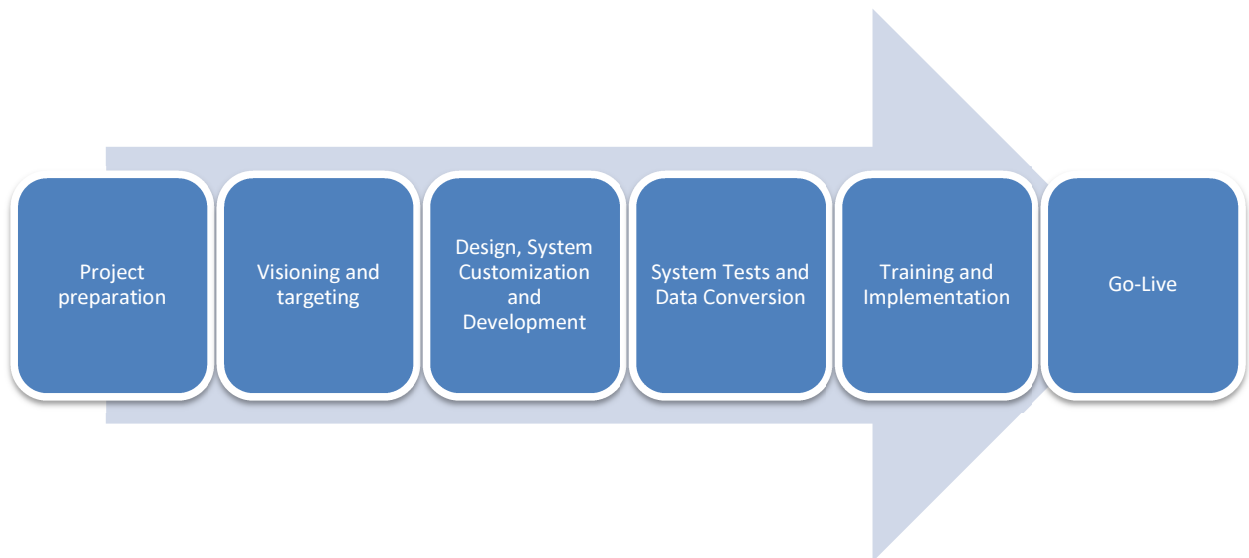
Figure 8: Implementation of the EHR system

Step 1: Project preparation

This phase will involve determining if organizations are ready to make the change to upgrade their current system to a new version that improves on quality. The phase will address the importance of the new version and also determine what is working well and what can be improved. Analysis of existing systems will be done to identify weak points in terms of data quality and this will help in definition of project standards i.e. change management training, technology and system control strategies.

Step 2: Visioning and targeting (defining the user requirements and conceptual design)

Analysis of the current functions and operational processes in terms of ensuring data quality will be carried out in order to know what the project can absorb. Users will also be required to give suggestions on the interface as well as the additional indicators that would suit the EHR.

Step 3: Design, System Customization and Development

A detailed process design, end user training plan and application security techniques will be developed in line with the user suggestions, the standards for data collection tools and standards for EHRs systems. These system modules will be incorporated in the system also to match the organizational conceptual design.

Step 4: System Tests and Data Conversion

The following objectives will be performed in order to achieve the said step:

- Preparation and establishment of a productive environment for the system.
- Testing of all the individual modules and the system as a whole.
- Integration testing to ensure that all the modules are able to function and talk to one another as required.
- Stress/ torture testing - this test will measure how the system functions when subjected to controlled amounts of stress so as to determine the stability of the system.
- User approval testing – the system will be tested by the end user where any feedback for improvement of the system will be forwarded back for final changes before releasing the system.
- System performance testing – this system will determine the speed or effectiveness of the system.

Step 5: Training and Implementation

Installation of the software will be conducted in the selected facilities. Creation of user documents containing user procedures will be implemented. This will help in training the end users and the super users of the system on how to use the system.

Step 6: Go-Live

After all the five steps have been implemented to near success, the system will go live. Initial user and technical support will be given to the users in case of any difficulties of using the system.

Project Plan

The project is expected to begin in 15th February 2013 and run till 26th July 2013. The major project milestones are scheduled to finish before the deadline to allow for any unexpected situations which could slow the project down. Furthermore, the write-up of the project report and user manuals begins very early and continues right to the end of the project to ensure as much writing is completed early. Consultation with the project supervisor will be on a regular basis, especially at the start and end of a major scheduled activity.

Ref	Activity	Due Date
01	Submission of Project proposal to supervisor	15th February 2013
02	Oral presentation of project proposal (Milestone 1)	By 19th March 2013
03	Project implementation	Immediately after Milestone 1
	Resource acquisition installation of software tools	Immediately after Milestone 1
04	Oral presentation of project proposal (Milestone 2)	By 14th June 2013
05	Evaluation, Analysis and conclusion of project	Immediately after Milestone 2
06	Oral presentation of final project proposal (Milestone 3)	By 31st July 2013

Table 4: Project Plan

3.8   System Data\Workflow

Patient Check in process workflow

Patient Check-in Process

Nurse/Provider Workflow
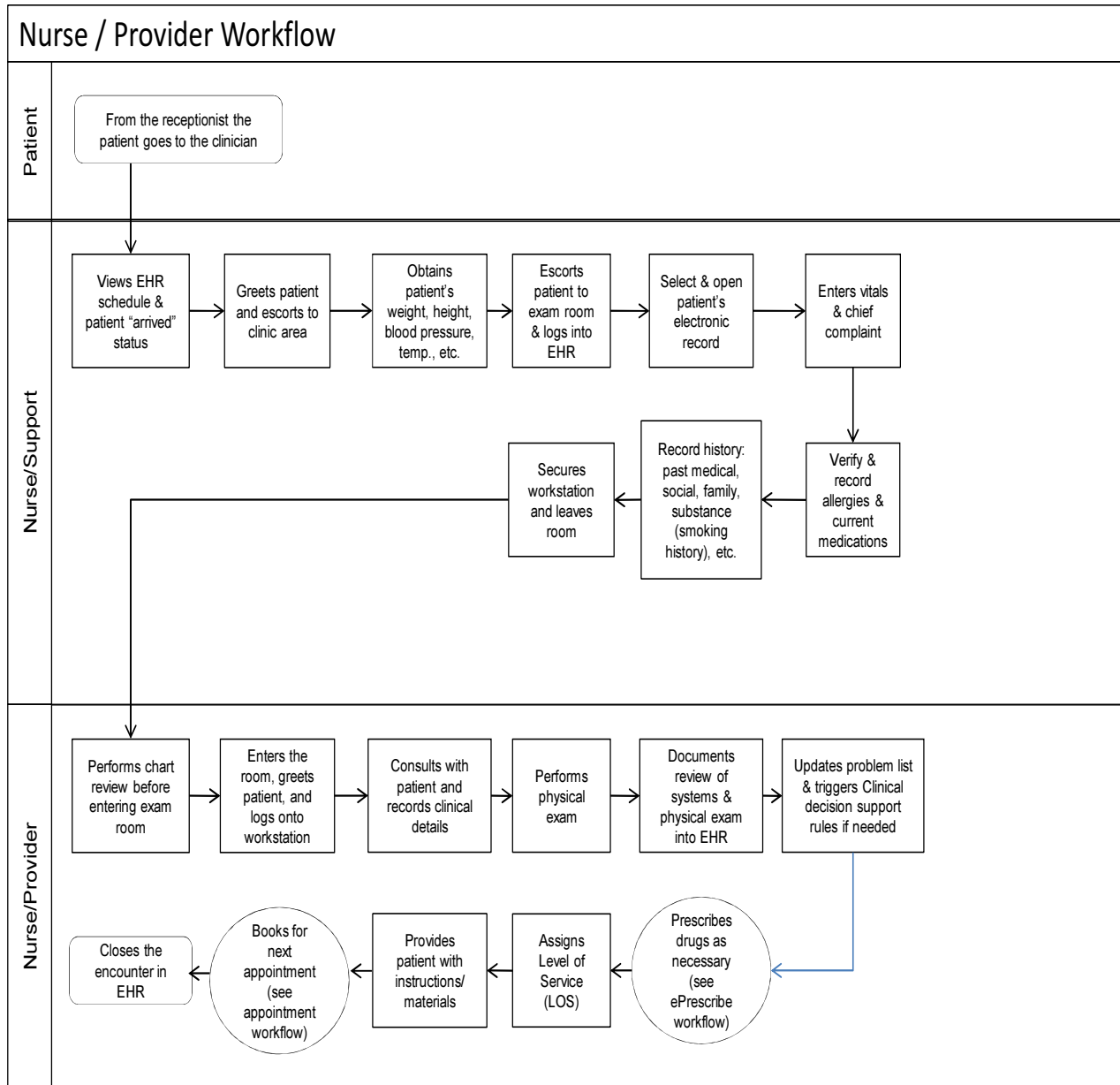
Figure 10: Nurse/Provider Workflow

Appointment Scheduling Workflow
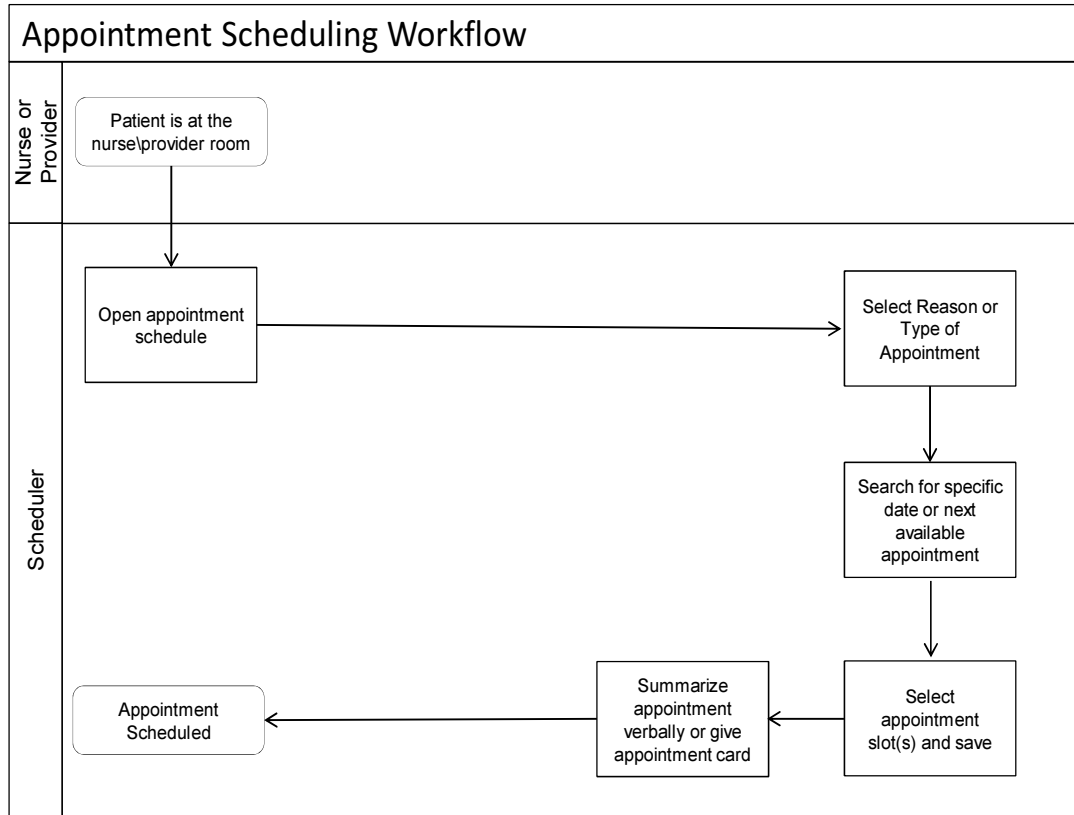
Figure 11: Appointment Scheduling Workflow

CHAPTER 4: ANALYSIS AND DESIGN

4.1 Analysis of the questionnaire

4.1.1 Facility General Information

This section contains general information about the facilities that were handed over the questionnaires

1. The 22 persons interviewed from 17 facilities **job titles** ranged from 5 Data Managers, 3 Nurses in Charge, 2 Program Managers, 2 M&E Manager, 1 M&E Senior Officer, 1 M&E Director, 1 Facility in charge, 1 Facility Coordinator, 5 Community Health Workers and 1 Data Supervisor all with a background of how EHR/EMR systems works and also vast knowledge on data management that span from data reporting, data entry, data cleaning and data quality.

2. Of the 17 facilities which were interviewed most of the facilities were from Non-Governmental sector since most of the Governmental Organization had no EHR/EMR systems with them and hence were excluded from the interviews.
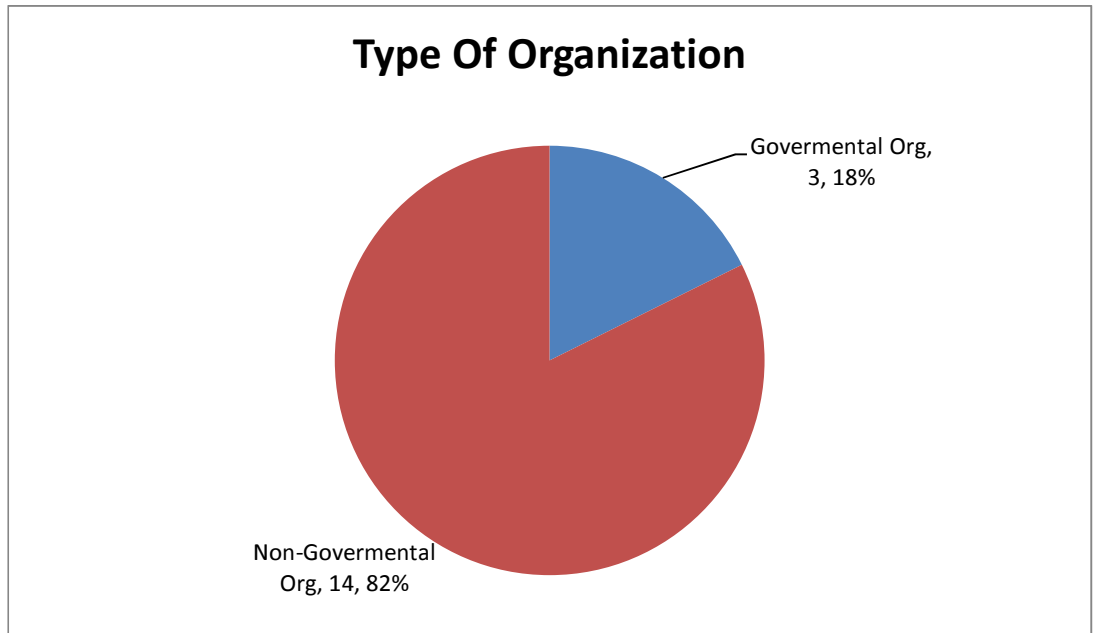
Figure 12: Type of Organization

3. All of these facilities were from Nairobi County.
4. The **type of service** that these facilities offered are as shown below
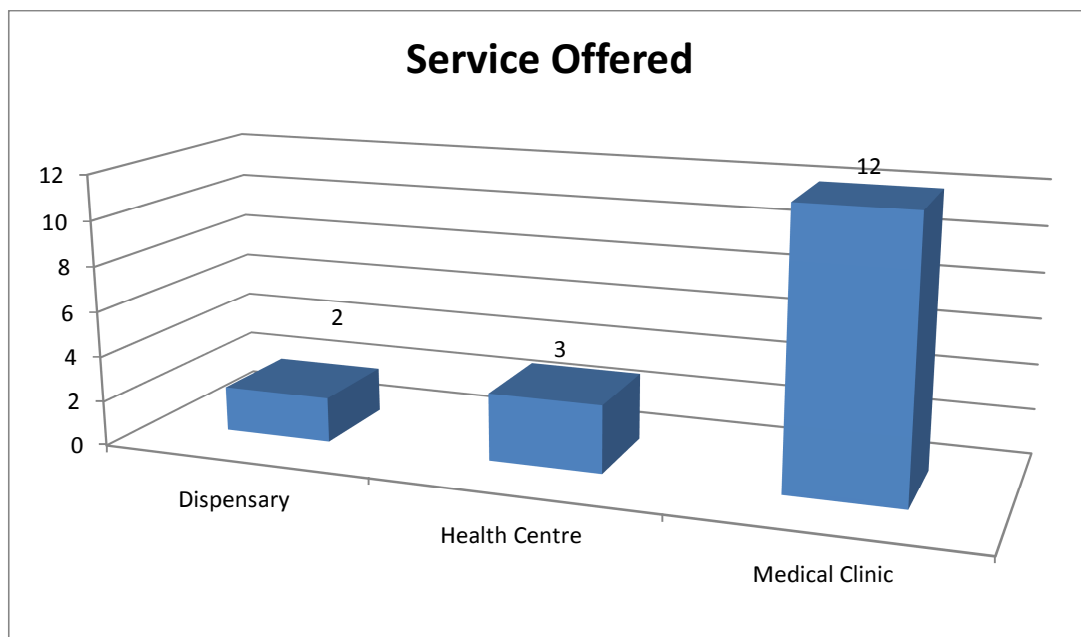
Figure 13: Services Offered

5.   For each of the 17 facilities the reports of **care Program outcomes as at 28th February 2013** was analyzed and the indicators collected were:

- Number of cumulative clients ever in care.
- Number of client's cumulative care Active.
- Number of clients cumulative care Transfer Out.
- Number of clients cumulative care Stopped treatment.
- Number of clients cumulative care Died.
- Number of clients cumulative care Lost to follow up (LTFU).

As a summary of the indicators collected, the number of clients this facilities have ever seen in care as at 28th February 2013 are 64,439. The indicators are as shown below

Care Outcomes   n = 64,439

- Active, 26528, 41%
- LTFU, 23531, 37%
- Transfer Out, 9190, 14%
- Died, 4108, 6%
- Stopped, 1082, 2%
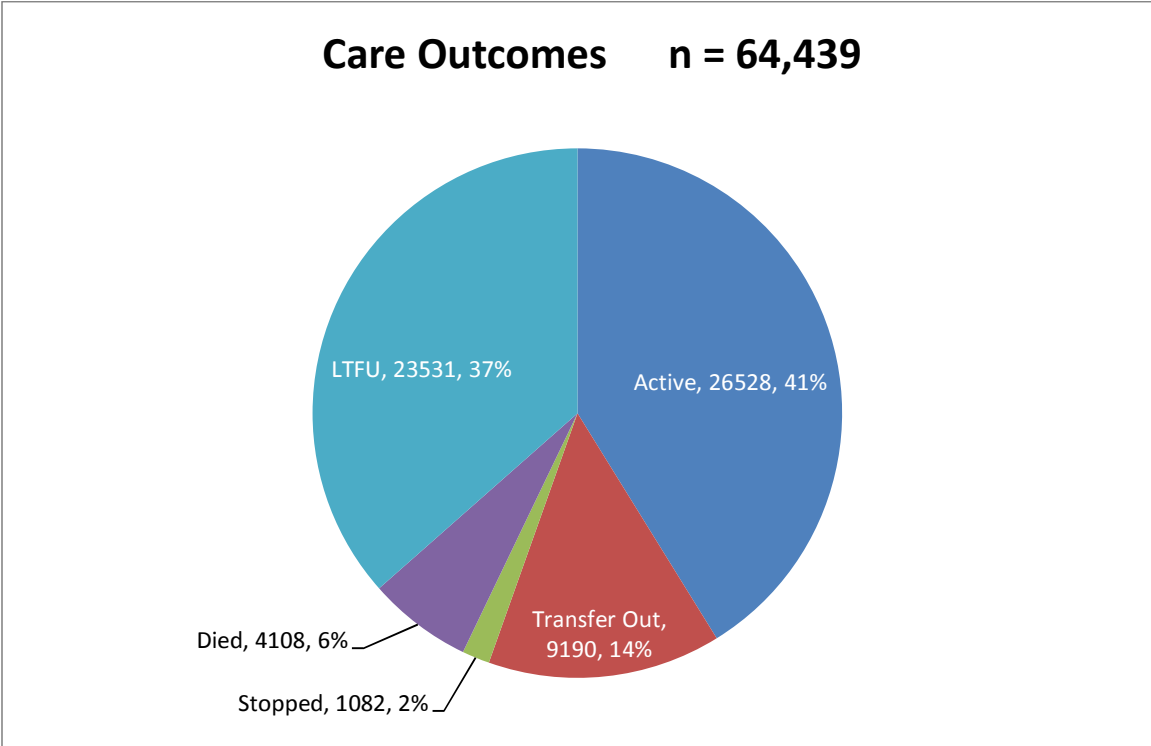
Figure 14: Care Outcomes

Figure 15 shows the magnitude of LTFU on care in each facility. Of the LTFU clients who had self-transferred were considered as LTFU since they had no official transfer out letters from the respective facilities. Of the 37% who had LTFU, 10% were self-transfers while 90% were true LTFU.
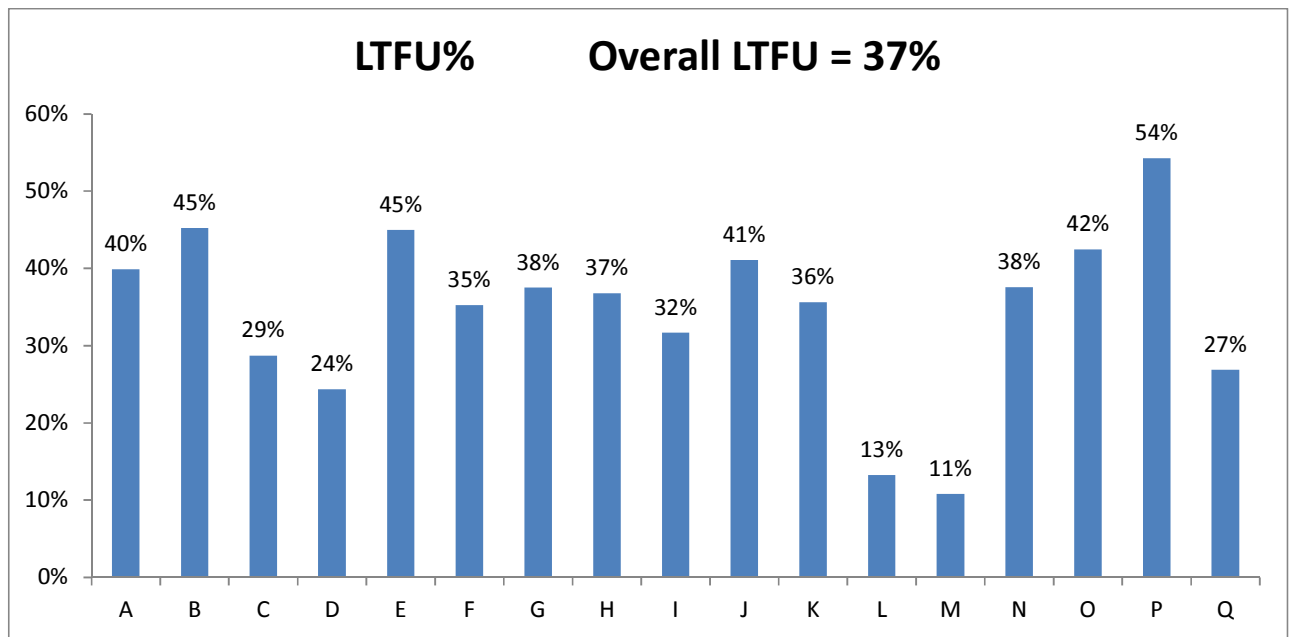
Figure 15: Care LTFU rates per facility

6. For each of the 17 facilities the reports of **HAART Program outcomes as at 28th February 2013** was analyzed and the indicators collected were:

- Number of cumulative clients ever in HAART.
- Number of clients cumulative HAART Active.
- Number of clients cumulative HAART Transfer Out.
- Number of client's cumulative HAART Stopped treatment.
- Number of clients cumulative HAART Died.
- Number of clients cumulative HAART Lost to follow up (LTFU).

As a summary of the indicators collected, the number of clients this facilities have ever initiated on HAART as at 28th February 2013 are 41,112. The indicators are as shown below
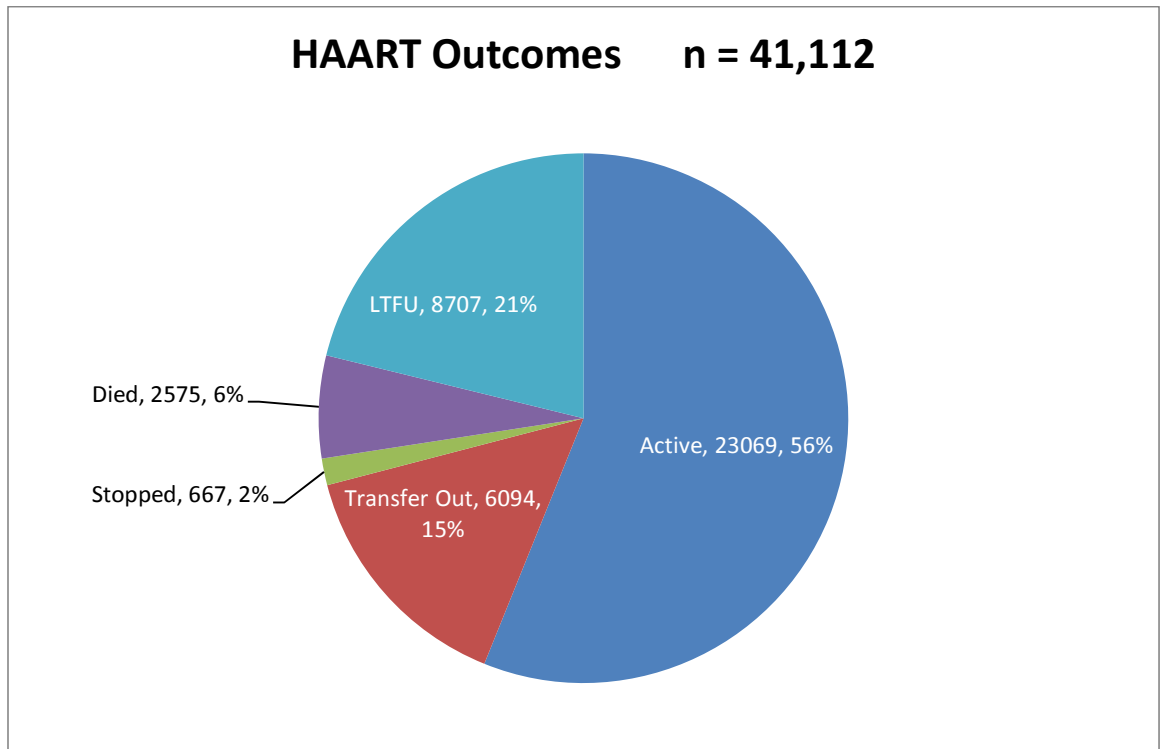
Figure 16: HAART outcomes

Figure 20 shows the magnitude of LTFU on HAART in each facility. Of the LTFU clients who had self-transferred were considered as LTFU since they had no official transfer out letters from the respective facilities. Of the 21% who had LTFU, 15% were self-transfers while 85% were true LTFU.
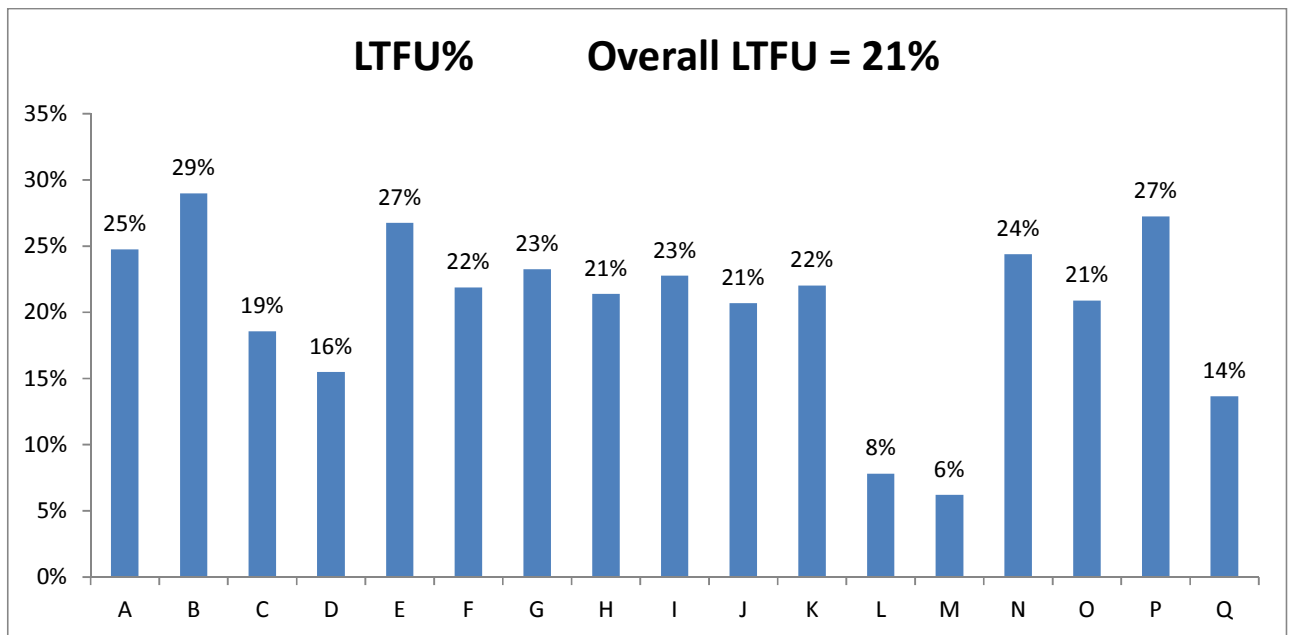
Figure 17: HAART LTFU rates per facility

In conclusion, both care and HAART outcomes had high rates of LTFU, 37% and 21% respectively, in the 17 facilities showing that there would be a big challenge, as also reviewed in the literature review, for facilities to try and trace back their clients to ascertain what their true outcomes are. This also had an impact on the quality of care and HAART reports that the facility produces.

4.1.2 Electronic Health Records System

This section explores the general knowledge or use of an electronic health records (EHR) system in a facility

1. **Is there an EHR system in use?**

   All the 17 facilities had an EHR system in place that they were using to key in their records. The EHM systems ranged from retrospective data entry to prospective data entry systems.

2. **If Yes, Is the EHR system used for patient registration?**

   All of the EHR systems were used for patient registrations in various ways. Of the systems with prospective data entry procedures, the system automatically picked the next unique number of a client that was being started to care and that's the number the client would be using for the rest of their care visits that they would be attending. Of the systems with retrospective data entry procedures, the receptionist would verify with the system the last unique number that was issued and issue the next unique number to a client starting care and that's the number the client would be using for the rest of their care visits that they would be attending.

3. **Does the EHR system have a function of detecting data entry errors?**

   65% of the EHR systems had the capability of detecting data entry errors at time of keying in the records. Some of the data entry errors checks as cited by the persons interviewed included:

   - A must to screen PLHIV clients for STI screening.
   - All PLHIV or TB infected clients to have an AA score.
   - Dates that are not right.
   - Females not receiving male circumcision.
   - It's a must you give an eligible PMTCT mother ART prophylaxis.
   - Most fields have been limited to selection only (drop down choices) and no typing.
   - No female under 9 to get a pregnancy test.
   - Not dispensing drugs to clients with a BMI<18.5 unless they are seen by the nutritionist.
   - Post-Natal baby prophylaxis is not left blank.
   - Restricts one from giving the wrong dosage.
   - Standardized laboratory values.
   - A male not having a pregnancy test.
   - All pregnancy should have a delivery detail before the next pregnancy is recorded.
   - Date of birth is never greater than today's date.
   - Every client to have a TB screening done.

4. **What is your role in the EHR system use?**

Of the 22 persons interviewed, all of them are in one way or another involved in data management. The data management aspects spanned from Data governance and stewardship, Data capture and maintenance, Data quality, Data analysis, Data collection and Data standards.

5. **Does the EHR system have interoperability capabilities?**

Only 6% of all the facilities had the capability of interoperability. The rest of the systems had not been fitted with interoperability capabilities and the main challenge was because of the technical limitation of the personnel that made the system.

6. **Does the EHR system have clinical alerts?**

53% of the facilities had the capability of populating clinical alerts. Some of the clinical alerts as cited by the responders included:

- Adverse drugs reactions
- Caregiver not included in a child's demographics.
- Due for bleeding.
- Falling CD4's.
- IPT treatment alerts when a client nears the 6th month of finishing treatment.
- PCR testing to be done after 2 weeks of breast feeding cessation.
- When a client is near finishing treatment.
- A report is automated to produce LTFU clients.
- Cervical cancer to be conducted on a yearly basis for the PLHIV.
- Change of ART regimens.
- Due for next appointment reports.
- Falling weight.

In conclusion, this showed that there was a good understanding of what the EHR system does. All the systems were being used for patient health care management in one way or another in and most of the systems had the capability of populating clinical alerts and detecting data entry errors at time of keying in the records thus showing the level of data quality the facilities were trying to achieve. In each and every facility interviewed, at least there was a focal data personnel whom could be relied on when it came to any data issues. With all this in place, the logistics of rolling out the proposed system will not be met with much resistance especially in facilities that have already implemented an EHR system.

4.1.3 Biometric Technology

This section explored the general knowledge of biometric technology or the use of measurable physiological and/or behavioral characteristics to authenticate a user.

1. **Is there a high level of awareness about Biometric Screening in your facility?**

77% of the persons interviewed indicated that staff in their facilities was aware of a biometrics' function.

Biometric Awareness

Strongly agree, 2, 12%

Agree, 11, 65%

Disagree, 4, 23%
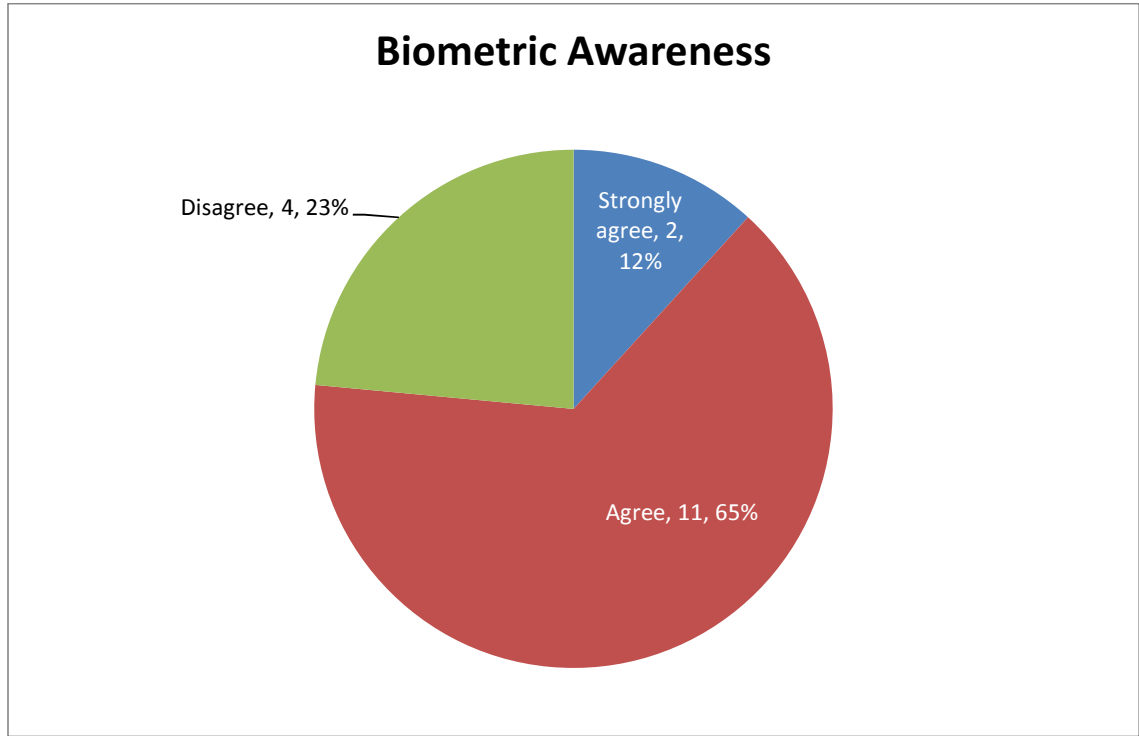
Figure 18: Biometric Awareness

2. **Please indicate which one or more of the following biometric technologies you have used before.**
Finger-scan is clearly the most known technique. It was cited as the most common. The person's interviewed had at one time used the technology for medical insurances purposes, logging into a computer and time and attendance at their work place.

Face-scan was the second most known of biometric technique. The person's interviewed had at one time used the technology while logging into their laptops.

Third was voice-scan which was traced to mobile phones. Many of today's mobile phones have voice recognition for calling people.

35% of the persons interviewed did not know of any biometric technology, proving that biometric technology has come a long way and can be adapted with ease if much education is done on its benefits and capabilities.

3. **How often do you use biometric technology?**
Of the respondents under question number 2, most of them (91%) use the technology frequently showing that the likelihood of acceptability of this technology.
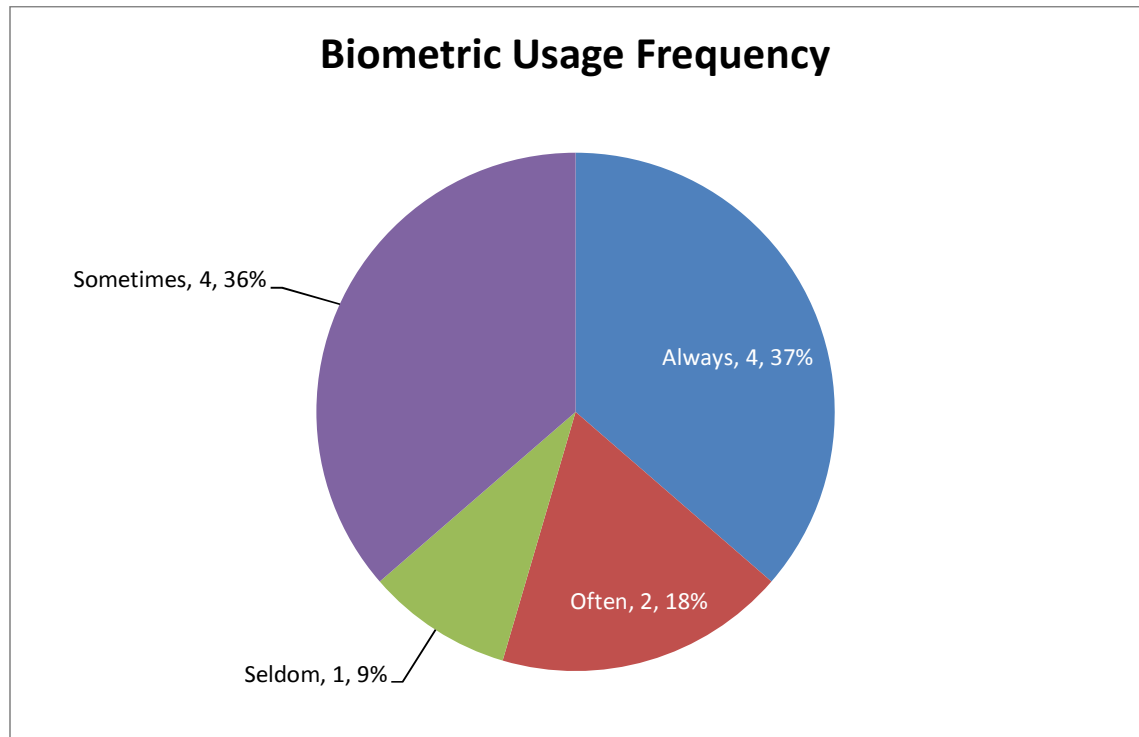
Figure 19: Biometric Usage Frequency

4. **To what extent do you agree with the following statement that capturing of a person's biometric features over the EHR system can be trusted?**

   The findings showed that 71% of the respondents strongly agreed that biometrics can be trusted in terms of identifying a person i.e. it increases the security, while the rest agreed on the same.

   Furthermore the respondents feel that biometrics would increase the security because it is not something that you can forget, fake or lose the same way you can do with passwords.

5. **To what extent do you agree with the following statement that the use of the EHR system integrated with biometric technology will yield more accurate data?**

   Of the responders questioned 65% strongly agree that accurate data would be captured while the rest agreed on the same in the case that biometric technology was integrated with EHR. They believed that biometrics makes it harder to duplicate and steal the identification of someone and this would go a long way in solving the issues of clients forgetting their registration cards that contain the clinic unique number.

6. **Do you feel that privacy safeguards and fair information practices must be put into place, if biometrics will be used in the future?**

   85% of the responders strongly agreed that privacy safeguards and fair information practices should be put in place, if biometrics were to be integrated to the EMR in the future. This showed that the responders really thought through the risks there could be if this kind of information would be stolen.

Some of the responders in the remaining 15% who also agreed on the same were worried about the information being used for wrong purposes.

Of the 85% maybe they could not have thought more about the issue in mention but the feeling is that their worries would have increased if they thought a bit more and realized that this information could be dangerous. One way to beat this is to pass laws for getting people to respect the biometric system.

7. **People should be fully informed about the uses a facility will make of their biometric ID and why it is needed?**

   94% of the responders strongly agreed that the clients in the facilities should be informed of the use of biometrics technology before they were scanned. The rest of the 6% also agreed on the same.
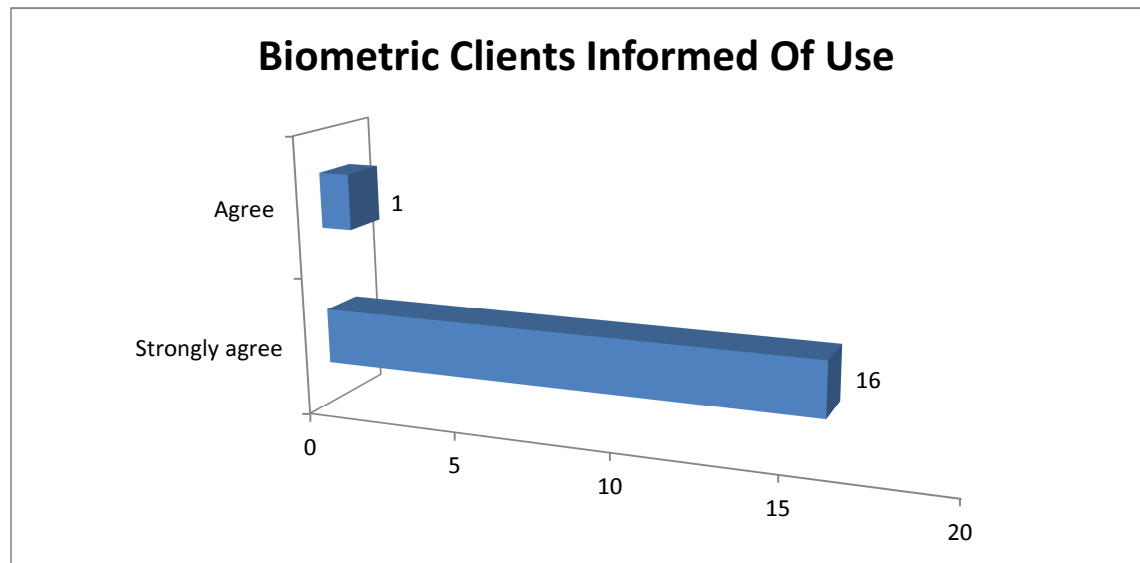
Figure 20: Biometric Clients Informed Of Use

8. **Is there a data security policy in the facility?**

   Only 41% of the responders indicated that there was a written policy that existed in the facility. This was risky since if the biometric technology was introduced in the facilities without a written policy, it would be difficult to know which steps to follow in case an information technology breach occurred.

   18% of the responders indicated that they had no written policy but they knew them very well after trainings they had undergone. The risk that these facilities would face would be when there are key staff turnovers of the staff who knew these policies.

   41% of the responders indicated that their facilities had no policy written and they did not know of any policies to follow in case a breach occurred.
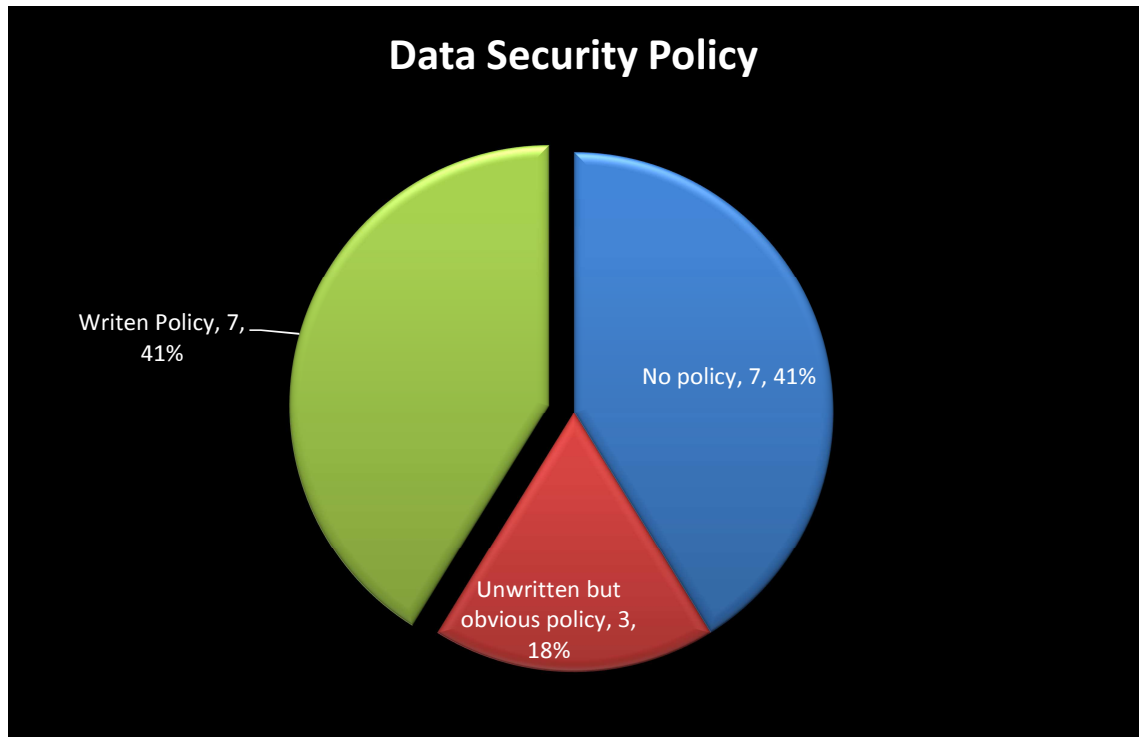
Figure 21: Data Security Policy

9. **What would be the main obstacle of obtaining biometric equipment for integration with an EHR?**

   Cost was singled out by 82% of the responders as the major issue when it comes to acquiring a biometric system. The costs regarding equipment, installation, training system and software maintenance as well as operation cost must be taken into consideration.

   In spite of all the responders thinking that biometrics would increase security and trustworthiness, reliability and privacy were still questioned. They believed more needs to be improved on the two mentioned issues.

   Only 12% of the responders believed that compatibility with the existing EHR would be an issue.

   Forty seven percent of the providers believed that patient neglect ion (due to stigma) towards the device would limit them from acquiring the biometric device.

   In conclusion, this showed that most of the staff in the facilities was aware of the biometric technology where fingerprint scanner was cited as the most commonly known. Most of the staff agreed that biometrics can be trusted in terms of identifying a person, increasing security and capturing of accurate data. Most facilities were noted not to be having a written IT policy and that cost was the major hindrance to acquiring biometric devices.

   In spite of the few challenges that were noted in this section, the logistics of rolling out the proposed system with a biometric functionality will not be met with much resistance especially since most of the staff interviewed had some knowledge of the biometric devices and the advantages that come with it.

4.1.4   Tracking Patients

This section explores the general knowledge of how facilities treat the issue of tracing lost to follow up (LTFU) patients.

1. **Does the facility have a patient tracking standard operating procedures?**

   35% of the responders indicated that they had standard operating procedures (SOP) document of tracing patients LTFU.

2. **If Yes, what procedures/methods are listed?**

   Some of the procedures as cited by the 35% responders included:

   - Contacting clients through phone calls.
   - Give messages through the radio.
   - Tracing of clients LTFU thorough the Health Care Workers.
   - Tracing of clients LTFU thorough the Community Health Workers.
   - Tracing of clients LTFU thorough the Social Workers.
   - Automated reports of clients nearly getting LTFU.

3. **If No, what undocumented procedures/methods are listed?**

   Some of the procedures as cited by the 29% responders who indicated that there was no SOP in their facilities but they had procedures included:

   - Contacting clients through phone calls.
   - Give messages through the radio.
   - Tracing of clients LTFU thorough the Health Care Workers.
   - Tracing of clients LTFU thorough the Community Health Workers.
   - Tracing of clients LTFU thorough the Social Workers.
   - Automated reports of clients nearly getting LTFU.
   - Use support groups.

   35% of the responders had no procedures for tracking patients.

4. **Has the facility ever traced the Lost to follow up patients?**

   52% of the responders indicated that they have ever performed the procedure of tracing LTFU clients back to care. But of the 52%, 33% could not remember how many clients they had targeted to bring back to care and how many actually came. Of those who could remember the last tracing numbers of their clients back to care, indicated that 32% were traced back successfully. This shows that as much as there are procedures of tracing clients back to care, it was not a perfect method.

5. **What were their true outcomes after being traced back?**

   Some of the reasons indicated after being traced back to care included:

   - Economy difficulties.
   - Felt like they had healed.
   - Had gone upcountry.
   - Stigma.
   - Distance to the clinic.
   - Child care commitments.

- Mortality.

6. **How do the rates of Lost to follow up affect the facility outcomes/reporting?**

   In sight given by the responders on how LTFU affects reporting/outcomes included:

   - It affects the cohort analysis.
   - It affects the true picture of treatment.
   - It does not show a good reflection of the outcomes.
   - There is biasness of the results since some clients are on care elsewhere.
   - Affects the decision making.

   29% of the responders were not sure how LTFU affects reporting and outcomes.

7. **What measures has the facility put in place of reducing Lost to follow up rates?**

   Measures that were given by the responders on what the facilities have done to reduce LTFU rates included:

   - Attach each client to a CHW.
   - Client education on adherence.
   - Phone calls to clients LTFU.
   - Support Groups.
   - Using the EHR effectively to populate reports before the clients get LTFU.

   29% of the responders indicated that there were no measures of reducing the rates of LTFU. Some also indicated that as much as the client's phone numbers were being used, some numbers were inaccurate since at the time of calling the number was either disengaged or non-responsive.

   In conclusion, nearly half of the responders had ever traced their LTFU patients back to care with only a third of them not remembering the actual number traced back. Poor documentation in terms of documenting clients traced back and having no standard operating procedures for tracing clients was present in many facilities. This showed that the staff might not trace patients since there were no standards guiding them on how to go about it in spite of them knowing how LTFU rates affect their facility outcomes.

4.1.5 Linkages to care

This section explores the general knowledge of the issue of patients linkages to care they have been tested for HIV in the outreach

1. **Does the facility carry out HIV testing and counseling (HTC) outreaches?**

   71% of the responders indicated that they carry out HIV testing and counseling outreaches on average of 3 times in a month mostly on weekends with some facilities going for a minimum of 2 times and others going in all the 4 weekends.

2. **Approximately how many clients are tested per month?**

3. **Approximately, of the tested how many turn HIV reactive per month?**

4. **Approximately how many of the HIV reactive get attend care after being referred?**

   For questions number 2, 3 and 4 it was looking at the magnitude of the HTC testing and the lost opportunities the facilities incur on not being able to link clients to care. Some of the issues cited by the responders were that some of these clients were repeat testers and were on care in other facilities. Another reason cited was that when the clients come to the facilities to start care on a later date, they

might change their names due to stigma issues and hence not link him/her in the database since they have come as a different person while others forgot their client unique number that they were given at the outreach testing.
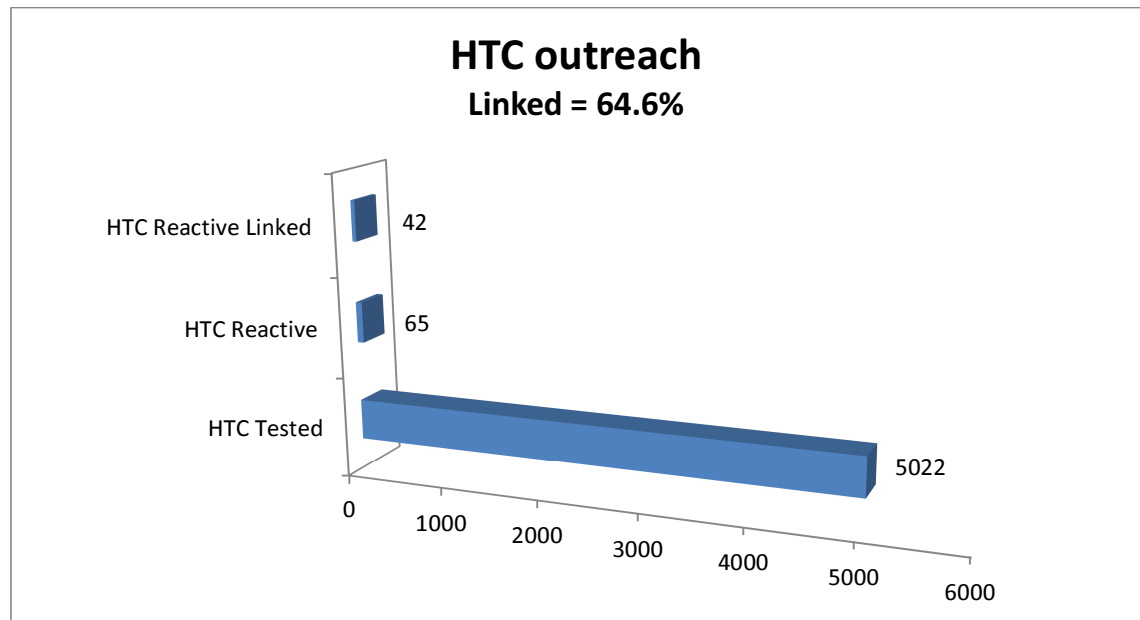
Figure 22: HTC outreach

5. **What measures has the facility put in place of reducing the low rates of linkages to care?**

Measures that were given by the responders on what the facilities have done to increase rates of linkages included:

- Accompanying the clients to the clinic on the same day they were tested HTC reactive.
- Acquiring phone numbers.
- Education of importance of care.

1 responder indicated that their facility had no measures of reducing their low rates of linkages to care.

In conclusion, linkage to care was low, being at 64.6% in the 17 facilities instead of the targeted 100%. This showed that, as also reviewed in the literature review, 35.4% of the HIV reactive clients were not started in care, thus having the potential risk of spreading HIV to the general population since they would miss out on health and prevention education. Reasons cited by the responders about the clients who were not linked involved using extra resources to trace the clients and also relying on hearsay. This also had an impact on the quality of reports that the facility produced.

4.1.6   Suggestions to the EHR
This section explored the suggestions that the responders gave on enhancements that needs to be done to make the proposed system appealing and acceptable.

The suggestions included:

- Have a system that has clinical decision support.
- Integrate the new system with our system.
- Link all systems in Kenya together.
- Link the system to a mobile application to ease collection of outreach data.
- Make the system more secure.
- Make the system web based
- User friendly system.
- Incorporate Alerts.
- Incorporate data error checks.
- The flow of the patients should be like that of the clinic.

3 responders never contributed their suggestions.

In conclusion, most responders wanted an EHR system that would help ease their work and improve on the quality of data that is produced.

4.2   System Development

The following resources will be needed in order to complete the project successfully

4.2.1 Software Resources

- My Structured Query Language (MySQL)

  SQL is a special programming language for managing data in relational database management system (Korth and Silberschatz, 1991, Vaughn, 1998). It is an open-source database that is available for all major operating systems. It will be used to make the back end of the Database Management System where data will be stored. It is favored because it is easy to learn, very secure, user friendly, ability to use relations, its high ability to manipulate data using SQL commands and also it's open source software.

- Hypertext Processor (PHP)

  PHP is a server side scripting language for building dynamic, interactive website (Doyle, 2011). It is typically used with the Apache web server but also available for IIS. It uses the .php file extension. It will be used to make the front end where the information will be keyed in form. It is favored due to its flexibility, compatibility, portability and also it is open source software. It also has many tools available to create a good computer-user interface.

- JavaScript

  JavaScript is a scripting language that enables one to create an interactive front end (McNavage, 2010). It will be used for validations of user input into the system.

- VB.6

  Visual Basic is a high level programming language. It will be used in the coding of the interface that will link the biometric device with the proposed system.

4.2.2 Hardware Resources

- PC / Laptop computer for development of programs and write-up of project report.
- Biometric technology to record the finger prints of the study subjects.

4.2.3 Architecture of the EHR system

Data Model

The database will be designed in a relationship model. Tables will be able to link through each other using a unique identifier that the client has been given at time of registration. MySQL will be used for the structuring purpose because it has added advantage of easy implementation and being able to store more data compared to software's like MS Access. The system will also be incorporated with a biometric module in that it is able to store the unique finger print identifiers of the patients.

Fingerprint Registration/Identification Process

For clients who will be enrolled in care or will be undergoing HIV testing, their fingerprints will be captured by the sensing device and then record them as a template with personal information i.e. their clinic unique identifier into the database. At the identification phase, the system will capture the finger data from a finger via the sensing devices, extracts features, verifies the features by comparing with templates in the database, and then

outputs a result as accepted only when the features match to one of the templates. The figure below (Matsumoto et al., 2002) depicts the process described.
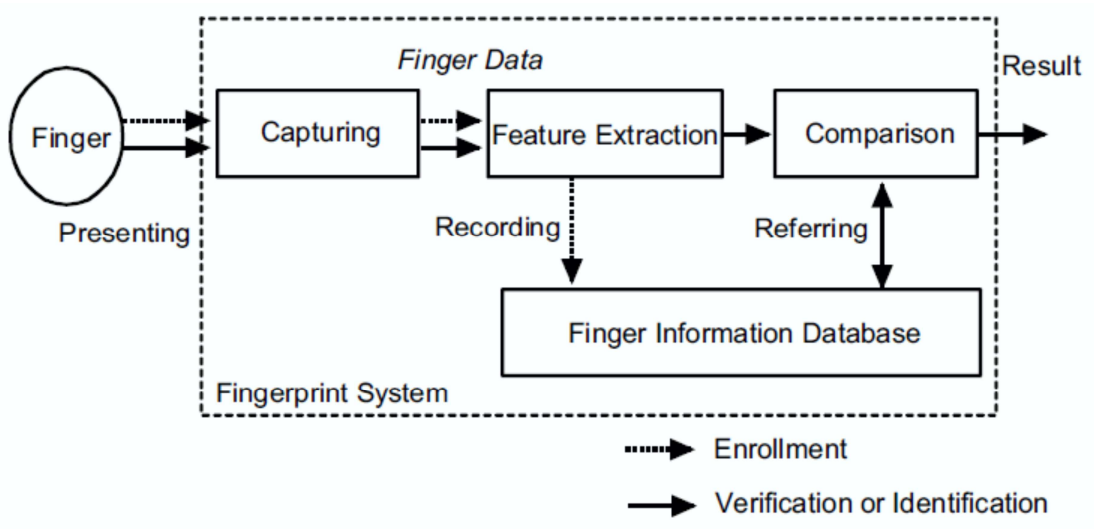
Figure 23: Structure of a fingerprint system

Network architecture

The system will be located in a Local/Wide area network (LAN/WAN) architecture for purposes of ease exchange of data. The MySQL database will be centralized for ease access by the Health Care Workers or facilities.

User Interface

The user interface will be developed with JavaScript/PHP to allow clinicians to interact with the system. The interface will be in a user friendly format web page that will help us introduce a PDA interface at a later stage with much ease.

4.2.4 Implementation of Security / Privacy

From the organizational point of view, it should ensure that data security and confidentiality, be its top priority before and after implementation of an EHR system. For this needs to be implemented the following objectives should be met

- **Software encryption**: Organizations can get an on-the-fly encryption for servers/PCs. In this process, data is encrypted or decrypted automatically before it is loaded or saved, invisible to the user. Information stored on an encrypted volume can be accessed only if the user has the correct password or encryption keys. The information at rest on the server's disk is completely encrypted. If a hacker obtains unauthorized access, the data is unreadable.

- **Hardware encryption**: Backup devices e.g. tapes, should be encrypted. This will render them useless in case they are stolen or get lost since the unauthorized person won't have the encryption keys. Some

of the best practices that an organization should do when it comes to hardware encryption are never to lose the encryption keys and store the encryption keys separately from the backup devices.

- **Network encryption**. To prevent unauthorized server access, an organization should encrypt its entire network, both wired and wireless. Network encryption ensures that hackers attempting "sniffing attacks" will not see any information in transmission. Data is encrypted only while in transit, existing as plaintext on the originating and receiving hosts. Some of the best practices that an organization might consider when implementing a network security is to ensure that routing works before encryption is implemented; network encryption should be done at the endpoints to avoid CPU cycle waste; be very attentive to network bottlenecks; use a tunnel If you need to encrypt other than IP traffic; guard against Peer to Peer network applications because they might compromise the EHR data; partition the network and keep patient and guest data on separate partitions.

- **Information Technology (IT) Policies**: Ensure that the organization has an IT policy in place and also ensure that the organization's workforce complies fully with it in order to minimize the threat of data being misused. Review security measures as needed to ensure reasonable and appropriate protection of information. A disaster recovery plan should be in place that spells out exactly what will be needed to recover patient's data in the event of a fire, vandalism, natural disaster or system failure. Regularly educate employees on IT policies and emphasize the importance of keeping patient data safe and secure. The IT policy should include objectives on enhancement of physical security of the data center; access control to the software's that control the information system and data stored in the repository; a delegated personnel responsible for data ownership; data protection policies enhanced for data leaving the system; patients informed consents of their data being in the system.

Overall, infrastructure encryption is worth the investment by organizations, though it is not a surety towards medical records security.

The security and confidentiality of the proposed system will comprise of the following features

- **Role-based privileges** – this approach will be implemented to restrict system access to authorized users. Within an organization, roles are created for various job functions thus in the proposed system the permissions to view certain data will be assigned to specific roles. The system users will be assigned particular roles, and through those role assignments acquire the computer permissions to perform particular system functions. This feature will enable data to be confidential to a certain degree unlike anybody just being able to view any data.
- **Audit logging/trails** – this approach will be implemented to track or show a record of who has accessed the proposed system and what operations he or she has performed during a given period of time. Since all users will be having a unique login name, it will be easy to identify who did what and take further action in case it was unlawful. This will be useful both for maintaining security and for recovering lost transactions. This function will only be viewable to the specific employees mandated

with the role of auditing. The audit trails will include successful and unsuccessful logins; data transfer; data viewing; data entry; data manipulation/changing.

- **Separation of backing up and restoring data activities** – If someone has the right to back up data, that person could be compromised and take the backup media offsite and reveal to unauthorized users. The system will completely separate and assign the two activities to different teams of people to help prevent the above scenario.

- **Strong password authentication** - this approach will be implemented to enable the system to adhering to the password set standards for login and authentication. The standards will include
  - ➢ A minimum password length of 6 or greater characters
  - ➢ Password complexity will comprise of a hybrid of both alpha-numeric and special characters
  - ➢ Account lockout threshold will comprise of 3 invalid attempts and can only be unlocked by the administrator after writing a letter of explanation.
  - ➢ Account lockout duration will be set to until it is unlocked by the administrator.
  - ➢ The maximum password age will be implemented to 30 days

- **Database encryption** - this approach will be implemented by technologies like biometric cryptosystems which in the long run would improve public confidence and acceptance of biometrics. Biometric cryptosystems (encryption) will be designed to securely bind a digital key to a biometric or generate a digital key from a biometric. This will ensure that a patient's biometric information if stolen will not be useful to the unauthorized person since they do not have the right authentication key for decryption.

4.3   Design

4.3.1   Overview

The proposed system was developed based on the HIV indicators borrowed from the MOH 257 Blue card. This is a card that is usually used as a follow up form for clients who are ongoing with HIV care and treatment. It also took into account the users requirements, both functional and non-functional. The interface was designed with the screen layout in mind. The user interface was designed using Human–computer interaction (HCI) design principles that took into account the following

- **Focus on stakeholders and task**
  For the stakeholders i.e. the administrator of the facility, the receptionist and the clinicians are the key stakeholders of this system since they are the ones who will be interacting with it on a daily working basis. The specific tasks they perform in the system were derived from the normal workflow that goes in the clinics.

- **Empirical measurement**
  The interface was tested by the real users who would come in contact with the interface on an everyday basis.

- **Iterative design**

This involved the stakeholders much in terms of keeping the activity of frequent updates in terms of designing the user interface, test of the system to see if it is working optimally, analyzing results and the repeating the process all over again until it met the required standards. This would ensure that the usability of the system would be an easy process and that the system was able to function accordingly.

- **Promote trust**

    The system promotes trust to the users since their credentials are well secured and also to the clients since their information is well encrypted.

- **Support diversity of users**

    The system has been coded using open source programming and thus can be used by users from different nationalities with different backgrounds.

4.3.2   Design of the Database

The proposed system was developed with the following design guidelines in place

- **Consistency**

    The interface in the proposed system is consistent throughout thus making it easy for the end user to easily adapt to it. This entails:

    ➢ The same appearance, meaning and operation held true for all the user's interactions within the system.

    ➢ The correspondence between the system's representation and the real-world phenomenon in terms of appearance, meaning and operation was the same.

- **User control and feedback**

    The system allows the user to be in control i.e. by it not taking over control. The system also allows the user to control the pace and format of presentation. The system also populates feedback that directly supports the action to be taken by the user.

- **Aesthetically pleasing**

    The systems interface has been made in such a way the user will not strain while using the system. The system frontend is nice to look at. It mostly comprises of cool colors like light blue.

- **Normalization**

    The fields and tables of the database structure were reduced to the level of 3rd degree so as to minimize on redundancy (storing the same data in more than one table) and dependency (only storing related data in a table).

4.4 **System Analysis**

4.4.1 **Description of the current systems**

Currently in Kenya, most of the EHR/EMR systems have been developed on a standalone system using Java-based web, Microsoft access or Visual basic applications as their front end and some having MySQL or MSSQL software's as their back end.

Most of these systems have been designed with the main purpose of collecting patient's information so as to measure patient's outcomes, analyze data and use the resulting analysis. These analyses are used to provide improved care on the patients' health and quality decision making that would guide the running of their programs.

Most of these systems have been developed with the first level of data cleaning in mind, where it involves having error checks at time of keying in the data e.g. wrong height, weight etc., thus compromising the whole aspect of data quality since data quality does not stop at the entry point of data only. Most of the systems do not meet the standards that have been set for capturing a client's demographics information.

Some of the systems lacked security in terms of who accessed the data, which was able to change any record thus posing the danger of compromising confidentiality/privacy of a client's details.

4.4.2 **The proposed system**

The proposed system goes beyond the first level of data entry checks where it incorporates the following features thus making the data populated from it more credible:

- **Biometric**

  A part from the natural identifiers like the national ID number, clinic number and a client's three names, the function of a fingerprint biometric scan has been incorporated in the system. This would help in identifying a client uniquely for clients who have either forgotten their National ID card at home, those who have forgotten their clinic number or for those who have not been issued with a National ID number.

  This system would go beyond the first level of cleaning by being able to trace patients who have moved to other facilities to seek care and did not report to their mother facility that they were transferring out.

- **Authentication and Authorization**

  The proposed system is able to authenticate who you are. For example, a clinician can login into his/her data entry front end with their user name and password and be able to key-in the patient's diagnosis for the day.

  The proposed system is also able to authorize/verify what a user is supposed to do in the system. For example, a receptionist can login into his/her data entry front end with their user name and password, but he/she is not authorized to serve a client through the patient encounter form.

  Authorization occurs after successful authentication.

The diagram below depicts the features of authentication and authorization in the system. It shows how a user working at an EHR system interacts with the authentication system to prove his identity and then carries on connecting to the server system. The server system, in turn, interacts with an authorization system to determine what rights and privileges the client's user should be granted
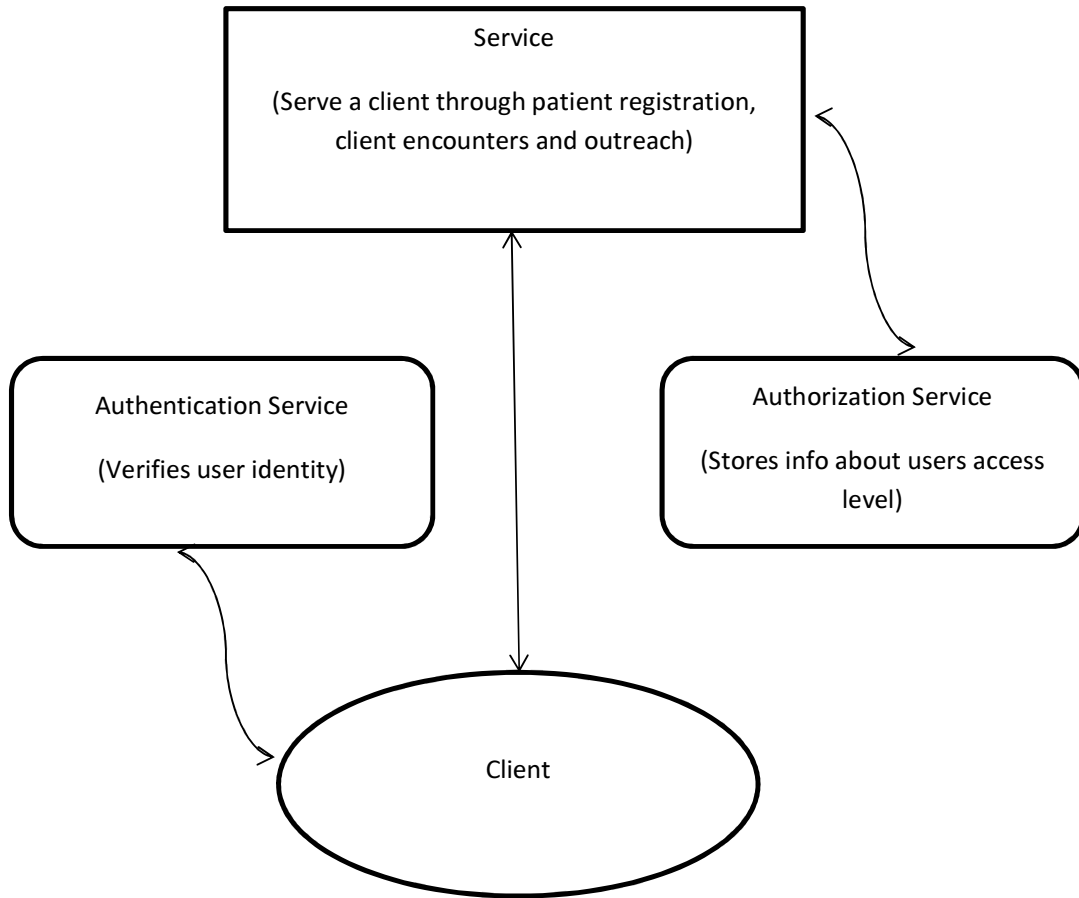
Figure 26: Authentication vs. Authorization

In the proposed system, the username and password information for each authenticable user is stored locally on the server system. Users send their usernames and passwords in plain text to the server system, which in turn compares their authentication information with its local database. If the provided username and password are found to match, the user is considered authenticated.
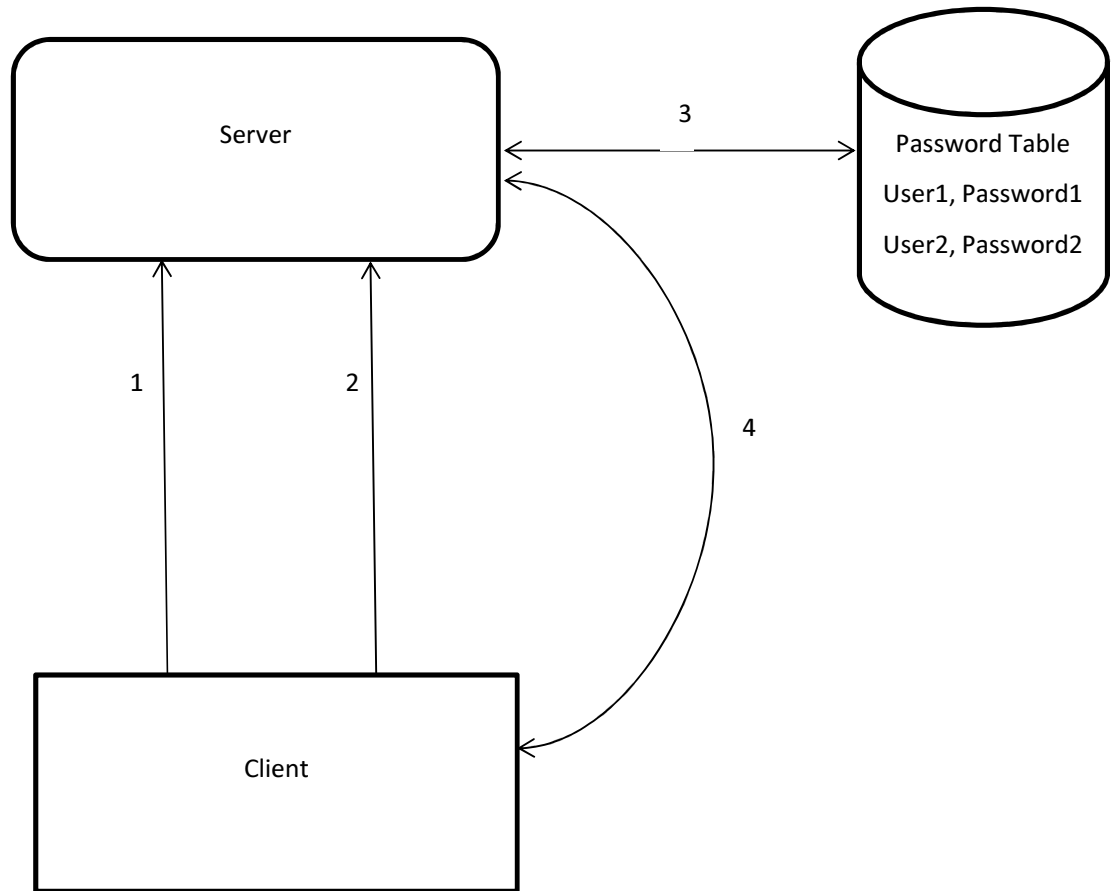
Figure 24: Authentication Method

In the proposed system:
1. When the client opens the system through the browser, the client sends the user name to the server.
2. And also sends the encrypted password to server (the cryptographic hash function used in this functionality produces a 128-bit (16-byte) hash value).
3. Server compares the user name and password with what is at the database to determine if the user is authentic. The password table contains a list of all users and their associated password of which the passwords are in encrypted format.
4. Server provides services authorized for user if the user name and password has been matched as per step number 3.

Administrator user rights

Table Name	Facility	Users	Appointments	Patient Register	Outreach	Death Report	Encounters contacts
Select	Y	Y					
Insert	Y	Y					
Update	Y	Y					
Delete	Y	Y					

Table 5: Administrator user rights

Receptionist user rights

Table Name	Facility	Users	Appointments	Patient Register	Outreach	Death Report	Encounters contacts
Select			Y	Y	Y		
Insert			Y	Y	Y		
Update				Y	Y		
Delete							

Table 6: Receptionist user rights

Clinician user rights

Table Name	Facility	Users	Appointments	Patient Register	Outreach	Death Report	Encounters contacts
Select					Y	Y	Y
Insert					Y	Y	Y
Update					Y	Y	Y
Delete							

Table 7: Clinician user rights

- **Encryption**
  In the proposed system data encryption is a security feature that has been implemented thus achieving the efforts of database security. Data is automatically encrypted when it is backed up for storage. This also enhances the feature of data integrity since in a case that the backups get stolen or lost they cannot be used with anyone else.
  System user's passwords have been encrypted with a one way encryption algorithm, which means that it cannot be decrypted into the original string. The cryptographic hash function used in this functionality produces a 128-bit (16-byte) hash value.

- **Audit Trail**
  The proposed system provides robust audit support in the database. Since the system is going to be used by many users, the audit trails instills a good practice of tracking changes in sensitive/confidential tables which could inform the organization of better judgment in case an issue occurs. Audit records include information about the user performing the operation, the action that was performed, the operation that was audited, and the table that was affected and the date and time of the operation. Audit records are stored in the database audit trail and can only be seen by the administrator.

- **Backups**
  The proposed system provides a feature of backing up the database just at the click of a button by the administrator. These backup can be used for recovering data after its loss, deletion or corruption. This

feature will also enhance the virtue of data protection. The backup is encrypted thus enhancing the feature of security while the backup is carried offsite or get lost with the backup tapes.

- **Data accuracy**
In the system, accuracy collection of data has been achieved by ensuring that the results collected observe the true values or values accepted as being true by limiting as per the indicators.

- **Clarity**
The system labeling of the indicators that are being collected are very clear and easy to understand for the users of the system. This will make the system users to easily use the system and adapt to it at a quicker rate.

4.5   Implementation

The proposed system is made up of 8 modules: Facility, Users, Appointments, Patient register, Outreach, Death report and encounters and the biometric module. Each module is developed using PHP, java scripts using MySQL as the backend except for the biometric module which was coded using VB6. The system is based on three tier architecture: presentation layer, business layer and data layer.

- The presentation layer was developed using dynamic PHP pages. The smarty templating engine was implemented to provide a uniform look of all the pages. To give a rich look to the pages and to reduce the servers load various HTML controls were used.
- The business layer comprises of the Facility, Users, Appointments, Patient register, Outreach, Death report and encounters classes which were developed using PHP. The Facility, Users, Appointments, Patient register, Outreach, Death report and encounters classes contain all the clients and the users (clinicians, receptionists and administrators) details respectively. Each class contains methods that can be invoked by authenticated users of the proposed system via the presentation layer. The biometric functionality which was developed using VB6 is very vital to the system since it uniquely identifies a client.
- In the data layer there is a direct connection between MySQL database and the business layer. The database consists of the 7 tables which were normalized until the 3rd normalization form. Entity, referential integrity and domain constrains were enforced on all the tables.

Implementation platform/Development Environment:

Software: Windows 7/XP platform, PHP, MySQL, HTML, Java scripts and VB6.

Hardware: ZK4500 fingerprint biometric device and personal computer.

4.5.1. Testing

The system was tested on a continual basis during development. Each module was tested individually so as to comfortably integrate the system fully and ready for use. A series of different tests were used in the testing phase.

The system was tested for the following:

- At time of coding, the coding process underwent through some stages of testing which included:
  - ➢ Taking the design of the whole system, using the MOH 257 blue card plus additional indicators deemed important, and breaking the design into different components. The components were broken down into Health facility, Users, Patients, Encounters, Outreach, Death report, daily register, audit trail, template and specific reports.
  - ➢ The first component was started and completed and tests done on it.
  - ➢ The second component was started and completed and tests done on it.
  - ➢ This went on until the last component was done.
  - ➢ After each component was done the interaction between the modules completed were tested and this procedure was carried out till the end.
- Installation testing was done on Windows XP and Windows 7 and on running the system; the installed software's worked correctly as expected.
- Testing the fully integrated application including the computer hardware's and the biometric device. This was in order to check how the components interacted with each other and with the system as a whole. The results showed that there was no problem whatsoever with the integration and the hardware's together with the system interacted perfectly. Since the software's that were used to make the system were open source, you could integrate the system in any platform i.e. from Windows XP and Windows 7.
- Input validation functionality: Verifying through testing if every data input in the system produced the desired outputs. Dummy data was entered by the various users and when verifying the data through the backend, the data entered reflected exactly what was entered in the frontend. JavaScript validation was used to validate data in HTML forms before sending off the content to a server.
  The typical fields checked were:
  - ➢ If the user left required fields empty.
  - ➢ If the user entered a valid dates.
  - ➢ If the user entered text in a numeric field.

  If the field never met the required standards, an alert message would pop up below the data entry screen notifying the user of the issue at hand. The function returns false, and the form will not be submitted. The function calls when a form is submitted.

- Testing if the user's experience with the application was up to the standards that they have been experiencing. The users recommended on the flow of the system saying it was exactly what they follow in their clinics.
- Authentication test was conducted so as to confirm the identity of the persons using the system and also be able to trace the origin of the staff entering the records. The system was able to lock out anyone entering their passwords incorrectly and only the system administrator would activate the user to be able to use the system again. The system is also able to keep a track of the audit trails where it can log every activity being done in the system.
  Authentication of client being served in the facility was also tested and the results showed that the biometric device was able to identify a client uniquely.
- Access control was implemented in the system where there was selective restriction of access to specific modules according to your cadre. After login the system:
  - ➢ The system administrator could only see the Facility module, Users module, database backup module and audit trail reports.
  - ➢ The receptionist can only see the appointments, patients and outreach modules.

> ➢ The nurse could only see the encounters module, outreach module and the patient's outcome reports.
>
> ➢ Depending on which type of clinic the facility was based on, the care facility cannot view the death report module and the funeral homes cannot view the care modules that comprise of encounters and outreach.

Through the different testing's the system underwent, it proved that the system would work and perform the duties that the system was intended to perform.

Test results

Test Num.	Test Description	Expected Results	Observed Results
1	Is it possible to log successfully after trying to log in incorrectly more than 3 times	No	No
2	Is it possible to recover data in case data is lost or corrupted	Yes	Yes
3	After 30 days of changing password, does the system prompt you to change password	Yes	Yes
4	Is the client registered accurate and reliable	Yes	Yes
5	How many times can a client be served	Once	Once
6	Is the system able to uniquely identify a client	Yes	Yes
7	Is the system able to update the outcomes of the previous facility in case a client moves to another facility without due notice	Yes	Yes
8	Does the system implement the roles of user access controls	Yes	Yes

4.5.2. User Training and System Verification

User Training

User training was conducted on a Saturday, since at this time the personnel were not busy with work related matters.

A group of 7 users were chosen and they included 3 receptionist, 3 nurses and 1 information technology personnel who acted as the administrator of the system.

The training conducted was a role based training where the training was organized according to functions. This type of training was chosen because it was deemed effective since the training was directly related to the work they do on a daily basis. In spite of all the users chosen for this training having a background in computer skills, they were still taught on basic computer procedures like starting up a computer, how to login into the computer with the right credentials and on which important applications to start up that went in line with the system.

The users were trained on the different modules that need to be learned and this included:

- Administrator modules:
  - ➢ How to install the system.
  - ➢ How to add and edit a facility.
  - ➢ How to add and edit a user.
  - ➢ How to activate the accounts of employees whose accounts have been blocked.
  - ➢ How to do backups and restore a database.
  - ➢ How to check on the audit trail report.
- Receptionist modules:
  - ➢ How to scan a fingerprint.
  - ➢ How to register a client in the patient's and outreach form.

> ➢ How to confirm a client has been served.
- Nurse module:
    - ➢ How to register a client in the outreach form.
    - ➢ How to enter a client's vitals and health related information in the encounters form.
    - ➢ How to confirm a client has been served.
    - ➢ How to check on the client's status report.
- General module:
    - ➢ How to change their passwords.

At the end of the training, each user was given a user manual which they could refer to as a reference. In case of any major challenges at time of data entry on job training was conducted.

As part of training, the users were able to use themselves as test cases when entering the data in the system.

User System Verification

The users were satisfied with the type of training that was conducted, the reliability of the system and the support that they were accorded to them.

The users agreed that the system resulted in efficiency gains especially when it came to tracing of patients who have LTFU or have not been linked to care after an outreach testing. The use of alerts at time of data entry improved data entry and the users commended on that feature.

The users agreed on the fact that the system security implemented was working well since they could only access the required modules according to their roles (which also improved the practice of medicine) and also the password standard requirements were implemented in the system.

CHAPTER 5: CONCLUSIONS, SHORTCOMINGS AND RECOMMENDATIONS

5.1   CONCLUSIONS

The aim of the project was to show high accountability by organizations in the health sector, comprising and not limited to governmental, non-governmental organization, faith based organization and private clinics, that they are able to produce quality data. The specific objectives set in order to achieve this goal was to develop a system that had the potential of reducing the rates of LTFU and increasing the rates of linkages into care and also determining what are the factors that lead to LTFU and the low rates of linkages to care.

Information related to the issues of LTFU, linkages to care as well as other related information were collected from the different programs across Nairobi, Kenya. The data was collected using questionnaires, interviews and from the internet through NASCOP and District Health Information Software 2 (DHIS 2) websites. The target population from which the information was collected were the staff members (Program managers, Monitoring and Evaluation managers, community health workers or any other cadre that is directly related with data management) of the organizations that dealt mainly with HIV/AIDS related programs both in the public and private sectors within Nairobi area. After data collection the data was keyed in a Microsoft Access database and pulled into STATA 12 for analyses. The findings from the analyses mostly contributed to the designing of the system.

The system was developed based on the findings of the analysis and HIV indicators borrowed from the MOH 257 Blue card. The design of the database took into account the tasks of the stakeholders, consistency of the interfaces, user control, biometric integration, authentication and authorization. The variables in the database were normalized to the 3rd normalization form where also entity, referential integrity and domain constrains were enforced on all the tables.

The development environment comprised of Windows 7/XP platform, PHP, MySQL, HTML, Java scripts and VB6 for software and ZK4500 fingerprint biometric device and a personal computer for hardware.

The system was tested on a continual basis during development. Each module was tested individually so as to comfortably integrate the system fully and ready for use. A series of different tests were used in the testing phase which included code testing, installation testing, integration testing, input validation testing, authentication testing and access control testing.

User training was conducted on a Saturday to a group of 7 users i.e. 3 receptionist, 3 nurses and 1 information technology personnel who acted as the administrator of the system. The training was conducted on a role based theme i.e. according to their functions. At the end of the training, each user was given a user manual which they could refer to as a reference. As part of training, the users were able to use themselves as test cases when entering the data in the system. The users noted that the use of alerts and triggers at time of data entry improved on data quality and the users commended on that feature. The users agreed on the fact that the system security implemented was working well since they could only access the required modules according to their roles (which also improved the practice of medicine) and also the password standard requirements were implemented in the system. They also noted that the electronic medical records were secure since when looking at the

backend, where the data sits, they could not make head or tail of the data they saw since data encryption was implemented. The administrator also commended on the audit trail feature implemented in the system since he was able to view logs of any data changes and who had effected them.

The general feeling of the users, after testing the system and using themselves as test cases, was that if the system was implemented in all the facilities that especially deal with HIV/AIDS nationally, it would improve on the quality of data by mitigating the high rates of LTFU and low rates of linkages to care. The facilities would therefore improve on the documentation and consumption of their medical records. The consumption was in terms of making informative decisions for planning health care services and allocating resources. They also noted that the system could improve on their, as health care provider's, efficiency in terms of saving resources e.g. time and money that could have been used to trace clients LTFU and not linked to care and use those resources to better provide quality services to the clients in the clinic.

Vis-à-vis the set objective the project was able to conclude that high data quality can be achieved in terms of reducing the high rates of lost to follow up (LTFU) and increases the rates of linkages into care when a good EHR system integrated with a biometric technology is implemented and linked to all the facilities that deal with patient health programs. At time of testing the system by entering client data, where the users also posed as clients, the system was able to identify a client with ease within different facilities i.e. in cases a client had self-transferred without an official letter or died, the system would update the client status previous facility and replace their LTFU status in the previous facility.

From the findings of the project (from the questionnaires) the following emerged as the main factors that lead to high rates of LTFU among clients enrolled in care

- Economy difficulties – Most of the people living with HIV are within the middle and low class. Some of these patients nearest HIV clinic are not near (walking distance) thus the need for them on getting transport to get to their clinic. But due to their financial shortfall, they opt not to come for their clinic visits and supplement their transport money for food. This issue led to LTFU of the client with time.

- Felt like they had healed – some clients when they are initiated into ARV drugs, their CD4's shot up and for a while they might believe that they are healed. Due to this believe they usually abscond from taking drugs and coming to clinics thus in the long run being declared LTFU. Later their CD4's fall and they are forced to go back to the clinic, mostly another clinic than the one they were in previously to avoid being taken through adherence counseling, to seek treatment.

- Had gone upcountry – it was noted that when the HIV level of most clients advance they relocate or go up country, and most of the time they do not come for an official transfer letter. This would make the clinic not to know where exactly the patient is receiving medication. After the stipulated time of declaring a client LTFU elapses they are declared LTFU and only after tracking them is when they are reported as self-transfer.

- Stigma – for clients who live within the clinic's catchment area, sometimes they feel stigmatized and discriminated since they live within the community that the clinic is located. This makes them not to come for clinic visits since they can be related to the clinic by the community, thus driving them to seek care elsewhere.

- Distance to the clinic – clients who have stigma issues usually come for testing in a clinic that is far from their residence. When they are confirmed HIV reactive, as per protocol they are started on care. But due to the distance between their residence and the clinic and also due to the time of HIV testing, they never disclosed where and why they were coming for testing; they usually do not come back for their scheduled clinics.

- Child care commitments – for some clients it was noted that at times they may become single parents due to the death of their spouses and this ties them from coming to the clinic since they are the bread winners of their homes.

- Mortality – it was noted that some clients who were actually declared as LTFU were reported as dead by their relatives after efforts of tracking them. This is because most of the clients, who died, at time of enrolment, had a progressed disease (stage 4) and low CD4's thus it being too late to give them an intervention.

Whereas for the low rates of linkages to care factors that lead to low rates included

- Repeat testers – Some of the clients who are not linked to care are later on identified as repeat testers. At time of testing, the clients do not indicate that they had already been tested earlier or they are in clinic elsewhere. It is taken as if the clients just want to confirm if they are really HIV positive. This in the long run ruins the quality of data since the clients will not bother to come for care and continue with care in the facility they were in before being retested.

- Forgot the unique number – At time of testing if a client is tested HIV positive, they are allocated a unique number when being referred for care. Later on when the client comes for care, some of them have already forgotten their unique number and the efforts of trying to identify them (especially when there is more than one person who has the same name) might be unsuccessful. The receptionist is forced to register the client as a new person again thus resulting to no linkages of the record that was updated at the outreach testing.

- Stigma - for clients who live within the clinic's catchment area, sometimes they feel stigmatized and discriminated since they live within the community that the clinic is located. This makes them not to come for clinic visits since the clinic is related with HIV/AIDS

As per the tests that were conducted on the system, the system was able to address the issues stated above technically thus implying that in the long run if this system was used effectively, it would improve on data quality. Some LTFU issues that were socially related e.g. child care commitment, treated with a complex initial HAART regiment and economy difficulties could not be solved by the system and called for further actions by the facilities.

Lost to follow up (LTFU) can be mitigated by the system as follows:

- For clients who have gone upcountry, intravenous drug users, not covered by health insurance, felt like they had healed, never come because of the distance to the clinic or stigma issues, the system is able to identify the clients irrespective of them changing clinics whether near to where they live or far. This system if implemented in all the facilities across Kenya, would reduce the rate of LTFU since the system would be able to identify this clients uniquely with their biometric features

and be able to update the previous facility from where this client came from as self-transfer instead of the LTFU outcome/status.

- For clients who die after being enrolled into care and cannot be traced by facilities to ascertain their current status or when traced it is with much effort from the health care providers, through their unique biometric characteristics the system is able to identify this clients from the mortuary and update the current status both at the mortuary and the previous facility as dead instead of the LTFU outcome/status.

Some issues that brought about low rates of linkages to care that were socially related e.g. low health literacy, denial and disbelief about their HIV reactive status, low education level, competing priorities of providing and caring for families, mistrust issues of the health care system and poor trust in health care providers could not be solved by the system and called for further actions by the facilities.

For linkages to care the system was able to address the issues as follows:

- For clients who pose as new HIV testers and yet in reality they are repeat testers, those who have forgotten the outreach unique number that they were given at time of testing, those who have changed clinics to seek free services due to the fact that they do not hold a health insurance coverage, those who change clinics due to stigma issues and for those who are in care elsewhere, the system is able to identify the client at point of registration thus avoiding the issue of double registration and also being able to positively link the client to care even if they were tested by another facility. The system would be able to update the outcome of the previous facility that the client came from thus not marking the client as not linked to care and improving on quality of data.

5.2   SHORTCOMINGS

Although the project has achieved its objectives, there are some unavoidable limitations that were experienced.

- This project was tested only on a small size of population that helped in the testing of the system i.e. the group doubled among themselves as clients as well as health care providers. This limitation could not be overcome for the project because there were anticipated issues that were picked at time of data collection in the sampled facilities as well as during the literature review. Some of this issues included client's perception on biometric privacy issues. Information collected showed that some patients may reject the use of biometric technology on the assumptions that the biometric templates collected might be used for mass surveillance by the private corporations and governments, the information may be misused to track their activities e.g. tracking of criminal activities, used for another unintended or unauthorized purpose.

- Biometric technology cost: ideally the project would have been implemented in a few facilities so as to prove by collection of data that the issue of quality data can be achieved but the cost of procuring the biometric devices for the different facilities was beyond the projects limit since it would have been costly.

- Some clients who cannot provide fingerprint biometrics (e.g., those with damaged or missing fingers because their finger ridges have become worn with age, dry or worn from work related activities) may find it difficult to register.

- Longitudinal effects: the time available to carry out the project and to measure a significant effect, whether negative or positive, was limited. The factors that contributed to this issue was that clients are usually given an appointment of three months for their next clinic visit and in case they decide to go to another facility without informing the original care provider or send a treatment supporter for refills.

5.3   RECOMMENDATIONS

The project recommends that all facilities that deal with any type of disease be it HIV related or not and are under the Government, Private Sector, Non-Governmental Organizations or Faith Based Organizations should adopt an EHR that has been integrated with a biometric technology for accuracy of collecting clean data that can be used effectively for program monitoring and reporting. All this systems if implemented should have a central point of reference in terms of the biometric demographic information, preferably NASCOP Strategic information Management Unit (SIMU), where all the data converge in order of ease of verification and identification of their clients. In order for this to be a reality, a couple of issues have to be resolved for the smooth and realistic implementation of the system

- Recommend that the government ensure that:
    - Further provisions are made, by the relevant bodies e.g. Parliament or the Judiciary, relating to a more particular aspects of data protection, such as the classification of personal information and their differential treatment in terms of usage and disclosure. Biometric data used for patient health can be classified under a category where it can only be used for patient care and no other reason even if the authorities request for the information.
    - Biometric information should be collected with clear and written justification that should be approved by a committee appointed by the relevant body in the government.
    - The statute concerning confidentiality and protection of a person's information privacy under Article 31 and 35 of The Constitution of Kenya 2010 (National_Council_for_Law_Reporting, 2010) is followed to the law and parties that break the law are heavily penalized.
    - There is an ongoing reduction in the cost of the biometric hardware in order to ease facilities in procuring the hardware's.

- The consent of the persons from whom the biometric template is being collected should be signed by the client as well as the provider and filed accordingly.
- Periodic audits or reviews should be carried out to determine that the biometric information stored is adequately secured, that data collected on the user remain private and its used according to the purpose it was collected for and the consent of the persons from whom the data are being collected are filed accordingly.
- All facilities that deal with biometric templates should ensure that documented IT policies are in place (in relation to personal information) and are adhered to. The policies could include and are not limited to:
    - Ensuring access (physical or remote) to PCs/Server is restricted at all times to authorized personnel.
    - Ensuring that computer features have been put in place to lock a computer screen whenever it has not been attended to for at least 5 minutes so as to protect access of information from unauthorized user.

- Warning system users not to disclose any confidential or sensitive information, client data, or information covered by existing privacy or confidentiality laws, policies or procedures.
- Warning the system users of not downloading any executable software, including freeware and shareware, or installing personal software's unless it is dutifully authorized.
- Ensuring that all information output no longer required by the facility is disposed of with due regard to its sensitivity.
- Ensuring that users are not allowed to transfer Facility data out of the Facility's control without permission.
- Ensuring that system users have domain login passwords that meet the password's standards e.g. password changed after every 30days, password complexity enabled etc.
- Ensuring that there are proper mechanisms in place to notify system administrators of all joiners/leavers to facilitate the prompt addition/removal of all access rights.
- Ensuring that the network lines and equipment, and other equipment used in the authentication process have been secured and are being monitored on an ongoing basis to ensure their security.

- All systems that handle biometric data should ensure that audits trails are properly and frequently reviewed in order to ensure proper use, maintenance and control of biometric data.

Other sophisticated cryptography technologies e.g. cancellable biometrics should be further explored and implemented in EHR systems that are integrated with biometric technology in order to protect sensitive user-specific data.

Facilities should ensure that they educate their clients on the benefits that the biometric technology will bring to them in order to ease the clients privacy concerns. The information to be packaged could include and not limited to:

- Showing the ease of starting care elsewhere without the hustle of being asked questions that could have been picked from the previous facility. This could be even extended to getting care from anywhere in case they travel for long holidays.
- Showing how clinics will move fast instead of files being searched for identification.
- Showing the patients, with examples, how biometric devices are being used for various reasons all over the world to ease work.
- Showing the repercussion's the organizations would undergo if they broke the rule of confidentiality and privacy regarding the client's data.
- Showing the advantages of reduced cases of medical identity theft.
- Showing how accurately a client could be identified thus reducing on medical accidents, errors and risks.
- Showing how privacy will be enhanced because clients will not be required to carry their patients cards (which can be lost) which contain personal identifying details like name, phone number, residence and date of birth.

With the luxury of time further research, after the implementation of the systems in several facilities and collection of real data is done, can be conducted to determine to what extent the system reduced or increased the rates of LTFU and linkages to care before and after the system was implemented.

The system can be integrated with hybrid biometric scanners in order to cushion clients who cannot provide a fingerprint biometric due to various unavoidable reasons as cited in the literature. The hybrid biometric platform would support fingerprint, palm vein, iris, finger vein biometric etc.

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Appendix A: User Manual

Below is the interface one encounters while opening the web based system
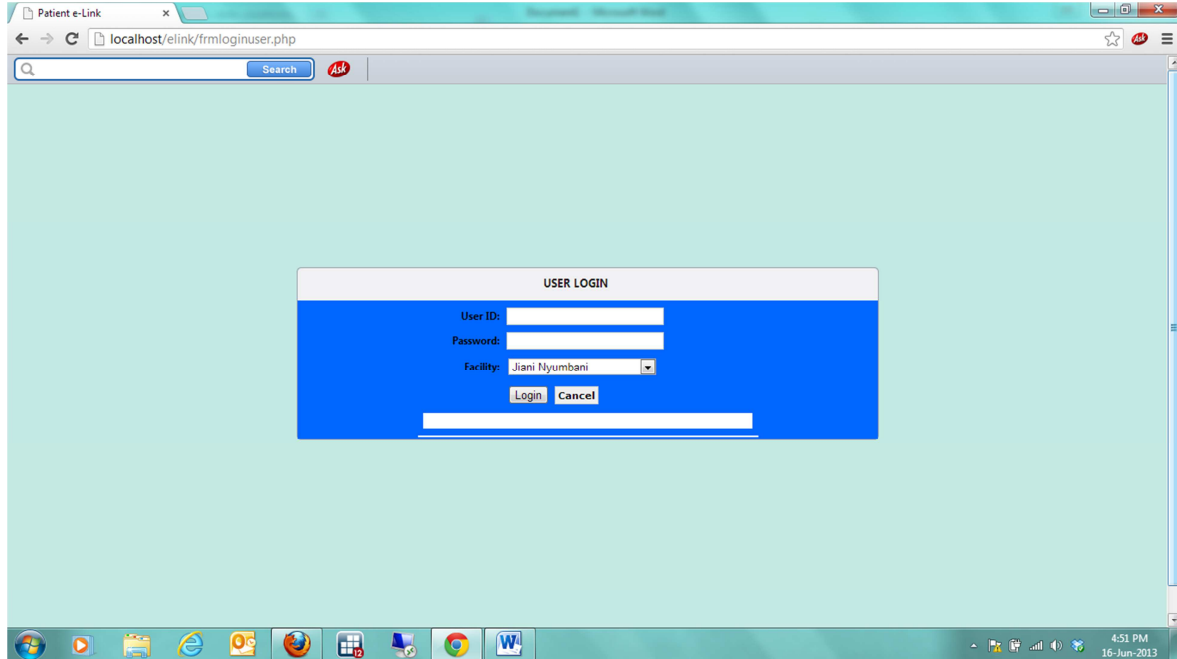
Figure 25: Login Screen

The user has to enter the right credentials in order to login
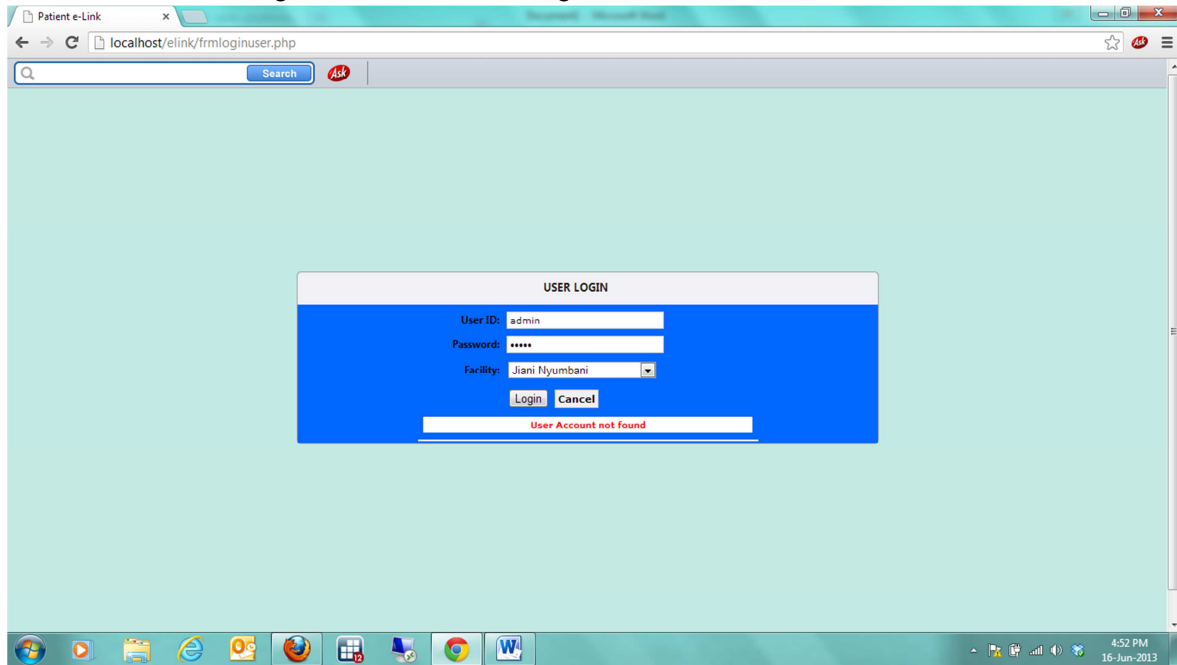
Figure 26: Wrong user name credentials
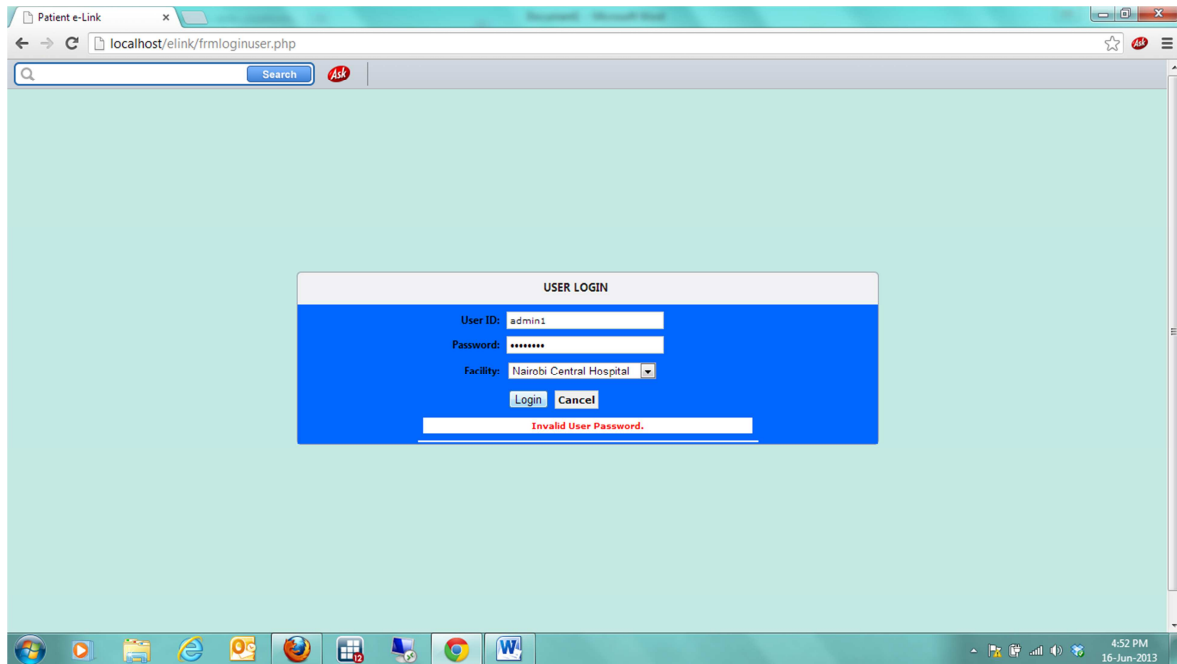
Figure 27: Wrong password credentials

Administrator Interface
This interface shows the interface of the facility's administrator
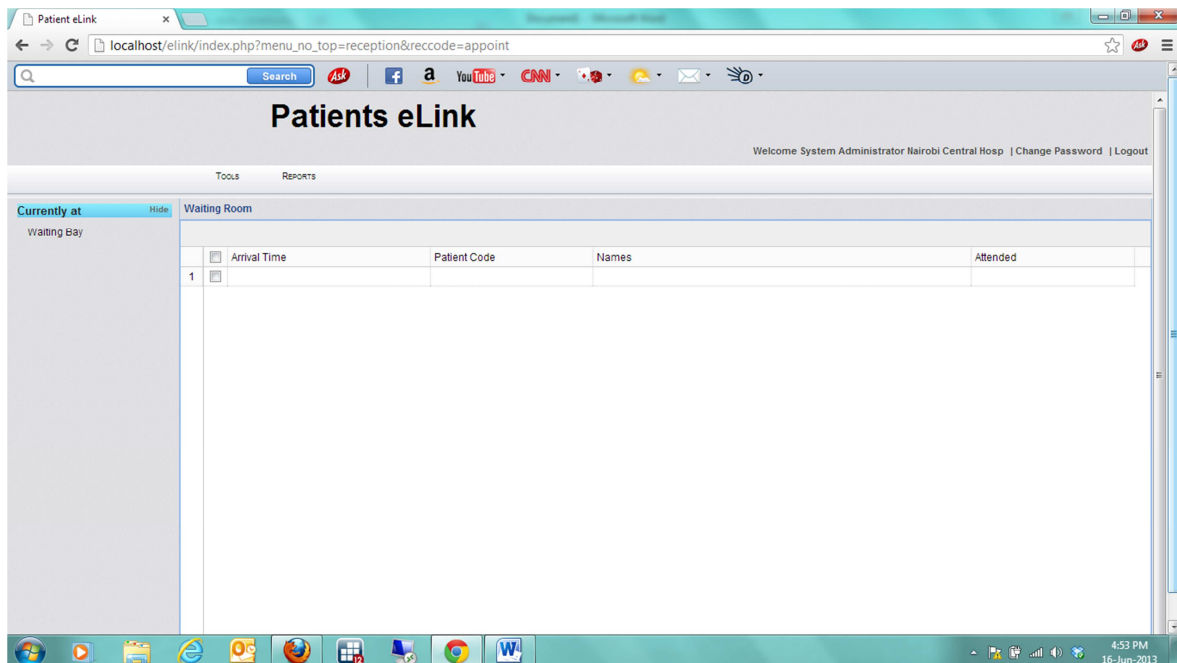
Figure 28: Administrator interface

The administrator has the rights to add and edit facilities and users of the specific facility. He also has the ability to view the systems audit trails under the reports menu.
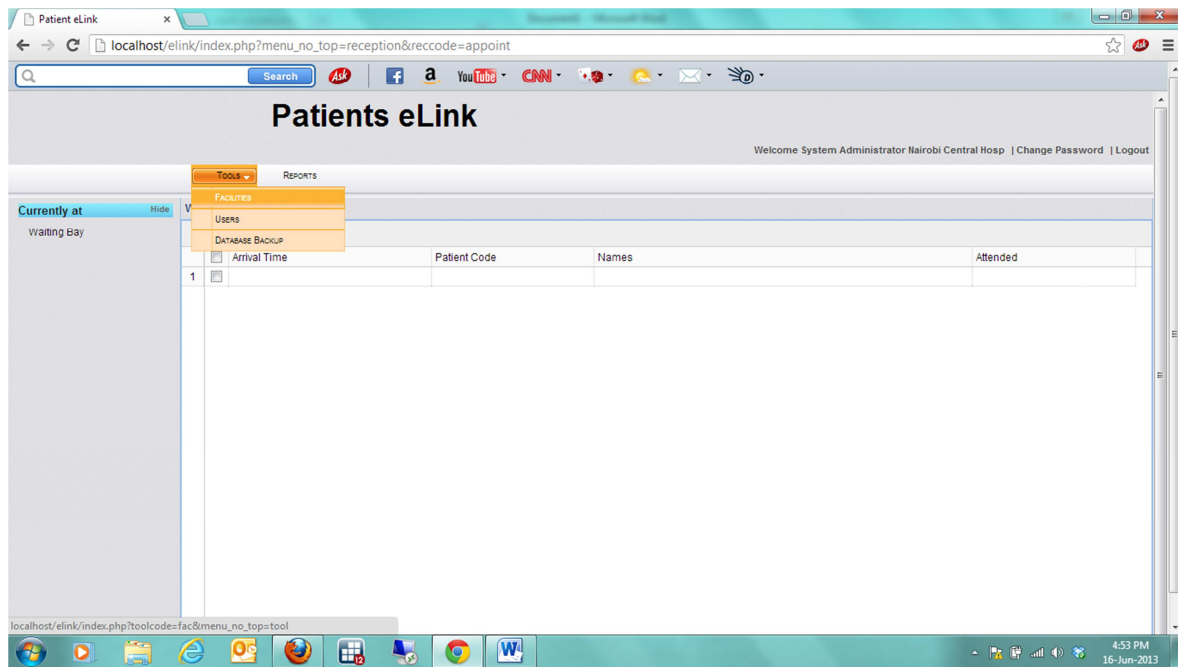
Figure 29: administrator's interface menu
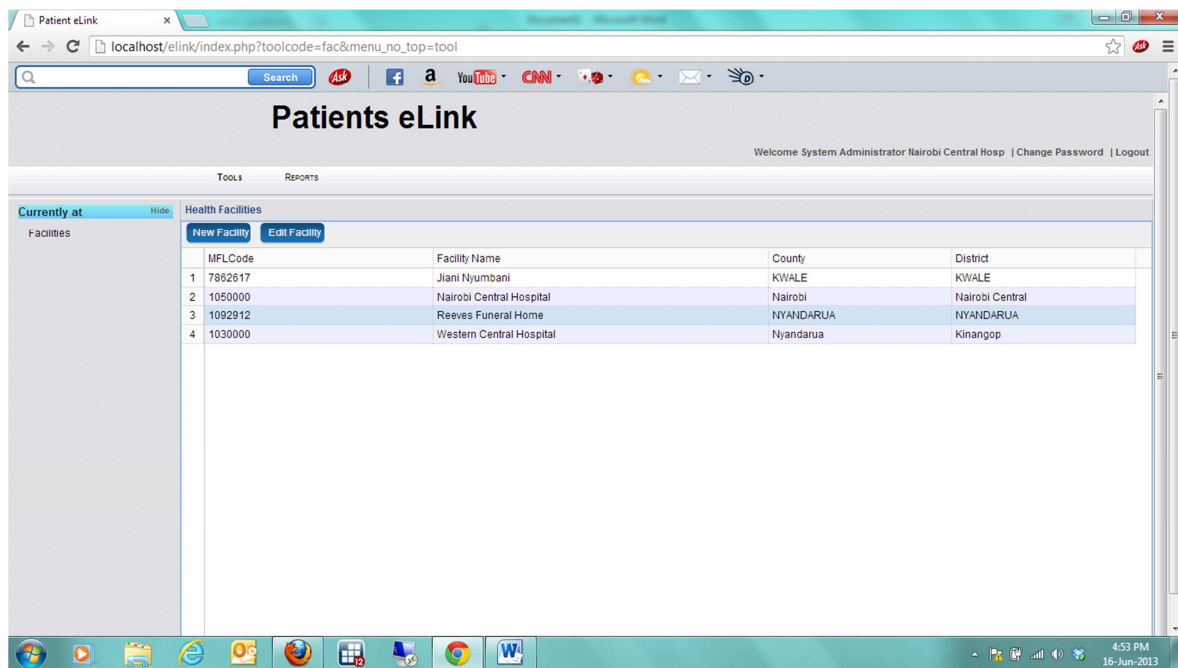
Figure 30: Administrators facilities view

Administrator's view of adding a facility
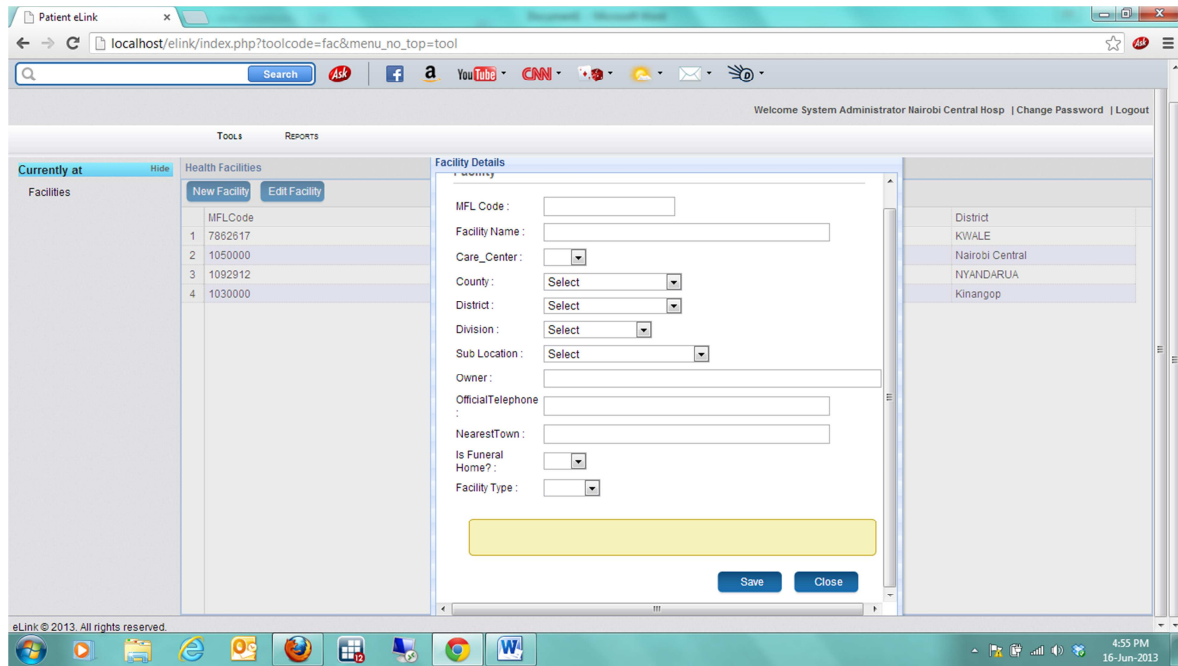
Figure 31: Administrators Interface of adding a facility

Administrator's view of editing a facility
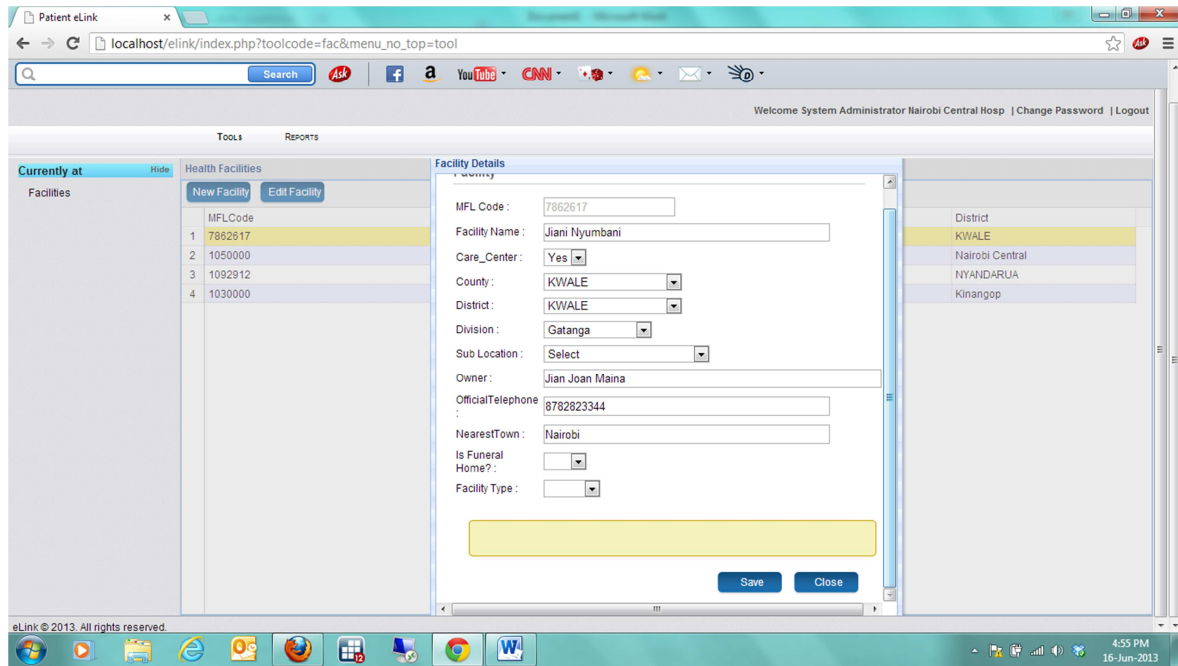
Figure 32: Administrators Interface of editing a facility

Administrator's view of adding a user
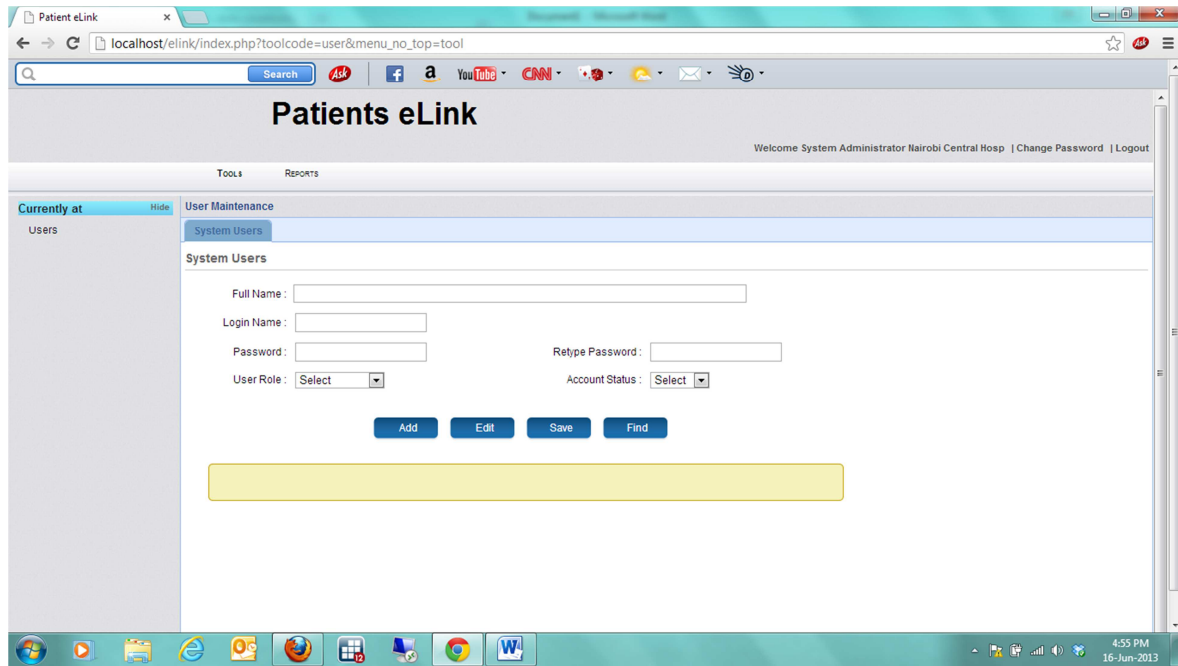
Figure 33: Administrators Interface of adding a user

Administrator's view of editing a user
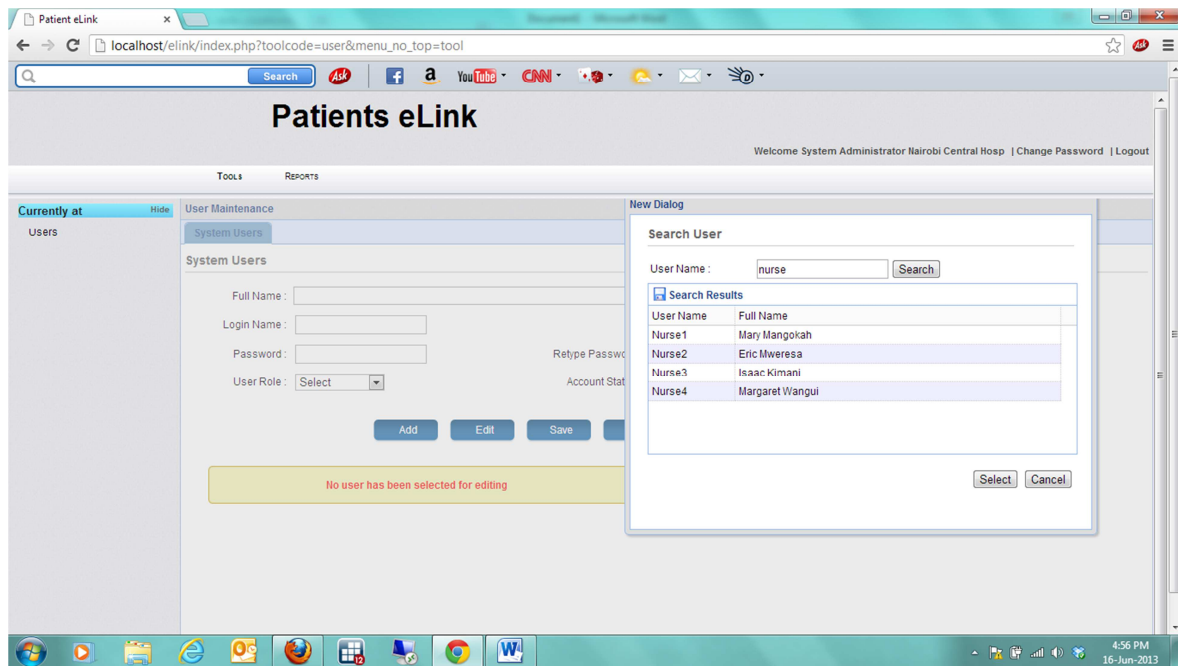
Figure 34: Administrators Interface of editing user 1
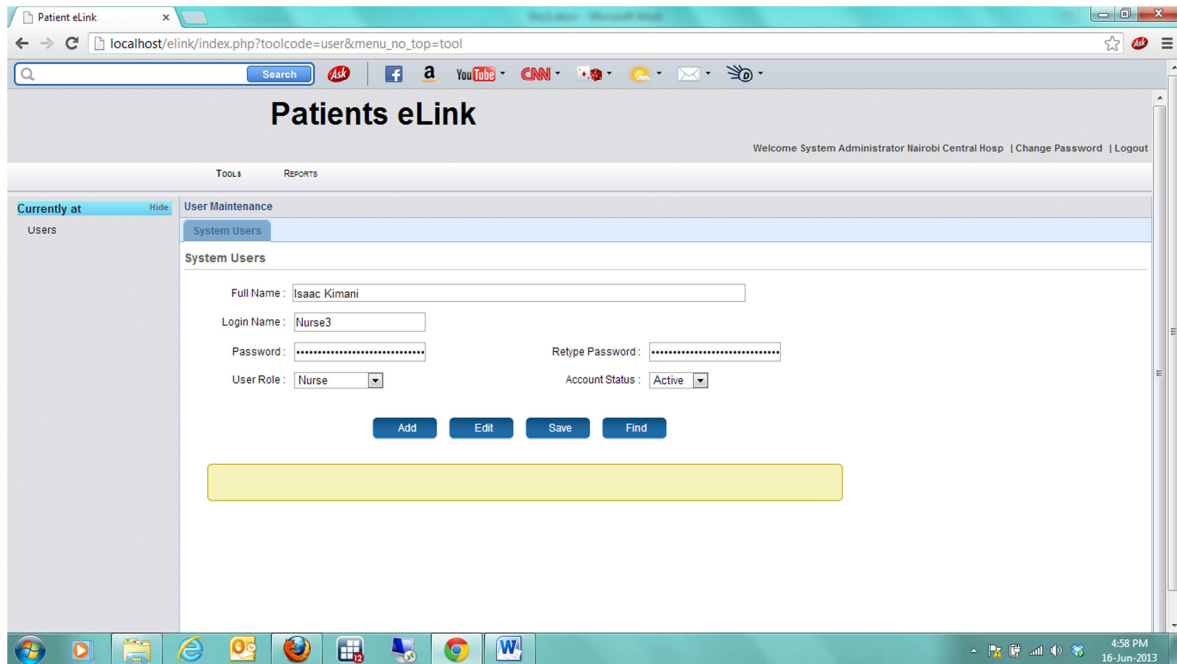
Figure 35: Administrators Interface of editing user 2

Administrator's view of backing up the database as well as restoring the database
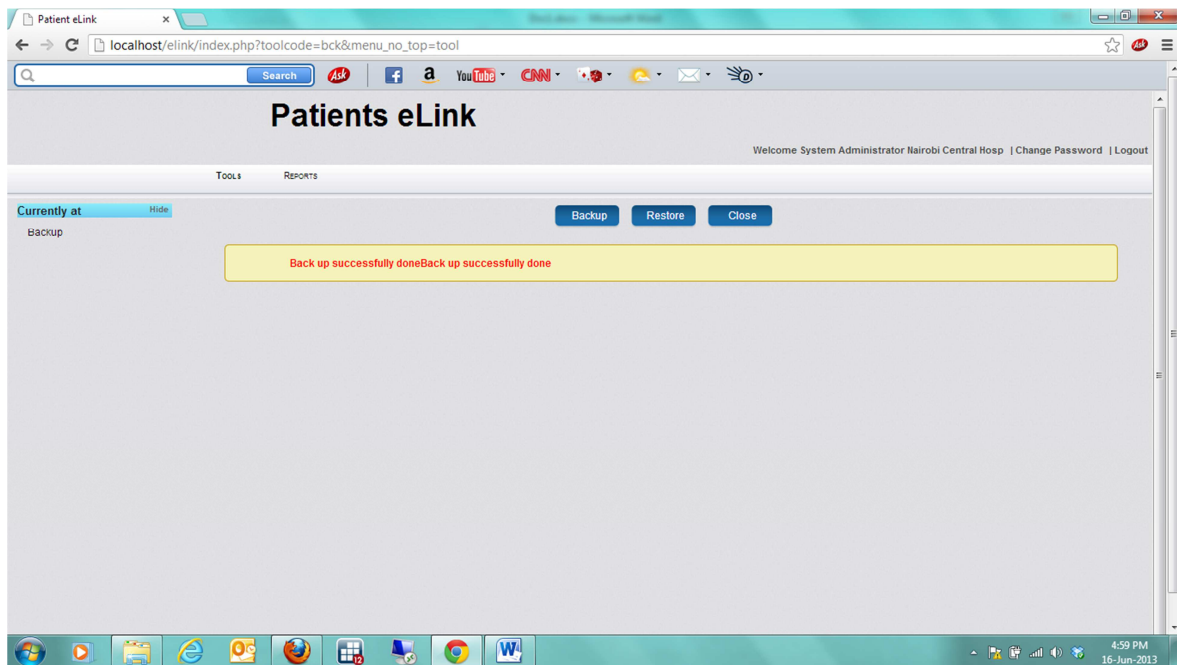
Figure 36: Administrators Interface of backing up and restoring the database

Administrators Interface of viewing the systems audit trails
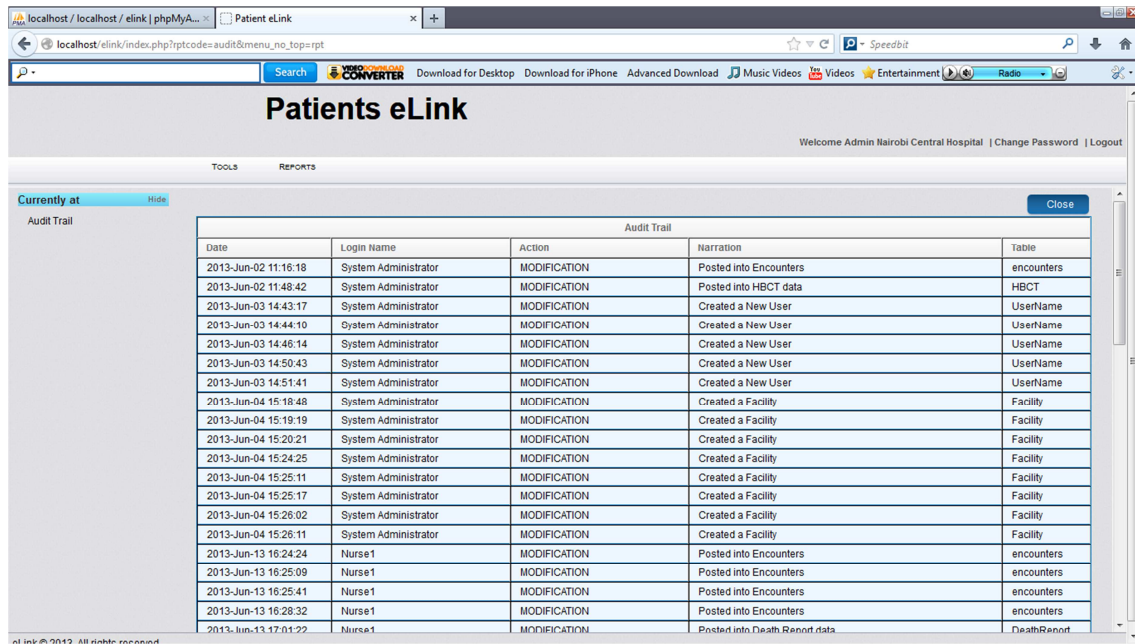
Figure 37: Administrators Interface of viewing the systems audit trails

Receptionist Interface

Below are the interfaces that a receptionist encounters while they login
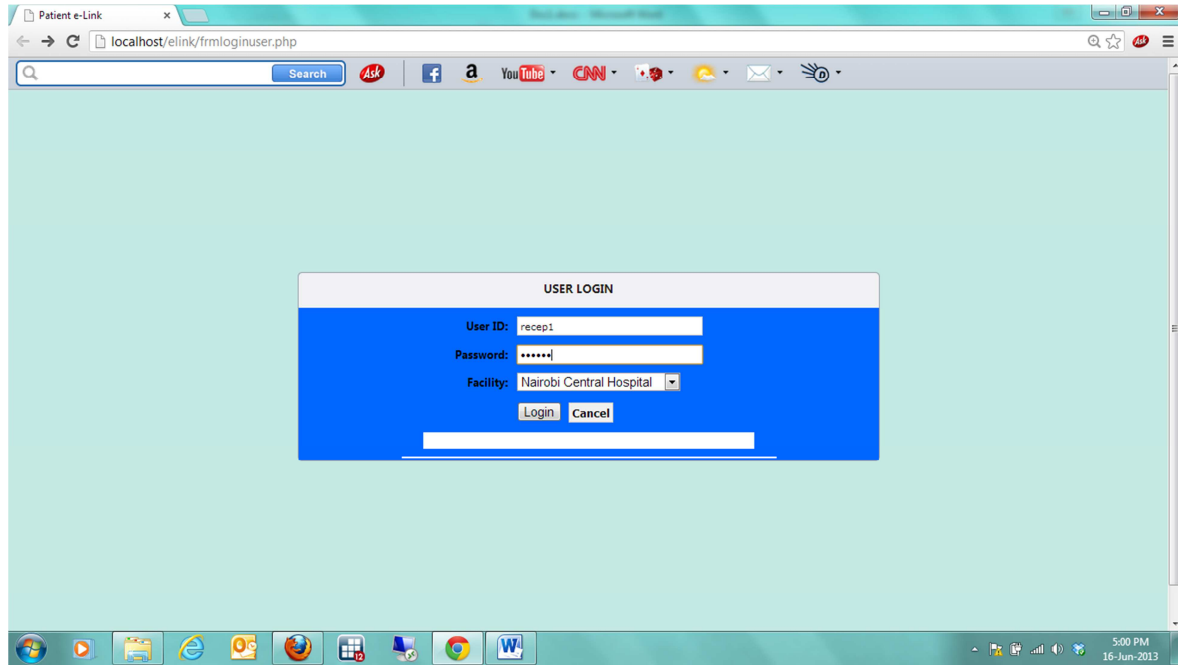
Figure 38: Receptionist Interface 1

The receptionist has the rights to view the waiting bay, add new clients to patients register and outreach forms of the specific facility.
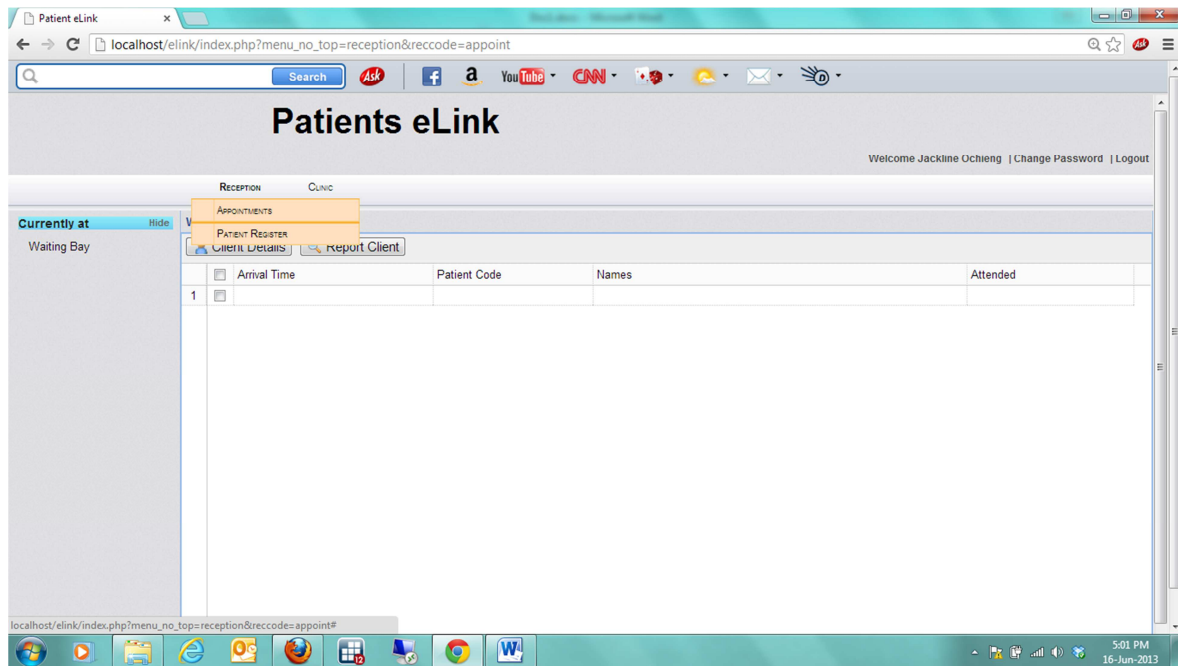
Figure 39: Receptionist Interface 2

When adding a new client in the demographic or outreach, or serving an already existing client in care the receptionist will have to ensure that the biometric device is connected to the computer. The receptionist will read the fingerprint scan and on 'report client' button and a dialog box pops up that notifies the receptionist to register the client.
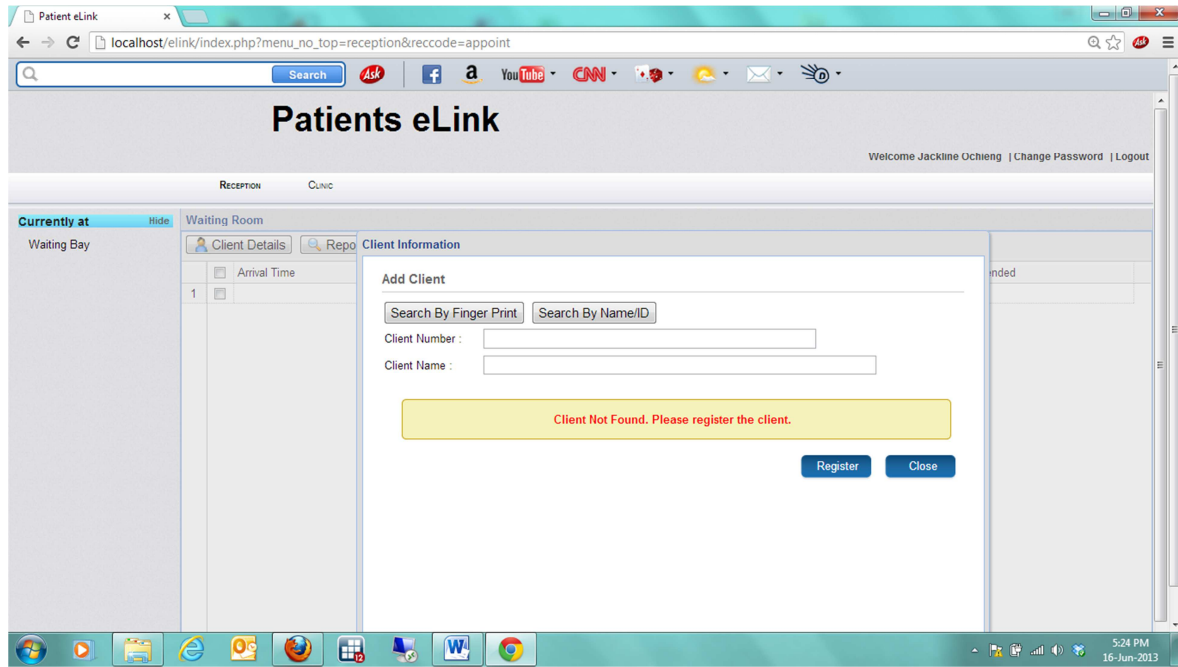
Figure 40: Registering the new client

The patient form pops up after the receptionist clicks on the 'register' button and he/she keys in the details
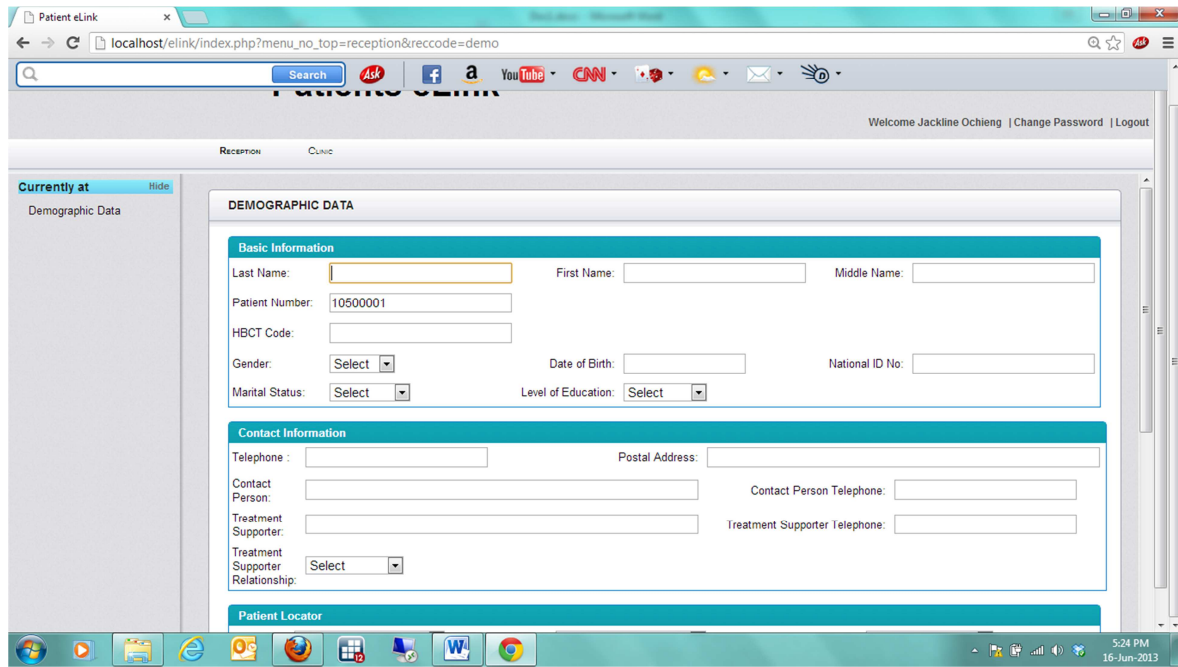
Figure 41: Patient form for demographic data

After finishing keying in the demographic data, you're notified that the data has been saved successfully.
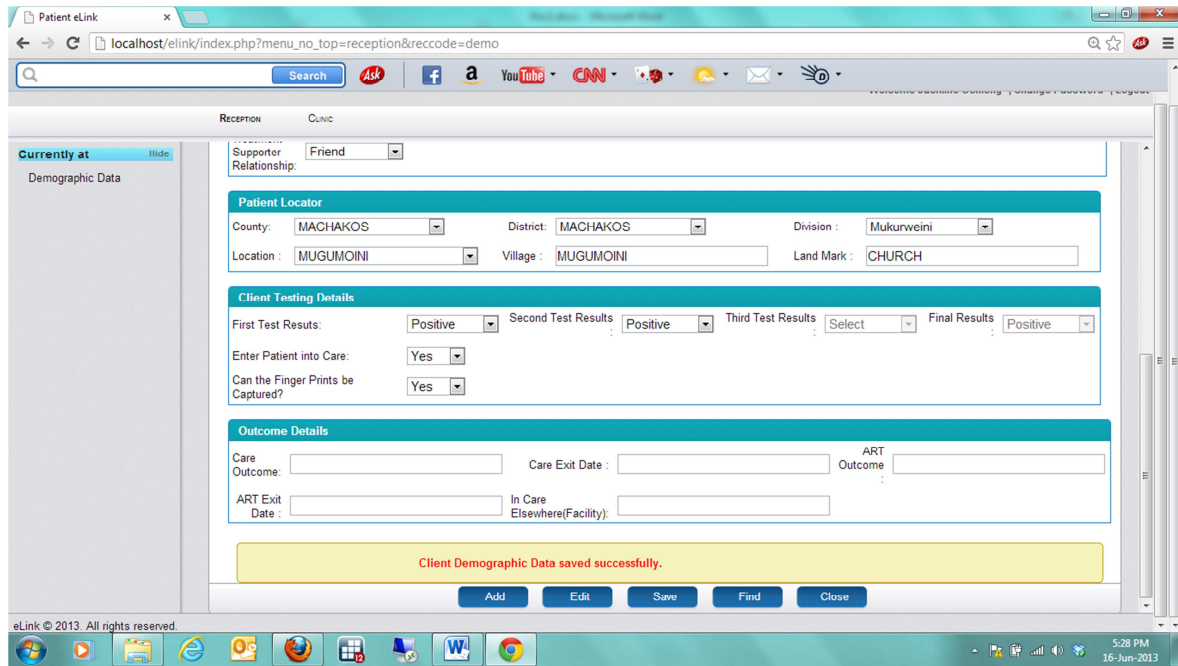
Figure 42: Demographic data saved successfully

In case the receptionist starts the client on care, the client will be thrown in the waiting bay by default else they wount appear
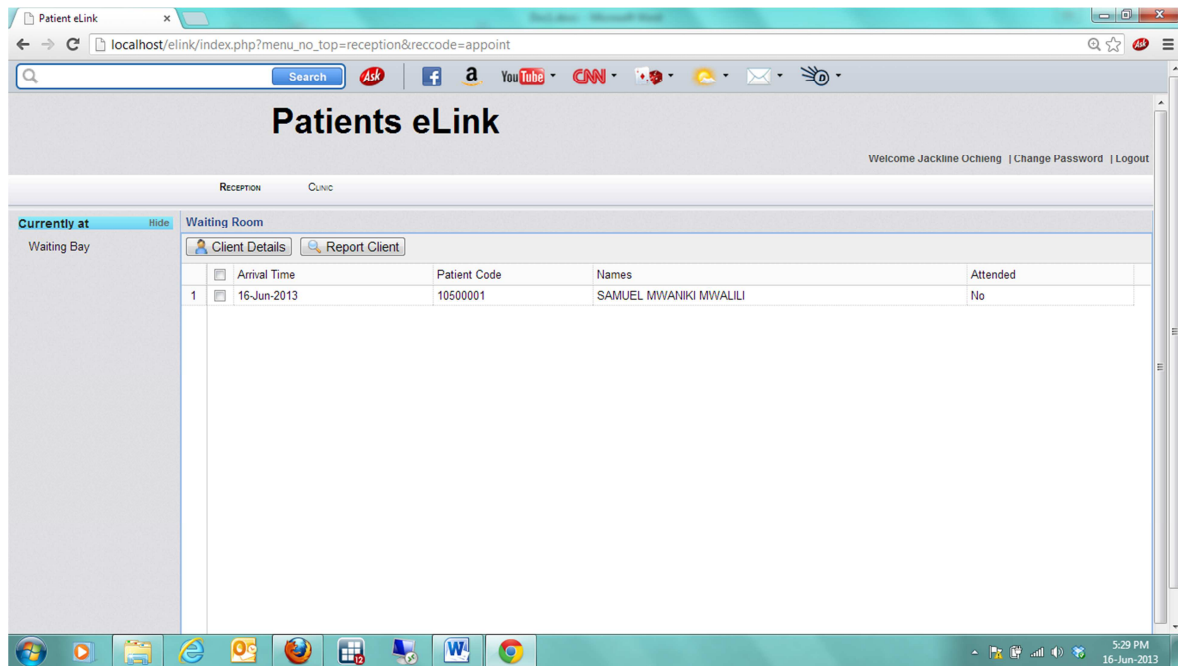
Figure 43: Waiting bay after the client is started on care

Receptionist outreach data

In case the receptionist is at the outreach camp testing clients, they will go through the same procedure of reading the fingerprint scans. In case the client was already a client in one of the facilities, the receptionist will be notified through the biometric interface else they will just open the outreach interface directly and register the client as a new client.

Figure 44: Outreach form when registering a new client

After finishing to key in the details of the outreach client, the data is saved successfully but the client is not thrown in the waiting bay since they are in the outreach.
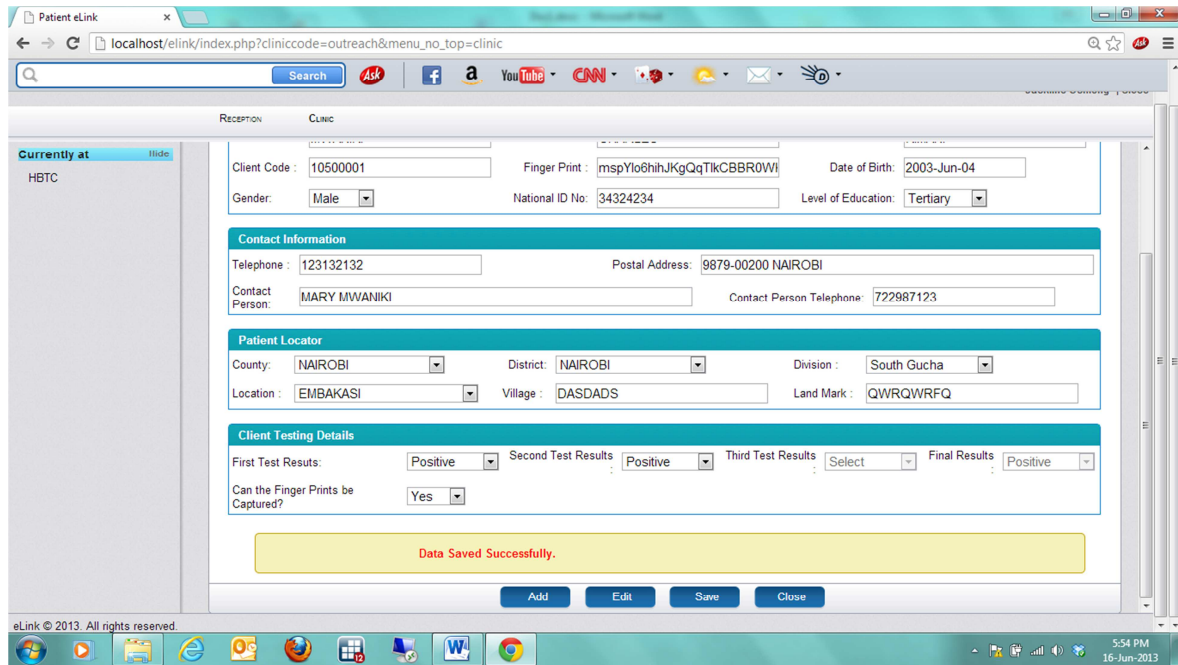
Figure 45: Outreach form when the data is saved successfully

If the same client tested at outreach comes to the clinic for services and their fingerprint are scanned, then they will appear on the client information dialog window as a client found in outreach and option of registering the client to care will be availed.
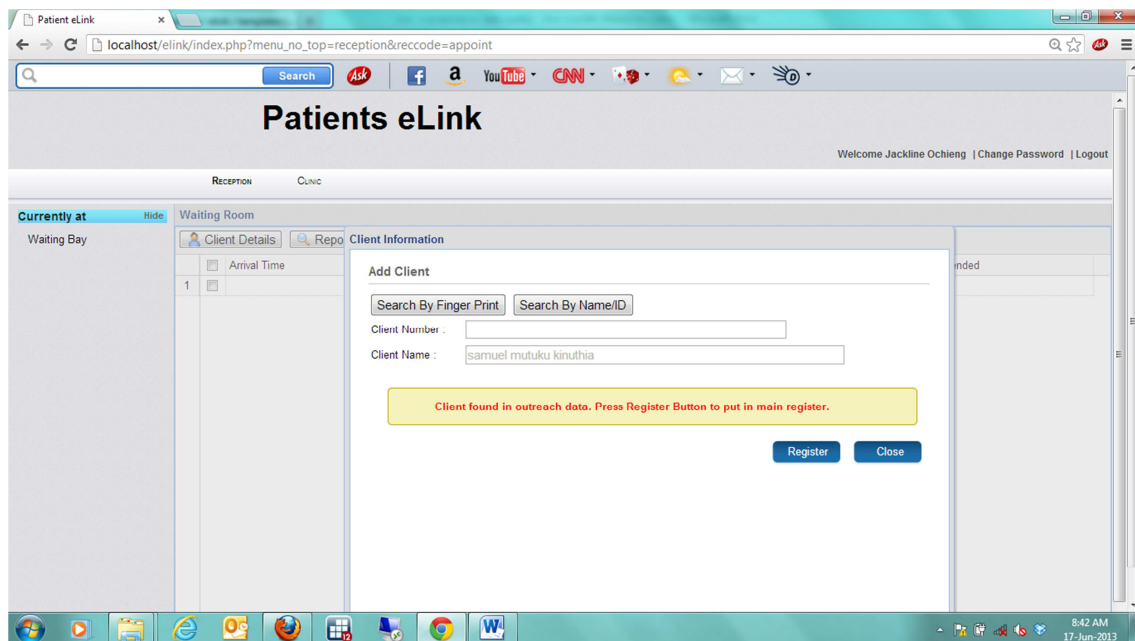
Figure 46: An outreach client coming for services in the clinic

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On clicking register, all their information will be pulled from the outreach data and displayed on the screen, where the receptionist will fill in the necessary information that was not keyed in at the time of outreach.
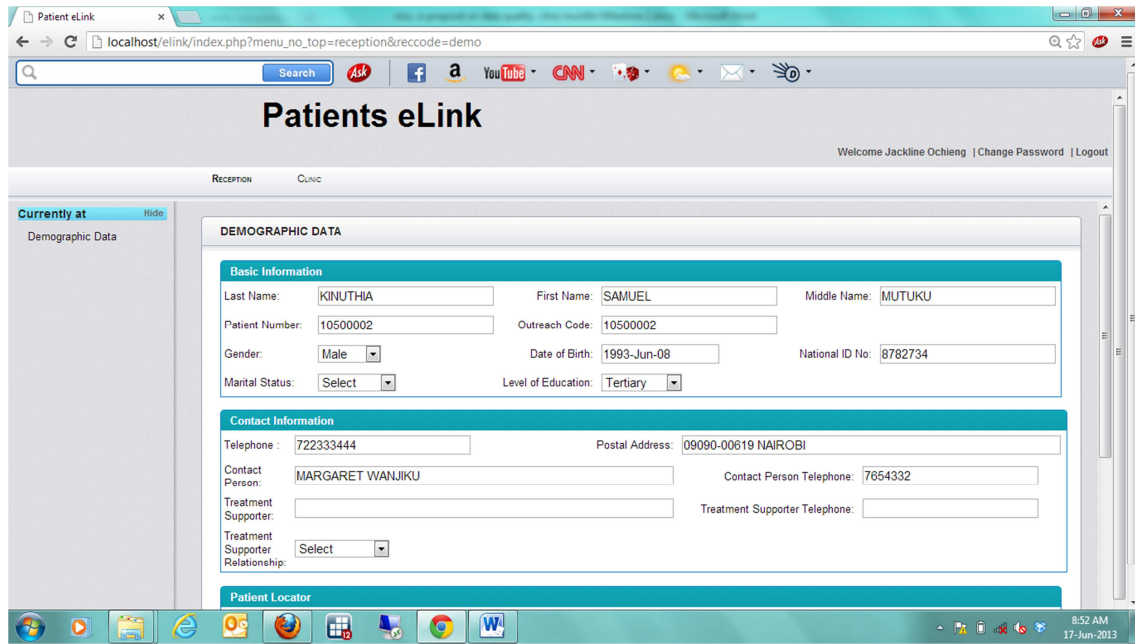
Figure 47: An outreach client being registered to care

After keying in the necessary details and prompted to enter into care, the data is saved successfully and the outreach patient is thrown into the waiting bay for the clinician to attend to him/her.
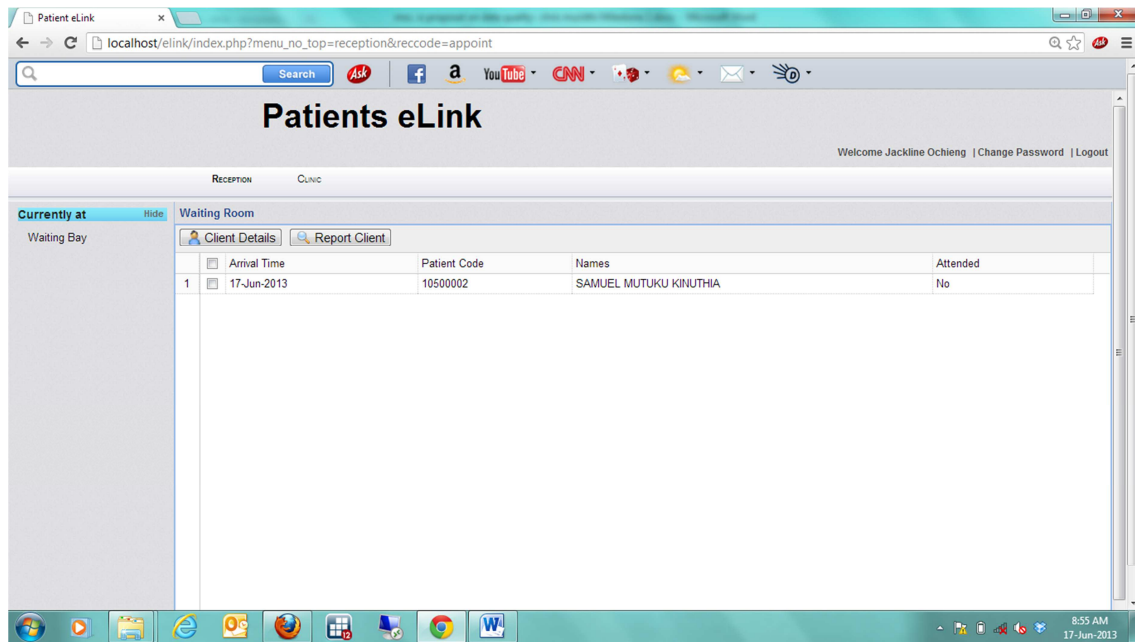
Figure 48: An outreach client being scheduled in the waiting bay

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Nurse Interface

Below are the interfaces that a receptionist encounters while they login
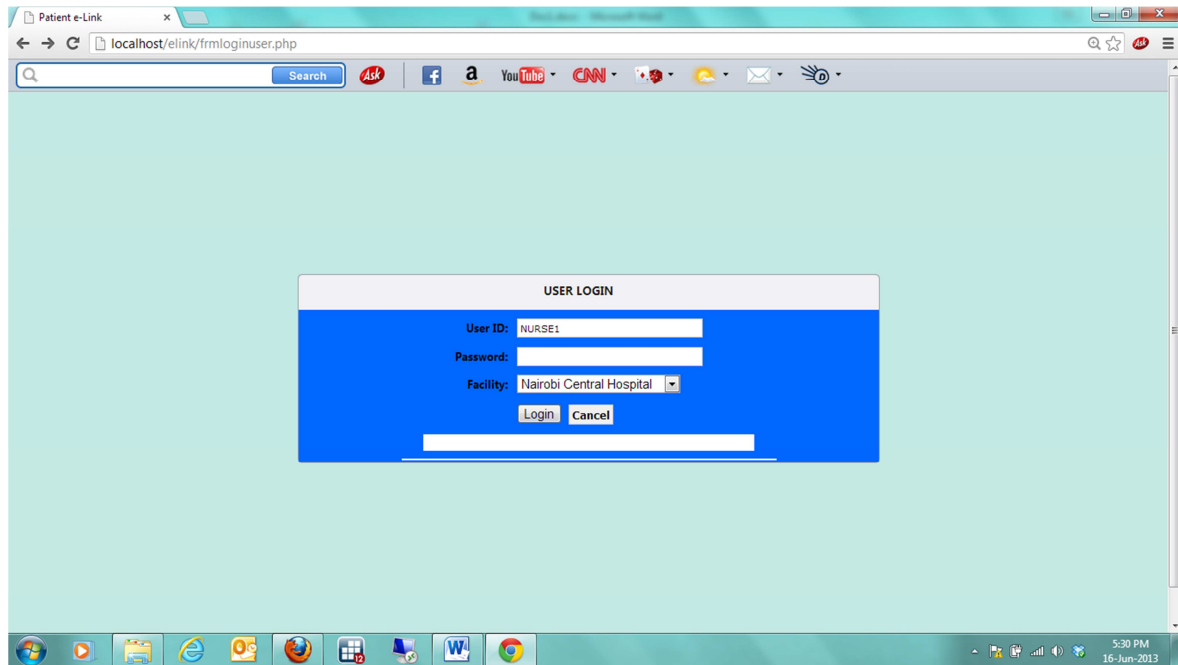
Figure 49: Interface of a nurse login

The nurse has the rights to view the waiting bay, add new clients outreach forms, attend to the regular clients of the specific facility as well as fill in a death report.
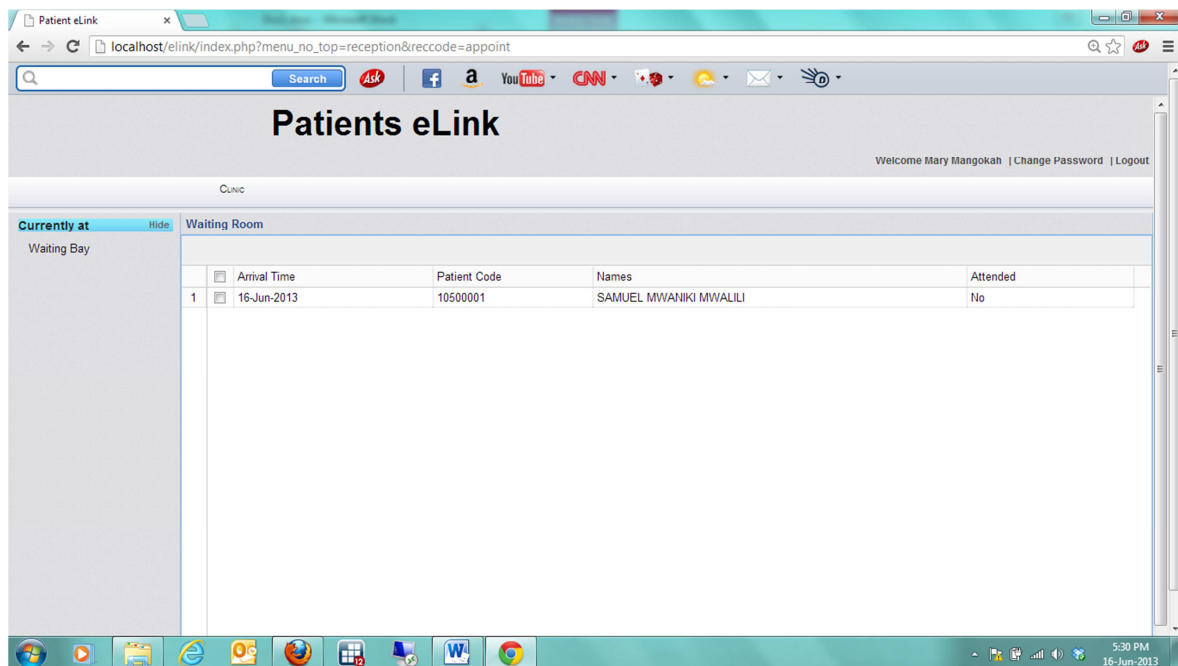
Figure 50: Nurse's interface

For the client who was served by the receptionist, would appear on the waiting bay for them to be served by a nurse. The nurse would select the client for serving and click *Yes*.
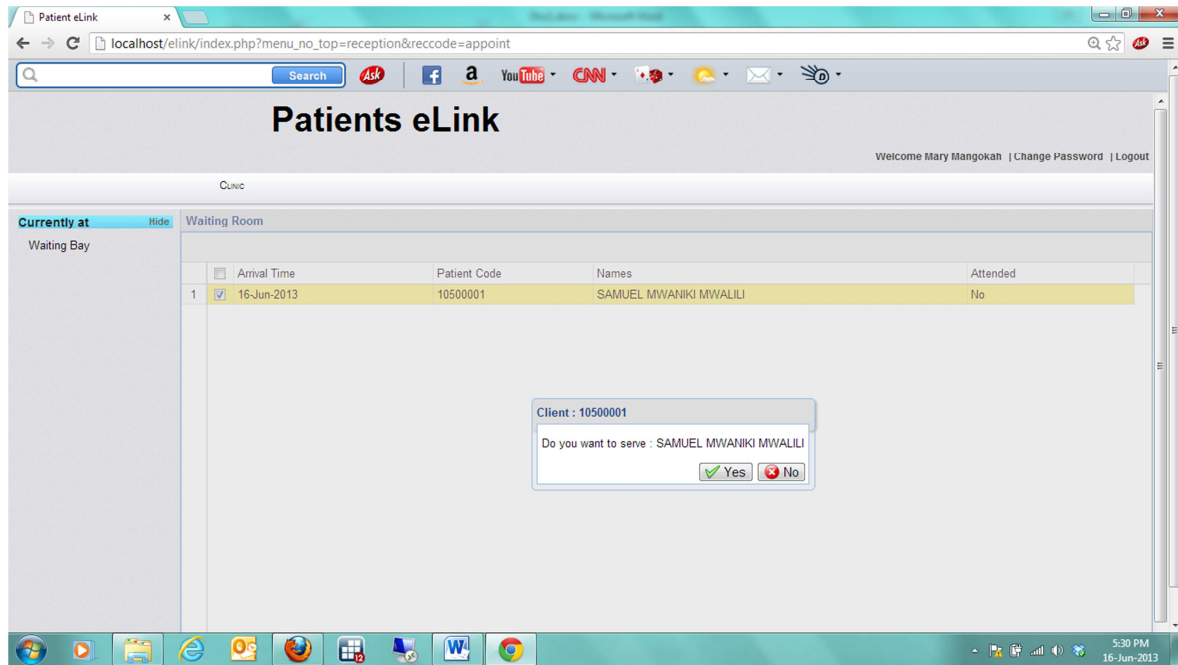
Figure 51: Nurse selecting a client when serving

On clicking Yes, the encounter's form would open and the client vitals and all the rest of the necessary information be keyed in.
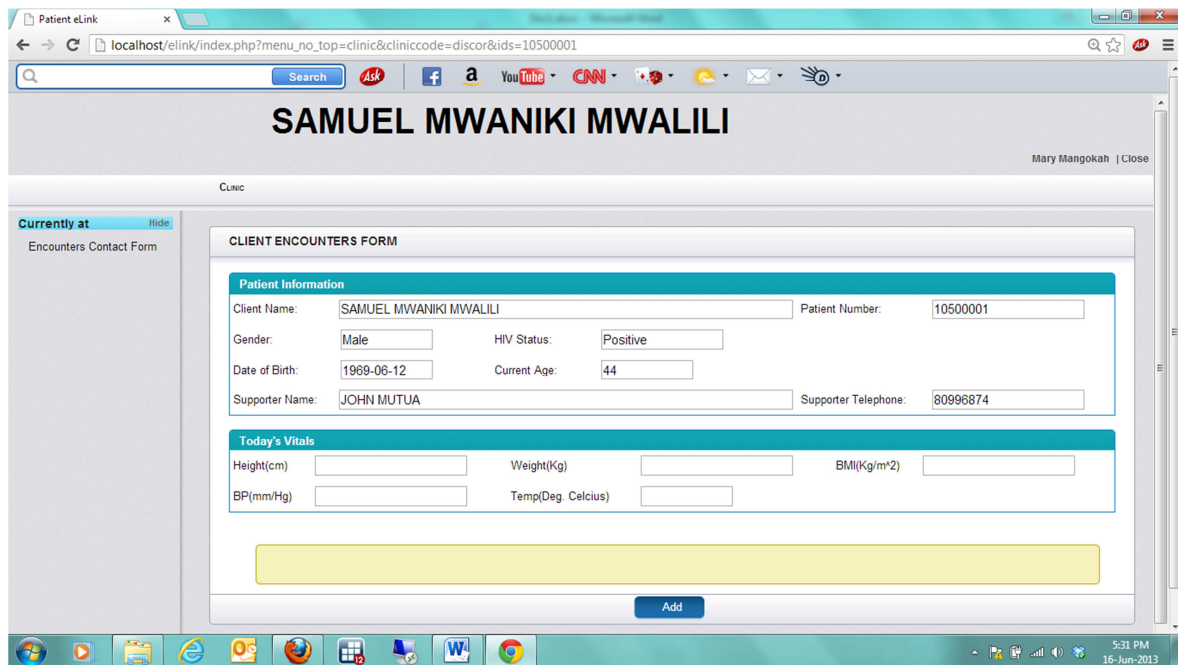
Figure 52: Nurse Interface of serving a client through the encounter form

After the nurse has successfully keyed in the details, she/he saves the data
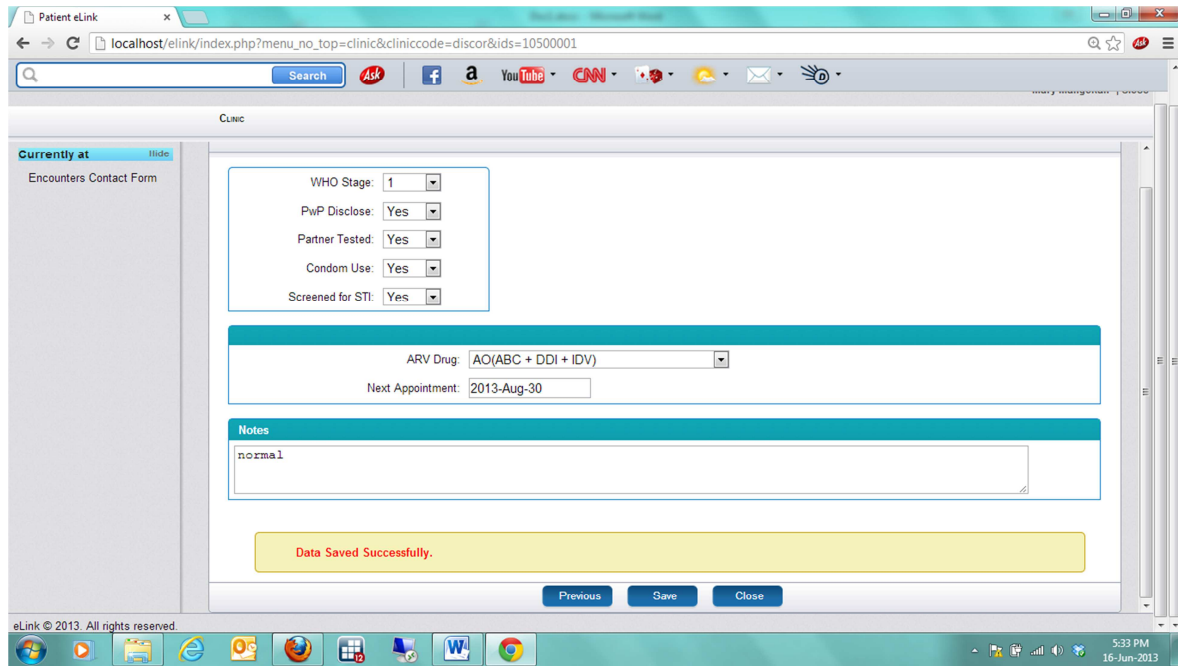
Figure 53: Encounter's form being saved after successfully being keyed in

After serving the client, the waiting bay notifies the nurse that the client has been served
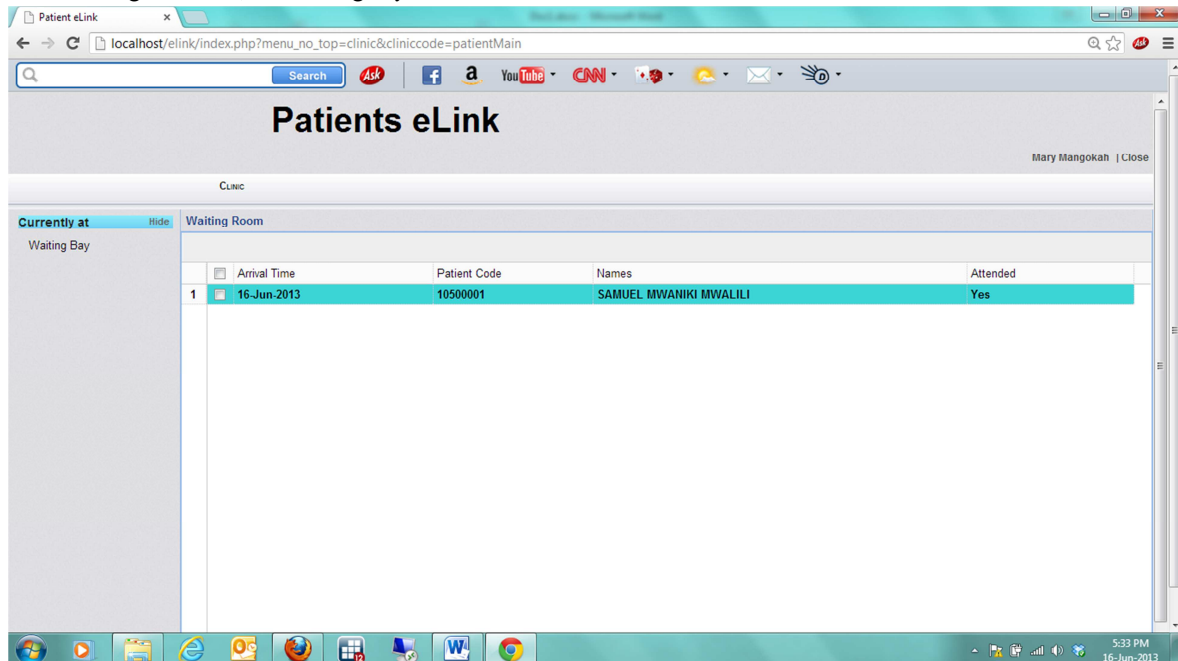
Figure 54: Alert in the waiting bay notifying a patient has been served

Funeral home Interface

In case a client dies and is taken to a funeral home, the receptionist will still go through the same process of scanning the fingerprint. If the client was never registered in any of the facilities that use this system, then the client information dialog box would notify the receptionist that the client was not found and the client number and name would be blank. But if the client was registered in any of the facilities that use this system, then the client information dialog box would notify the receptionist that the client was not found (in the particular facility) and the client number and name would be having information suggesting that the client was a patient in another facility.
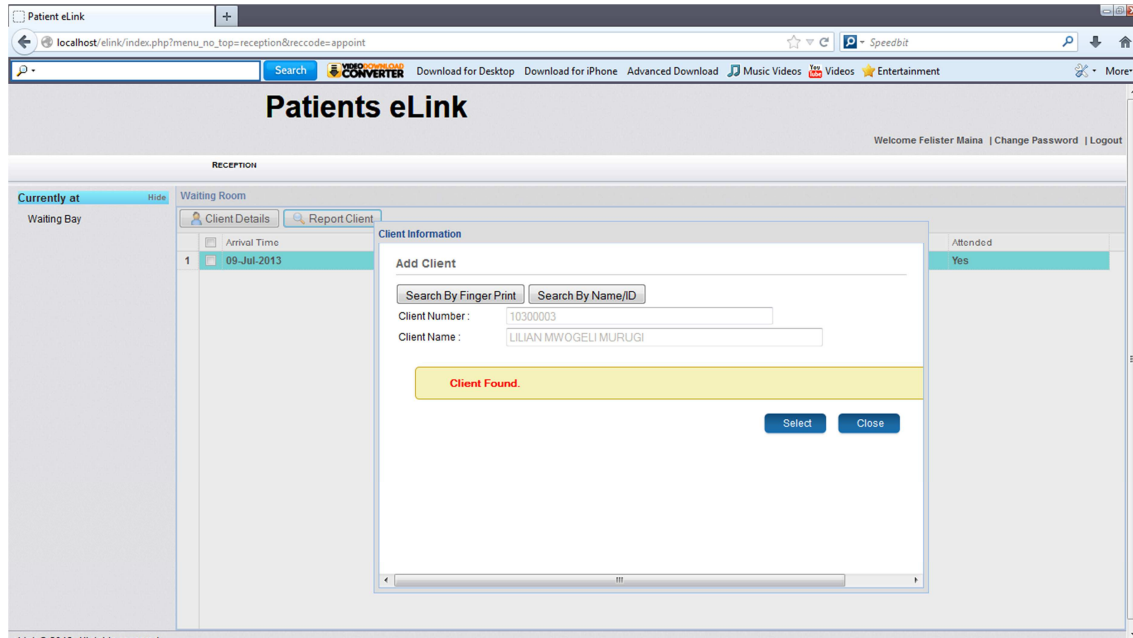
Figure 55: Client registered in a funeral home

On selecting the client, the record will be scheduled in the waiting bay so that the clinician can be able to fill the details of the dead body.
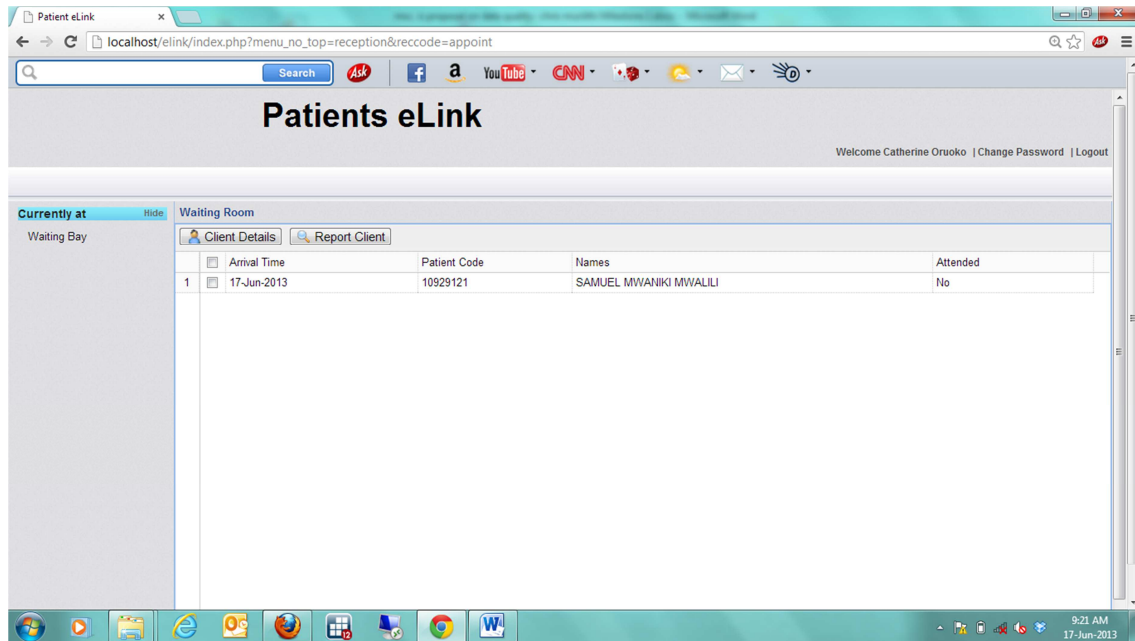
Figure 56: Dead client scheduled on the waiting bay

When the nurse logs in to fill in the necessary details of the dead client the death report form will open up
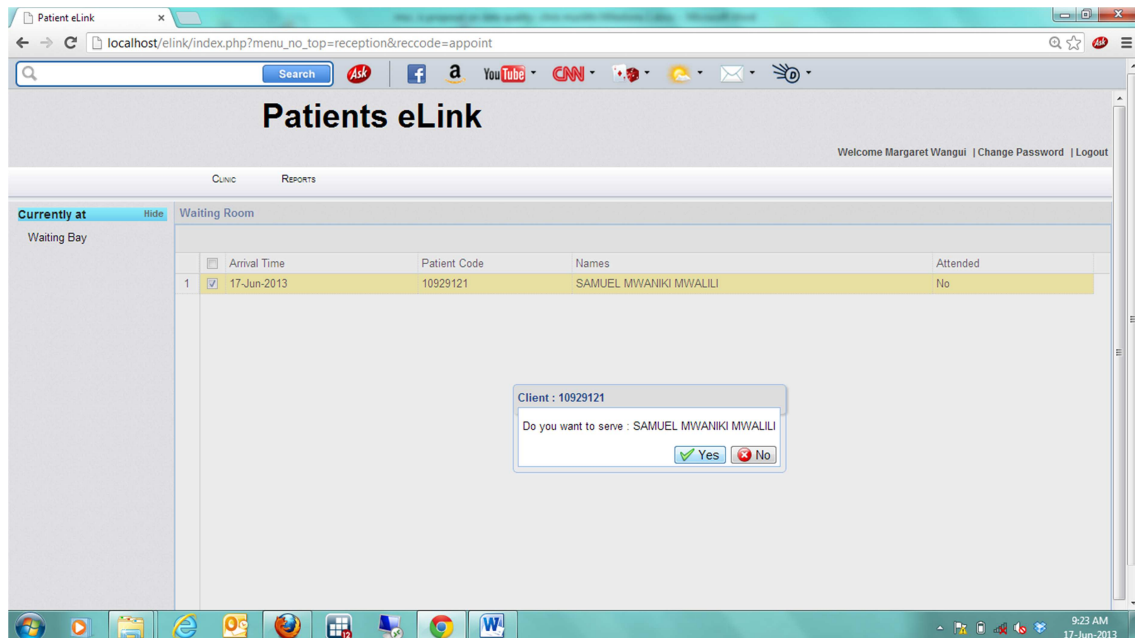
Figure 57: Funeral home nurse waiting bay

Death report form opening where the nurse will fill in the details

Figure 58: Death report form

After filling in the details the data will be saved successfully and on the waiting bay the client's status will read that he/she has been attended to.

Figure 59: Client already attended to in the funeral home

The nurse also has a report view where they can view the latest status of their clients.

Figure 60: Outcome report

The nurse can also view a summary of the facilities report.

Figure 61: Client Status Report

Changing Passwords

For all the users of the system, they have the capability of changing their own passwords by clicking on *change password* button
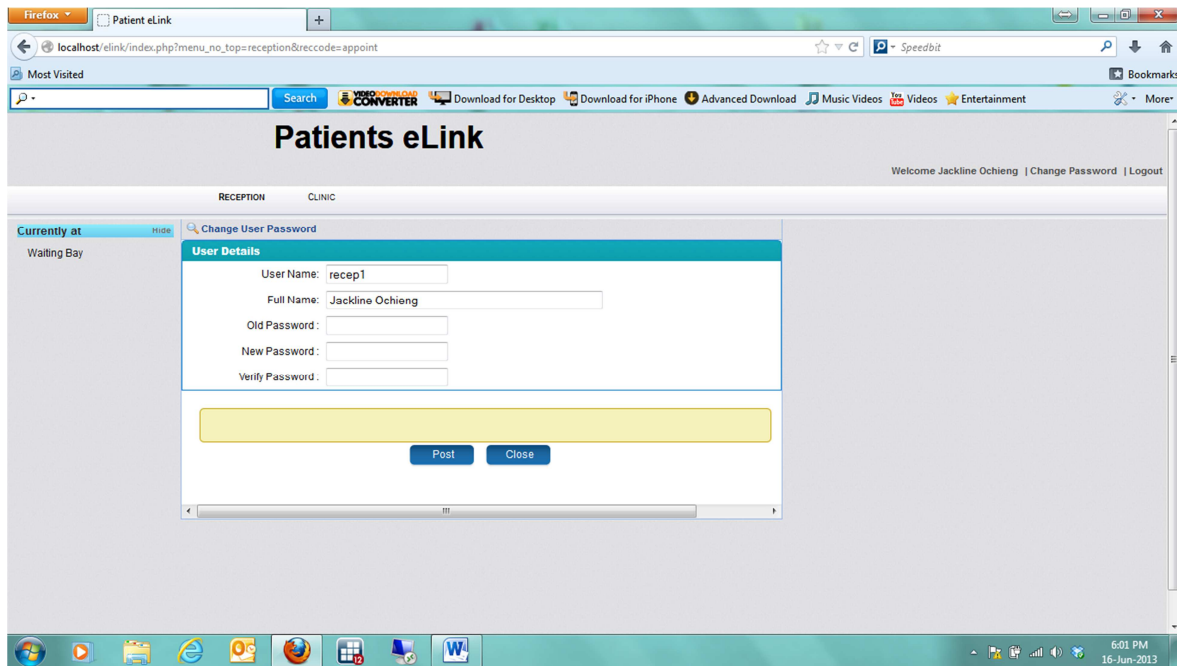
Figure 62: Changing password interface 1

The password requirement of having more than 7 characters and a mixture of numeric and alphabetic words need to be met.
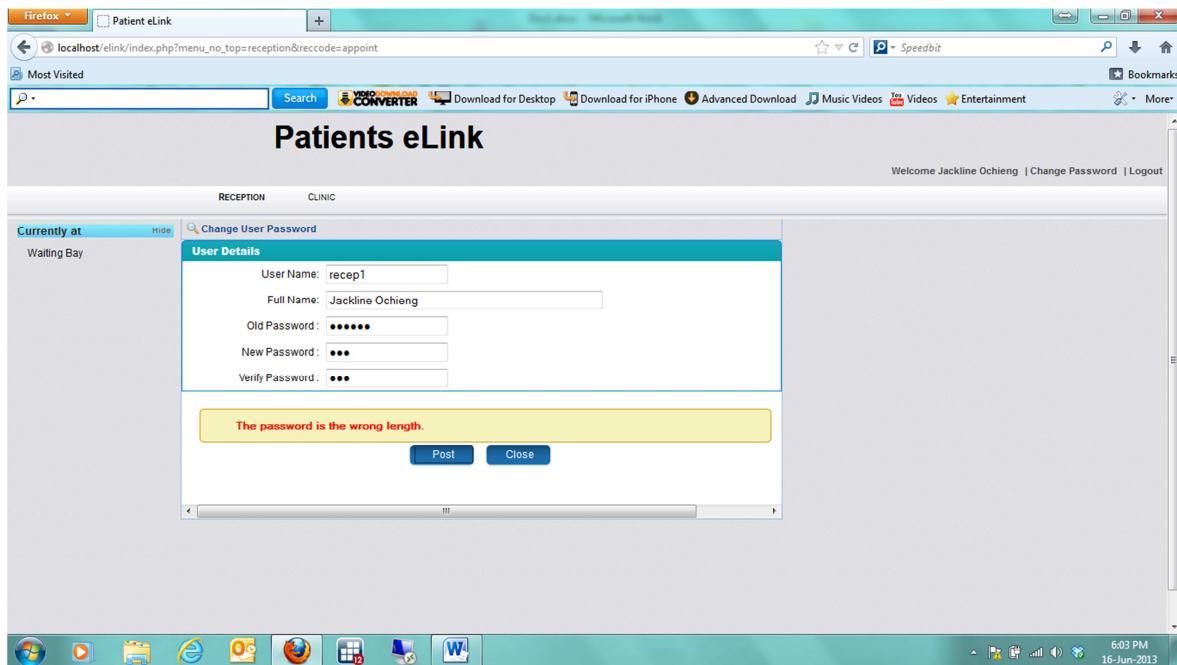
Figure 63: Password requirements need to be met

After the passwords have met the required standards, they are saved successfully.
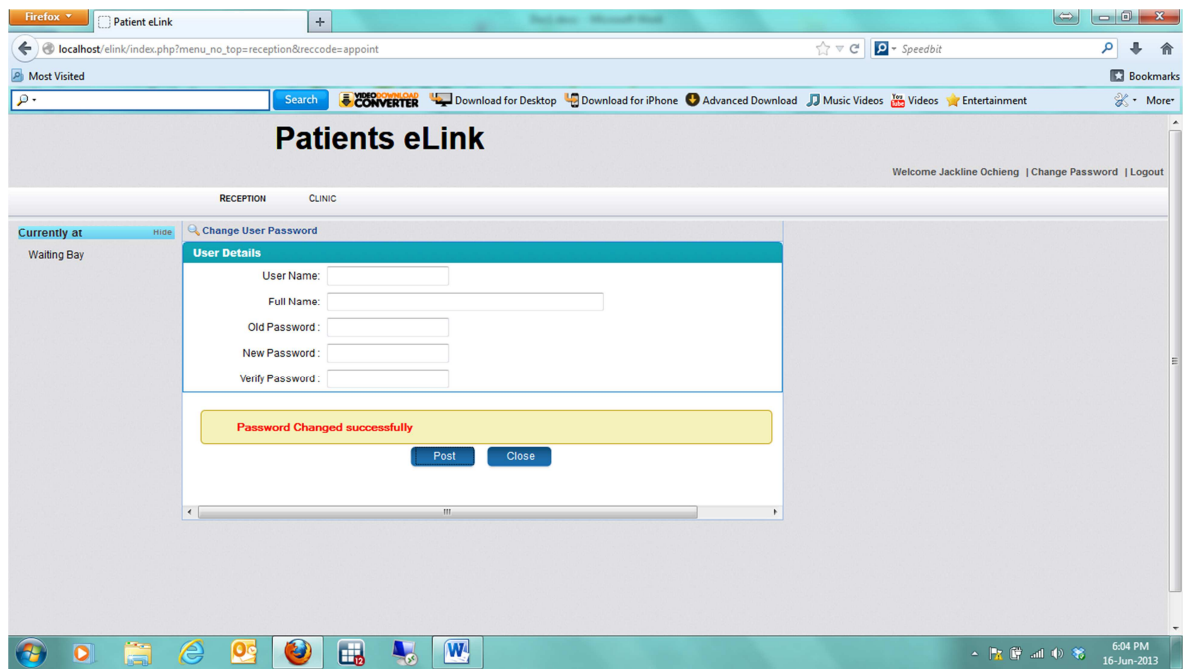
Figure 64: Password change saved successfully

Appendix B: Data flow diagram and description of the proposed system

Entity description show the fields in each table of the system

Patient's table entity description: this table contains the demographic records of all the clients who ever accessed care.

Attributes Name	Format	Size	Identifiers
PatientCode (PK)	varchar	20	Yes
Date	date		
Facility	varchar	50	
FirstName	varchar	50	
MiddleName	varchar	50	
LastName	varchar	50	
Gender	varchar	10	
DateofBirth	date		
LevelOfEducation	varchar	20	
NationalID	varchar	50	
FPMap	longtext		
PostalAddress	varchar	150	
Telephone	varchar	50	
ContactPerson	varchar	150	
ContactPersonTel	varchar	20	
County	varchar		
District	varchar	20	
Division	varchar	20	
Location	varchar	20	
Village	varchar	20	
LandMark	varchar	50	
PatientInCare	bit	1	
HIVStatus	varchar	20	
Test1Result	varchar	20	
Test2Result	varchar	20	
Test3Result	varchar	20	
CareOutcome	varchar	50	
CareExitDate	date		
ARToutcome	varchar	50	
ARTExitDate	date		
OutreachCode	varchar	20	
OnCareElsewhere_Facility	varchar	50	
MaritalStatus	varchar	50	
TreatmentSupporterName	varchar	255	
TreatmentSupporterRelationship	varchar	255	
TreatmentSupporterTelephone	varchar	50	
ProviderName	varchar	100	

Table 8: Patients table entity description

Encounters table entity description: this table contains the clinical visit records a client has ever attended.

Attributes Name	Format	Size	Identifiers
PatientCode (PK)	varchar	20	Yes
Date (PK)	date		Yes
Facility	varchar	50	
Weight	int	11	
Height	int	11	
Temperature	int	11	

BP	varchar	20	
GeneralExamination	varchar	1000	
SkinExamination	varchar	1000	
MouthExamination	varchar	1000	
LymphNodesExam	varchar	1000	
ENTExam	varchar	1000	
EyesExam	varchar	1000	
RespiratoryExam	varchar	1000	
CardioVascularExam	varchar	1000	
NervousSystemExam	varchar	1000	
AbdomenExam	varchar	200	
MusculoSkeletal	varchar	200	
GenitoUrinary	varchar	200	
DrugCombination	varchar	50	
NextAppointment	varchar	20	
WHOstage	smallint	1	
PwP_Disclosure	bit	1	
PwP_PartnerTested	bit	1	
PwP_Condoms	bit	1	
PwP_STIscreen	bit	1	
Notes	varchar	4000	
ProviderName	varchar	100	

Table 9: Encounters table entity description

Death report table entity description: this table contains the records of all clients who have died and passed through a funeral home.

Attributes Name	Format	Size	Identifiers
PatientCode (PK)	varchar	20	Yes
DeathDate	date		
DateReportedDead	date		
ReportedBy	varchar	150	
FacilityReported	varchar	50	
CauseOfDeath	varchar	200	
PathologicalReport	varchar	2000	
ProviderName	varchar	100	

Table 10: Death report table entity description

Outreach table entity description: this table contains all the records of clients who have ever been tested in a mobile outreach testing.

Attributes Name	Format	Size	Identifiers
OutreachCode (PK)	varchar	50	Yes
Date	date		
Facility	varchar	50	
FirstName	varchar	50	
MiddleName	varchar	50	
LastName	varchar	50	
Gender	varchar	50	
DateofBirth	date		
NationalID	varchar	50	
FPMap	varchar	200	
PostalAddress	varchar	150	
Telephone	varchar	50	
ContactPerson	varchar	150	
ContactPersonTelephone	varchar	50	
District	varchar	20	
Division	varchar	20	

Location	varchar	20	
Village	varchar	20	
LevelOfEducation	varchar	20	
Test1Result	varchar	20	
Test2Result	varchar	20	
Test3Result	varchar	20	
FinalResult	varchar	50	
ProviderName	varchar	100	

Table 11: OUTREACH table entity description

Health Facilities table entity description: this table contains all the records of the facility using these system.

Attributes Name	Format	Size	Identifiers
MFLCode	varchar	50	
FacilityName (PK)	varchar	50	Yes
Care_Center	bit	1	
Funeral_Home	bit	1	
County	varchar	50	
District	varchar	50	
Division	varchar	50	
Location	varchar	50	
SubLocation	varchar	50	
Type	varchar	50	
Owner	varchar	200	
OfficialTelephone	varchar	50	
NearestTown	varchar	50	

Table 12: Health Facilities table entity description

System Users table entity description: this table contains all the records of system users who are using this system

Attributes Name	Format	Size	Identifiers
LoginName (PK)	varchar	50	Yes
FullName	varchar	150	
UserPassword	varchar	100	
UserRole	varchar	50	
AccountEnabled	varchar	50	
ActiveFacility	varchar	50	
ModifiedOn	Date		

Table 13: System Users table entity description

Audit Trail table entity description: this table contains all the audit records of any modification that has been done in the system.

Attributes Name	Format	Size	Identifiers
LoginName	varchar	20	
Action	varchar	200	
ActionDate	varchar	20	
Narration	varchar	200	
TableName	varchar	100	
LoginName	Int	1	

Table 14: Audit Trail table entity description

Daily Register table entity description: this table helps in viewing the clients that are on waiting bay

Attributes Name	Format	Size	Identifiers
ArrivalTime (PK)	varchar	20	Yes
PatientCode (PK)	varchar	20	Yes
Attended	Bit	1	
Facility	varchar	50	

Table 15: Daily Register table entity description

Entity relationship diagram i.e. show the structure of the proposed relational database i.e. how it connects all the tables.
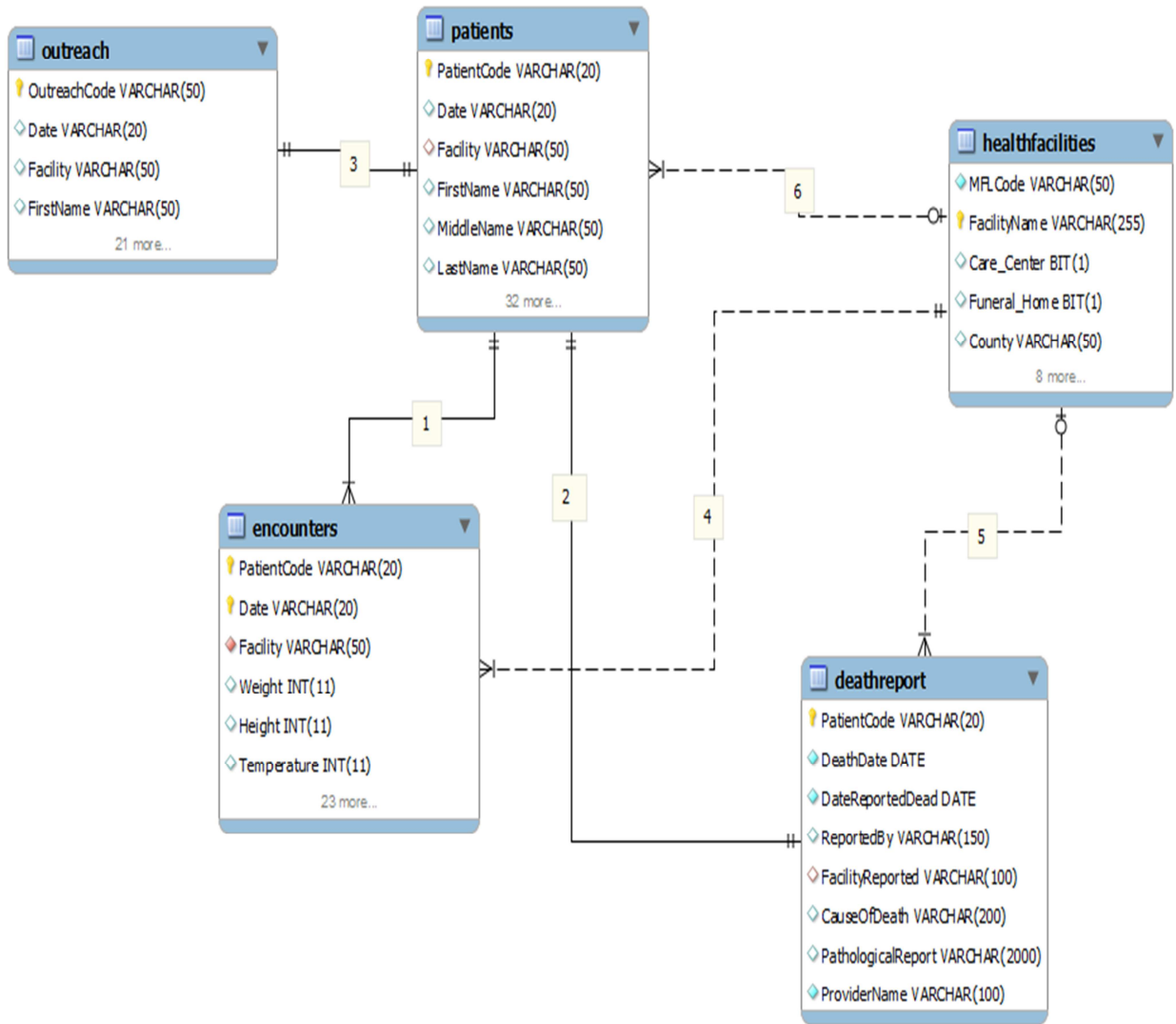
Figure 65: Entity relationship diagram

Relationship description:

Below are the associations between tables of the system:

i. Relationship number 1
- Owner: Patients.
- Member: Encounters.
- Relationship: One to Many.
- Description: a patient can have only one unique record per facility in the patients table but have more than one record in the encounters table due to the visits he/she has attended to the clinic.

ii. Relationship number 2
- Owners: Death Report / Patients.
- Relationship: One to One.
- Description: a patient can only have one unique record of death in the death report table and also one record in the patients table due to the fact that it would only update outcomes of the last clinic the patient attended.

iii. Relationship number 3
- Owners: Patients / Outreach.
- Relationship: One to One.
- Description: a patient can only have one unique record in the outreach table and also one record in the patients table.

iv. Relationship number 4
- Owner: Health facilities.
- Member: Encounters.
- Relationship: One to Many.
- Description: a facility can only have one unique record in the Health facilities table but have more than one record in the encounters table due to the fact that clients attend many clinic visits.

v. Relationship number 5
- Owner: Health facilities.
- Member: Death Report.
- Relationship: One to Many.
- Description: a facility can only have one unique record in the Health facilities table but have more than one record in the death report table due to the fact the funeral home have a lot of records of the specific facility.

vi. Relationship number 6
- Owner: Health facilities.
- Member: Patients.
- Relationship: One to Many.
- Description: a facility can only have one unique record in the Health facilities table but have more than one record in the patients table due to the clinic has many records.

Data Dictionary Attribute description

Attribute name	Description
PatientCode	• The attribute is the unique identifier of the patient in the clinic. Each client's record is recorded the related tables using this unique number • Varchar 20 • Used in the following tables: Patients, Encounters, daily register, death report
AbdomenExam	• These attribute contains the results obtained from the physical examination of a patient presenting with abdominal pain or a history that suggests an abdominal pathology. • Varchar 200 • Used in the following tables: Encounters
AccountEnabled	• These attribute contains the user details of which an account has been disabled or not. • Varchar 50 • Used in the following tables: System Users
Action	• These attribute contains details of whether any modifications was done to any tables • Varchar 200 • Used in the following tables: Audit Trail
ActionDate	• These attribute contains the date that this modifications was done to any tables • Varchar 200 • Used in the following tables: Audit Trail
ActiveFacility	• These attribute contains the facility the system user is currently in • Varchar 50 • Used in the following tables: system user
ArrivalTime	• These attribute contains the time the client walked in the clinic • Varchar 20 • Used in the following tables: Daily register
ARTExitDate	• These attribute contains the date the client ceased from being active on HAART in the respective facility • date • Used in the following tables: Patient
ARToutcome	• These attribute contains the current outcomes of a client on HAART in the respective facility • Varchar 50 • Used in the following tables: Patient
Attended	• These attribute records if a client was served in the clinic. • Bit 1 • Used in the following tables: Daily register
BP	• These attribute (blood pressure) contains results obtained from the vital signs of a client. • Varchar20 • Used in the following tables: Encounters
CardioVascularExam	• These attribute contains the results obtained from the physical examination of a patient's heart. • Varchar 1000 • Used in the following tables: Encounters
Care_Center	• These attribute contains the results of whether a clinic is a care center or not. • Bit 1 • Used in the following tables: health facilities
CareExitDate	• These attribute contains the date the client ceased from being

Attribute name	Description
	active on care in the respective facility • date • Used in the following tables: Patient
CareOutcome	• These attribute contains the current outcomes of a client on care in the respective facility • Varchar 50 • Used in the following tables: Patient
CauseOfDeath	• These attribute contains the specific reason of death as reported by the person who brought in the body or the last person who saw him alive. • Varchar 200 • Used in the following tables: Death report
ContactPerson	• These attribute contains the names of the person the client would be comfortable with incase something was to happen to the client i.e. next of kin • Varchar 150 • Used in the following tables: OUTREACH, Patients
ContactPersonTel	• These attribute contains the telephone number of the person the client would be comfortable with incase something was to happen to the client i.e. next of kin • Varchar 20 • Used in the following tables: OUTREACH, Patients
County	• These attribute contains the names of the county the client currently lives in • Varchar 50 • Used in the following tables: Health facilities, Patients
Date	• These attribute contains the date that the client was specifically served for any care service • date • Used in the following tables: Encounters, Patients and OUTREACH
DateofBirth	• These attribute contains the date of birth that the client was born • date • Used in the following tables: Patients and OUTREACH
DateReportedDead	• These attribute contains the date that the person who brought in the body or the last person who saw him alive reported. • date • Used in the following tables: Death report
DeathDate	• These attribute contains the actual date the client died. • date • Used in the following tables: Death report
District	• These attribute contains the names of the district the client currently lives in • Varchar 20 • Used in the following tables: Health facilities, Patients, OUTREACH
Division	• These attribute contains the names of the division the client currently lives in • Varchar 20 • Used in the following tables: Health facilities, Patients, OUTREACH
DrugCombination	• These attribute contains the HAART regimen the client received on the specific day • Varchar 50 • Used in the following tables: Encounters

Attribute name	Description
ENTExam	• These attribute contains the results obtained from the ear, nose and throat physical examination of a patient. • Varchar 1000 • Used in the following tables: Encounters
EyesExam	• These attribute contains the results obtained from the eyes physical examination of a patient. • Varchar 1000 • Used in the following tables: Encounters
Facility	• These attribute contains the facility name that the client was specifically served in • Varchar 50 • Used in the following tables: Encounters, Daily Register, Patients and OUTREACH
FacilityName	• These attribute contains the facility name of the facilities using the system • Varchar 50 • Used in the following tables: Health facility
FacilityReported	• These attribute contains the facility that the client was reported dead and was either a client their or it's a funeral home • Varchar 50 • Used in the following tables: Death report
FinalResult	• These attribute contains the final HIV results of a client after he/she was tested one or two times depending on the HIV results • Varchar 50 • Used in the following tables: OUTREACH
FirstName	• These attribute contains the first name of a client • Varchar 50 • Used in the following tables: OUTREACH and Patients
FPMap	• These attribute contains the fingerprint scans reading of a client's finger • longtext • Used in the following tables: OUTREACH and Patients
FullName	• These attribute contains the full name of the system user • Varchar 150 • Used in the following tables: System user
Funeral_Home	• These attribute contains the results of whether a clinic is a funeral home or not. • Bit 1 • Used in the following tables: health facilities
Gender	• These attribute contains the gender status of a client • Varchar 50 • Used in the following tables: OUTREACH and Patients
GeneralExamination	• These attribute contains the results obtained from the general examination of a patient. • Varchar 1000 • Used in the following tables: Encounters
GenitoUrinary	• These attribute contains the results obtained from the genitoUrinary examination of a patient for that day. • Varchar 200 • Used in the following tables: Encounters
OUTREACHCode	• The attribute is the unique identifier of the patient tested while at outreach. Each client's record is recorded the related tables using this unique number • Varchar 50 • Used in the following tables: Patients and OUTREACH

Attribute name	Description
Height	• These attribute contains the measurements of height in centimeters of a patient. • int 11 • Used in the following tables: Encounters
HIVStatus	• These attribute contains the final HIV results of a client after he/she was tested one or two times depending on the HIV results • Varchar 20 • Used in the following tables: Patients
LandMark	• These attribute contains the names of the nearest landmark the client currently lives • Varchar 50 • Used in the following tables: Patients
LastName	• These attribute contains the last name of a client • Varchar 50 • Used in the following tables: OUTREACH and Patients
LevelOfEducation	• These attribute contains the level of education the client has so far reached • Varchar 20 • Used in the following tables: OUTREACH and Patients
Location	• These attribute contains the names of the locations the client currently lives in • Varchar 20 • Used in the following tables: Health facilities, Patients and OUTREACH
LoginFails	• These attribute contains a counter that counts how many times a system user has tried to login unsuccessfully • Int 1 • Used in the following tables: Audit trail
LoginName	• These attribute contains the login name of the system user • Varchar 20 • Used in the following tables: System user and Audit trail
LymphNodesExam	• These attribute contains the results/findings obtained from the Lymph Nodes exam of a patient. • Varchar 1000 • Used in the following tables: Encounters
MaritalStatus	• These attribute contains the marital status of the client • Varchar 50 • Used in the following tables: Patients
MFLCode	• These attribute contains the Master Facility List code of the specific facility • Varchar 50 • Used in the following tables: Health Facilities
MiddleName	• These attribute contains the middle name of a client • Varchar 50 • Used in the following tables: OUTREACH and Patients
MouthExamination	• These attribute contains the results/findings obtained from the mouth exam of a patient. • Varchar 1000 • Used in the following tables: Encounters
MusculoSkeletal	• These attribute contains the results/findings obtained from the musculoskeletal exam of a patient. • Varchar 200 • Used in the following tables: Encounters
Narration	• These attribute contains an explanation of what the system user was trying to modify in any of the tables

Attribute name	Description
	• Varchar 200 • Used in the following tables: System user
NationalID	• These attribute contains the national ID number of a client • Varchar 50 • Used in the following tables: OUTREACH and Patients
NearestTown	• These attribute contains the name of the nearest town that is close to the specific facility • Varchar 50 • Used in the following tables: Health Facilities
NervousSystemExam	• These attribute contains the results/findings obtained from the Nervous System exam of a patient. • Varchar 1000 • Used in the following tables: Encounters
NextAppointment	• These attribute contains the date that the patient has been scheduled to come back again. • date • Used in the following tables: Encounters
Notes	• These attribute contains the clinical notes of a patient that the clinician keyed in. • varchar 4000 • Used in the following tables: Encounters
OfficialTelephone	• These attribute contains the official telephone number of the specific facility • Varchar 50 • Used in the following tables: Health Facilities
OnCareElsewhere_Facility	• These attribute contains the current facility that the client moved to • Varchar 50 • Used in the following tables: Patients
Owner	• These attribute contains the name of the owner of the said facility e.g. GOK, AMPATH • Varchar 200 • Used in the following tables: Health Facilities
PathologicalReport	• These attribute contains the Pathologist Report of the client was reported dead • Varchar 2000 • Used in the following tables: Death report
PatientInCare	• These attribute contains information of whether a client is in care or not • Bit 1 • Used in the following tables: Patients
PostalAddress	• These attribute contains the postal address number of a client • Varchar 150 • Used in the following tables: OUTREACH and Patients
ProviderName	• These attribute contains the user name (clinician or receptionist) who served the client on the specified day • Varchar 100 • Used in the following tables: Patients, Outreach, Death report and Encounters
PwP_Condoms	• These attribute contains information of whether a client was dispensed with condoms to enhance the theme of prevention with positives (PWP) • Bit 1 • Used in the following tables: Encounters
PwP_Disclosure	• These attribute contains information of whether a client indicated that they disclosed the HIV+ results to their partners

Attribute name	Description
	to enhance the theme of PWP • Bit 1 • Used in the following tables: Encounters
PwP_PartnerTested	• These attribute contains information of whether a client's partner has been tested to enhance the theme of PWP • Bit 1 • Used in the following tables: Encounters
PwP_STIscreen	• These attribute contains information of whether a client was screened for STI to enhance the theme of PWP • Bit 1 • Used in the following tables: Encounters
ReportedBy	• These attribute contains the names Report of the client was reported dead • Varchar 2000 • Used in the following tables: Death report
RespiratoryExam	• These attribute contains the results/findings obtained from the Respiratory exam of a patient. • Varchar 1000 • Used in the following tables: Encounters
SkinExamination	• These attribute contains the results/findings obtained from the skin condition exam of a patient. • Varchar 1000 • Used in the following tables: Encounters
SUbLocation	• These attribute contains the name of the sub-location that the specific facility is located in • Varchar 50 • Used in the following tables: Health Facilities
TableName	• These attribute contains the name of the table that the system user was trying to modify in the system • Varchar 200 • Used in the following tables: System user
Telephone	• These attribute contains the telephone number of a client • Varchar 50 • Used in the following tables: OUTREACH and Patients
Temperature	• These attribute contains the measurements of temperature in Celsius of a patient. • int 11 • Used in the following tables: Encounters
Test1Result	• These attribute contains the result of the first HIV test of the client • Varchar 20 • Used in the following tables: OUTREACH and Patients
Test2Result	• These attribute contains the result of the second HIV test of the client • Varchar 20 • Used in the following tables: OUTREACH and Patients
Test3Result	• These attribute contains the result of the third HIV test of the client • Varchar 20 • Used in the following tables: OUTREACH and Patients
TreatmentSupporterName	• These attribute contains the names of the treatment supporter the client would identify • Varchar 50 • Used in the following tables: Patients
TreatmentSupporterRelationship	• These attribute contains the relationship the client has with his/her treatment supporter

Attribute name	Description
	• Varchar 50 • Used in the following tables: Patients
TreatmentSupporterTelephone	• These attribute contains the telephone number of the client's treatment supporter • Varchar 50 • Used in the following tables: Patients
Type	• These attribute contains the type of facility the clinic is i.e. private or public • Varchar 50 • Used in the following tables: Health Facilities
UserPassword	• These attribute contains the encrypted password of the system user • Varchar 100 • Used in the following tables: System user
UserRole	• These attribute contains the user roles of the system user e.g. clinician, receptionist etc. • Varchar 100 • Used in the following tables: System user
Village	• These attribute contains the names of the village the client currently lives in • Varchar 20 • Used in the following tables: Health facilities, Patients and OUTREACH
Weight	• These attribute contains the measurements of weight in kilograms of a patient. • int 11 • Used in the following tables: Encounters
WHOstage	• These attribute contains the WHO stage that the client was given on that day. • smallint 1 • Used in the following tables: Encounters

Table 16: Data Dictionary Attribute description

Appendix C: Questionnaire

UNIVERSITY OF NAIROBI

COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCE

SCHOOL OF COMPUTING AND INFORMATICS

<u>**STRENGTHENING THE QUALITY OF HIV DATA IN KENYA QUESTIONNAIRE**</u>

My name is Christopher Muriithi Mwangi, a student at the University Of Nairobi School Of Computing and Informatics – Chiromo Campus, undertaking a research project entitled **Strengthening the Quality of HIV Data in Kenya:** Tracing of Patients Lost to Follow Up and Reduction of Low Linkage Rates.

The objective of this research is to assist me in justifying the creation of an EHR system that will improve on the quality of HIV data in programmes across Kenya.

The research is purely academic, confidential and will be solely used for that purpose. Your details or data will not be passed to any third party without your prior permission.

I request to take a moment of your time to answer the questions below and revert back to me. I will greatly appreciate your frank responses to these questions. Please feel free to contact me for any clarifications.

Christopher Muriithi Mwangi

Email: <u>nomischris@yahoo.com</u>

Form Number: _____

Date of Interview _____

NB:

    a.   Fill your answers to all the questions in the space provided
    b.   Do not indicate your name anywhere in the questionnaire
    c.   It is important that all the sections have responses

SECTION A

General Information

This section of the questionnaire identifies more about the health facility being questioned.

1.   Job Title _____

2.   Type of facility

       ☐ Non-Governmental Organization

       ☐ Governmental Organization

       ☐ Private Institution

3.   Name of Facility _____

4.   Master Facility Code _____

5.   Indicate county_____

6.   Type of service offered

       ☐ Medical Clinic

       ☐ Laboratory (Stand-alone)

       ☐ Dispensary

       ☐ Health Centre

       ☐ VCT Centre (Stand-Alone)

Care Program outcomes (Up to 28th February 2013)

1.   Number of cumulative clients ever in care _____

2.   Number of clients cumulative care Active _____

3.   Number of clients cumulative care Transfer Out _____

4.   Number of clients cumulative care Stopped treatment _____

5.   Number of clients cumulative care Died _____

6.   Number of clients cumulative care Lost to follow up _____

HAART Program outcomes (Up to 28th February 2013)

7.   Number of cumulative clients ever in HAART _____

8.   Number of clients cumulative HAART Active _____

9.   Number of clients cumulative HAART Transfer Out _____

10. Number of clients cumulative HAART Stopped treatment _____

11. Number of clients cumulative HAART Died _____

12. Number of clients cumulative HAART Lost to follow up _____

SECTION B

Electronic Health System (EHR)

This section of the questionnaire explores the general knowledge or use of an electronic health system in a facility.

1. Is there an EHM system in use? ☐ YES ☐ NO

2. If No, what system do use for documentation?

   ☐ MOH registers ☐ Printed contacts ☐ No documentation

   ☐ Others (Specify) _____

3. If Yes, Is the EHM system used for patient registration? ☐ YES ☐ NO

4. Does the EHR system have a function of detecting data entry errors? ☐ YES ☐ NO

5. If Yes to the Question above, kindly name a few functions.

   _____
   _____
   _____
   _____

6. What is your role in the EHR system use?

   _____
   _____

7. Does the EHR system have interoperability capabilities? ☐ YES ☐ NO

8. Does the EHR system have clinical alerts? ☐ YES ☐ NO

9. If Yes to the Question above, kindly name a few alerts.

   _____
   _____
   _____
   _____

Biometric Technology

This section of the questionnaire explores your general knowledge of biometric technology or the use of measurable physiological and/or behavioral characteristics to authenticate a user.

10. Is there a high level of awareness about Biometric Screening in your facility?

    ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐ Do not Know

11. Please indicate which one or more of the following biometric technologies you have used before.

    ☐ Fingerprint ☐ Voice ☐ Palm ☐ Face ☐ Retinal

    ☐ Iris ☐ Signature ☐ Gait ☐ None

NB: If you answered **None** to the previous question, please skip question 3 and 4.

12. How often do you use biometric technology?

    ☐ Always ☐ Often ☐ Sometimes ☐ Seldom

13. What do you use you biometric technology for?

☐ Time and Attendance ☐ Logging into a computer ☐ Unlocking a door

☐ Insurances purposes ☐ others _____

14. To what extent do you agree with the following statement that capturing of a person's biometric features over the EHR system can be trusted?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

15. To what extent do you agree with the following statement that the use of the EHR system integrated with biometric technology will yield more accurate data?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

16. Do you feel that privacy safeguards and fair information practices must be put into place, if biometrics will be used in the future?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

17. People should be fully informed about the uses a facility will make of their biometric ID and why it is needed?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

18. Is there a data security policy in the facility?

☐ Written policy ☐ Unwritten but obvious policy ☐ No Policy at all

19. What would be the main obstacle of obtaining biometric equipment for integration with an EHR?

☐ Reliability ☐ Cost ☐ Compatibility ☐ Privacy ☐ Others _____

SECTION C

This section of the questionnaire explores your general knowledge of how facilities track lost to follow up patients and also those who are supposed to be linked to care

Tracking patients

1. Does the facility have a patient tracking standard operating procedures? ☐ YES ☐ NO

2. If Yes, what procedures/methods are listed?

_____

_____

_____

_____

3. If No, what undocumented procedures/methods are listed?

_____

_____

_____

_____

4. Has the facility ever traced the Lost to follow up patients? ☐ YES ☐ NO

5. If Yes, what samples were taken for tracing and how many clients were traced and status updated

    a. Sample _____   Traced back _____

    b. Sample _____   Traced back _____

    c. Sample _____   Traced back _____

6. What were their true outcomes after being traced back?

    i. Under sample a (Give the actual reasons)

        _____

        _____

        _____

    ii. Under sample b (Give the actual reasons)

        _____

        _____

        _____

    iii. Under sample c (Give the actual reasons)

        _____

        _____

        _____

7. How do the rates of Lost to follow up affect the facility outcomes/reporting?

_____

_____

_____

8. What measures has the facility put in place of reducing Lost to follow up rates?

_____

_____

_____

Linkage to care

9. Does the facility carry out HIV testing and counseling outreaches? ☐ YES ☐ NO

10. If Yes, How frequently per month? _____

11. Approximately how many clients are tested per month? _____

12. Approximately, of the tested how many turn HIV reactive per month? _____

13. Approximately how many of the HIV reactive get attend care after being referred? _____

14. What measures has the program put in place of reducing the low rates of linkages to care?

_____

_____

_____

<u>Suggestion</u>

In your own words, suggest any other thing that needs to be done to make the proposed system appealing and acceptable.

_____

_____

_____

_____

Appendix D: Sample code

<u>User Login form PHP</u>

```php
<?php

define('ROOT_PATH', dirname($_SERVER['SCRIPT_FILENAME']));
$wpath = explode('frmLoginUser.php', $_SERVER['REQUEST_URI']);

session_start();

$_SESSION['WPATH']= $wpath[0];
require_once ROOT_PATH . '/Lib/dao/SQLClass.php';
require_once ROOT_PATH . '/Lib/confs/sysConf.php';

$conf = new sysConf();
$sql = new SQLClass($conf);

$fCode = '10501';
$fName = 'NAIROBI-CENTRAL';
$_SESSION['FacilityName'] = $fName;
mysql_connect("localhost", "root", "") or die(mysql_error());
mysql_select_db("elink");
$fac = mysql_query("SELECT `MFLCode`, `FacilityName` FROM `healthfacilities`;");
$rowscnt = mysql_num_rows($fac);
if( $rowscnt!==0 )
{
        $i = 0;
        while ( $row = mysql_fetch_assoc($fac) )
        {
                $Facilities[$i][0] = $row['MFLCode'];
                $Facilities[$i][1] = $row['FacilityName'];
                $i++;
        }
}

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">


<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">

<head>
  <title>Patient e-Link</title>
  <link href="css/ClientStyle.css" type ="text/css" rel="Stylesheet" />
  <link href="css/Login.css" type ="text/css" rel="Stylesheet" />
        <link rel="stylesheet" href="./css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="./css/icon.css" type="text/css" media="screen" />
  <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="js/html5.js"></script>
        <![endif]-->
        <script src="./js/jquery-1.7.2.js" type="text/javascript"></script>
        <script type="text/javascript" src="./js/jquery.easyui.min.js"></script>
        <script type="text/javascript" src="./js/userlogin.js"></script>
```

```html
</head>
<body style="background-color:#C4E9E2">
   <div id="mainBodyHome" style="left:0px;">
     <section id="login_main" class="column">
        <article class="Login_module login_width_full">
        <header><h3>User Login</h3></header>
        <div class="login_module_content">
                                <table style="width:400px" align="center">
                                      <tr class="LoginDataTableContent">
                                      <td style="width:100%;" align="center" valign="middle">
                                          <table  style="width:100%" cellpadding="3">
                                             <tr class="LoginDataTableContent">
                                                <td align="right"
width="40%"><strong>User ID:</strong></td>
                                                   <td align="left">
                                                       <input type="text"
name="txtUserID" id="txtUserID" size="32px" value=""/></td>
                                             </tr>
                                             <tr class="LoginDataTableContent">
                                                <td align="right"
width="40%"><strong>Password:</strong></td>
                                                   <td align="left">
                                                       <input type="password"
name="txtPassword" id="txtPassword" size="32px"/>
                                                   </td>
                                             </tr>
                                             <tr class="LoginDataTableContent">
                                                <td align="right"
width="40%"><strong>Facility:</strong></td>
                                                   <td align="left">

                                                      <select name="cmbFacility"
id="cmbFacility">
                                                         <?php

         if(isset($Facilities))
                                                            {

         foreach($Facilities as $res)
                                                               {

         if(isset($fName) && key1==$fName)

         {

                 echo "<option selected='selected' value='$res[1]'>$res[1]</option>";

         }

         else

         {

                 echo "<option value='$res[1]'>$res[1]</option>";

         }
                                                               }
                                                            }
                                                      ?>
                                                   </select>
```

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```html
                                                </td>
                                        </tr>
                                        <tr class="LoginDataTableContent">
                                                <td align="right" width="20%">
                                         </td>
                                                <td align="left">
                                                        <button
id='btnLogin'>Login</button>
                                                        <input type="reset"
name="cmdCancel" id="cmdCancel" class="ButtonText" value="Cancel" size="76px" />

                                                </td>
                                        </tr>
                                        <tr class="LoginDataTableContent">
                                                <td align="center" colspan="2"><input
style="color:red;text-align:center;border:0;font-weight: bold;font-size: 10px;" readonly="true" type="label"
name="txtError" id="txtError" size="60px" value="/></td>
                                        </tr>
                                </table>
                        </td>
                        </tr>
                        <tr class="LoginDataTableContent">
                          <td height="0px" bgcolor="#fff" width="383px;"></td>
                        </tr>
                </table>
        </div>
                        </article>
                </section>
        </div>
</body>
</html>
```

Patients

Patient PHP

```php
<?php

require_once ROOT_PATH . '/Lib/dao/SQLClass.php';
require_once ROOT_PATH . '/Lib/confs/sysConf.php';
require_once ROOT_PATH . '/lib/common/definition_full.php';

class patientinfo {
        private $ServiceNumber, $ClientName, $FirstName, $MiddleName, $LastName, $DOB, $Age,
$Gender, $HIVStatus ;
        private $SupportName, $SupportRelation,$SupportCellNo, $objPatient;
        /*
        * Getter & Setter Methods
        */
        private function setServiceNumber($snum){$this->ServiceNumber = $snum;}
        private function getServiceNumber(){return $this->ServiceNumber;}
        private function setClientName($cname){    $this->ClientName = $cname;}
        private function getClientName(){return $this->ClientName;}
        private function setFirstName($fname){$this->FirstName = $fname;}
        private function getFirstName(){return $this->FirstName;}
        private function setMiddleName($mname){$this->MiddleName = $mname;}
        private function getMiddleName(){return $this->MiddleName;}
        private function setLastName($lname){       $this->LastName = $lname;}
        private function getLastName(){     return $this->LastName;}
        private function setGender($g){       $this->Gender = $g;}
        private function getGender(){return $this->Gender;}
```

```php
        private function setAge($g){        $this->Age = $g;}
        private function getAge(){return $this->Age;}
        private function setDOB($g){        $this->DOB = $g;}
        private function getDOB(){return $this->DOB;}
        private function setHIVStatus($status){        $this->HIVStatus = $status;        }
        private function getHIVStatus()        {return $this->HIVStatus; }
        private function setSupportName($sup){        $this->SupportName = $sup;        }
        private function getSupportName() {                return $this->SupportName;        }
        private function setSupportRelation($add)    {                $this->SupportRelation = $add;    }
        private function getSupportRelation()        {                return $this->SupportRelation;    }

        private function setSupportCellNo($cell)    {                $this->SupportCellNo = $cell;    }
        private function getSupportCellNo()        {                return $this->SupportCellNo;    }


        private function retrievePatient($sernum)
        {                        //

                $conf = new sysConf();
                $sql = new SQLClass($conf);
                $Snum = $this->getServiceNumber();
                //echo $Snum;exit();
                if(isset($Snum) && $Snum != '')
                {
                        mysql_connect("localhost", "root", "") or die(mysql_error());
                        mysql_select_db("elink");
                        $client = mysql_query("SELECT AES_DECRYPT(`PatientCode`,'nomiskris1')
PatientCode,AES_DECRYPT(FirstName,'nomiskris1') FirstName,
                                AES_DECRYPT(MiddleName,'nomiskris1')
MiddleName,AES_DECRYPT(LastName,'nomiskris1') LastName,
                                AES_DECRYPT(Gender,'nomiskris1')
Gender,AES_DECRYPT(HIVStatus,'nomiskris1') HIVStatus,AES_DECRYPT(DateofBirth,'nomiskris1') as
DOB,
                                year(curDate())-year(AES_DECRYPT(DateOfBirth,'nomiskris1')) as Age,
                                AES_DECRYPT(TreatmentSupporterRelationship,'nomiskris1')
TreatmentSupporterRelationship,
                                AES_DECRYPT(TreatmentSupporterTelephone,'nomiskris1')
TreatmentSupporterTelephone,
                                AES_DECRYPT(TreatmentSupporterName,'nomiskris1')
TreatmentSupporterName,
                                concat(AES_DECRYPT(FirstName,'nomiskris1'),'
',AES_DECRYPT(MiddleName,'nomiskris1'),' ',AES_DECRYPT(LastName,'nomiskris1')) ClientName FROM
`patients` where AES_DECRYPT(PatientCode,'nomiskris1')='" . $Snum . "';");
                        $rowscnt = mysql_num_rows($client);
                        if( $rowscnt!==0 )
                        {
                                while ( $row = mysql_fetch_array($client) )
                                {
                                        $this->setClientName($row['ClientName']);
                                        $this->setServiceNumber($row['PatientCode']);
                                        $_SESSION['ClientName'] = $this->getClientName();
                                        $_SESSION['ServiceNumber'] = $this->getServiceNumber();
                                        $this->setFirstName($row['FirstName']);
                                        $this->setMiddleName($row['MiddleName']);
                                        $this->setLastName($row['LastName']);
                                        $this->setGender($row['Gender']);
                                        $this->setAge($row['Age']);
                                        $this->setDOB($row['DOB']);
                                        $this-
>setHIVStatus($row['HIVStatus']!=''?$row['HIVStatus']:'ND');
```

```php
                                        $this->setSupportName($row['TreatmentSupporterName']);
                                        $this-
>setSupportRelation($row['TreatmentSupporterRelationship']);
                                        $this->setSupportCellNo($row['TreatmentSupporterTelephone']);
                                }
                        }
                }
        }


        public function getPatient($sernum, $patmode) {
                $this->setServiceNumber($sernum);
                $this->retrievePatient($sernum);

                ?>
                <link rel="stylesheet" href="<?php echo ROOT_PATH; ?>/css/clientstyle.css"
type="text/css" media="screen" />
                <link rel="stylesheet" href="<?php echo ROOT_PATH; ?>/css/layout.css" type="text/css"
media="screen" />
                <link rel="stylesheet" href="<?php echo ROOT_PATH; ?>/css/icon.css" type="text/css"
media="screen" />

                <table id='tbPI' class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                        <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Patient Information</strong></th></tr>
                        <tr class="DataTableContent">
                                <td style="align:right;"><label for="txtClientName">Client
Name:</label></td>
                                <td colspan="3"><input type="text" name="txtClientName"
id="txtClientName" readonly="true" size="60" style='width:99%' value='<?php echo $this->getClientName();
?>'/></td>
                                <td style="align:right;"><label for="txtServiceNumber">Patient
Number:</label></td>
                                <td><input type="text" readonly="true" name="txtServiceNumber"
id="txtServiceNumber" size="20" value="<?php echo $this->getServiceNumber(); ?>"/></td>
                        </tr>
                        <tr class="DataTableContent">
                                <td style="align:right"><label for="txtGender">Gender:</label></td>
                                <td><input type="text" readonly="true" name="txtGender" id="txtGender"
value='<?php echo $this->getGender(); ?>' size="10"/></td>
                                <td style="align:right">HIV Status:</td>
                                <td><input name="txtHIVStatus" id="txtHIVStatus" readonly='true'
type='text' value='<?php echo $this->getHIVStatus(); ?>' size="15"/></td>

                        </tr>
                        <tr class="DataTableContent">
                                <td style="align:right;">Date of Birth:</td>
                                <td><input type="text" name="txtDOB" id="txtDOB" readonly='true'
size="10" value='<?php echo $this->getDOB(); ?>'/>
                                <td style="align:right;">Current Age:</td>
                                <td><input type="text" name="txtAge" id="txtAge" readonly='true'
size="10" value='<?php echo $this->getAge(); ?>'/>
                        </tr>
                        <tr class="DataTableContent">
                                <td style="align:right;"><label for="txtSupporterName">Supporter
Name:</label></td>
```

```
                              <td colspan="3"><input type="text" name="txtSupporterName"
id="txtSupporterName" readonly="true" size="60" style='width:99%' value='<?php echo $this-
>getSupportName(); ?>'/></td>
                              <td style="align:right;"><label for="txtSupporterTelephone">Supporter
Telephone:</label></td>
                              <td><input type="text" readonly="true" name="txtSupporterTelephone"
id="txtSupporterTelephone" size="20" value="<?php echo $this->getSupportCellNo(); ?>"/></td>
                    </tr>

               </table>
               <?php
} //end of getPatient()
}
?>
```

Demographic data PHP

```php
<?php
ob_start();
session_start();

define('ROOT_PATH',$_SESSION['path']);

if(!isset($_SESSION['Full_Name']))
{
        header('Location: ../../frmloginuser.php');
        exit();
}
mysql_connect("localhost", "root", "") or die(mysql_error());
mysql_select_db("elink");
$fac = mysql_query("SELECT ifnull(max(AES_DECRYPT(PatientCode,'nomiskris1')),0)+1 PatientID FROM
`patients` WHERE Facility=aes_encrypt('".$_SESSION['FacilityName']."','nomiskris1');");
$rowscnt = mysql_num_rows($fac);
if( $rowscnt!==0 )
{
        $i = 0;

        while ( $row = mysql_fetch_assoc($fac) )
        {
                if(strlen($row['PatientID'])<strlen($_SESSION['Facility']))
                {
                        $PatientID = $_SESSION['Facility'].$row['PatientID'];
                }
                else
                {
                        $PatientID = $row['PatientID'];
                }
                $i++;
        }
}
else
{
        $PatientID = $_SESSION['Facility'].'1';
}
?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
```

```html
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title></title>
<link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
<!--[if lt IE 7]>
<script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
<![endif]-->
<!--[if lt IE 9]>
<script type="text/javascript" src="../../js/html5.js"></script>
<![endif]-->

<script src="../../js/jquery-1.5.2.min.js" type="text/javascript"></script>
<script src="../../js/hideshow.js" type="text/javascript"></script>
<script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
<script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
<script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
<script type="text/javascript" src="../../js/jquery.equalHeight.js"></script>
<script type="text/javascript" src="./js/DemographicData.js"></script>
<style>

        .ui-state-error
        {
                border: 2px solid #cd0a0a;background: #cdaaaa;
        }
</style>
</head>

<body>

  <section id="main" class="column">
      <article class="module width_full">
                        <header><h3>Demographic Data</h3></header>
                          <div class="module_content">

                              <input type='hidden' id='actionID' name='actionID' value=''/>
                              <input type='hidden' id='searchType' name='searchType' value=''/>
                              <input type='hidden' id='txtOption' name='txtOption' value='<?php echo
isset($Option) ? $Option : 'N'; ?>'/>
                              <input type='hidden' id='actionCode' name='actionCode' value='<?php echo
isset($actioncode) ? $actioncode : ''; ?>'/>
                              <input type='hidden' id='age' name='age' value='<?php echo isset($Age)
&& $Age!='' ? $Age : 0; ?>'/>

                              <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                      <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Basic Information</strong></th></tr>

                                      <tr class="DataTableContent">
                                          <td style="align:right;width:15%;">Last Name:</td>
                                          <td><input class='changecase' type="text" size="25"
name="txtLastName" id="txtLastName" value='<?php echo isset($LastName) ? $LastName : ''; ?>'/></td>
                                          <td style="text-align:right;width:15%;">First Name:</td>
```

```
                                                    <td><input class='changecase' type="text"
name="txtFirstName"  size="25" id="txtFirstName" value='<?php echo isset($FirstName) ? $FirstName : ";
?>'/> </td>
                                                    <td style="text-align:right;width:15%;">Middle
Name:</td>
                                                    <td><input class='changecase' type="text"  size="25"
name="txtMiddleName" id="txtMiddleName" value='<?php echo isset($MiddleName) ? $MiddleName : ";
?>'/></td>
                                            </tr>
                                            <tr class="DataTableContent">
                                                    <td>Patient Number:</td>
                                                    <td><input type="text" name="txtServiceNumber"
id="txtServiceNumber" size="25" value='<?php echo isset($PatientID) ? $PatientID : "; ?>'/></td>

                                                    <td style="text-align:right;width:15%;">Outreach
Code:</td>
                                                    <td><input type="text" readonly="true"
name="txtHBCTCode" id="txtHBCTCode" size="25" value='<?php echo isset($HBCTCode) ? $HBCTCode :
"; ?>'/></td>
                                            </tr>
                                            <tr class="DataTableContent">

                                                    <td>Gender:</td>
                                                    <td><select name="cmbGender" id="cmbGender">
                                                            <option value="">Select</option>
                                                            <option value="Male">Male</option>
                                                            <option
value="Female">Female</option>

                                                        </select></td>
                                                    <td style="text-align:right">Date of Birth:</td>
                                                    <td><input type="text" readonly='readonly'
name="txtDOB" id="txtDOB" size="15" value='<?php echo isset($DOB) ? $DOB : "; ?>'/></td>
                                                    <td style="text-align:right">National ID No:</td>
                                                    <td><input type="text" name="txtIDNo" id="txtIDNo"
class='easyui-numberbox' size="25px" value='<?php echo isset($ID_NO) ? $ID_NO : "; ?>'/></td>


                                            </tr>
                                                    <td>Marital Status:</td>
                                                    <td><select name="cmbMaritalStatus"
id="cmbMaritalStatus">
                                                                <option value=">Select</option>
                                                                <option>Minor</option>
                                                                <option>Single</option>
                                                                <option>Married</option>
                                                                <option>Separated</option>
                                                                <option>Widow</option>
                                                        </select>
                                                    </td>
                                                    <td style='text-align:right;'>Level of Education:</td>
                                                    <td><select name="cmbEducation" id="cmbEducation">
                                                                <option value="">Select</option>
                                                                <option>None</option>
                                                                <option>Primary</option>
                                                                <option>Secondary</option>
                                                                <option>Tertiary</option>
                                                        </select>
                                                    </td>
                                            </tr>
```

```
                                          </table>
                                          <br class="spacer"/>
                                          <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                                      <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Contact Information</strong></th></tr>
                                          <tr class='DataTableContent'>
                                                      <td>Telephone :</td>
                                                      <td><input type="text" name="txtTelContact"
id="txtTelContact" class='easyui-numberbox' size="25" value='<?php echo isset($TelNumber) ? $TelNumber :
''; ?>'/></td>

                                                      <td style='text-align:right;'>Postal Address:</td>
                                                      <td colspan="3"><input type="text"
name="txtPostalAddress" id="txtPostalAddress" size='60' value='<?php echo isset($PostAddress) ?
$PostAddress : ''; ?>'/></td>
                                          </tr>
                                          <tr class="DataTableContent">
                                                      <td>Contact Person:</td>
                                                      <td colspan="3"><input type="text"
name='txtSecondaryContactPerson' id="txtSecondaryContactPerson" value='<?php echo
isset($SecondaryContact) ? $SecondaryContact : ''; ?>' size="60"/></td>


                                                      <td style='text-align:right;'>Contact Person
Telephone:</td>
                                                      <td><input type="text" name="txtSecondaryContact"
id="txtSecondaryContact" class='easyui-numberbox' size="25" value='<?php echo isset($KinTel) ? $KinTel : '';
?>'/></td>
                                          </tr>
                                          <tr class="DataTableContent">
                                                      <td>Treatment Supporter:</td>
                                                      <td colspan="3"><input type="text" name='txtNextofKin'
id="txtNextofKin" value='<?php echo isset($SecondaryContact) ? $SecondaryContact : ''; ?>' size="60"/></td>


                                                      <td style='text-align:right;'>Treatment Supporter
Telephone:</td>
                                                      <td><input type="text" name="txtKinTel" id="txtKinTel"
class='easyui-numberbox' size="25" value='<?php echo isset($KinTel) ? $KinTel : ''; ?>'/></td>
                                          </tr>
                                          <tr class="DataTableContent">


                                                      <td style='text-align:left;'>Treatment Supporter
Relationship:</td>

                                                      <td><select name="cmbRelationship"
id="cmbRelationship">

                                                                  <option value="">Select</option>
                                                                  <option>Father</option>
                                                                  <option>Mother</option>
                                                                  <option>Spouse</option>
                                                                  <option>Brother</option>
                                                                  <option>Sister</option>
                                                                  <option>Uncle</option>
                                                                  <option>Aunt</option>
                                                                  <option>Guardian</option>
                                                                  <option>Friend</option>
                                                                  <option>Sibling</option>
                                                                  <option>Son</option>
                                                                  <option>Neighbour</option>
                                                                  <option>Cousin</option>
                                                                  <option>Daughter</option>
                                                                  <option>Grand Parent</option>
```

```html
                                        <option>None</option>
                                    </select>
                                </td>
                            </tr>
        </table>
                                        <br/>
                                        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                            <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Patient Locator</strong></th></tr>
                                            <tr class="DataTableContent">
                                                <td>Location :</td>
                                                <td><select name="cmbLocation" id="cmbLocation">
                                                        <option value="">Select</option>

                                                        <option>Donholm</option>
                                                        <option>Kasarani</option>
                                                        <option>Westlands</option>
                                                        <option>Kawangware</option>
                                                        <option>Karen</option>
                                                        <option>Githurai</option>
                                                        <option>Kimende</option>
                                                        <option>Kangoco</option>
                                                        <option>Limuru</option>
                                                        <option>Ndenderu</option>
                                                    </select></td>
                                                <td>Village :</td>
                                                <td><input type="text" name="txtVillage"
id="txtVillage" size="30" value='<?php echo isset($Village) ? $Village : ''; ?>'/></td>
                                                <td>Land Mark :</td>
                                                <td><input type="text" name="txtLandMark"
id="txtLandMark" size="30" value='<?php echo isset($LandMark) ? $LandMark : ''; ?>'/></td>
                                            </tr>
                                            <tr class="DataTableContent">
                                                <td>County:</td>
                                                <td><input name="cmbCounty" id="cmbCounty"
readonly="true"/></td>

                                                <td style='text-align:right'>District:</td>
                                                <td><input name="cmbDistrict" id="cmbDistrict"
readonly="true"/></td>

                                                <td>Division :</td>
                                                <td><input name="cmbDivision" id="cmbDivision"
readonly="true"/></td>
                                            </tr>

                                        </table>
                                        <br class="spacer"/>
                                        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0" id="Results">
                                            <tr class="DataTableTitle"><th colspan="8" width="100%"
align="left"><strong>Client Testing Details</strong></th></tr>
                                            <tr class="DataTableContent">
                                                <td>First Test Resuts:</td>
                                                <td><select name="txtHIVResults1"
id="txtHIVResults1">

                                                        <option value="">Select</option>
                                                        <option>Positive</option>
                                                        <option>Negative</option>
                                                        <option>Inconclusive</option>
                                                    </select>
```

```
                                                        </td>
                                                        <td style='text-align:right'>Second Test Results :</td>
                                                        <td><select name="txtHIVResults2"
id="txtHIVResults2">
                                                                        <option value="">Select</option>
                                                                        <option>Positive</option>
                                                                        <option>Negative</option>
                                                                        <option>Inconclusive</option>
                                                                </select>
                                                        </td>
                                                        <td style='text-align:right'>Third Test Results :</td>
                                                        <td><select name="txtHIVResults3"
id="txtHIVResults3">
                                                                        <option value="">Select</option>
                                                                        <option>Positive</option>
                                                                        <option>Negative</option>
                                                                        <option>Inconclusive</option>
                                                                </select>
                                                        </td>
                                                        <td style='text-align:right'>Final Results :</td>
                                                        <td><select name="txtHIVResults" id="txtHIVResults">
                                                                        <option value="">Select</option>
                                                                        <option>Positive</option>
                                                                        <option>Negative</option>
                                                                        <option>Inconclusive</option>
                                                                </select>
                                                        </td>
                                                </tr>
                                                <tr class="DataTableContent">
                                                        <td style='text-align:left'>Enter Patient into Care:</td>
                                                        <td><select name="txtPatientInCare"
id="txtPatientInCare">
                                                                        <option value="">Select</option>
                                                                        <option value="1">Yes</option>
                                                                        <option value="0">No</option>
                                                                </select>
                                                        </td>
                                                </tr>
                                        </table>
                                        <br class="spacer"/>
                                        <table>
                                                <tr class="DataTableContent">
                                                        <td style='text-align:left'>Can the Finger Prints be
Captured?</td>
                                                        <td><select name="txtFPPresent" id="txtFPPresent">
                                                                        <option value="">Select</option>
                                                                        <option value="1">Yes</option>
                                                                        <option value="0">No</option>
                                                                </select>
                                                        </td>
                                                </tr>
                                        </table>
                                        <br class="spacer"/>
                                        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                                <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Outcome Details</strong></th></tr>
                                                <tr class="DataTableContent">
                                                        <td>Care Outcome:</td>
```

```html
                                            <td><input type="text" name="txtCareOutcome"
id="txtCareOutcome" size="30" readonly="readonly" value='<?php echo isset($Village) ? $Village : '';
?>'/></td>
                                            <td style='text-align:right'>Care Exit Date :</td>
                                            <td><input type="text" name="txtCareExitDate"
id="txtCareExitDate" readonly="readonly" size="30" value='<?php echo isset($Village) ? $Village : '';
?>'/></td>
                                            <td style='text-align:right'>ART Outcome :</td>
                                            <td><input type="text" name="txtARTOutcome"
id="txtARTOutcome" readonly="readonly" size="30" value='<?php echo isset($Village) ? $Village : '';
?>'/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style='text-align:right'>ART Exit Date :</td>
                                            <td><input type="text" name="txtARTExitDate"
id="txtARTExitDate" size="30" readonly="readonly" value='<?php echo isset($Village) ? $Village : '';
?>'/></td>
                                            <td style='text-align:left'>In Care
Elsewhere(Facility):</td>
                                            <td><input type="text" name="txtElsewhereFacility"
id="txtElsewhereFacility" size="30" readonly="readonly" value='<?php echo isset($Village) ? $Village : '';
?>'/></td>
                                    </tr>
                            </table>
                            </div><!--End of Screen 2-->
                            <div class='alert_warning1' id='nt'>
                                    <input  style="color:red;background-color:transparent;text-
align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label" id="txtError" size="100"
value=""/>
                                    </div>

                    </div>
                    <div id="dlg" class="easyui-dialog" style="width:350px;height:300px;padding:10px
20px"
                            closed="true" modal="true">
                            <img style="text-alin:center;" id="fpImg"/>
                            <div style="text-align:left;padding-top:10px;">

                                    <div id="patdet">
                                            Patient Number : <input type="text"
name="txtFPServiceNumber" id="txtFPServiceNumber" size="25" value=""/><br/>
                                            Last Name :<input class='changecase' type="text"
size="25" name="txtFPLastName" id="txtFPLastName" value=""/><br/>
                                            First Name :<input class='changecase' type="text"
name="txtFPFirstName"  size="25" id="txtFPFirstName" value=""/><br/>
                                            Middle Name :<input class='changecase' type="text"
size="25" name="txtFPMiddleName" id="txtFPMiddleName" value=""/><br/>
                                            Facility :<input type="text" readonly="true"
name="txtFacility" id="txtFacility" size="20px" value=""/><br/>
                                            Telephone :<input type="text" readonly="true"
name="txtTelephone" id="txtTelephone" size="20px" value=""/><br/>
                                    </div>
                                    <input type="button" onclick="$('#dlg').dialog('close');"
value="OK" class="action_btn"/>
                            </div>

                    </div>
                    <div id="fp">
```

Finger Print :<input type="text" readonly="true" name="txtFP" id="txtFP" size="70px" value='<?php echo isset($FP) ? $FP : "; ?>'/><input type="button" id="btnAcquire" value="Acquire" class="action_btn"/>
                    </div>
                    <footer>
                        <table width="100%">
                            <tr>
                            <td style='text-align:center'>
                                <button id="btnNewRecord" class='action_btn'>Add</button>
                                <button id="btnEditRecord" class='action_btn'>Edit</button>
                                <button id="btnSaveRecord" class='action_btn' onclick='saveDemo();'>Save</button>
                                <button id="btnFindDemo" class='action_btn'>Find</button>
                                <button id="btnClose" class='action_btn'>Close</button>
                            </td>
                            </tr>
                        </table>
                    </footer>
                </article>
        </section>
</body>
</html>

Demographic Data JS

```
function saveDemo()
{

        var ServiceNumber  = $("#txtServiceNumber"),FirstName = $("#txtFirstName"),
                MiddleName = $("#txtMiddleName"),LastName = $("#txtLastName"),IDNo = $("#txtIDNo"),
                Gender = $("#cmbGender"),DateOfBirth = $("#txtDOB"),
                EducationLevel = $("#cmbEducation"),
                KinRelationship = $("#cmbRelationship"),
                NextOfKin = $("#txtNextofKin"),KinTelNumber = $("#txtKinTel"),
                PostalAddress = $("#txtPostalAddress"),TelNumber = $("#txtTelContact"),
                HIVStatus = $("#txtHIVResults"),
                SecondaryContact = $("#txtSecondaryContactPerson"),SecTelNumber =
$("#txtSecondaryContact"),
                HomeDistrict = $("#cmbDistrict"),Division = $("#cmbDivision"),
                County = $("#cmbCounty"),Location = $("#cmbLocation"),Landmark = $("#txtLandMark"),
                HBTCNumber = $("#txtHBCTCode"),
                MaritalStatus = $("#cmbMaritalStatus");

        var bValid = true;

        if( LastName.val() == "") {errMsg('Last Name required!!!');LastName.addClass( "ui-state-error"
);return false;  }
        if( FirstName.val() == "") {errMsg('First Name required!!!');FirstName.addClass( "ui-state-error"
);return false;  }
        if( MiddleName.val() == "") {errMsg('Middle Name required!!!');MiddleName.addClass( "ui-state-
error" );return false;  }
        if( Gender.val() == '') {errMsg('Select the gender!!!');Gender.addClass( "ui-state-error" );return false;  }

        if( DateOfBirth.val() == '') {errMsg('Date of birth required!!!');DateOfBirth.addClass( "ui-state-error"
);return false;  }

        if( MaritalStatus.val() == "") {errMsg('Marital Status required!!!');MaritalStatus.addClass( "ui-state-
error" );return false;  }
```

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```javascript
        if( EducationLevel.val() == "") {errMsg('Education Level required!!!');EducationLevel.addClass( "ui-state-error" );return false;  }
        if( NextOfKin.val() == "") {errMsg('Next of Kin required!!!');NextOfKin.addClass( "ui-state-error" );return false;  }
        //if( TelNumber.val() == "") {errMsg('Telephone Contact required!!!');TelNumber.addClass( "ui-state-error" );return false;  }
        //if( HIVStatus.val() == "") {errMsg('HIV Status required!!!');HIVStatus.addClass( "ui-state-error" );return false;  }
        if( Landmark.val() == "") {errMsg('Landmark required!!!');Landmark.addClass( "ui-state-error" );return false;  }
        if( HomeDistrict.val() == "") {errMsg('District required!!!');HomeDistrict.addClass( "ui-state-error" );return false;  }
        if( $('#txtFPPresent').val() == "") {errMsg('Can the Finger Prints be Captured?');return false;  }
        if( $('#txtFPPresent').val()==1 && $('#txtFP').val() == "") {errMsg('Finger Print not yet scanned required!');return false;  }

        var IDNo = 0;IDNo = parseFloat($('#txtIDNo').val());
        var data =
"IDNo="+IDNo+"&ServiceNumber="+ServiceNumber.val()+"&FirstName="+FirstName.val();
                data += "&MiddleName="+MiddleName.val()+"&LastName="+LastName.val();
                data += "&Gender="+Gender.val()+"&DateOfBirth="+DateOfBirth.val();

                data += "&EducationLevel="+EducationLevel.val();
                data +=
"&TxSupporterRelationship="+KinRelationship.val()+"&TxSupporter="+NextOfKin.val();
                data +=
"&TxSupporterTelNumber="+KinTelNumber.val()+"&PostalAddress="+PostalAddress.val();
                data += "&TelContact="+TelNumber.val()+"&HIVResults="+HIVStatus.val();
                data += "&MaritalStatus="+MaritalStatus.val();
                data += "&SecondaryContactPerson="+SecondaryContact.val();
                data += "&SecondaryContact="+SecTelNumber.val();
                data += "&HomeDistrict="+HomeDistrict.val()+"&Division="+Division.val();

                data +=
"&County="+County.val()+"&Location="+Location.val()+"&Landmark="+Landmark.val();
                data += "&Village="+$('#txtVillage').val();
                data += "&PatientInCare="+$('#txtPatientInCare').val();
                data += "&HBCTNumber="+HBTCNumber.val();
                data += "&FP="+$('#txtFP').val();
                data += "&Test1Result="+$('#txtHIVResults1').val();
                data += "&Test2Result="+$('#txtHIVResults2').val();
                data += "&Test3Result="+$('#txtHIVResults3').val();

                $.ajax({
                        type : 'POST',
                        data : data,
                        datatype: 'text',
                        url : './data/SaveData.php?action=SaveDemo',

                        success : function(msg11){
                                errMsg(msg11);
                        }
                });

}
function errMsg(er)
{
        $('#txtError').val(er);
}
function checkRegexp( o, regexp, n )
```

```
{
        if ( !( regexp.test( o.val() ) ) ) {
                o.addClass( "ui-state-error" );
                errMsg( n );
                return false;
        } else {
        return true;
        }
}
$(function(){

        var tDate=new Date();
        tDate.setDate(tDate.getDate() - 1)

        $( "#txtDOB" ).datepicker({changeMonth: true,changeYear: true,maxDate: tDate,dateFormat: 'yy-mm-
dd',yearRange: "1900:2050"});
        $('#txtDOB').attr('readonly','readonly');
        $( "#patdet" ).hide();
        $( "#fp" ).hide();
        $( "#Results" ).hide();
        $.getJSON('./data/FetchData.php?action=getFP',
                function(data){
                $.each(data,function(index){
                        if(data[index].template=='')
                        {
                                $('#txtError').val('The Client has not scanned finger print. Scan finger print
and Press Add Button');
                        }
                        else
                        {
                                $('#txtFP').val(data[index].template);
                        }
                        });
        });
        $('#btnClose').click(function(){
                window.top.location.href = '../../index.php?menu_no_top=reception&reccode=appoint';
        });

        $('#btnNewRecord').click(function(){
                $.getJSON('./data/FetchData.php?action=getFP',
                        function(data){
                        $.each(data,function(index){
                                if(data[index].template=='')
                                {
                                        $('#txtError').val('The Client has not scanned finger print. Scan
finger print and Press Add Button');
                                }
                                else
                                {
                                        $('#txtFP').val(data[index].template);
                                }
                                });
                });
        });
        $('#cmbLocation').change(function(){
                if($('#cmbLocation').val())
                {

        $.getJSON('Data/FetchData.php?action=mapLocation&Location='+$('#cmbLocation').val(),function(d
ata){
```

```
                        $.each(data,function(index){

                                $("#cmbDistrict").val(data[index].District);
                                $("#cmbDivision").val(data[index].Division);
                                $("#cmbCounty").val(data[index].County);


                        });
                });
        }
        else
        {
                $("#cmbDistrict").val('');
                $("#cmbDivision").val('');
                $("#cmbCounty").val('');
        }
    });

    //$('#btnAcquire').click(function(){

    $('#txtFacility').val('');$('#txtFPMiddleName').val('');$('#txtFPFirstName').val('');$('#txtFPLastName').v
al('');
                $('#txtFPServiceNumber').val('');$('#txtTelephone').val('');$( "#patdet"
).hide();$('#txtFPMiddleName').val();
                $('#txtFPFirstName').val();
        $('#txtFPLastName').val();$('#txtFPServiceNumber').val();$('#txtTelephone').val();
                //Back Screen
                $('#txtFacility').val();$('#txtMiddleName').val();
        $('#txtFirstName').val();$('#txtLastName').val();
                $('#txtServiceNumber').val();$('#txtTelContact').val();          $("#txtIDNo").val();
        $("#cmbGender").val();
                $("#txtDOB").val();          $("#cmbEducation").val(); $("#cmbRelationship").val();
        $("#txtNextofKin").val();
                $("#txtKinTel").val();          $("#txtPostalAddress").val();          $("#txtHIVResults").val();
        $("#txtSecondaryContactPerson").val();
                $("#txtSecondaryContact").val();     $("#cmbDistrict").val();
        $("#cmbDivision").val();$("#cmbCounty").val();

        $("#cmbLocation").val();$("#txtLandMark").val();$("#txtVillage").val();$("#txtHBCTCode").val();

        $("#cmbMaritalStatus").val();$("#txtElsewhereFacility").val();$("#txtARTExitDate").val();$("#txtART
Outcome").val();
                $("#txtCareExitDate").val();$("#txtCareOutcome").val();
                $("#txtPatientInCare").val();$("#txtHIVResults1").val();
                $("#txtHIVResults2").val();          $("#txtHIVResults3").val();
                $.getJSON('../appointments/FetchData.php?action=fpmap',function(data){
                        $.each(data,function(index){
                                $('#txtFP').val(data[index].template);

                                $('#txtMiddleName').val(data[index].MiddleName);
                                $('#txtFirstName').val(data[index].FirstName);
                                $('#txtLastName').val(data[index].LastName);
                                //$('#txtServiceNumber').val(data[index].ServiceNumber);
                                $('#txtTelContact').val(data[index].Telephone);
                                $("#txtIDNo").val(data[index].IDNo);
                                $("#cmbGender").val(data[index].Gender);
                                $("#txtDOB").val(data[index].DOB);
                                $("#cmbEducation").val(data[index].Education);
                                $("#txtPostalAddress").val(data[index].PostalAddress);
                                $("#txtHIVResults").val(data[index].HIVResults);
                                $("#txtSecondaryContactPerson").val(data[index].ContactPerson);
```

```
                              $("#txtSecondaryContact").val(data[index].SecondaryContact);
                              $("#cmbDistrict").val(data[index].District);
                              $("#cmbDivision").val(data[index].Division);
                              $("#cmbCounty").val(data[index].County);
                              $("#cmbLocation").val(data[index].Location);
                              $("#txtVillage").val(data[index].Village);
                              //$("#txtLandMark").val(data[index].LandMark);
                              $("#txtHBCTCode").val(data[index].OCode);
                              $("#txtHIVResults1").val(data[index].Test1Result);
                              $("#txtHIVResults2").val(data[index].Test2Result);
                              $("#txtHIVResults3").val(data[index].Test3Result);

                    });
          });

    //});
});
```

Outreach

Outreach PHP

```php
<?php
ob_start();
session_start();

mysql_connect("localhost", "root", "") or die(mysql_error());
mysql_select_db("elink");
$fac = mysql_query("SELECT ifnull(max(OutreachCode),0)+1 PatientID FROM `Outreach` WHERE
Facility='".$_SESSION['FacilityName']."';");
$rowscnt = mysql_num_rows($fac);
if( $rowscnt!==0 )
{
          $i = 0;

          while ( $row = mysql_fetch_assoc($fac) )
          {
                    if(strlen($row['PatientID'])<strlen($_SESSION['Facility']))
                    {
                              $PatientID = $_SESSION['Facility'].$row['PatientID'];
                    }
                    else
                    {
                              $PatientID = $row['PatientID'];
                    }
                    $i++;
          }
}
else
{
          $PatientID = $_SESSION['Facility'].'1';
}
?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
          <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
          <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
```

```html
<link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
<!--[if lt IE 7]>
<script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
<![endif]-->
<!--[if lt IE 9]>
<script type="text/javascript" src="../../js/html5.js"></script>
<![endif]-->
<script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
<script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
<script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
<script type="text/javascript" src="./js/frmHBTC.js"></script>

</head>


<body>
      <section id="main" class="column">
    <article class="module width_full">
                        <header><h3>Outreach Form</h3></header>
                      <div class="module_content">


                                  <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                              <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Basic Information</strong></th></tr>
                                              <tr class="DataTableContent">
                                                    <td>Date:</td>
                                                    <td><input type="text" size="25" name="txtDate"
readonly="readonly" id="txtDate" value='<?php echo date('Y-M-d'); ?>'/></td>
                                                    <td style="text-align:right;">Facility :</td>
                                                    <td><input type="text" name="txtFacility"  size="25"
id="txtFacility" value='<?php echo isset($_SESSION['FacilityName']) ? $_SESSION['FacilityName'] : ''; ?>'/>
</td>
                                              </tr>
                                              <tr class="DataTableContent">
                                                    <td style="align:right;">Last Name:</td>
                                                    <td><input class='changecase' type="text" size="25"
name="txtLastName" id="txtLastName" value='<?php echo isset($LastName) ? $LastName : ''; ?>'/></td>
                                                    <td style="text-align:right;">First Name:</td>
                                                    <td><input class='changecase' type="text"
name="txtFirstName"  size="25" id="txtFirstName" value='<?php echo isset($FirstName) ? $FirstName : '';
?>'/> </td>
                                                    <td style="text-align:right;">Middle Name:</td>
                                                    <td><input class='changecase' type="text"  size="25"
name="txtMiddleName" id="txtMiddleName" value='<?php echo isset($MiddleName) ? $MiddleName : '';
?>'/></td>
                                              </tr>
                                              <tr class="DataTableContent">
                                                    <td>Client Code :</td>
                                                    <td><input type="text" name="txtServiceNumber"
id="txtServiceNumber" readonly="true" size="25" value='<?php echo isset($PatientID) ? $PatientID : '';
?>'/></td>
                                                    <td style="text-align:right;">Finger Print :</td>
```

```
                                                                    <td><input type="text" readonly="true" name="txtFP"
id="txtFP" size="25"></td>
                                                                    <td style="text-align:right">Date of Birth:</td>
                                                                    <td><input type="text" readonly='readonly'
name="txtDOB" id="txtDOB" size="15" value='<?php echo isset($DOB) ? $DOB : ''; ?>'/></td>
                                                            </tr>
                                                            <tr class="DataTableContent">
                                                                    <td>Gender:</td>
                                                                    <td><select name="cmbGender" id="cmbGender">
                                                                            <option value="">Select</option>
                                                                            <option value="Male">Male</option>
                                                                            <option
value="Female">Female</option>
                                                                    </select></td>
                                                                    <td style="text-align:right">National ID No:</td>
                                                                    <td><input type="text" name="txtIDNo" id="txtIDNo"
class='easyui-numberbox' size="25px" value='<?php echo isset($ID_NO) ? $ID_NO : ''; ?>'/></td>

                                                                    <td style='text-align:right;'>Level of Education:</td>
                                                                    <td><select name="cmbEducation" id="cmbEducation">
                                                                            <option value="">Select</option>

        <option>None</option><option>Primary</option><option>Secondary</option><option>Tertiary</op
tion>
                                                                    </select>
                                                                    </td>
                                                            </tr>

                                                    </table>
                                                    <br class="spacer"/>
                                                    <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                                            <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Contact Information</strong></th></tr>
                                                            <tr class='DataTableContent'>
                                                                    <td>Telephone :</td>
                                                                    <td><input type="text" name="txtTelContact"
id="txtTelContact" class='easyui-numberbox' size="25" value='<?php echo isset($TelNumber) ? $TelNumber :
''; ?>'/></td>
                                                                    <td style='text-align:right;'>Postal Address:</td>
                                                                    <td colspan="3"><input type="text"
name="txtPostalAddress" id="txtPostalAddress" size='60' value='<?php echo isset($PostAddress) ?
$PostAddress : ''; ?>'/></td>
                                                            </tr>
                                                            <tr class="DataTableContent">
                                                                    <td>Contact Person:</td>
                                                                    <td colspan="3"><input type="text" name='txtNextofKin'
id="txtNextofKin" value='<?php echo isset($SecondaryContact) ? $SecondaryContact : ''; ?>' size="60"/></td>

                                                                    <td style='text-align:right;'>Contact Person
Telephone:</td>
                                                                    <td><input type="text" name="txtKinTel" id="txtKinTel"
class='easyui-numberbox' size="25" value='<?php echo isset($KinTel) ? $KinTel : ''; ?>'/></td>
                                                            </tr>
                                                    </table>
                                                    <br/>
                                                    <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                                            <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Patient Locator</strong></th></tr>
```

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```html
<tr class="DataTableContent">
        <td>Location :</td>
        <td><select name="cmbLocation" id="cmbLocation">
                <option value="">Select</option>

                <option>Donholm</option>
                <option>Kasarani</option>
                <option>Westlands</option>
                <option>Kawangware</option>
                <option>Karen</option>
                <option>Githurai</option>
                <option>Kimende</option>
                <option>Kangoco</option>
                <option>Limuru</option>
                <option>Ndenderu</option>
            </select></td>
        <td>Village :</td>
        <td><input type="text" name="txtVillage"
id="txtVillage" size="30" value='<?php echo isset($Village) ? $Village : ''; ?>'/></td>
        <td>Land Mark :</td>
        <td><input type="text" name="txtLandMark"
id="txtLandMark" size="30" value='<?php echo isset($LandMark) ? $LandMark : ''; ?>'/></td>
    </tr>
    <tr class="DataTableContent">
        <td>County:</td>
        <td><input name="cmbCounty" id="cmbCounty"
readonly="true"/></td>

        <td style='text-align:right'>District:</td>
        <td><input name="cmbDistrict" id="cmbDistrict"
readonly="true"/></td>

        <td>Division :</td>
        <td><input name="cmbDivision" id="cmbDivision"
readonly="true"/></td>
    </tr>
    </tr>

</table>
<br class="spacer"/>
<table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
        <tr class="DataTableTitle"><th colspan="8" width="100%"
align="left"><strong>Client Testing Details</strong></th></tr>
        <tr class="DataTableContent">
        <td>First Test Resuts:</td>
        <td><select name="txtHIVResults1"
id="txtHIVResults1">
                <option value="">Select</option>
                <option>Positive</option>
                <option>Negative</option>
                <option>Inconclusive</option>
            </select>
        </td>
        <td style='text-align:right'>Second Test Results :</td>
        <td><select name="txtHIVResults2"
id="txtHIVResults2">
                <option value="">Select</option>
                <option>Positive</option>
                <option>Negative</option>
                <option>Inconclusive</option>
            </select>
```

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```html
</td>
<td style='text-align:right'>Third Test Results :</td>
<td><select name="txtHIVResults3"
id="txtHIVResults3">
                <option value="">Select</option>
                <option>Positive</option>
                <option>Negative</option>
                <option>Inconclusive</option>
        </select>
</td>
<td style='text-align:right'>Final Results :</td>
<td><select name="txtHIVResults" id="txtHIVResults">
                <option value="">Select</option>
                <option>Positive</option>
                <option>Negative</option>
                <option>Inconclusive</option>
        </select>
</td>
</tr>
<tr class="DataTableContent">
        <td style='text-align:left'>Can the Finger Prints be
Captured?</td>

        <td><select name="txtFPPresent" id="txtFPPresent">
                <option value="">Select</option>
                <option value="1">Yes</option>
                <option value="0">No</option>
        </select>
</td>
</tr>
</table>
<div class='alert_warning1' id='nt'>
        <input  style="color:red;background-color:transparent;text-
align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label" id="txtError" size="100"
value=''/>
        </div>
</div>
<footer>
        <table width="100%">
        <tr>
        <td style="text-align:center">
                <button id="btnNewRecord"
class='action_btn'>Add</button>
                                <button id="btnEditRecord"
class='action_btn'>Edit</button>
                                <button id="btnSaveRecord"
class='action_btn'>Save</button>
                                <button id="btnClose" class='action_btn'>Close</button>
        </td>
        </tr>
        </table>
</footer>

</article>
</section>
</body>

</html>
```

Outreach JS

```
$(function(){
```

```
        $( "#txtDate" ).datepicker({changeMonth: true,changeYear: true,maxDate :new Date(),dateFormat:
'yy-M-dd'});
        $( "#txtDOB" ).datepicker({changeMonth: true,changeYear: true,maxDate :new Date(),dateFormat:
'yy-M-dd'});
        $.getJSON('./data/FetchData.php?action=getFP',
                function(data){
                $.each(data,function(index){
                if(data[index].template=='')
                {
                        $('#txtError').val('The Client has not scanned finger print. Scan finger print and Press
Add Button');
                }
                else
                {
                        $('#txtFP').val(data[index].template);
                }
                });
        });
        $('#cmbLocation').change(function(){
                if($('#cmbLocation').val())
                {

        $.getJSON('Data/FetchData.php?action=mapLocation&Location='+$('#cmbLocation').val(),function(d
ata){
                                $.each(data,function(index){

                                        $("#cmbDistrict").val(data[index].District);
                                        $("#cmbDivision").val(data[index].Division);
                                        $("#cmbCounty").val(data[index].County);

                                });
                        });
                }
                else
                {
                        $("#cmbDistrict").val('');
                        $("#cmbDivision").val('');
                        $("#cmbCounty").val('');
                }
        });
        $('#btnNewRecord').click(function(){
                $.getJSON('./data/FetchData.php?action=getFP',
                        function(data){
                        $.each(data,function(index){
                                if(data[index].template=='')
                                {
                                        $('#txtError').val('The Client has not scanned finger print. Scan
finger print and Press Add Button');
                                }
                                else
                                {
                                        $('#txtFP').val(data[index].template);
                                }
                                });
                        });
        });
        function validate()
        {
                if($('#txtServiceNumber').val() == "") {errMsg("Client Code  required!!!");return false;}//End
of validation for client code
```

```
// validation for client name
if($('#txtFirstName').val() == "") {errMsg("Client Name required!!!");return false;}
// validation for client name
if($('#txtMiddleName').val() == "") {errMsg("Client Name required!!!");return false;}
// validation for client name
if($('#txtLastName').val() == "") {errMsg("Client Name required!!!");return false;}
// validation for gender
if($('#cmbGender').val() == "Select") {errMsg("Gender required!!!");return false;}
// validation for DOB
if($('#txtDOB').val() == "") {errMsg("Date of Birth required!!!");return false;}
        // validation for DOB
if($('#txtTelContact').val() == "") {errMsg("Telephone Number required!!!");return false;}
        // validation for level of education
if($('#cmbEducation').val() == "Select") {errMsg("Level of Education required!!!");return false;}
// validation for Facility Code
if($('#txtFacility').val() == "") {errMsg("Facility required!!!");return false;}
// validation for Division
if($('#cmbDistrict').val() == "") {errMsg("Dstrict required!!!");return false;}
// validation for Division
if($('#cmbDivision').val() == "") {errMsg("Division required!!!");return false;}
// validation for Location
if($('#cmbLocation').val() == "") {errMsg("Location required!!!");return false;}
if($('#txtVillage').val() == "") {errMsg("Village name required!!!");return false;}
if( $('#txtFPPresent').val() == "") {errMsg('Can the Finger Prints be Captured?');return false;  }
if( $('#txtFPPresent').val()==1 && $('#txtFP').val() == "") {errMsg('Finger Print not yet scanned
required!');return false;  }

    return true;
}
$('#txtHIVResults2').attr('disabled','disabled');$('#txtHIVResults3').attr('disabled','disabled');
$('#txtHIVResults').attr('disabled','disabled');
$('#txtHIVResults1').change(function(){
        if($('#txtHIVResults1').val()=='Positive')
        {
                $('#txtHIVResults2').removeAttr('disabled');
        }
        else
        {

if($('#txtHIVResults2').attr('disabled')!=='disabled'){$('#txtHIVResults2').attr('disabled','disabled');}
        }
        if($('#txtHIVResults1').val()=='Negative')
        {

if($('#txtHIVResults').attr('disabled')!=='disabled'){$('#txtHIVResults').attr('disabled','disabled');}

$('#txtHIVResults').val('Negative');$('#txtHIVResults2').val('');$('#txtHIVResults3').val('');
        }
});
$('#txtHIVResults2').change(function(){
        if($('#txtHIVResults2').val()=='Positive' && $('#txtHIVResults1').val()=='Positive')
        {
                $('#txtHIVResults').val('Positive');
        }
        else if($('#txtHIVResults1').val()=='Positive' && $('#txtHIVResults2').val()=='Negative')
        {
                $('#txtHIVResults').val('Inconclusive');
        }
        else
        {
```

```javascript
                if($('#txtHIVResults3').attr('disabled')!=='disabled'){$('#txtHIVResults3').attr('disabled','disabled');}
                }
                if($('#txtHIVResults2').val()=='Negative')
                {

                    if($('#txtHIVResults').attr('disabled')!=='disabled'){$('#txtHIVResults').attr('disabled','disabled');}
                        //$('#txtHIVResults').val('Negative');
                }
        });
        $('#btnClose').click(function(){
                window.top.location.href = '../../index.php?menu_no_top=reception&reccode=appoint';
        });
        function errMsg(er)
        {
                $('#txtError').val(er);
        }

        $('#btnSaveRecord').click(function(){
                if(validate())
                {
                    var data ='';
                    var ServiceNumber  = $("#txtServiceNumber"),FirstName = $("#txtFirstName"),
                            MiddleName = $("#txtMiddleName"),LastName =
$("#txtLastName"),IDNo = $("#txtIDNo"),
                                    Gender = $("#cmbGender"),DateOfBirth = $("#txtDOB"),
                                    EducationLevel = $("#cmbEducation"),
                                    NextOfKin = $("#txtNextofKin"),KinTelNumber = $("#txtKinTel"),
                                    PostalAddress = $("#txtPostalAddress"),TelNumber = $("#txtTelContact"),
                                    HIVStatus = $("#txtHIVResults"),
                                    HomeDistrict = $("#cmbDistrict"),Division = $("#cmbDivision"),
                                    County = $("#cmbCounty"),Location = $("#cmbLocation"),Landmark =
$("#txtLandMark");


                    var data =
"IDNo="+IDNo.val()+"&ServiceNumber="+ServiceNumber.val()+"&FirstName="+FirstName.val();
                                    data += "&Date="+$('#txtDate').val();
                                    data +=
"&MiddleName="+MiddleName.val()+"&LastName="+LastName.val();
                                    data += "&Gender="+Gender.val()+"&DateOfBirth="+DateOfBirth.val();

                                    data += "&EducationLevel="+EducationLevel.val();
                                    data += "&PostalAddress="+PostalAddress.val();
                                    data +=
"&TelContact="+TelNumber.val()+"&HIVResults="+HIVStatus.val();
                                    data += "&SecondaryContactPerson="+NextOfKin.val();
                                    data += "&SecondaryContact="+KinTelNumber.val();
                                    data +=
"&HomeDistrict="+HomeDistrict.val()+"&Division="+Division.val();
                                    data +=
"&County="+County.val()+"&Location="+Location.val()+"&Landmark="+Landmark.val();
                                    data += "&Village="+$('#txtVillage').val();
                                    data += "&FACILITY="+$('#txtFacility').val();
                                    data += "&FP="+$('#txtFP').val();
                                    data += "&Test1Result="+$('#txtHIVResults1').val();
                                    data += "&Test2Result="+$('#txtHIVResults2').val();
                                    data += "&Test3Result="+$('#txtHIVResults3').val();

                    $.ajax({
```

```
                                        type : 'POST',
                                        url : './data/SaveData.php?action=HBCT',
                                        data : data,
                                        success : function(msg)
                                        {
                                                errMsg(msg);
                                        },
                                        fail : function(error)
                                        {
                                                errMsg(error);
                                        }
                                });
                        }
                });

});
```

Encounters

Encounters PHP

```php
<?php
ob_start();
session_start();

define('ROOT_PATH',$_SESSION['path']);
/*
if(!isset($_SESSION['Full_Name']))
{
        header('Location: ' . ROOT_PATH . '/frmloginuser.php');
        exit();
}
*/
require_once './currentparticulars.php';
require_once './patientinfo.php';

require_once ROOT_PATH . '/Lib/dao/SQLClass.php';
require_once ROOT_PATH . '/Lib/confs/sysConf.php';

$patientObj = new patientInfo();

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
```

```html
<!--[if lt IE 9]>
<script type="text/javascript" src="../../../js/html5.js"></script>
<![endif]-->
<script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
<script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
<script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
<script src="./js/discordantcontact.js" type="text/javascript"></script>
<style>
        .immunology
        {
                background-color: transparent;
        }
</style>
</head>

<body>
        <section id="main" class="column">
        <article class="module width_full">
                        <header><h3>Client Encounters Form</h3></header>
                          <div class="module_content">

                                <div id='screen1'>
                                <?php $patientObj->getPatient(isset($_SESSION['ServiceNumber']) ?
$_SESSION['ServiceNumber'] : '', 'Modify'); ?>
                                <br class="spacer"/>
                                <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                        <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Today's Vitals</strong></th></tr>
                                        <tr class="DataTableContent" style="width:100%">
                                                <td><label for="txtHeight">Height(cm)</label></td>
                                                <td><input name="txtHeight" id="txtHeight"
class="easyui-numberbox" type="text" value=""/></td>
                                                <td><label for="txtWeight">Weight(Kg)</label></td>
                                                <td><input name="txtWeight" id="txtWeight"
class="easyui-numberbox" type="text" value=""/></td>
                                                <td><label for="txtBMI"
id="lblBMI">BMI(Kg/m^2)</label></td>
                                                <td><input name="txtBMI" id="txtBMI" type="text"
value=""/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td><label for="txtBP">BP(mm/Hg)</label></td>
                                                <td><input name="txtBP" id="txtBP" type="text"
value=""/></td>
                                                <td><label for="txtTemp">Temp(Deg.
Celcius)</label></td>
                                                <td><input name="txtTemp" id="txtTemp" type="text"
size='10px'/></td>
                                        </tr>
                                </table>
                                </div><!--END OF SCREEN 1 -->
                                <div id='screen2'>
                                <input type="hidden" id="txtCurrentARTRegimen" readonly='readonly'
name="txtCurrentARTRegimen" size='30' value='<?php echo isset($_SESSION['CurrentRegimen']) ?
$_SESSION['CurrentRegimen'] : ''; ?>'/>
```

```
                                <input type="hidden" id='txtClientAge' name='txtClientAge' value='<?php
echo isset($_SESSION['ClientAge']) ?$_SESSION['ClientAge']:0; ?>'/>
                                <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                        <tr class="DataTableTitle"><th colspan="4" width="100%"
align="left"><strong>Physical Examination</strong></th></tr>
                                        <tr class="DataTableContent">
                                                <td style="width:15%"></td>
                                                <td style="text-align:center;font-weight:Bold;font-
size:13px" colspan="3">Findings</td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style='text-align:right'>General :</td>
                                                <td><select name="cmbGeneralCondition"
id="cmbGeneralCondition">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                    </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td><input type="text" disabled="disabled"
name="txtGeneralCondition" id='txtGeneralCondition' style="width:95%;color:#000"/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style="text-align:right">Skin :</td>
                                                <td><select name="cmbSkin" id="cmbSkin">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                    </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td style="width:80%"><input type="text"
disabled="disabled" name="txtSkin" id="txtSkin" style="width:95%"/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style="text-align:right">Mouth :</td>
                                                <td><select name="cmbMouth" id="cmbMouth">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                    </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td style="width:80%"><input type="text"
disabled="disabled" name="txtMouth" id="txtMouth" style="width:95%"/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style="text-align:right">Lymph Nodes :</td>
                                                <td><select name="cmbLymph" id="cmbLymph">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                    </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td style="width:80%"><input type="text"
disabled="disabled" name="txtLymph" id="txtLymph" style="width:95%"/></td>
                                        </tr>
```

```
                                    <tr class="DataTableContent">
                                            <td style="text-align:right">E.N.T :</td>
                                            <td><select name="cmbENT" id="cmbENT">
                                                    <option value="">Select</option>
                                                    <option>Normal</option>
                                                    <option>Abnormal</option>
                                                </select>
                                            </td>
                                            <td style='text-align:right'>Details:</td>
                                            <td style="width:80%"><input type="text"
disabled="disabled" name="txtENT" id="txtENT" style="width:95%"/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style="text-align:right">Eyes :</td>
                                            <td><select name="cmbEyes" id="cmbEyes">
                                                    <option value="">Select</option>
                                                    <option>Normal</option>
                                                    <option>Abnormal</option>
                                                </select>
                                            </td>
                                            <td style='text-align:right'>Details:</td>
                                            <td style="width:80%"><input type="text"
disabled="disabled" name="txtEyes" id="txtEyes" style="width:95%"/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style="text-align:right">Respiratory system :</td>
                                            <td><select name="cmbRespiratory"
id="cmbRespiratory">
                                                    <option value="">Select</option>
                                                    <option>Normal</option>
                                                    <option>Abnormal</option>
                                                </select>
                                            </td>
                                            <td style='text-align:right'>Details:</td>
                                            <td style="width:80%"><input type="text"
disabled="disabled" name="txtRespiratory" id="txtRespiratory" style="width:95%"/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style="text-align:right">Cardiovascular system :</td>
                                            <td><select name="cmbCardiovascular"
id="cmbCardiovascular">
                                                    <option value="">Select</option>
                                                    <option>Normal</option>
                                                    <option>Abnormal</option>
                                                </select>
                                            </td>
                                            <td style='text-align:right'>Details:</td>
                                            <td style="width:80%"><input type="text"
disabled="disabled" name="txtCardiovascular" id="txtCardiovascular" style="width:95%"/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style="text-align:right">Abdomen :</td>
                                            <td><select name="cmbGastrointestinal"
id="cmbGastrointestinal">
                                                    <option value="">Select</option>
                                                    <option>Normal</option>
                                                    <option>Abnormal</option>
                                                </select>
                                            </td>
                                            <td style='text-align:right'>Details:</td>
```

```html
                                                <td style="width:80%"><input type="text"
disabled="disabled" name="txtGastrointestinal" id="txtGastrointestinal" style="width:95%"/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style="text-align:right">Musculoskeletal system
:</td>
                                                <td><select name="cmbMusculoskeletal"
id="cmbMusculoskeletal">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td style="width:80%"><input type="text"
disabled="disabled" name="txtMusculoskeletal" id="txtMusculoskeletal" style="width:95%"/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style="text-align:right">Central Nervous system
:</td>
                                                <td><select name="cmbNervous" id="cmbNervous">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td style="width:80%"><input type="text"
disabled="disabled" name="txtNervous" id="txtNervous" style="width:95%"/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style="text-align:right">Genitourinary :</td>
                                                <td><select name="cmbGenitourinary"
id="cmbGenitourinary">
                                                        <option value="">Select</option>
                                                        <option>Normal</option>
                                                        <option>Abnormal</option>
                                                </select>
                                                </td>
                                                <td style='text-align:right'>Details:</td>
                                                <td style="width:80%;"><input type="text"
disabled="disabled" name="txtGenitourinary" id="txtGenitourinary" style="width:95%"/></td>
                                        </tr>
                                </table>

                        </div><!--END OF SCREEN 2 -->
                        <div id='screen3'>
                        <table class="InsideDataTable" style="width:30%;" cellpadding="4"
cellspacing="0">
                                <tr>
                                        <td style='text-align:right'>WHO Stage:</td>
                                        <td><select name="cmbWHOstage"
id="cmbWHOstage">
                                                <option value="">Select</option>
                                                <option>1</option>
                                                <option>2</option>
                                                <option>3</option>
                                                <option>4</option>
                                        </select>
                                </td>
```

```
                                                </tr>
                                                <tr>
                                                        <td style='text-align:right'>PwP Disclose:</td>
                                                        <td><select name="cmbDisclose" id="cmbDisclose">
                                                                <option value="">Select</option>
                                                                <option value="1">Yes</option>
                                                                <option value="0">No</option>
                                                        </select>
                                                </td>
                                                </tr>
                                                <tr>
                                                        <td style='text-align:right'>Partner Tested:</td>
                                                        <td><select name="cmbPartnerTested"
id="cmbPartnerTested">
                                                                <option value="">Select</option>
                                                                <option value="1">Yes</option>
                                                                <option value="0">No</option>
                                                        </select>
                                                </td>
                                                </tr>
                                                <tr>
                                                        <td style='text-align:right'>Condom Use:</td>
                                                        <td><select name="cmbCondomUse"
id="cmbCondomUse">
                                                                <option value="">Select</option>
                                                                <option value="1">Yes</option>
                                                                <option value="0">No</option>
                                                        </select>
                                                </td>
                                                </tr>
                                                <tr>
                                                        <td style='text-align:right'>Screened for STI:</td>
                                                        <td><select name="cmbScreenedForSTI"
id="cmbScreenedForSTI">
                                                                <option value="">Select</option>
                                                                <option value="1">Yes</option>
                                                                <option value="0">No</option>
                                                        </select>
                                                </td>
                                                </tr>
                                        </table>
                                        <br class="spacer"/>
                                        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0" id="Results">
                                                <tr class="DataTableTitle"><th colspan="8" width="100%"
align="left"><strong>Client Testing Details</strong></th></tr>
                                                <tr class="DataTableContent">
                                                        <td>First Test Resuts:</td>
                                                        <td><select name="txtHIVResults1"
id="txtHIVResults1">
                                                                <option value="">Select</option>
                                                                <option>Positive</option>
                                                                <option>Negative</option>
                                                                <option>Inconclusive</option>
                                                        </select>
                                                </td>
                                                        <td style='text-align:right'>Second Test Results :</td>
                                                        <td><select name="txtHIVResults2"
id="txtHIVResults2">
                                                                <option value="">Select</option>
```

```
                                                <option>Positive</option>
                                                <option>Negative</option>
                                                <option>Inconclusive</option>
                                        </select>
                                </td>
                                <td style='text-align:right'>Third Test Results :</td>
                                <td><select name="txtHIVResults3"
id="txtHIVResults3">

                                        <option value="">Select</option>
                                        <option>Positive</option>
                                        <option>Negative</option>
                                        <option>Inconclusive</option>
                                </select>
                        </td>
                        <td style='text-align:right'>Final Results :</td>
                        <td><select name="txtHIVResults" id="txtHIVResults">
                                        <option value="">Select</option>
                                        <option>Positive</option>
                                        <option>Negative</option>
                                        <option>Inconclusive</option>
                                </select>
                        </td>
                </tr>
                <tr class="DataTableContent">
                        <td style='text-align:left'>Enter Patient into Care:</td>
                        <td><select name="txtPatientInCare"
id="txtPatientInCare">

                                        <option value="">Select</option>
                                        <option value="1">Yes</option>
                                        <option value="0">No</option>
                                </select>
                        </td>
                </tr>
                <tr class="DataTableContent">
                        <td style='text-align:left'>Reason for Self Referral :</td>
                        <td><select name="txtReasonforSelfReferral"
id="txtReasonforSelfReferral">
                                        <option value="">Select</option>
                                        <option>Economy difficulties</option>
                                        <option>Felt like they had
healed</option>

                                        <option>Had gone upcountry</option>
                                        <option>Stigma</option>
                                        <option>Distance the clinic</option>
                                        <option>Childcare
commitments</option>
                                        </select>
                        </td>
                </tr>
        </table>
        <br class="spacer"/>
        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                        <tr class="DataTableTitle"><th colspan="4" width="100%"
align="left"><strong></strong></th></tr>
                        <tr class="DataTableContent">
                        <td style="text-align:right;">ARV Drug:</td>
                        <td colspan="3"><Select id="txtDrugCombination"
name="txtDrugCombination">

                                        <option value="">Select</option>
```

ABC)</option>

NVP)</option>

EFV)</option>

NVP)</option>

EFV)</option>

AZT)</option>

NVP)</option>

EFV)</option>

ABC)</option>

LPV/r)</option>

NVP)</option>

LPV/r)</option>

EFV)</option>

LPV/r)</option>

EFV)</option>

IDV)</option>

LPV/r)</option>

LPV/r)</option>

EFV)</option>

LPV/r)</option>

DRV/r)</option>

LPV/r)</option>

NVP)</option>

EFV)</option>

EFV)</option>

LPV/r)</option>

LPV/r)</option>

ABC)</option>

NVP)</option>

<option>AF(AZT + 3TC +

<option>AF1A(AZT + 3TC +

<option>AF1B(AZT + 3TC +

<option>AF2A(TDF + 3TC +

<option>AF2B(TDF + 3TC +

<option>AF2C(TDF + 3TC +

<option>AF3A(d4T + 3TC +

<option>AF3B(d4T + 3TC +

<option>AF3C(d4T + 3TC +

<option>AO(ABC + 3TC + DDI +

<option>AO(ABC + 3TC + DDI +

<option>AO(ABC + AZT + DDI +

<option>AO(ABC + AZT +

<option>AO(ABC + AZT +

<option>AO(ABC + DDI +

<option>AO(ABC + DDI +

<option>AO(ABC + DDI + NVP +

<option>AO(AZT + ABC + 3TC +

<option>AO(AZT + DDI +

<option>AO(AZT + 3TC + DDI +

<option>AO(AZT + 3TC +

<option>AO(AZT + DDI +

<option>AO(AZT + DDI +

<option>AO(D4T + DDI +

<option>AO(DDI + 3TC +

<option>AO(DDI + 3TC +

<option>AO(DDI + IDV+

<option>AO(EFV + LPV/r)</option>
<option>AO(TDF + 3TC +

<option>AO(TDF + 3TC + AZT +

EFV)</option>

LPV/r)</option>

LPV/r)</option>

EFV)</option>

LPV/r)</option>

EFV)</option>

LPV/r)</option>

NVP)</option>

EFV)</option>

LPV/r)</option>

LPV/r)</option>

LPV/r)</option>

ABC)</option>

LPV/r)</option>

ABC)</option>

LPV/r)</option>

AZT)</option>

LPV/r)</option>

LPV/r)</option>

LPV/r)</option>

LPV/r)</option>

ABC)</option>

NVP)</option>

EFV)</option>

LPV/r)</option>

NVP)</option>

EFV)</option>

AZT)</option>

LPV/r)</option>

<option>AO(TDF + AZT +

<option>AO(TDF + EFV +

<option>AO(TDF + FTC + AZT +

<option>AO(TDF + FTC +

<option>AO(TDF + FTC +

<option>AO(TDF + LPV/r)</option>
<option>AO(TDF + NVP +

<option>AO(TDF + NVP +

<option>AO1A(ABC + 3TC +

<option>AO1B(ABC + 3TC +

<option>AO1C(ABC + 3TC +

<option>AS1A (AZT + 3TC +

<option>AS1B(AZT + ddI +

<option>AS1C(AZT + 3TC +

<option>AS2A(TDF + 3TC +

<option>AS2B(TDF + 3TC +

<option>AS2B(TDF + ABC +

<option>AS2C(TDF + 3TC +

<option>AS2D(TDF + ABC +

<option>AS2E(TDF + AZT +

<option>AS3A(ABC + ddI +

<option>AS4A(d4T + 3TC +

<option>AS4B(d4T + 3TC +

<option>CF1A(AZT + 3TC +

<option>CF1B(AZT + 3TC +

<option>CF1C(AZT + 3TC +

<option>CF2A(ABC + 3TC +

<option>CF2B (ABC + 3TC +

<option>CF2C(ABC + 3TC +

<option>CF2D(ABC + 3TC +

NVP)</option>

EFV)</option>

LPV/r)</option>

LPV/r)</option>

DDI)</option>

EFV)</option>

LPV/r)</option>

NVP)</option>

EFV)</option>

+LPV/r)</option>

LPV/r)</option>

LPV/r)</option>

ABC)</option>

DDI)</option>

LPVr)</option>

LPV/r)</option>

LPV/r)</option>

LPV/r)</option>

LPV/r)</option>

EFV)</option>

LPV/r)</option>

DRV/r)</option>

LPV/r)</option>

NVP)</option>

LPV/r)</option>

NVP)</option>

EFV)</option>

LPV/r)</option>

<option>CS1B(AZT+ABC+LPV/r)</option>

<option>CF3A(d4T + 3TC +

<option>CF3B(d4T + 3TC +

<option>CO(ABC + 3TC + AZT +

<option>CO(ABC + 3TC + DDI +

<option>CO(ABC + 3TC +

<option>CO(ABC + 3TC)</option>
<option>CO(ABC + AZT +

<option>CO(ABC + AZT +

<option>CO(ABC + AZT +

<option>CO(ABC + DDI +

<option>CO(AZT + 3TC + DDI

<option>CO(AZT + 3TC + EFV +

<option>CO(AZT + DDI +

<option>CO(d4T + 3TC +

<option>CO(d4T + 3TC +

<option>CO(D4T + 3TC +

<option>CO(d4T + ABC +

<option>CO(d4T + DDI +

<option>CO(DDI + 3TC +

<option>CO(NVP + 3TC +

<option>CO(TDF + 3TC +

<option>CO(TDF + 3TC + AZT +

<option>CO(TDF + 3TC +

<option>CO(TDF + 3TC +

<option>CO(TDF + 3TC +

<option>CO(TDF + ABC +

<option>CO1A(AZT + ddI +

<option>CO1B(AZT + ddI +

<option>CS1A(AZT + 3TC +

<option>CS1C(AZT+ddI+LPV/r)</option>

<option>CS2A(ABC+3TC+LPV/r)</option>

<option>CS2B(ABC+ddI +

LPV/r)</option>

<option>CS3A(d4T+3TC+LPV/r)</option>

<option>CS3B(d4T+ABC+LPV/r)</option>

<option>NVP OD for 6 weeks</option>
<option>NVP OD till end of

breastfeeding</option>

<option>PA1A(AZT + 3TC)</option>
<option>PA1B(AZT + 3TC +

LPV/r)</option>

<option>PA2A(d4T + 3TC)</option>
<option>PA2B(d4T + 3TC +

LPV/r)</option>

<option>PA3A(TDF + 3TC)</option>
<option>PA3B(TDF + 3TC +

LPV/r)</option>

<option>PC(AZT)</option>
<option>PC1(NVP OD)</option>
<option>PC1A(AZT + 3TC)</option>
<option>PC1B(AZT + 3TC +

LPV/r)</option>

<option>PC2(NVP OD)</option>
<option>PC2A(d4T + 3TC)</option>
<option>PC2B(d4T + 3TC +

)</option>

<option>PC3(NVP + AZT + 3TC

<option>PM(3TC 150mg)</option>
<option>PM(PMTCT HAART: TDF +

3TC + EFV)</option>

<option>PM(PMTCT HAART: ABC +

3TC + LPV/r)</option>

<option>PM(PMTCT HAART: ABC +

3TC + NVP)</option>

<option>PM(PMTCT HAART: d4T +

3TC + EFV)</option>

<option>PM(PMTCT HAART: d4T +

3TC + NVP)</option>

<option>PM1(AZT; NVP+AZT+3TC;

AZT/3TC)</option>

<option>PM2(NVP+AZT+3TC;

AZT/3TC)</option>

<option>PM3(PMTCT HAART: AZT +

3TC + NVP)</option>

<option>PM4(PMTCT HAART: AZT +

3TC + EFV)</option>

<option>PM5(PMTCT HAART: AZT +

3TC + LPV/r)</option>

<option>PM6(PMTCT HAART: TDF

+ 3TC + NVP)</option>

<option>PM7(PMTCT HAART: TDF

+ 3TC + LPV/r)</option>

<option>PM8(NVP SD)</option>
</select>

```
                                            </td>
                                        </tr>
                                        <tr class="DataTableContent">
                                            <td style="text-align:right;">Next Appointment:</td>
                                            <td colspan="3"><input type="text"
id="txtNextAppointment" name="txtNextAppointment" size='15px' value="<?php echo isset($TCA) ? $TCA :
"; ?>"></td>
                                        </tr>
                                    </table>
                                    <br class="spacer"/>
                                    <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                        <tr class="DataTableTitle"><th colspan="4" width="100%"
align="left"><strong>Notes</strong></th></tr>
                                        <tr class="DataTableContent">
                                            <td><textarea name="txtHistorySymptoms"
id='txtHistorySymptoms' rows="3" cols="100"><?php echo isset($HoPresentingSymptoms) ?
$HoPresentingSymptoms : "; ?></textarea></td>

                                        </tr>
                                    </table>
                                </div><!--END OF SCREEN 3 -->
                                    <form id="contactForm" name="contactForm" method="post"
action="adultcontactform.php" onSubmit="return true;">
                                        <br class="spacer"/>
                                        <input type='hidden' id='curScreen' name='curScreen'
value="/>
                                        <div class='alert_warning1' id='nt'>
                                            <input  style="color:red;background-
color:transparent;text-align:left;border:0;font-weight: bold;font-size: 12px;style:98%" type="label"
id="txtError" readonly="true" size="150px" value="/>
                                        </div>

                                    </form>
                            </div>
                            <footer>
                                <table width="100%">
                                    <tr>
                                    <td style="text-align:center">
                                            <button id="btnNewRecord"
class='action_btn'>Add</button>
                                            <button id="btnEditRecord"
class='action_btn'>Edit</button>
                                            <button id="btnPrevious"
class='action_btn'>Previous</button>
                                            <button id="btnNext" class='action_btn'>Next</button>
                                            <button id="btnSaveRecord"
class='action_btn'>Save</button>
                                            <button id="btnClose" class='action_btn'>Close</button>
                                    </td>
                                    </tr>
                                </table>
                            </footer>
                        </article>
                </section>
            </body>

            </html>
```
Encounters JS

```javascript
$(function(){
        //$("#screen1").hide();
        var mDate=new Date();
        mDate.setDate(mDate.getDate() + 90);
        $('#txtNextAppointment').datepicker({changeMonth: true,changeYear: true,minDate: new
Date(),maxDate: mDate,dateFormat: 'yy-M-dd'});
        $('#edheader', parent.document).html($('#txtClientName').val());
        $('#edheader2', parent.document).html('Patient Number :['+$('#txtServiceNumber').val()+']
Age:['+$('#txtCurrentAge').val()+'] HIV Status:['+$('#txtHIVStatus').val()+']
Gender:['+$('#txtGender').val()+']');
        $('#lblBMI').hide();$('#txtBMI').hide();
        $("#screen2").hide();
        $("#screen3").hide();
        $("#btnPrevious").hide();$("#btnNext").hide();$("#btnEditRecord").hide();
        $("#btnSaveRecord").hide();$("#btnClose").hide();
        $("#curScreen").val('1');
        $('#btnNewRecord').click(function(){
                $("#btnNewRecord").hide();
                if($("#txtHeight").val())
                {
                        $("#curScreen").val('2');$("#btnNext").show();$("#btnPrevious").show();
                        $("#screen1").hide();$("#screen2").show();

                }
                else
                {
                        $("#btnNext").show();$("#curScreen").val('1');

                }
        });
        $('#btnPrevious').click(function(){
                var curScreen = $("#curScreen").val();
                var curScreenNew = '1';
                $("#btnNext").show();
                switch(curScreen)
                {
                        case '1':{curScreenNew = '1';break;}
                        case '2':{curScreenNew = '1';break;}
                        case '3':{curScreenNew = '2';break;}
                }
                if(curScreenNew == '1')
                {
                        $("#screen2").hide();$("#btnPrevious").hide();$("#btnNewRecord").show();
                        $("#screen1").show();$("#btnNext").show();errMsg('');
                }
                else
                {
                        $("#screen"+curScreen).hide();
                        $("#screen"+curScreenNew).show();
                        $("#btnSaveRecord").hide();$("#btnClose").hide();
                }
                $("#curScreen").val(curScreenNew);
        });
        $('#btnNext').click(function(){
                var curScreen = $("#curScreen").val();
                var curScreenNew = '0', bValid = true;
                errMsg('');

                $("#btnNewRecord").hide();
                switch(curScreen)
                {
                        case '1':
```

```
                {
                        if(!validateScreen1())
                        {
                                bValid = false;
                        }
                        else
                        {
                                $("#btnPrevious").show();
                                curScreenNew = '2';
                        }
                        break;
                }
                case '2':
                {
                        if(!validateScreen2())
                        {
                                bValid = false;
                        }
                        else
                        {
                                curScreenNew = '3';
                        }
                        break;
                }
        }

        if(bValid)
        {
                if(curScreen == '2')
                {
                        $("#screen2").hide();$("#screen3").show();$("#btnNext").hide();
                        $("#btnSaveRecord").show();$("#btnClose").show();
                }
                else
                {
        $("#screen"+curScreen).hide();$("#screen"+curScreenNew).show();$("#btnPrescribe").hide();
                        $("#btnSaveRecord").hide();$("#btnClose").hide();
                }
                $("#curScreen").val(curScreenNew);
        }
});
function validateScreen1()
{
        var v1    = $ ('#txtHeight'),v2        = $ ('#txtWeight'),BP        = $ ('#txtBP'),v6  = $
('#txtTemp');

        if(v1.val() ==''){errMsg('Height required');v1.focus();return false;}
        if(v2.val() ==''){errMsg('weight required');v2.focus();return false;}
        if(BP.val() ==''){errMsg('Blood Pressure');BP.focus();return false;}
        if(v6.val() ==''){errMsg('Temperature');v6.focus();return false;}

        if(parseInt(v1.val())>250){errMsg('Height cannot be more than
250');$('#txtHeight').val('');$('#txtHeight').focus();return false;}
        if(parseInt(v2.val())>200){errMsg('Weight cannot be more than
200');$('#txtVWeight').val('');$('#txtVWeight').focus();return false;}
        if(parseInt(v1.val())>250){errMsg('Height cannot be more than
250');$('#txtHeight').val('');$('#txtHeight').focus();return false;}
        if(parseInt(v6.val())>42){errMsg('Temperature cannot be more than acceptable high of
42');return false;}
```

```
                if(parseInt(v6.val())<33){errMsg('Temperature cannot be less than acceptable low of
33');return false;}
                var BPM=BP.val();
                var indx1 = BPM.indexOf('/'),systolic=0,diastolic=0;
                if(indx1==-1){errMsg('BP Format not valid');BP.focus();return false;}
                        systolic = BPM.substring(0,indx1);
                        diastolic = BPM.substring(indx1+1);
                if(systolic.length<2){errMsg('BP Format not valid');BP.focus();return false;}
                if(!diastolic){errMsg('BP Format not valid');BP.focus();return false;}
                if(diastolic.length<2){errMsg('BP Format not valid');BP.focus();return false;}
                if(parseInt(systolic)<70){errMsg('Systolic cannot be less than acceptable low of
70');BP.focus();return false;}
                if(parseInt(systolic)>260){errMsg('Systolic cannot be more than acceptable high of
260');BP.focus();return false;}
                if(parseInt(diastolic)<40){errMsg('Diastolic cannot be less than acceptable low of
40');BP.focus();return false;}
                if(parseInt(diastolic)>200){errMsg('Diastolic cannot be more than acceptable high of
200');BP.focus();return false;}


                return true;
        }
        function validateScreen2()
        {
                v5      = $ ('#txtGeneralCondition'),
                v6      = $ ('#txtSkin'),v7        = $ ('#txtMouth'),v8        = $ ('#txtLymph'),v9
        = $ ('#txtENT'),v10      = $ ('#txtEyes'),
                v12     = $ ('#txtRespiratory'),v13 = $ ('#txtCardiovascular'),v14       = $
('#txtGastrointestinal'),v15 = $ ('#txtMusculoskeletal'),v16       = $ ('#txtNervous'),
                v17     = $ ('#txtGenitourinary');
                v25     = $ ('#cmbGeneralCondition'),
                v26     = $ ('#cmbSkin'),v27       = $ ('#cmbMouth'),v28       = $
('#cmbLymph'),v29       = $ ('#cmbENT'),v210       = $ ('#cmbEyes'),
                v212    = $ ('#cmbRespiratory'),v213        = $ ('#cmbCardiovascular'),v214   = $
('#cmbGastrointestinal'),v215      = $ ('#cmbMusculoskeletal'),v216   = $ ('#cmbNervous'),
                v217    = $ ('#cmbGenitourinary');

                var exam = 'examination findings';
                if(v25.val() ==''){errMsg('Select General '+exam);return false;}
                if(v25.val() =='Abnormal' && v5.val() ==''){errMsg('General '+exam);return false;}
                if(v26.val() ==''){errMsg('Select Skin '+exam);return false;}
                if(v26.val() =='Abnormal' && v6.val()==''){errMsg('Skin '+exam);return false;}
                if(v27.val() ==''){errMsg('Select Mouth '+exam);return false;}
                if(v27.val() =='Abnormal' && v7.val() ==''){errMsg('Mouth '+exam);return false;}
                if(v28.val() ==''){errMsg('Select Lymph Nodes '+exam);return false;}
                if(v28.val() =='Abnormal' && v8.val() ==''){errMsg('Lymph Nodes '+exam);return false;}
                if(v29.val() ==''){errMsg('Select E.N.T '+exam);return false;}
                if(v29.val() =='Abnormal' && v9.val() ==''){errMsg('E.N.T '+exam);return false;}
                if(v210.val() ==''){errMsg('Select Eyes '+exam);return false;}
                if(v210.val() =='Abnormal' && v10.val() ==''){errMsg('Eyes '+exam);return false;}
                if(v212.val() ==''){errMsg('Respiratory system '+exam);return false;}
                if(v212.val() =='Abnormal' && v12.val() ==''){errMsg('Respiratory system '+exam);return
false;}
                if(v213.val() ==''){errMsg('Select Cardiovascular system '+exam);return false;}
                if(v213.val() =='Abnormal' && v13.val() ==''){errMsg('Cardiovascular system '+exam);return
false;}
                if(v214.val() ==''){errMsg('Select Abdominal '+exam);return false;}
                if(v214.val() =='Abnormal' && v14.val() ==''){errMsg('Abdominal '+exam);return false;}
                if(v215.val() ==''){errMsg('Select Musculoskeletal system '+exam);return false;}
                if(v215.val() =='Abnormal' && v15.val() ==''){errMsg('Musculoskeletal system
'+exam);return false;}
```

```javascript
                if(v216.val() ==''){errMsg('Select Central Nervous system '+exam);return false;}
                if(v216.val() =='Abnormal' && v16.val() =='' ){errMsg('Central Nervous system
'+exam);return false;}
                if(v217.val() ==''){errMsg('Select Genitourinary '+exam);return false;}
                if(v217.val() =='Abnormal' && v17.val() ==''){errMsg('Genitourinary '+exam);return false;}
                return true;
        }

        function validate()
        {
                var v58  = $('#txtNextAppointment');

                if($('#txtHTCNumber').val()==""){errMsg('VCT Number required');return false;}
                if(v58.val() == ''){errMsg('Next Appointment date');v58.focus();return false;}
                if($('#txtHistorySymptoms').val() ==''){errMsg('Notes not
given');$('#txtHistorySymptoms').focus();return false;}

                return true;
        }


        function errMsg(er)
        {
                $('#txtError').val(er);
        }

        $('#btnSaveRecord').click(function(){
                if(validate())
                {
                        var data =
'ServiceNumber='+$('#txtServiceNumber').val()+'&Temperature='+$('#txtTemp').val()+'&BP='+$('#txtBP').val(
)+'&Height='+$('#txtHeight').val();
                        data += '&Weight='+$('#txtWeight').val()+'&BMI='+$('#txtBMI').val();
                        data +=
'&txtHistorySymptoms='+$('#txtHistorySymptoms').val()+'&txtGeneralCondition='+$('#txtGeneralCondition').
val();
                        data +=
'&txtSkin='+$('#txtSkin').val()+'&txtMouth='+$('#txtMouth').val()+'&txtLymph='+$('#txtLymph').val()+'&txtE
NT='+$('#txtENT').val();
                        data += '&txtEyes='+$('#txtEyes').val();
                        data +=
'&txtRespiratory='+$('#txtRespiratory').val()+'&txtCardiovascular='+$('#txtCardiovascular').val()+'&txtGastroin
testinal='+$('#txtGastrointestinal').val();
                        data +=
'&txtMusculoskeletal='+$('#txtMusculoskeletal').val()+'&txtNervous='+$('#txtNervous').val()+'&txtGenitourina
ry='+$('#txtGenitourinary').val();
                        data +=
'&txtNextAppointment='+$('#txtNextAppointment').val()+'&cmbGeneralCondition='+$('#cmbGeneralCondition
').val();
                        data +=
'&cmbSkin='+$('#cmbSkin').val()+'&cmbMouth='+$('#cmbMouth').val()+'&cmbLymph='+$('#cmbLymph').val
()+'&cmbENT='+$('#cmbENT').val();
                        data += '&cmbEyes='+$('#cmbEyes').val();
                        data +=
'&cmbRespiratory='+$('#cmbRespiratory').val()+'&cmbCardiovascular='+$('#cmbCardiovascular').val()+'&cmb
Gastrointestinal='+$('#cmbGastrointestinal').val();
                        data +=
'&cmbMusculoskeletal='+$('#cmbMusculoskeletal').val()+'&cmbNervous='+$('#cmbNervous').val()+'&cmbGen
itourinary='+$('#cmbGenitourinary').val();
                        data += '&Whostage='+$('#cmbWHOstage').val();
```

```
                              data += '&PwP_Disclosed='+$('#cmbDisclose').val();
                              data += '&PwP_PartnerTested='+$('#cmbPartnerTested').val();
                              data += '&PwP_Condoms='+$('#cmbCondomUse').val();
                              data += '&PwP_STIscreen='+$('#cmbScreenedForSTI').val();
                              data +=
'&DrugCombination='+encodeURIComponent($('#txtDrugCombination').val());
                              data += '&txtReasonforSelfReferral='+$('#txtReasonforSelfReferral').val();
                              data += "&PatientInCare="+$('#txtPatientInCare').val();
                              data += "&Test1Result="+$('#txtHIVResults1').val();
                              data += "&Test2Result="+$('#txtHIVResults2').val();
                              data += "&Test3Result="+$('#txtHIVResults3').val();

                              $.ajax({
                                      type : 'POST',
                                      url : './data/SaveData.php?action=SaveDiscordantContact',
                                      data : data,
                                      success : function(msg)
                                      {
                                              errMsg(msg);
                                      }
                              });


                      }
              });
              $('#btnClose').click(function(){
                      window.top.location.href = "../../index.php?menu_no_top=clinic&cliniccode=patientMain";
              });
              $('#txtHIVResults2').attr('disabled','disabled');$('#txtHIVResults3').attr('disabled','disabled');
              $('#txtHIVResults').attr('disabled','disabled');
              $('#txtHIVResults1').change(function(){
                      if($('#txtHIVResults1').val()=='Positive')
                      {
                              $('#txtHIVResults2').removeAttr('disabled');
                      }
                      else
                      {

if($('#txtHIVResults2').attr('disabled')!=='disabled'){$('#txtHIVResults2').attr('disabled','disabled');}
                      }
                      if($('#txtHIVResults1').val()=='Negative')
                      {

if($('#txtHIVResults').attr('disabled')!=='disabled'){$('#txtHIVResults').attr('disabled','disabled');}

              $('#txtHIVResults').val('Negative');$('#txtHIVResults2').val('');$('#txtHIVResults3').val('');
                      }
              });
              $('#txtHIVResults2').change(function(){
                      if($('#txtHIVResults2').val()=='Positive' && $('#txtHIVResults1').val()=='Positive')
                      {
                              $('#txtHIVResults').val('Positive');
                      }
                      else if($('#txtHIVResults1').val()=='Positive' && $('#txtHIVResults2').val()=='Negative')
                      {
                              $('#txtHIVResults').val('Inconclusive');
                      }
                      else
                      {

if($('#txtHIVResults3').attr('disabled')!=='disabled'){$('#txtHIVResults3').attr('disabled','disabled');}
```

```
                        }
                        if($('#txtHIVResults2').val()=='Negative')
                        {

        if($('#txtHIVResults').attr('disabled')!=='disabled'){$('#txtHIVResults').attr('disabled','disabled');}


                        }
                });

                $('#cmbGeneralCondition').change(function(){

        if($('#txtGeneralCondition').attr('disabled')!=='disabled'){$('#txtGeneralCondition').attr('disabled','disab
led');}

                if($('#cmbGeneralCondition').val()=='Abnormal'){$('#txtGeneralCondition').removeAttr('disabled');}
                        else{$('#txtGeneralCondition').val('');}
                });
                $('#cmbSkin').change(function(){
                        if($('#txtSkin').attr('disabled')!=='disabled'){$('#txtSkin').attr('disabled','disabled');}
                        if($('#cmbSkin').val()=='Abnormal'){$('#txtSkin').removeAttr('disabled');}
                        else{$('#txtSkin').val('');}
                });
                $('#cmbMouth').change(function(){
                        if($('#txtMouth').attr('disabled')!=='disabled'){$('#txtMouth').attr('disabled','disabled');}
                        if($('#cmbMouth').val()=='Abnormal'){$('#txtMouth').removeAttr('disabled');}
                        else{$('#txtMouth').val('');}
                });
                $('#cmbLymph').change(function(){
                        if($('#txtLymph').attr('disabled')!=='disabled'){$('#txtLymph').attr('disabled','disabled');}
                        if($('#cmbLymph').val()=='Abnormal'){$('#txtLymph').removeAttr('disabled');}
                        else{$('#txtLymph').val('');}
                });
                $('#cmbENT').change(function(){
                        if($('#txtENT').attr('disabled')!=='disabled'){$('#txtENT').attr('disabled','disabled');}
                        if($('#cmbENT').val()=='Abnormal'){$('#txtENT').removeAttr('disabled');}
                        else{$('#txtENT').val('');}
                });
                $('#cmbEyes').change(function(){
                        if($('#txtEyes').attr('disabled')!=='disabled'){$('#txtEyes').attr('disabled','disabled');}
                        if($('#cmbEyes').val()=='Abnormal'){$('#txtEyes').removeAttr('disabled');}
                        else{$('#txtEyes').val('');}
                });
                $('#cmbRespiratory').change(function(){

        if($('#txtRespiratory').attr('disabled')!=='disabled'){$('#txtRespiratory').attr('disabled','disabled');}
                        if($('#cmbRespiratory').val()=='Abnormal'){$('#txtRespiratory').removeAttr('disabled');}
                        else{$('#txtRespiratory').val('');}
                });
                $('#cmbCardiovascular').change(function(){

        if($('#txtCardiovascular').attr('disabled')!=='disabled'){$('#txtCardiovascular').attr('disabled','disabled');
}

        if($('#cmbCardiovascular').val()=='Abnormal'){$('#txtCardiovascular').removeAttr('disabled');}
                        else{$('#txtCardiovascular').val('');}
                });
                $('#cmbGastrointestinal').change(function(){

        if($('#txtGastrointestinal').attr('disabled')!=='disabled'){$('#txtGastrointestinal').attr('disabled','disabled'
);}
```

```
                if($('#cmbGastrointestinal').val()=='Abnormal'){$('#txtGastrointestinal').removeAttr('disabled');}
                        else{$('#txtGastrointestinal').val('');}
                });
                $('#cmbMusculoskeletal').change(function(){

                if($('#txtMusculoskeletal').attr('disabled')!=='disabled'){$('#txtMusculoskeletal').attr('disabled','disabled
');}

                if($('#cmbMusculoskeletal').val()=='Abnormal'){$('#txtMusculoskeletal').removeAttr('disabled');}
                        else{$('#txtMusculoskeletal').val('');}
                });
                $('#cmbNervous').change(function(){
                        if($('#txtNervous').attr('disabled')!=='disabled'){$('#txtNervous').attr('disabled','disabled');}
                        if($('#cmbNervous').val()=='Abnormal'){$('#txtNervous').removeAttr('disabled');}
                        else{$('#txtNervous').val('');}
                });
                $('#cmbGenitourinary').change(function(){

                if($('#txtGenitourinary').attr('disabled')!=='disabled'){$('#txtGenitourinary').attr('disabled','disabled');}
                        if($('#cmbGenitourinary').val()=='Abnormal'){$('#txtGenitourinary').removeAttr('disabled');}
                        else{$('#txtGenitourinary').val('');}
                });
});
```

Death report

Death Report PHP

```php
<?php
ob_start();
session_start();

define('ROOT_PATH',$_SESSION['path']);

if(!isset($_SESSION['Full_Name']))
{
        header('Location: ../../frmloginuser.php');
        exit();
}
mysql_connect("localhost", "root", "") or die(mysql_error());
mysql_select_db("elink");
$fac = mysql_query("SELECT `MFLCode`, `FacilityName` FROM `healthfacilities`;");
$rowscnt = mysql_num_rows($fac);
if( $rowscnt!==0 )
{
        $i = 0;
        while ( $row = mysql_fetch_assoc($fac) )
        {
                $Facilities[$i][0] = $row['MFLCode'];
                $Facilities[$i][1] = $row['FacilityName'];
                $i++;
        }
}
$client = mysql_query("SELECT AES_DECRYPT(`PatientCode`,'nomiskris1')
PatientCode,AES_DECRYPT(FirstName,'nomiskris1') FirstName,AES_DECRYPT(MiddleName,'nomiskris1')
MiddleName,AES_DECRYPT(LastName,'nomiskris1')
LastName,FPMap,AES_DECRYPT(Gender,'nomiskris1') Gender,AES_DECRYPT(HIVStatus,'nomiskris1')
HIVStatus,AES_DECRYPT(DateofBirth,'nomiskris1') as DOB,AES_DECRYPT(PostalAddress,'nomiskris1')
PostalAddress,AES_DECRYPT(Telephone,'nomiskris1') Telephone,AES_DECRYPT(NationalID,'nomiskris1')
```

```php
NationalID FROM `patients` where AES_DECRYPT(PatientCode,'nomiskris1')='" .
$_SESSION['ServiceNumber'] . "';");
$rowscount = mysql_num_rows($client);
if( $rowscount!==0 )
{
        while ( $row = mysql_fetch_array($client) )
        {
                $ServiceNumber = $row['PatientCode'];
                $FirstName = $row['FirstName'];
                $MiddleName = $row['MiddleName'];
                $LastName = $row['LastName'];
                $DOB = $row['DOB'];
                $Gender = $row['Gender'];
                $ID_NO = $row['NationalID'];
                $FP = $row['FPMap'];
                $PostAddress = $row['PostalAddress'];
                $TelNumber = $row['Telephone'];
        }
}
?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title></title>
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="../../js/html5.js"></script>
        <![endif]-->

        <script src="../../js/jquery-1.5.2.min.js" type="text/javascript"></script>
        <script src="../../js/hideshow.js" type="text/javascript"></script>
        <script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
        <script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
        <script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
        <script type="text/javascript" src="../../js/jquery.equalHeight.js"></script>
        <script type="text/javascript" src="./js/deathreport.js"></script>
        <style>

                .ui-state-error
                {
                        border: 2px solid #cd0a0a;background: #cdaaaa;
                }
        </style>
</head>

<body>
```

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```html
<section id="main" class="column">
    <article class="module width_full">
        <header><h3>Death Report</h3></header>
        <div class="module_content">

            <input type='hidden' id='actionID' name='actionID' value=''/>
            <input type='hidden' id='searchType' name='searchType' value=''/>
            <input type='hidden' id='txtOption' name='txtOption' value='<?php echo
isset($Option) ? $Option : 'N'; ?>'/>
            <input type='hidden' id='actionCode' name='actionCode' value='<?php echo
isset($actioncode) ? $actioncode : ''; ?>'/>
            <input type='hidden' id='age' name='age' value='<?php echo isset($Age)
&& $Age!='' ? $Age : 0; ?>'/>

            <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Basic Information</strong></th></tr>
                <tr class="DataTableContent">
                    <td style="align:right;width:15%;">Last Name:</td>
                    <td><input class='changecase' readonly="true"
type="text" size="25" name="txtLastName" id="txtLastName" value='<?php echo isset($LastName) ?
$LastName : ''; ?>'/></td>
                    <td style="text-align:right;width:15%;">First Name:</td>
                    <td><input class='changecase' readonly="true"
type="text" name="txtFirstName"  size="25" id="txtFirstName" value='<?php echo isset($FirstName) ?
$FirstName : ''; ?>'/> </td>
                    <td style="text-align:right;width:15%;">Middle
Name:</td>
                    <td><input class='changecase' readonly="true"
type="text"  size="25" name="txtMiddleName" id="txtMiddleName" value='<?php echo isset($MiddleName) ?
$MiddleName : ''; ?>'/></td>
                </tr>
                <tr class="DataTableContent">
                    <td>Patient Number:</td>
                    <td><input type="text" readonly="true"
name="txtServiceNumber" id="txtServiceNumber" size="25" value='<?php echo isset($ServiceNumber) ?
$ServiceNumber : ''; ?>'/></td>
                    <td  style="text-align:right;width:15%;">Finger Print
:</td>
                    <td colspan="2"><input type="text" readonly="true"
name="txtFP" id="txtFP" size="25" value='<?php echo isset($FP) ? $FP : ''; ?>'/></td>
                </tr>
                <tr class="DataTableContent">
                    <td>Gender:</td>
                    <td><select name="cmbGender" id="cmbGender">
                        <option value="">Select</option>
                        <?php if(isset($Gender) &&
$Gender=='Male'){ ?>
                        <option selected="true"
value="Male">Male</option>
                        <option
value="Female">Female</option>
                        <?php }elseif(isset($Gender) &&
$Gender=='Female'){ ?>
                        <option value="Male">Male</option>
                        <option selected="true"
value="Female">Female</option>
                        <?php } ?>
```

```
                                    </select></td>
                                    <td style="text-align:right">Date of Birth:</td>
                                    <td><input type="text" readonly='readonly'
name="txtDOB" id="txtDOB" size="15" value='<?php echo isset($DOB) ? $DOB : ''; ?>'/></td>
                                    <td style="text-align:right">National ID No:</td>
                                    <td><input type="text" readonly="true" name="txtIDNo"
id="txtIDNo" class='easyui-numberbox' size="25px" value='<?php echo isset($ID_NO) ? $ID_NO : '';
?>'/></td>
                            </tr>
                        </table>
                        <br class="spacer"/>
                        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                    <tr class="DataTableTitle"><th colspan="6" width="100%"
align="left"><strong>Contact Information</strong></th></tr>
                                    <tr class='DataTableContent'>
                                            <td style='text-align:right'>Telephone :</td>
                                            <td><input type="text" readonly="true"
name="txtTelContact" id="txtTelContact" class='easyui-numberbox' size="25" value='<?php echo
isset($TelNumber) ? $TelNumber : ''; ?>'/></td>
                                            <td style='text-align:right;'>Postal Address:</td>
                                            <td colspan="3"><input type="text" readonly="true"
name="txtPostalAddress" id="txtPostalAddress" size='60' value='<?php echo isset($PostAddress) ?
$PostAddress : ''; ?>'/></td>
                                    </tr>
                        </table>
                        <br class="spacer"/>
                        <table class="InsideDataTable" style="width:100%;" cellpadding="4"
cellspacing="0">
                                    <tr class="DataTableTitle"><th colspan="8" width="100%"
align="left"><strong>Death Details</strong></th></tr>
                                    <tr class="DataTableContent">
                                            <td style='text-align:right'>Date of Death:</td>
                                            <td><input type="text" readonly='readonly'
name="txtDeathDate" id="txtDeathDate" size="15" value='<?php echo isset($DeathDate) ? $DeathDate : '';
?>'/></td>
                                            <td style='text-align:right'>Death Reported On :</td>
                                            <td><input type="text" readonly='readonly'
name="txtDeathReportedOn" id="txtDeathReportedOn" size="15" value='<?php echo isset($DeathReportedOn)
? $DeathReportedOn : ''; ?>'/></td>
                                    </tr>
                                    <tr class="DataTableContent">

                                            <td style='text-align:right'>Cause of Death :</td>
                                            <td><input type="text" name="txtCauseOfDeath"
id="txtCauseOfDeath" size="50px" value='<?php echo isset($CauseOfDeath) ? $CauseOfDeath : ''; ?>'/></td>
                                            <td style='text-align:right'>Death Reported By :</td>
                                            <td><input type="text" name="txtDeathReportedby"
id="txtDeathReportedBy" size="50px" value=''/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style='text-align:right'>Facility Reported At :</td>
                                            <td><input name="cmbFacility" id="cmbFacility"
value="<?php echo isset($_SESSION['FacilityName']) ? $_SESSION['FacilityName'] : ''; ?>" size="40px"
readonly="true"/></td>
                                    </tr>
                                    <tr class="DataTableContent">
                                            <td style='text-align:right'>Postmortem Done :</td>
```

```
                                            <td><select name="cmbPostMortem"
id="cmbPostMortem"><option value="">Select</option><option value="1">Yes</option><option
value="0">No</option></select></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td style='text-align:right'>Pathologist Report :</td>
                                                <td colspan="3"><textarea name="txtPathologicalReport"
disabled="disabled" id="txtPathologicalReport" rows="3" cols="100"></textarea></td>
                                        </tr>
                                    </table>

                                </div><!--End of Screen 2-->
                                <div class='alert_warning1' id='nt'>
                                        <input  style="color:red;background-color:transparent;text-
align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label" id="txtError" size="100"
value=''/>
                                    </div>

                            </div>

                            <footer>
                                    <table width="100%">
                                            <tr>
                                            <td style='text-align:center'>
                                                    <button id="btnNewRecord"
class='action_btn'>Add</button>

                                                    <button id="btnEditRecord"
class='action_btn'>Edit</button>

                                                    <button id="btnSaveRecord" class='action_btn'
onclick='saveDemo();'>Save</button>

                                                    <button id="btnFindDemo"
class='action_btn'>Find</button>

                                                    <button id="btnClose" class='action_btn'>Close</button>
                                            </td>
                                            </tr>
                                    </table>
                            </footer>
                        </article>
                </section>
</body>
</html>
```

Death Repot JS

```
function saveDemo()
{

        var ServiceNumber  = $("#txtServiceNumber");

        var bValid = true;

        if( $('#txtDeathDate').val() == "") {errMsg('Death Date required!!!');$('#txtDeathDate').addClass( "ui-
state-error" );return false;  }
        if( $('#txtDeathReportedOn').val() == "") {errMsg('Death reported on
required!!!');$('#txtDeathReportedOn').addClass( "ui-state-error" );return false;  }
        if( $('#txtDeathReportedBy').val() == "") {errMsg('Death Reported by
required!!!');$('#txtDeathReportedBy').addClass( "ui-state-error" );return false;  }
        if( $('#cmbFacility').val() == "") {errMsg('Facility death report required!!!');$('#cmbFacility').addClass(
"ui-state-error" );return false;  }
```

```
        if( $('#txtCauseOfDeath').val() == "") {errMsg('Cause of Death
required!!!');$('#txtCauseOfDeath').addClass( "ui-state-error" );return false;  }
        if( $('#cmbPostMortem').val() == "") {errMsg('Post Mortem done.');$('#cmbPostMortem').addClass(
"ui-state-error" );return false;  }
        if( $('#cmbPostMortem').val() == 1 && $('#txtPathologicalReport').val() == "") {errMsg('Pathology
Report.');$('#cmbPostMortem').addClass( "ui-state-error" );return false;  }


        var data  =
"DeathDate="+$('#txtDeathDate').val()+"&ServiceNumber="+ServiceNumber.val()+"&DateReportedDead="+
$('#txtDeathReportedOn').val();
                data += "&ReportedBy="+$('#txtDeathReportedBy').val();
                data +=
"&FacilityReported="+$('#cmbFacility').val()+"&CauseOfDeath="+$('#txtCauseOfDeath').val();
                data += "&PathologicalReport="+$('#txtPathologicalReport').val();


                $.ajax({
                        type : 'POST',
                        data : data,
                        datatype: 'text',
                        url : './data/SaveData.php?action=DeathReport',

                        success : function(msg11){
                                errMsg(msg11);
                        }
                });

}
function errMsg(er)
{
        $('#txtError').val(er);
}
function checkRegexp( o, regexp, n )
{
        if ( !( regexp.test( o.val() ) ) ) {
                o.addClass( "ui-state-error" );
                errMsg( n );
                return false;
        } else {
        return true;
        }
}
$(function(){

        var tDate=new Date();
        tDate.setDate(tDate.getDate() - 1)

        $( "#txtDOB" ).datepicker({changeMonth: true,changeYear: true,maxDate: tDate,dateFormat: 'yy-mm-
dd',yearRange: "1900:2050"});
        $( "#txtDeathReportedOn" ).datepicker({changeMonth: true,changeYear: true,maxDate: new
Date(),dateFormat: 'yy-M-dd'});
        $( "#txtDeathDate" ).datepicker({changeMonth: true,changeYear: true,maxDate: new
Date(),dateFormat: 'yy-M-dd'});
        $('#cmbPostMortem').change(function(){
                if($('#cmbPostMortem').val()==1)
                {

        if($('#txtPathologicalReport').attr('disabled')!=='disabled'){$('#txtPathologicalReport').removeAttr('disa
bled');}
                }
                else
```

```
                {
        if($('#txtPathologicalReport').attr('disabled')!=='disabled'){$('#txtPathologicalReport').attr('disabled','di
sabled');}
                }
        });
        $('#txtDOB').attr('readonly','readonly');
        $('#txtError').val('');
        $('#btnClose').click(function(){
                window.top.location.href = '../../index.php?menu_no_top=reception&reccode=appoint';
        });

});
```

Health Facilities

Health Facilities PHP

```php
<?php
ob_start();
session_start();

define('ROOT_PATH',$_SESSION['path']);
if(!isset($_SESSION['Full_Name']))
{
        header('Location: ' . ROOT_PATH . '/frmloginuser.php');
        exit();
}

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/waitingbay.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="js/html5.js"></script>
        <![endif]-->
        <script src="../../js/jquery-1.5.2.min.js" type="text/javascript"></script>
        <script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
        <script src="../../js/jquery.equalHeight.js" type="text/javascript"></script>
        <script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
        <script src="./js/facilitities.js" type="text/javascript"></script>
</head>


<body class="easyui-layout">
        <div region="center" title="Health Facilities" style="overflow:hidden;">

                <table id="facilities" class="easyui-datagrid"></table>
```

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```html
                <div id="toolbar"><button id='btnCreate' class="action_btn">Create</button><button
id='btnEdit' class="action_btn">Edit...</button></div>

        </div>
        <div id="dlg" class="easyui-dialog" style="width:550px;height:550px;padding:10px 20px"
                closed="true" modal="true" title="Facility Details">
                <div class="ftitle">Facility</div>
                <table width='100%'>
                        <tr><td><label>MFL Code :</label></td><td><input
id="txtMFLCode"/></td></tr>
                        <tr><td><label>Facility Name :</label></td><td><input id="txtFacilityName"
size="50px"/></td></tr>
                        <tr><td><label>Care_Center :</label></td><td><select
id="cmbCare_Center"/><option value=""> </option><option value="1">Yes</option><option
value="0">No</option></select></td></tr>
                        <tr><td><label>County :</label></td><td><select name="cmbCounty"
id="cmbCounty">
                                                                <option value="">Select</option>
                                                                <option>KWALE</option>
                                                                <option>KILIFI</option>
                                                                <option>TANA RIVER</option>
                                                                <option>LAMU</option>
                                                                <option>TAITA TAVETA</option>
                                                                <option>GARISSA</option>
                                                                <option>WAJIR</option>
                                                                <option>MANDERA</option>
                                                                <option>MARSABIT</option>
                                                                <option>ISIOLO</option>
                                                                <option>MERU</option>
                                                                <option>THARAKA NITHI</option>
                                                                <option>EMBU</option>
                                                                <option>KITUI</option>
                                                                <option>MACHAKOS</option>
                                                                <option>MAKUENI</option>
                                                                <option>NYANDARUA</option>
                                                                <option>NYERI</option>
                                                                <option>KIRINYAGA</option>
                                                                <option>MURANGA</option>
                                                                <option>KIAMBU</option>
                                                                <option>TURKANA</option>
                                                                <option>WEST POKOT</option>
                                                                <option>SAMBURU</option>
                                                                <option>TRANS NZOIA</option>
                                                                <option>UASIN GISHU</option>
                                                                <option>ELGEYO
MARAKWET</option>
                                                                <option>NANDI</option>
                                                                <option>BARINGO</option>
                                                                <option>LAIKIPIA</option>
                                                                <option>NAKURU</option>
                                                                <option>NAROK</option>
                                                                <option>KAJIADO</option>
                                                                <option>KERICHO</option>
                                                                <option>BOMET</option>
                                                                <option>KAKAMEGA</option>
                                                                <option>MOMBASA</option>
                                                                <option>BUNGOMA</option>
                                                                <option>BUSIA</option>
                                                                <option>SIAYA</option>
                                                                <option>KISUMU</option>
```

```html
                                                    <option>HOMABAY</option>
                                                    <option>MIGORI</option>
                                                    <option>KISII</option>
                                                    <option>NYAMIRA</option>
                                                    <option>NAIROBI</option>
                                                    <option>VIHIGA</option>
                                        </select></td></tr>
                        <tr><td><label>District :</label></td><td><select name="cmbDistrict"
        id="cmbDistrict">
                                                    <option value="">Select</option>
                                                    <option>KWALE</option>
                                                    <option>KILIFI</option>
                                                    <option>TANA RIVER</option>
                                                    <option>LAMU</option>
                                                    <option>TAITA TAVETA</option>
                                                    <option>GARISSA</option>
                                                    <option>WAJIR</option>
                                                    <option>MANDERA</option>
                                                    <option>MARSABIT</option>
                                                    <option>ISIOLO</option>
                                                    <option>MERU</option>
                                                    <option>THARAKA NITHI</option>
                                                    <option>EMBU</option>
                                                    <option>KITUI</option>
                                                    <option>MACHAKOS</option>
                                                    <option>MAKUENI</option>
                                                    <option>NYANDARUA</option>
                                                    <option>NYERI</option>
                                                    <option>KIRINYAGA</option>
                                                    <option>MURANGA</option>
                                                    <option>KIAMBU</option>
                                                    <option>TURKANA</option>
                                                    <option>WEST POKOT</option>
                                                    <option>SAMBURU</option>
                                                    <option>TRANS NZOIA</option>
                                                    <option>UASIN GISHU</option>
                                                    <option>ELGEYO
MARAKWET</option>
                                                    <option>NANDI</option>
                                                    <option>BARINGO</option>
                                                    <option>LAIKIPIA</option>
                                                    <option>NAKURU</option>
                                                    <option>NAROK</option>
                                                    <option>KAJIADO</option>
                                                    <option>KERICHO</option>
                                                    <option>BOMET</option>
                                                    <option>KAKAMEGA</option>
                                                    <option>MOMBASA</option>
                                                    <option>BUNGOMA</option>
                                                    <option>BUSIA</option>
                                                    <option>SIAYA</option>
                                                    <option>KISUMU</option>
                                                    <option>HOMABAY</option>
                                                    <option>MIGORI</option>
                                                    <option>KISII</option>
                                                    <option>NYAMIRA</option>
                                                    <option>NAIROBI</option>
                                                    <option>VIHIGA</option>
                                        </select></td></tr>
```

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```html
<tr><td><label>Division :</label></td><td><select name="cmbDivision"
id="cmbDivision">
                                        <option value="">Select</option>

                                        <option>Gatanga</option>
                                        <option>Gatundu</option>
                                        <option>Githunguri</option>
                                        <option>Kabete</option>
                                        <option>Kandara</option>
                                        <option>Kiambaa</option>
                                        <option>Kiambu East</option>
                                        <option>Kiambu West</option>
                                        <option>Kieni West</option>
                                        <option>Kieni East</option>
                                        <option>Kigumo</option>
                                        <option>Kipipiri</option>
                                        <option>Kirinyaga Central</option>
                                        <option>Kirinyaga East</option>
                                        <option>Kirinyaga South</option>
                                        <option>Vihiga</option>
                                </select></td></tr>
                <tr><td><label>Sub Location :</label></td><td><select name="cmbLocation"
id="cmbLocation">
                                        <option value="">Select</option>

                                        <option>HURUMA</option>
                                        <option>KARIOKOR</option>
                                        <option>MATHARE</option>
                                        <option>NGARA</option>
                                        <option>STAREHE</option>
                                        <option>KAWANGWARE</option>
                                        <option>KENYATTA/GOLF
COURSE</option>

                                        <option>MUTUINI</option>
                                        <option>RIRUTA</option>


        <option>UTHIRU/RUTHIMITU</option>
                                        <option>WAITHAKA</option>
                                        <option>DANDORA</option>
                                        <option>EMBAKASI</option>
                                        <option>KARIOBANGI
SOUTH</option>
                                </select></td></tr>
                <tr><td><label>Owner :</label></td><td><input id="txtOwner"
size="60px"/></td></tr>
                <tr><td><label>OfficialTelephone :</label></td><td><input id="txtOfficialTel"
size="50px"/></td></tr>
                <tr><td><label>NearestTown :</label></td><td><input id="txtNearestTown"
size="50px"/></td></tr>
                <tr><td><label>Is Funeral Home? :</label></td><td><select
id="cmbFuneral_Home"/><option value=""> </option><option value="1">Yes</option><option
value="0">No</option></select></td></tr>
                <tr><td><label>Facility Type :</label></td><td><select
id="cmbFacilityType"/><option value=""> </option><option value="Public">Public</option><option
value="Private">Private</option></select></td></tr>
                <tr>
                        <td colspan='2'>
                                <div class='alert_warning1' id='nt'>
```

```
                                          <input  style="color:red;background-
color:transparent;text-align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label"
name="txtError" id="txtError" size="50px" value="/>
                                          </div>
                              </td>
                    </tr>
          </table>
          <br class='spacer'/>
          <div align='right'>
                    <button id="btnSave" class="action_btn">Save</button>
                    <button onclick="javascript:$('#dlg').dialog('close')"
class="action_btn">Close</button>
                    </div>
          </div>
</body>
</html>
```

Health Facilities JS

```
$(function(){
          $('#facilities').datagrid({
                    fitColumns:true,
                    width:970,
                    height:500,
                    toolbar:'#toolbar',
                    nowrap: false,
                    striped: true,
                    singleSelect:true,
                    fit: true,
                    url:'FetchData.php?action=facilities',
                    columns:[[
                              {title:'MFLCode',field:'MFLCode',width:150,sortable:false},
                              {title:'Facility Name',field:'FacilityName',width:220,sortable:false},
                              {title:'County',field:'County',width:120,sortable:false},
                              {title:'District',field:'District',width:120,sortable:false},
                              {field:'Division',hidden:true},
                              {field:'NearestTown',hidden:true},
                              {field:'Care_Center',hidden:true},
                              {field:'Type',hidden:true},
                              {field:'Owner',hidden:true},
                              {field:'OfficialTelephone',hidden:true},
                              {field:'NearestTown',hidden:true}
                    ]],
                    onClickRow: function(index,rowData)
                    {
                              $('#txtMFLCode').val(rowData.MFLCode);

          if($('#txtMFLCode').attr('readonly')!=='readonly'){$('#txtMFLCode').attr('readonly','readonly');}
                              $('#txtFacilityName').val(rowData.FacilityName);
                              $('#cmbCare_Center').val(rowData.Care_Center);
                              $('#cmbCounty').val(rowData.County);
                              $('#cmbDistrict').val(rowData.District);
                              $('#cmbDivision').val(rowData.Division);
                              $('#cmbLocation').val(rowData.SUbLocation);
                              $('#txtOwner').val(rowData.Owner);
                              $('#txtOfficialTel').val(rowData.OfficialTelephone);
                              $('#txtNearestTown').val(rowData.NearestTown);
                              $('#cmbFuneral_Home').val(rowData.Funeral_Home);
                              $('#cmbFacilityType').val(rowData.FacilityType);
```

```
                    },
                    rownumbers:true
            });
            $('#btnCreate').click(function(){
                    errMsg('');
                    if($('#txtMFLCode').attr('readonly')=='readonly'){$('#txtMFLCode').removeAttr('readonly');}

            $('#txtMFLCode').val('');$('#txtFacilityName').val('');$('#cmbCare_Center').val('');$('#cmbCounty').val(
'');

            $('#cmbDistrict').val('');$('#cmbDivision').val('');$('#cmbLocation').val('');$('#txtOwner').val('');

            $('#txtOfficialTel').val('');$('#txtNearestTown').val('');$('#cmbFuneral_Home').val('');$('#cmbFacilityTy
pe').val('');
                    $('#dlg').dialog('open');
            });
            $('#cmbCare_Center').change(function(){
                    if($('#cmbCare_Center').val()==1)
                    {
                            $('#cmbFuneral_Home').val(0);
                    }
                    else
                    {
                            $('#cmbFuneral_Home').val('');
                    }
            });
            $('#cmbFuneral_Home').change(function(){
                    if($('#cmbFuneral_Home').val()==1)
                    {
                            $('#cmbCare_Center').val(0);
                    }
                    else
                    {
                            $('#cmbCare_Center').val('');
                    }
            });
            $('#btnEdit').click(function(){
                    errMsg('');
                    if($('#txtMFLCode').val()!=="")
                    {
                            $('#dlg').dialog('open');
                    }
            });
            $('#btnSave').click(function(){
                    errMsg('');
                    if(!$('#txtMFLCode').val()){errMsg('MFL Code');return false;}
                    if(!$('#txtFacilityName').val()){errMsg('Full Name');return false;}
                    if(!$('#cmbCare_Center').val()){errMsg('Care Center');return false;}
                    if(!$('#cmbCounty').val()){errMsg('County Required');return false;}
                    if(!$('#cmbDistrict').val()){errMsg('District Required');return false;}
                    if(!$('#cmbDivision').val()){errMsg('Division Required');return false;}
                    if(!$('#cmbLocation').val()){errMsg('Sub location required');return false;}
                    if(!$('#txtOwner').val()){errMsg('Owner required');return false;}
                    if(!$('#txtOfficialTel').val()){errMsg('Official Telephone required');return false;}
                    if(!$('#txtNearestTown').val()){errMsg('Nearest Town required');return false;}
                    if(!$('#cmbFuneral_Home').val()){errMsg('Funeral Home required');return false;}
                    if(!$('#cmbFacilityType').val()){errMsg('Facility Type required');return false;}
```

```
                var data =
'MFLCode='+$('#txtMFLCode').val()+'&FacilityName='+$('#txtFacilityName').val()+'&Care_Center='+$('#cmb
Care_Center').val()

        +'&County='+$('#cmbCounty').val()+'&District='+$('#cmbDistrict').val()+'&Division='+$('#cmbDivisi
on').val()+'&SubLocation='+$('#cmbLocation').val()+'&Owner='+$('#txtOwner').val()

        +'&OfficialTel='+$('#txtOfficialTel').val()+'&NearestTown='+$('#txtNearestTown').val()+'&FuneralH
ome='+$('#cmbFuneral_Home').val()+'&FacilityType='+$('#cmbFacilityType').val();

                // ajax call
                $.ajax({
                        type: "POST",
                        url: "SaveData.php?action=facility",
                        data: data,
                    success: function(html){ // this happens after we get results
                                errMsg(html);
                    }
                });

        return false;
            });

        function errMsg(er)
        {
                $('#txtError').val(er);
        }
});
```

Change Password

Change Password PHP

```php
<?php
ob_start();
session_start();

if(!isset($_SESSION['Full_Name']))
{
        header('Location: ../../../frmloginuser.php');
        exit();
}

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="../../../js/html5.js"></script>
```

```html
<![endif]-->
<script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
<script src="../../js/hideshow.js" type="text/javascript"></script>
<script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
<script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
<script type="text/javascript" src="../../js/jquery.equalHeight.js"></script>
<script type="text/javascript" src="js/changepwd.js"></script>
<style>
        .ui-state-error
        {
                border: 2px solid #cd0a0a;background: #cdaaaa;
        }
        .p-search{
                background:#fafafa;
                padding:5px;
                border:1px solid #ccc;
                border-bottom:0;
                overflow:hidden;
        }
        .p-search input{
                width:300px;
                border:1px solid #ccc;
        }
        .p-right{
                text-align:center;
                border:1px solid #ccc;
                border-left:0;
                width:150px;
                background:#fafafa;
                padding-top:10px;
        }
</style>
</head>


<body>
        <div class="easyui-panel" title="Change User Password" iconCls="icon-search"
                collapsible="false" style="width:700px;height:350px;">
    <div class="easyui-layout" fit="true">
      <div region="center" border="false">
                                <table class="InsideDataTable" cellpadding="4" cellspacing="0"
width='100%'>
                                        <tr class="DataTableTitle"><th colspan="2" width="100%"
align="left"><strong>User Details</strong></th></tr>
                                        <tr class="DataTableContent" style="width:100%">
                                                <td align="right">User Name: </td>
                                                <td><input type='text' id='txtUserName' readonly='true'
name='txtUserName' size='20' value='<?php echo $_SESSION['LoginName']; ?>'/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td align="right">Full Name: </td>
                                                <td><input type='text' id='txtFullName' readonly='true'
name='txtFullName' size='50' value='<?php echo $_SESSION['Full_Name']; ?>'/></td>
                                        </tr>
                                        <tr class="DataTableContent">
                                                <td align="right">Old Password :</td>
                                                <td><input type='password' id='txtOldPassword'
name='txtOldPassword'/></td>
                                        </tr>
                                        <tr class="DataTableContent">
```

```
                                              <td align="right">New Password :</td>
                                              <td><input type='password' id='txtNewPwd'
name='txtNewPwd'/></td>
                                       </tr>
                                       <tr class="DataTableContent">
                                              <td align="right">Verify Password :</td>
                                              <td><input type='password' id='txtVerifyNewPwd'
name='txtVerifyNewPwd'/></td>
                                       </tr>
                                </table   >
                                <br class='separator'/>

                                <div class='alert_warning1' id='nt'>
                                       <input  style="color:red;background-color:transparent;text-
align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label" id="txtError"
name="txtError" size="100px" value=""/>
                                </div>
                                <div>
                                       <input type='hidden' id='txtD' value='<?php echo date('d');?>'/>
                                       <input type='hidden' id='txtM' value='<?php echo date('m');?>'/>
                                       <input type='hidden' id='txtY' value='<?php echo date('Y');?>'/>
                                </div>

                                <table width="100%">
                                       <tr>
                                       <td style="text-align:center">
                                              <button id="btnSaveRecord"
class='action_btn'>Post</button>

                                              <button id="btnClose" class='action_btn'>Close</button>
                                       </td>
                                       </tr>
                                </table>
                        </div>
            </div>
       </div>

</body>

</html>
```

Change Password JS

```
$(function(){
        function validatePassword(fld) {
                var error = "";
                var illegalChars = /[\W_]/; // allow only letters and numbers

                if (fld.val() == "") {
                        error = "You didn't enter a password.\n";
                } else if ((fld.val().length < 7) || (fld.val().length > 15)) {
                        error = "The password is the wrong length. \n";

                } else if (illegalChars.test(fld.val())) {
                        error = "The password contains illegal characters.\n";
                }else if ( ( fld.val().search(/[a-zA-Z]+/)==-1) || (fld.val().search(/[0-9]+/)==-1) ) {
                        error = "The password must contain at least one numeral.\n";
                } else {
                        error="";
                }
```

```
                return error;
            }
        $('#btnSaveRecord').click(function(){

                var LoginName = $('#txtLoginName').val(),
                        cPassword = $('#txtOldPassword').val(),
                        nPassword = $('#txtNewPwd').val(),
                        VerifyPassword = $('#txtVerifyNewPwd').val(),
                        bValid =true,
                        error = validatePassword($('#txtNewPwd'));

                errMsg('');
                if(!cPassword){errMsg('Type Old User Password');bValid=false;return false;}
                if(error){errMsg(error);bValid=false;return false;}
                if(!VerifyPassword){errMsg('Type Confirmation Password');bValid=false;return false;}
                if(VerifyPassword !== nPassword){errMsg('The New password and verify Password do not
match');bValid=false;return false;}


                bValid=false;
                $.ajax({
                        type: "POST",
                        url: "FetchData.php?action=confirmpwd",
                        data: 'pwd='+cPassword,
                   success: function(html){ // this happens after we get results
                                if(html=='1')
                                {
                                        $.ajax({
                                                type: "POST",
                                                url: "SaveData.php?action=changepwd",
                                                data: 'Password='+nPassword,
                                          success: function(htmlMsg){ // this happens after we get results
                                                        errMsg(htmlMsg);
                                                        $('#txtUserName').val('');
                                                        $('#txtOldPassword').val('');
                                                        $('#txtNewPwd').val('');
                                                        $('#txtVerifyNewPwd').val('');
                                                        $('#txtFullName').val('');
                                                }
                                        });
                                }
                                else
                                {
                                        bValid=false;
                                        errMsg('Old User Password is not CORRECT.');
                                }
                        }
                });

    return false;
        });
        $('#btnClose').click(function(){
                window.top.location.href = "../../index.php?menu_no_top=reception&reccode=appoint";
        });
        function errMsg(er)
        {
                $('#txtError').val(er);
        }
});
```

User Maintenance

User Maintenance PHP

```php
<?php
ob_start();
session_start();

if(!isset($_SESSION['Full_Name']))
{
        header('Location: ../../frmloginuser.php');
        exit();
}

?>
```

```html
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="../../../js/html5.js"></script>
        <![endif]-->
        <script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
        <script src="../../js/hideshow.js" type="text/javascript"></script>
        <script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
        <script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
        <script type="text/javascript" src="../../js/jquery.equalHeight.js"></script>
        <script type="text/javascript" src="./js/usermaintenance.js"></script>

</head>


<body class="easyui-layout">
        <div region="center" title="User Maintenance" style="overflow:hidden;">
                <div class="easyui-tabs" fit="true" border="false">
                        <div title="System Users" style="overflow:hidden;padding:5px;">
                                <form id='usersForm' name='usersForm' method='post' action=''>
                                <div class="ftitle">System Users</div>
                                <table class='DataTable' cellspacing='0' cellpadding='4' width='70%'>
                                        <tr id='trNames'>
                                                <td style='text-align:right;'>Full Name :</td>
                                                <td colspan="3"><input type='text' readonly='readonly'
id='txtFullName' name='txtFullName' value='' size='40px' style="width:80%" class='uppercase'/></td>
                                        </tr>
                                        <tr>
                                                <td style='text-align:right;'>Login Name :</td>
                                                <td><input type='text' readonly='readonly'
id='txtLoginName' name='txtLoginName' value='' size='20'/></td>
                                        </tr>
```

```html
                                        <tr>
                                                <td style='text-align:right;'>Password :</td>
                                                <td><input type='password' readonly='readonly'
id='txtPassword' name='txtPassword' value=" size='20'/></td>
                                                <td style='text-align:right;'>Retype Password :</td>
                                                <td><input type='password' readonly='readonly'
id='txtVerifyPassword' name='txtVerifyPassword' value=" size='20'/></td>
                                        </tr>
                                        <tr>
                                                <td style='text-align:right;'>User Role :</td>
                                                <td><select id='cmbUserRole' name='cmbUserRole'>
                                                        <option value="">Select</option>
                                                        <option
value="Administrator">Administrator</option>
                                                        <option
value="Reception">Reception</option>
                                                        <option value="Nurse">Nurse</option>
                                                </td>
                                                <td style='text-align:right;'>Account Status :</td>
                                                <td><select id='cmbAccountStatus'
name='cmbAccountStatus'>
                                                        <option value="">Select</option>
                                                        <option value='Y'>Active</option>
                                                        <option value='N'>Locked</option>
                                                </td>
                                        </tr>
                                        <tr>
                                                <td colspan='2'><br class='spacer'/></td>
                                        </tr>
                                        <tr>
                                                <td colspan='4' style='text-align:center'>
                                                <input type='button' id='btnAddUser' name='btnAddUser'
value='Add' class='action_btn'>
                                                <input type='button' id='btnEditUser' name='btnEditUser'
value='Edit' class='action_btn'>
                                                <input type='button' id='btnSaveUser'
name='btnSaveUser' value='Save' class='action_btn'>
                                                <input type='button' class="action_btn" iconCls="icon-
find" onclick="javascript:$('#dlg').dialog('open')" value='Find'></td>
                                        </tr>
                                        <tr>
                                                <td colspan='4'>
                                                        <div class='alert_warning1' id='nt'>
                                                                <input style="color:red;background-
color:transparent;text-align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label"
name="txtUserError" id="txtUserError" size="80px" value="/>
                                                        </div>
                                                </td>
                                        </tr>
                                </table>

                        </form>

                </div>
        </div>
</div>
<div id="dlg" class="easyui-dialog" style="width:550px;height:400px;padding:10px 20px"
        closed="true" modal="true">
        <div class="ftitle">Search User</div>
        <table width='100%'>
```

```
                                    <tr>
                                            <td><label>User Name :</label></td>
                                            <td><input id="txtSearchText"/><button
id='btnSearch'>Search</button></td>
                                    </tr>
                    </table>
                    <table id='searchResults'>

                    </table>
                    <br class='spacer'/>
                    <div align='right'>
                            <button id="btnSelect">Select</button>
                            <button onclick="javascript:$('#dlg').dialog('close')">Cancel</button>
                    </div>
        </div>
</body>

</html>
```

User Maintenance JS

```
$(function(){

        $('#btnAddUser').click(function(){
                if($('#txtLoginName').attr('readonly') ==
'readonly'){$('#txtLoginName').removeAttr('readonly');}
                if($('#txtPassword').attr('readonly') == 'readonly'){$('#txtPassword').removeAttr('readonly');}
                if($('#txtVerifyPassword').attr('readonly') ==
'readonly'){$('#txtVerifyPassword').removeAttr('readonly');}
                if($('#txtFullName').attr('readonly') == 'readonly'){$('#txtFullName').removeAttr('readonly');}
                if($('#btnSaveUser').attr('disabled') == 'readonly'){$('#btnSaveUser').removeAttr('disabled');}
                if(!$('#btnAddUser').attr('disabled')){$('#btnAddUser').attr('disabled','disabled');}
                if(!$('#btnEditUser').attr('disabled')){$('#btnEditUser').attr('disabled','disabled');}
                return false;
        });
        $('#btnEditUser').click(function(){
                if($('#txtLoginName').val() !== '' && $('#txtPassword').val() !== '')
                {
                        if($('#txtLoginName').attr('readonly') ==
'readonly'){$('#txtLoginName').removeAttr('readonly');}
                        if($('#txtPassword').attr('readonly') ==
'readonly'){$('#txtPassword').removeAttr('readonly');}
                        if($('#txtFullName').attr('readonly') ==
'readonly'){$('#txtFullName').removeAttr('readonly');}
                        if($('#txtVerifyPassword').attr('readonly') ==
'readonly'){$('#txtVerifyPassword').removeAttr('readonly');}
                        if($('#cmbAccountStatus').attr('readonly') ==
'readonly'){$('#cmbAccountStatus').removeAttr('readonly');}
                        if($('#btnSaveUser').attr('disabled') ==
'disabled'){$('#btnSaveUser').removeAttr('disabled');}
                        if(!$('#btnAddUser').attr('disabled')){$('#btnAddUser').attr('disabled','disabled');}
                        if(!$('#btnEditUser').attr('disabled')){$('#btnEditUser').attr('disabled','disabled');}
                }
                else
                {errMsg('No user has been selected for editing');}
                return false;
        });
        $('#btnSaveUser').click(function(){
```

```javascript
                        var LoginName = $('#txtLoginName').val(),
                                cPassword = $('#txtPassword').val(),
                                VerifyPassword = $('#txtVerifyPassword').val(),
                                FirstName = $('#txtFullName').val(),
                                UserRole = $('#cmbUserRole').val(),
                                AccountStatus = $('#cmbAccountStatus').val(),
                                bValid =true;

                    errMsg('');
                    if(!FirstName){errMsg('Full Name');bValid=false;return false;}
                    if(!LoginName){errMsg('Type User Name');bValid=false;return false;}
                    if(!cPassword){errMsg('Type User Password');bValid=false;return false;}
                    if(!VerifyPassword){errMsg('Type Confirmation Password');bValid=false;return false;}
                    if(VerifyPassword !== cPassword){errMsg('The User Password and Confirmation Password
do not match');bValid=false;return false;}
                    if(!UserRole){errMsg('Select user role');bValid=false;return false;}
                    if(!AccountStatus){errMsg('Account Status required');bValid=false;return false;}

                    var data =
'Login_name='+LoginName+'&FullName='+FirstName+'&Password='+cPassword+'&Status='+AccountStatus+
'&UserRole='+UserRole;

                    // ajax call
                    $.ajax({
                            type: "POST",
                            url: "SaveData.php?action=user",
                            data: data,
                      success: function(html){ // this happens after we get results
                                    errMsg(html);
                                    $('#txtLoginName').val('');
                                    $('#txtPassword').val('');
                                    $('#txtVerifyPassword').val('');
                                    $('#txtFullName').val('');
                                    $('#cmbUserRole').val('');
                                    $('#cmbAccountStatus').val('');
                      }
                    });

    return false;
        });

        function errMsg(er)
        {
                $('#txtUserError').val(er);
        }
        ////////////////////////////
        var url = "FetchData.php?action=searchResults";
        LoadUsersGrid(url);

        function LoadUsersGrid(_url)
        {
                $('#searchResults').datagrid({
                        title:'Search Results',
                        iconCls:'icon-save',
                        fitColumns:true,
                        width:500,
                        height:200,
                        nowrap: false,
                        striped: true,
                        singleSelect:true,
```

```
                                        fit: false,
                                        url:_url,
                                        frozenColumns:[[
                                                        {title:'User Name',field:'loginName',width:100,sortable:false}
                                        ]],
                                        columns:[[
                                                        {title:'Full Name',field:'FullName',width:200,sortable:false},
                                                        {field:'Password',hidden:true},
                                                        {field:'UserRole',hidden:true},
                                                        {field:'AccountEnabled',hidden:true}

                                        ]],
                                        pagination:false,
                                        rownumbers:false
                        });
                }
        $('#btnSearch').click(function(){
                        var url = "FetchData.php?action=searchResults&SearchText="+$('#txtSearchText').val();
                        LoadUsersGrid(url);
        });
        $('#btnSelect').click(function()
        {
                        var selected = $('#searchResults').datagrid('getSelected');
                        if(selected)
                        {
                                        $('#txtLoginName').val(selected.loginName);
                                        $('#txtPassword').val(selected.Password);
                                        $('#txtVerifyPassword').val(selected.Password);
                                        $('#txtFullName').val(selected.FullName);
                                        $('#cmbUserRole').val(selected.UserRole);
                                        $('#cmbAccountStatus').val(selected.AccountEnabled);
                                        $('#dlg').dialog('close');return false;
                        }
                        else
                        {
                                        alert('No user selected to modify details.');
                        }
        });

});
```

Audit Report

Audit Report PHP

```php
<?php
ob_start();
session_start();

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link rel="icon" href="../../images/EdarpLogo.JPG" type="image/x-icon"/>
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
```

```html
<link rel="stylesheet" href="../../css/waitingbay.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
<link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
<!--[if lt IE 7]>
<script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
<![endif]-->
<!--[if lt IE 9]>
<script type="text/javascript" src="../../js/html5.js"></script>
<![endif]-->
<script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
<script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
<script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
<script type="text/javascript" src="./js/rptAudit.js"></script>
<style type="text/css">
        .rtitle
        {
                font-size:18px;
                font-weight:bold;
                padding:5px 10px;
                background:#336699;
                color:#fff;
        }

</style>
</head>


<body>
        <div class="module_content">
                <div style="text-align:right"><input type="button" id="btnClose" value="Close"
class="action_btn"/></div>
                <div style="padding:5px;overflow:hidden" id="dvStock">
                        <table cellpadding="0" width="80%" cellspacing="0" border="1" class="tablesorter"
id="stock">

                                <thead>
                                        <tr><th colspan='5' style="font-size:24;text-align:center">Audit
Trail</th></tr>
                                        <tr>
                                                <th width="15%" align='left'>Date</th>
                                                <th width="20%">Login Name</th>
                                                <th width="20%">Action</th>
                                                <th width="35%">Narration</th>
                                                <th width="10%">Table</th>
                                        </tr>
                                </thead>
                                <tbody>

                                </tbody>
                        </table>
                </div>
        </div>

</body>
```

```
</html>
```

Audit Report JS

```
$(function(){
        $.getJSON('FetchData.php?action=getAudit',
                function(data){
                var trClass='even';
                $.each(data,function(index){
                        if(index%2==1){ trclass = 'even';}
                        else{ trclass = 'odd';}

                        $('#stock tbody').append("<tr>"+
                                "<td class='"+trClass+"'>"+data[index].ActionDate+"</td>"+
                                "<td class='"+trClass+"'>"+data[index].Login_Name+"</td>"+
                                "<td class='"+trClass+"'>"+data[index].Action+"</td>"+
                                "<td class='"+trClass+"'>"+data[index].Narration+"</td>"+
                                "<td class='"+trClass+"'>"+data[index].TableName+"</td>"+
                                "</tr>");
                });
        });
        $('#btnClose').click(function(){
                window.top.location.href = "../../index.php?menu_no_top=reception&recccode=appoint";
        });
});
```

Outcome report

Outcome report PHP

```
<?php
ob_start();
session_start();

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link rel="icon" href="../../images/EdarpLogo.JPG" type="image/x-icon"/>
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/waitingbay.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
```

```
<script type="text/javascript" src="../../js/html5.js"></script>
<![endif]-->
<script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
<script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
<script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
<script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
<script type="text/javascript" src="./js/rptOutcome.js"></script>
<style type="text/css">
        .rtitle
        {
                font-size:18px;
                font-weight:bold;
                padding:5px 10px;
                background:#336699;
                color:#fff;
        }

</style>
</head>


<body>
        <div class="module_content">
                <div style="text-align:right"><input type="button" id="btnClose" value="Close"
class="action_btn"/></div>
                <div style="padding:5px;overflow:hidden" id="dvStock">
                        <table cellpadding="0" width="80%" cellspacing="0" border="1" class="tablesorter"
id="stock">

                                <thead>
                                        <tr><th colspan='5' style="font-size:24;text-align:center">Client
Status</th></tr>
                                        <tr>
                                                <th width="15%" align='left'>Patient Code</th>
                                                <th width="35%">Client Name</th>
                                                <th width="20%">Facility</th>
                                                <th width="15%">Status</th>
                                                <th width="15%">Valid as At</th>
                                        </tr>
                                </thead>
                                <tbody>

                                </tbody>
                        </table>
                </div>
        </div>

</body>

</html>
```

Outcome report JS

```
$(function(){
        $.getJSON('./data/FetchData.php?action=getOutcomes',
                function(data){
                var trClass='even';
```

```
                    $.each(data,function(index){
                            if(index%2==1){ trclass = 'even';}
                            else{ trclass = 'odd';}

                            $('#stock tbody').append("<tr>"+
                                    "<td class='"+trClass+"'>"+data[index].PatientCode+"</td>"+
                                    "<td class='"+trClass+"'>"+data[index].ClientName+"</td>"+
                                    "<td class='"+trClass+"'>"+data[index].Facility+"</td>"+
                                    "<td class='"+trClass+"'>"+data[index].CareOutcome+"</td>"+
                                    "<td class='"+trClass+"'>"+data[index].CareExitDate+"</td>"+
                                    "</tr>");
                    });
            });
            $('#btnClose').click(function(){
                    window.top.location.href = "../../index.php?menu_no_top=reception&recccode=appoint";
            });
    });
```

Status report

Status report PHP

```php
<?php
ob_start();
session_start();

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link rel="icon" href="../../images/EdarpLogo.JPG" type="image/x-icon"/>
        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/waitingbay.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="../../js/html5.js"></script>
        <![endif]-->
        <script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
        <script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
        <script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
        <script type="text/javascript" src="./js/rptStatus.js"></script>
        <style type="text/css">
                .rtitle
                {
                        font-size:18px;
```

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```
                                    font-weight:bold;
                                    padding:5px 10px;
                                    background:#336699;
                                    color:#fff;
                        }

              </style>
</head>


<body>
          <div class="module_content">
                    <div style="text-align:right"><input type="button" id="btnClose" value="Close"
class="action_btn"/></div>
                    <div style="padding:5px;overflow:hidden" id="dvStock">
                              <table cellpadding="0" width="80%" cellspacing="0" border="1" class="tablesorter"
id="stock">


                                        <thead>
                                                  <tr><th colspan='2' style="font-size:24;text-align:center">Client
Status</th></tr>
                                                  <tr>
                                                            <th width="35%" align='left'>Status</th>
                                                            <th width="10%" style="font-size:24;text-align:right">No
of Clients</th>
                                                  </tr>
                                        </thead>
                                        <tbody>

                                        </tbody>
                              </table>
                    </div>
          </div>

</body>

</html>
```

Status report JS

```
$(function(){
          $.getJSON('./data/FetchData.php?action=StatusRpt',
                    function(data){
                    var trClass='even';
                    $.each(data,function(index){
                              if(index%2==1){ trclass = 'even';}
                              else{ trclass = 'odd';}

                              $('#stock tbody').append("<tr>"+
                                        "<td class='"+trClass+"'>"+data[index].Status+"</td>"+
                                        "<td class='"+trClass+"'>"+data[index].NoofClients+"</td>"+
                                        "</tr>");
                    });
          });
          $('#btnClose').click(function(){
                    window.top.location.href = "../../index.php?menu_no_top=reception&recccode=appoint";
          });
});
```

Waiting Bay

Waiting Bay PHP

```php
<?php
ob_start();
session_start();
//<script type="text/javascript" src="../../js/jquery.datebox.js"></script>
define('ROOT_PATH',$_SESSION['path']);

if(!isset($_SESSION['Full_Name']))
{
        header('Location: ' . ROOT_PATH . '/frmloginuser.php');
        exit();
}

?>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

        <link rel="stylesheet" href="../../css/layout.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/waitingbay.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/easyui.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/icon.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/clientstyle.css" type="text/css" media="screen" />
        <link rel="stylesheet" href="../../css/jquery-ui.css" type="text/css" media="screen" />
        <!--[if lt IE 7]>
        <script type="text/javascript" src="http://info.template-
help.com/files/ie6_warning/ie6_script_other.js"></script>
        <![endif]-->
        <!--[if lt IE 9]>
        <script type="text/javascript" src="../../js/html5.js"></script>
        <![endif]-->
        <script src="../../js/jquery-1.7.2.js" type="text/javascript"></script>
        <script src="../../js/hideshow.js" type="text/javascript"></script>
        <script src="../../js/jquery.tablesorter.min.js" type="text/javascript"></script>
        <script type="text/javascript" src="../../js/jquery.easyui.min.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.datepicker.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.core.js"></script>
        <script type="text/javascript" src="../../js/jquery.ui.widget.js"></script>
        <script type="text/javascript" src="./waitingbay.js"></script>

</head>


<body class="easyui-layout">
        <input type='hidden' id='txtRole' value='<?php echo $_SESSION['role']; ?>' style="width:90px"/>

        <div region="center" title="Waiting Room" style="overflow:hidden;">

                <table id="wait" class="easyui-datagrid">

                </table>
                <div id="toolbar">
                        <?php if ($_SESSION['role']=='Reception'){ ?>
```

```html
				<button class="easyui-linkbutton" iconCls="icon-demo" plain="true"
title='Demographic Data' id='btnDemoData'>Client Details</button>
					<button class="easyui-linkbutton" iconCls="icon-search" plain="true"
title='Add Unscheduled clients to the waiting bay' id='btnAddClients'>Report Client</button>

				<?php } ?>
			</div>

		</div>

		<form id='waitForm' name='waitForm' method='post' action='waitingbay.php'>
			<input type='hidden' id='lblServiceNum' name='lblServiceNum' value=''/>
			<input type='hidden' id='lblFacility' name='lblFacility' value='<?php echo
$_SESSION['FacilityName']; ?>'/>
			<input type='hidden' id='lblUserRole' name='lblUserRole' value='<?php echo
$_SESSION['role']; ?>'/>
		</form>
		<div id="messager" title="eLink Message" class="easyui-dialog" closed="true" modal="true"
style='width:300px'>
			<p style='text-align:center;'><b>Do you want to serve : </b></p>
			<div style='text-align:right;'><button class="easyui-linkbutton" id='ok' iconCls="icon-
ok">Yes</button><button id='btnNo' class="easyui-linkbutton"  iconCls="icon-no" onclick="javascript:
$('#messager').dialog('close');">No</button></div>
		</div>
		<div id="dlg" class="easyui-dialog" style="width:670px;height:450px;padding:10px 20px"
			closed="true" modal="true">
			<div class="ftitle">Add Client</div>
			<div>
				<input type="button" id="btnFP" value="Search By Finger Print"
style="height:25px"/>
				<input type="button" id="btnNormal" value="Search By Name/ID"
style="height:25px"/>
			<div>
			<div id='FPSearch'>
				<table width='100%'>
					<tr><td><label>Client Number :</label></td><td><input
id="txtClientNumber" readonly="readonly" size="50px"/></td></tr>
					<tr><td><label>Client Name :</label></td><td><input id="txtClientName"
readonly="readonly" size="60px"/></td></tr>
					<tr>
						<td colspan='2'>
							<div class='alert_warning1' id='nt'>
								<input  style="color:red;background-
color:transparent;text-align:left;border:0;font-weight: bold;font-size: 12px;" readonly="true" type="label"
name="txtError" id="txtError" size="90px" value=''/>
							</div>
						</td>
					</tr>
				</table>
				<br class='spacer'/>
				<div align='right'>
					<button id="btnSave" class="action_btn">Select</button>
					<button onclick="javascript:$('#dlg').dialog('close')"
class="action_btn">Close</button>
				</div>
			</div>
			<div id="NormalSearch">
				<table width='100%'>
					<tr>
						<td>Search By :</td>
```

```
                                    <td><select id="cmbSearchBy"><option value='1'>ID
No</option><option value='2'>Name</option></select></td>
                                    </tr>
                                    <tr>
                                            <td><label>Search Text:</label></td>
                                            <td colspan='3'><input id="txtSearchText"/><button
id='btnSearch' class="easyui-linkbutton" iconCls="icon-find">Search</button></td>
                                    </tr>
                            </table>
                            <table id='searchResults' class="easyui-datagrid">

                            </table>
                            <br class='spacer'/>
                            <div align='right'>
                                            <button class="easyui-linkbutton" iconCls="icon-ok"
id="btnSelect">Select</button>
                                            <button class="easyui-linkbutton" iconCls="icon-cancel"
onclick="javascript:$('#dlg').dialog('close')">Cancel</button>
                            </div>
                    </div>
            </div>

</body>

</html>
```

Waiting Bay JS

```
/*Previous Date : <input type='text' name='txtCdate' id='txtCdate' style="width:90px"/>
                                            <a href="#" class="easyui-linkbutton"
iconCls="icon-search" title='Press to get waiting bay for past date' id='btnPreviousDate'>Load...</a>*/
$(function(){

        $.ajaxSetup({ cache: false });

        var refreshId = setInterval(function() {
    $("#wait").datagrid('reload');
  }, 45000);

        var url1 = 'FetchData.php?action=Normal' , showHiddenCols=true;

        LoadWaitingBay(url1);
        function LoadWaitingBay(_url)
        {
                $('#wait').datagrid({
                        fitColumns:true,
                        width:970,
                        height:500,
                        toolbar:'#toolbar',
                        nowrap: false,
                        striped: true,
                        singleSelect:true,
                        fit: true,
                        url:_url,
                        columns:[[
                                {field:'chk',checkbox:true},
                                {title:'Arrival Time',field:'ArrivalTime',width:150,sortable:false},
                                {title:'Patient Code',field:'ServiceNumber',width:120,sortable:false},
                                {title:'Names',field:'ClientName',width:280,sortable:false},
```

```
                                      {title:'Attended',field:'ClientStatus',width:120,sortable:false}
                              ]],
                              rowStyler : function(index,row)
                              {
                                      switch (row.ClientStatus)
                                      {
                                              case "Yes":
                                              {
                                                      return 'background-color:#3CD4D7;color:#fff;font-
weight:bold;';

                                                      break;
                                              }
                                              default:
                                              {
                                                      break;
                                              }
                                      }
                              },
                              onClickRow: function(index,rowData)
                              {
                                      if($('#lblUserRole').val()=='Nurse')
                                      {
                                              $('#txtSN').val(rowData.ServiceNumber);
                                              $('p').text('Do you want to serve : '+rowData.ClientName);
                                              $('#messager').dialog('open').dialog('setTitle','Client :
'+rowData.ServiceNumber);
                                      }
                              },
                              rownumbers:true
                      });
                      return false;
              }
      $('#NormalSearch').hide();
      $('#btnFP').click(function(){
              $('#FPSearch').show();
              $('#NormalSearch').hide();
      });
      $('#btnNormal').click(function(){
              $('#FPSearch').hide();
              $('#NormalSearch').show();
      });
      $('#btnAddClients').click(function(){
              $.getJSON('FetchData.php?action=fpmap',
                      function(data){
                      $.each(data,function(index){
                              if(data[index].ClientStatus=='0' || data[index].ClientStatus==0)
                              {
                                      $('#txtError').val('Client Not Found. Please register the client.');
                                      $('#txtClientNumber').val('');
                                      $('#txtClientName').val('');
                                      $('#btnSave').val('Register');
                                      $('#btnSave').text('Register');
                              }
                              else
                              {
                                      $('#txtClientNumber').val(data[index].PatientCode);
                                      $('#txtClientName').val(data[index].ClientName);
                                      if(data[index].PatientCode=='')
                                      {
```

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```
                                                                        $('#txtError').val('Client found in outreach data. Press
Register Button to put in main register.');
                                                                        $('#btnSave').val('Register');
                                                                        $('#btnSave').text('Register');

                                                        }
                                                        else
                                                        {
                                                                        $('#txtError').val('Client Found.');
                                                                        $('#btnSave').val('Select');
                                                                        $('#btnSave').text('Select');
                                                        }
                                        }
                                });
                });
                $('#dlg').dialog('open').dialog('setTitle','Client Information');
                return false;
        });
        //url =
"FetchData.php?action=searchResults&SearchText="+$('#txtSearchText').val()+"&SearchBy="+$('#cmbSearch
By').val();
        $('#searchResults').datagrid({
                        title:'Search Results',
                        iconCls:'icon-save',
                        fitColumns:true,
                        width:620,
                        height:200,
                        nowrap: false,
                        striped: true,
                        singleSelect:true,
                        fit: false,

        url:"FetchData.php?action=searchResults&SearchText="+$('#txtSearchText').val()+"&SearchBy="+$('
#cmbSearchBy').val(),
                        columns:[[
                                        {title:'Service Number',field:'ServiceNumber',width:100,sortable:false},
                                        {title:'Names',field:'ClientName',width:200,sortable:false},
                                        {title:'Gender',field:'Gender',width:50,sortable:false}
                        ]]
        });

        $('#btnSearch').click(function()
        {
                        if(!($('#txtSearchText').val())){alert('Type the
'+$('#cmbSearchBy').children('option:selected').text()+' to search.');return false;}
                        $('#searchResults').datagrid({
                                        title:'Search Results',
                                        iconCls:'icon-save',
                                        fitColumns:true,
                                        width:620,
                                        height:200,
                                        nowrap: false,
                                        striped: true,
                                        singleSelect:true,
                                        fit: false,

        url:"FetchData.php?action=searchResults&SearchText="+$('#txtSearchText').val()+"&SearchBy="+$('
#cmbSearchBy').val(),
                                        columns:[[
                                                        {title:'Service Number',field:'ServiceNumber',width:100,sortable:false},
                                                        {title:'Names',field:'ClientName',width:200,sortable:false},
```

```
                                        {title:'Gender',field:'Gender',width:50,sortable:false}
                        ]]
                });
        });

        $('#btnSelect').click(function()
        {
                var selected = $('#searchResults').datagrid('getSelected');
                if(selected)
                {
                        $.ajax({
                                type : 'POST',
                                url : 'SaveData.php?action=addClient',
                                data : 'ServiceNumber='+selected.ServiceNumber,
                                success : function(msg){
                                        $('#wait').datagrid('reload');
                                }
                        });

                        $('#dlg').dialog('close');return false;
                }
                else
                {
                        alert('No client selected to add to the waiting bay');
                }
        });

        $('#btnSave').click(function()
        {
                if($('#btnSave').val()=="Register")
                {
                        window.top.location.href =
"../../index.php?menu_no_top=reception&reccode=demo";
                }
                else
                {
                        $.ajax({
                                type : 'POST',
                                url : 'SaveData.php?action=addClient',
                                data : 'ServiceNumber='+$('#txtClientNumber').val(),
                                success : function(msg){
                                        $('#wait').datagrid('reload');
                                }
                        });
                        $('#dlg').dialog('close');return false;
                }
        });

        $('#ok').click(function(){
                var selected = $('#wait').datagrid('getSelected');

        window.top.location.href='../../index.php?menu_no_top=clinic&cliniccode=discor&ids='+selected.Ser
viceNumber;

        });
});
```

Fetch Data PHP

```php
<?php
ob_start();
session_start();

define('ROOT_PATH',$_SESSION['path']);
$secKey = "nomiskris1";

require_once ROOT_PATH . '/Lib/dao/SQLClass.php';
require_once ROOT_PATH . '/Lib/confs/sysConf.php';
require_once ROOT_PATH . '/Lib/common/definition_full.php';

$conf = new sysConf();
$sql = new SQLClass($conf);
$actionCode = isset($_GET['action']) ? $_GET['action'] : 'Normal';
$FName = $_SESSION['FacilityName'];
$RequestedBy = $_SESSION['LoginName'];

switch($actionCode)
{
        case 'CaptureFP':
        {
                //shell_exec("fpCapture.exe");
                //$WshShell = new COM("WScript.Shell");$oExec = $WshShell->Run("fpCapture.exe", 3,
true);
        }
        case 'Normal':
        {
                $waiting = array();

                mysql_connect("localhost", "root", "") or die(mysql_error());
                mysql_select_db("elink");
                $NormalStt = mysql_query("SELECT `ArrivalTime`,
AES_DECRYPT(b.`PatientCode`,'$secKey') PatientCode,concat(AES_DECRYPT(b.FirstName,'$secKey'),'
',AES_DECRYPT(MiddleName,'$secKey'),' ',AES_DECRYPT(LastName,'$secKey')) ClientName, `Attended`
FROM `dailyregister` a
                                inner join `patients` b on
a.`PatientCode`=AES_DECRYPT(b.`PatientCode`,'$secKey') WHERE `ArrivalTime`='" . date('d-M-Y') . "' and
a.`Facility`='".$_SESSION['FacilityName']."';");

                $Losttofup = mysql_query("Update patients set careoutcome=AES_ENCRYPT('Lost to
follow up','$secKey'),careexitdate=curdate(),artoutcome=AES_ENCRYPT('Lost to follow
up','$secKey'),artexitdate=curdate() where careoutcome=AES_DECRYPT('Active','$secKey') and patientcode in
(select AES_DECRYPT(patientcode,'$secKey') from encounters where curDate()>=date_add(Date,interval 90
day));");

                $rowscnt = mysql_num_rows($NormalStt);
                if( $rowscnt!==0 )
                {
                        while ( $row = mysql_fetch_assoc($NormalStt) )
                        {
                                $waiting[] =
array('ArrivalTime'=>$row['ArrivalTime'],'ServiceNumber'=>$row['PatientCode'],

        'ClientName'=>$row['ClientName'],'ClientStatus'=>($row['Attended']==1 ? 'Yes' : 'No'));

                        }
                }
                else
                {
```

```php
                                    $waiting[] =
array('ArrivalTime'=>'','ServiceNumber'=>'','ClientName'=>'','ClientStatus'=>'');
                    }
                    echo json_encode($waiting);

                    break;
            }
        case 'fpmap':
            {
                    $waiting = array();

                    mysql_connect("localhost", "root", "") or die(mysql_error());
                    mysql_select_db("elink");
                    $NormalStt = mysql_query("SELECT '' as OCode,AES_DECRYPT(`PatientCode`,'$secKey')
PatientCode,AES_DECRYPT(`PostalAddress`,'$secKey') PostalAddress,AES_DECRYPT(Gender,'$secKey')
Gender,AES_DECRYPT(`Telephone`,'$secKey') Telephone,
                                            AES_DECRYPT(`DateofBirth`,'$secKey')
DateofBirth,AES_DECRYPT(LevelofEducation,'$secKey')
LevelofEducation,AES_DECRYPT(`NationalID`,'$secKey') NationalID,`template`,
                                            AES_DECRYPT(District,'$secKey')
District,AES_DECRYPT(Division,'$secKey') Division,AES_DECRYPT(County,'$secKey')
County,AES_DECRYPT(Location,'$secKey') Location,AES_DECRYPT(Village,'$secKey')
Village,concat(AES_DECRYPT(FirstName,'$secKey'),' ',AES_DECRYPT(MiddleName,'$secKey'),'
',AES_DECRYPT(LastName,'$secKey')) ClientName,
                                            AES_DECRYPT(HIVStatus,'$secKey') as
HIVResults,AES_DECRYPT(Test1Result,'$secKey') Test1Result,AES_DECRYPT(Test2Result,'$secKey')
Test2Result,AES_DECRYPT(Test3Result,'$secKey') Test3Result,AES_DECRYPT(`FirstName`,'$secKey')
FirstName,AES_DECRYPT(`MiddleName`,'$secKey') MiddleName,AES_DECRYPT(`LastName`,'$secKey')
LastName,
                                            `FoundIn`,AES_DECRYPT(`ContactPerson`,'$secKey') as
ContactPerson,AES_DECRYPT(ContactPersonTel,'$secKey') as SecondaryContact FROM `templates` a
                                            inner join `patients` b on
a.`ClientNumber`=AES_DECRYPT(b.`PatientCode`,'$secKey') where `FoundIn`='Demo' LIMIT 1
                                            union SELECT AES_DECRYPT(`OutreachCode`,'$secKey') as
OCode,'' as PatientCode,AES_DECRYPT(`PostalAddress`,'$secKey')
PostalAddress,AES_DECRYPT(Gender,'$secKey') Gender,AES_DECRYPT(`Telephone`,'$secKey')
Telephone,
                                            AES_DECRYPT(`DateofBirth`,'$secKey')
DateofBirth,AES_DECRYPT(LevelofEducation,'$secKey')
LevelofEducation,AES_DECRYPT(`NationalID`,'$secKey') NationalID,`template`,
                                            AES_DECRYPT(District,'$secKey')
District,AES_DECRYPT(Division,'$secKey') Division,'' as County,AES_DECRYPT(Location,'$secKey')
Location,AES_DECRYPT(Village,'$secKey') Village,
                                            concat(AES_DECRYPT(FirstName,'$secKey'),'
',AES_DECRYPT(MiddleName,'$secKey'),' ',AES_DECRYPT(LastName,'$secKey')) ClientName,
                                            AES_DECRYPT(FinalResult,'$secKey') as
HIVResults,AES_DECRYPT(Test1Result,'$secKey') Test1Result,AES_DECRYPT(Test2Result,'$secKey')
Test2Result,AES_DECRYPT(Test3Result,'$secKey') Test3Result,AES_DECRYPT(`FirstName`,'$secKey')
FirstName,AES_DECRYPT(`MiddleName`,'$secKey') MiddleName,AES_DECRYPT(`LastName`,'$secKey')
LastName,`FoundIn`,
                                            AES_DECRYPT(ContactPerson,'$secKey')
ContactPerson,AES_DECRYPT(ContactPersonTelephone,'$secKey') as SecondaryContact
                                            FROM `templates` a
                                            inner join `outreach` b on
a.`ClientNumber`=AES_DECRYPT(b.`OutreachCode`,'$secKey') where `FoundIn`='Outreach' LIMIT 1");
                    $rowscnt = mysql_num_rows($NormalStt);
                    if( $rowscnt!==0 )
                    {
                            while ( $row = mysql_fetch_assoc($NormalStt) )
                            {
```

```php
                                if($row['FoundIn']='Demo')
                                {
                                        $waiting[] =
array('PatientCode'=>$row['PatientCode'],'OCode'=>$row['OCode'],'Education'=>$row['LevelofEducation'],'Ser
viceNumber'=>$row['PatientCode'],'template'=>$row['template'],'FoundIn'=>$row['FoundIn'],

        'Telephone'=>$row['Telephone'],'DOB'=>$row['DateofBirth'],'IDNo'=>$row['NationalID'],'ContactPer
son'=>$row['ContactPerson'],'SecondaryContact'=>$row['SecondaryContact'],

        'FirstName'=>$row['FirstName'],'MiddleName'=>$row['MiddleName'],'HIVResults'=>$row['HIVResul
ts'],'Test1Result'=>$row['Test1Result'],'Test2Result'=>$row['Test2Result'],

        'Test3Result'=>$row['Test3Result'],'LastName'=>$row['LastName'],'Gender'=>$row['Gender'],'District'
=>$row['District'],

        'Division'=>$row['Division'],'County'=>$row['County'],'Location'=>$row['Location'],'Village'=>$row['
Village'],

        'ClientName'=>$row['ClientName'],'ClientStatus'=>'1','PostalAddress'=>$row['PostalAddress']);
                                }
                                else
                                {
                                        $waiting[] =
array('PatientCode'=>$row['PatientCode'],'OCode'=>$row['OCode'],'Education'=>$row['LevelofEducation'],'Ser
viceNumber'=>$row['PatientCode'],'template'=>$row['template'],'FoundIn'=>$row['FoundIn'],

        'Telephone'=>$row['Telephone'],'DOB'=>$row['DateofBirth'],'IDNo'=>$row['NationalID'],'ContactPer
son'=>$row['ContactPerson'],'SecondaryContact'=>$row['SecondaryContact'],

        'FirstName'=>$row['FirstName'],'MiddleName'=>$row['MiddleName'],'HIVResults'=>$row['HIVResul
ts'],'Test1Result'=>$row['Test1Result'],'Test2Result'=>$row['Test2Result'],

        'Test3Result'=>$row['Test3Result'],'LastName'=>$row['LastName'],'Gender'=>$row['Gender'],'District'
=>$row['District'],

        'Division'=>$row['Division'],'County'=>$row['County'],'Location'=>$row['Location'],'Village'=>$row['
Village'],

        'ClientName'=>$row['ClientName'],'ClientStatus'=>'1','PostalAddress'=>$row['PostalAddress']);
                                }
                        }
                        else
                        {
                                $waiting[] =
array('PatientCode'=>'','OCode'=>'','Education'=>'','ServiceNumber'=>'','template'=>'','FoundIn'=>'',

        'Telephone'=>'','DOB'=>'','IDNo'=>'','ContactPerson'=>'','SecondaryContact'=>'',

        'FirstName'=>'','MiddleName'=>'','HIVResults'=>'','Test1Result'=>'','Test2Result'=>'',
                                        'Division'=>'','County'=>'','Location'=>'','Village'=>'',

        'Test3Result'=>'','LastName'=>'','Gender'=>'','District'=>'','','ClientName'=>'','ClientStatus'=>'0','Postal
Address'=>'');
                        }
                        echo json_encode($waiting);

                        break;
                }
                case 'searchResults':
```

```php
                {
                        $SearchText = $_GET['SearchText'];
                        if($_GET['SearchBy']==1)
                        {
                                $SearchCriteria = " where AES_DECRYPT(PatientCode,'$secKey') like '%" .
$SearchText . "%'";
                        }
                        else
                        {
                                $SearchCriteria = " where AES_DECRYPT(FirstName,'$secKey') like '%" .
strtoupper($SearchText) . "%'";
                        }
                        $res = array();

                        if($SearchText=='')
                        {
                                $res[] = array('ServiceNumber'=>'','ClientName'=>'','Gender'=>'');
                        }
                        else
                        {
                                mysql_connect("localhost", "root", "") or die(mysql_error());
                                mysql_select_db("elink");
                                $reslt = mysql_query("SELECT AES_DECRYPT(`PatientCode`,'$secKey')
PatientCode,AES_DECRYPT(`Gender`,'$secKey') Gender,concat(AES_DECRYPT(FirstName,'$secKey'),'
',AES_DECRYPT(MiddleName,'$secKey'),' ',AES_DECRYPT(LastName,'$secKey')) ClientName FROM
`patients` a ".$SearchCriteria);

                                $rowscnt = mysql_num_rows($reslt);
                                if( $rowscnt!==0 )
                                {
                                        while($row = mysql_fetch_array($reslt))
                                        {
                                                $res[] =
array('ServiceNumber'=>$row['PatientCode'],'ClientName'=>$row['ClientName'],'Gender'=>$row['Gender']);
                                        }
                                }
                                else
                                {
                                        $res[] = array('ServiceNumber'=>'','ClientName'=>'','Gender'=>'');
                                }
                        }
                        echo json_encode($res);
                        break;
                }
}
?>
```

Save Data PHP

```php
<?php
ob_start();
session_start();

define('ROOT_PATH',$_SESSION['path']);
$secKey = "nomiskris1";
require_once ROOT_PATH . '/Lib/dao/SQLClass.php';
require_once ROOT_PATH . '/Lib/confs/sysConf.php';
require_once ROOT_PATH . '/lib/common/definition_full.php';

$conf = new sysConf();
$sql = new SQLClass($conf);
```

```php
$actionCode = isset($_GET['action']) ? $_GET['action'] : 'saveRoom';
$CreatedBy = $_SESSION['Full_Name'];
$CreatedOn = date('d-M-Y');
$FName = $_SESSION['FacilityName'];
switch($actionCode)
{
        case 'addClient':
        {
                $ServiceNumber = $_POST['ServiceNumber'];        $Fcode = $_SESSION['FacilityName'];
                $ServiceNumber1 = $ServiceNumber;
                mysql_connect("localhost", "root", "") or die(mysql_error());
                mysql_select_db("elink");

                $stmt = mysql_query("SELECT AES_DECRYPT(`Facility`,'$secKey') as Facility FROM
`patients` WHERE AES_DECRYPT(`patientcode`,'$secKey')='" . $ServiceNumber . "';");
                $rowscount = mysql_num_rows($stmt);

                $fac = mysql_query("SELECT ifnull(max(AES_DECRYPT(PatientCode,'$secKey')),0)+1
PatientID FROM `patients` WHERE Facility=AES_ENCRYPT('".$_SESSION['FacilityName']."','$secKey');");
                $rowscnt = mysql_num_rows($fac);
                if( $rowscnt!==0 )
                {
                        $i = 0;

                        while ( $row = mysql_fetch_assoc($fac) )
                        {
                                if(strlen($row['PatientID'])<strlen($_SESSION['Facility']))
                                {
                                        $PatientID = $_SESSION['Facility'].$row['PatientID'];
                                }
                                else
                                {
                                        $PatientID = $row['PatientID'];
                                }
                                $i++;
                        }
                }
                else
                {
                        $PatientID = $_SESSION['Facility'].'1';
                }
                if( $rowscount!==0 )
                {
                        if ( $NewRow = mysql_fetch_array($stmt) )
                        {
                                if( $Fcode!==$NewRow['Facility'] )
                                {

                                        $strSQL  = "INSERT INTO `patients`(`PatientCode`, `Date`,
`Facility`, `FirstName`, `MiddleName`,
                                                                            `LastName`, `Gender`,
`DateofBirth`, `LevelOfEducation`, `NationalID`, `FPMap`,
                                                                            `PostalAddress`, `Telephone`,
`ContactPerson`, `ContactPersonTel`, `County`, `District`,
                                                                            `Division`, `Location`,
`Village`, `LandMark`, `PatientInCare`, `HIVStatus`,
                                                                            `Test1Result`, `Test2Result`,
`Test3Result`, `OutreachCode`,
```

```
                                                                    `MaritalStatus`,
`TreatmentSupporterName`,
`TreatmentSupporterRelationship`,`TreatmentSupporterTelephone`,`ProviderName`)
                                                    Select
AES_ENCRYPT('".$PatientID."','$secKey'), `Date`, AES_ENCRYPT('".$Fcode."','$secKey'), `FirstName`,
`MiddleName`,
                                                                    `LastName`, `Gender`,
`DateofBirth`, `LevelOfEducation`, `NationalID`, `FPMap`,
                                                                    `PostalAddress`, `Telephone`,
`ContactPerson`, `ContactPersonTel`, `County`, `District`,
                                                                    `Division`, `Location`,
`Village`, `LandMark`, `PatientInCare`, `HIVStatus`,
                                                                    `Test1Result`, `Test2Result`,
`Test3Result`, `OutreachCode`,
                                                                    `MaritalStatus`,
`TreatmentSupporterName`,
`TreatmentSupporterRelationship`,`TreatmentSupporterTelephone`,AES_ENCRYPT('".$CreatedBy."','$secKey'
)
                                                    from `patients` where
`patientcode`=AES_ENCRYPT('" . $ServiceNumber . "','$secKey');";
                                    $ServiceNumber = $PatientID;
                                    $stmt1 = mysql_query($strSQL);
                                    if(isset($_SESSION['Funeral_Home']) &&
$_SESSION['Funeral_Home']==1)
                                            {
                                                    $outcome = "Died";
                                            }
                                            else
                                            {
                                                    $outcome = "Self Transfer";
                                            }
                                    $stmt21 = mysql_query("Update Patients Set
CareOutcome=AES_ENCRYPT('$outcome','$secKey'),careexitdate=curdate(),ARTOutCome=AES_ENCRYPT
('$outcome','$secKey'),ARTEXitDate=curdate() Where
PatientCode=AES_ENCRYPT('$ServiceNumber1','$secKey');");
                                            }
                                    }
                            }

                    $stmt11 = mysql_query("SELECT `patientcode` FROM `dailyregister` WHERE
`patientcode`='" . $ServiceNumber . "' and `arrivaltime`='$CreatedOn';");
                    $rowscnt = mysql_num_rows($stmt11);
                    if( $rowscnt==0 )
                    {
                            $stmt2 = mysql_query("INSERT INTO `dailyregister`(`arrivaltime`, `patientcode`,
`attended`,`Facility`) VALUES ('$CreatedOn','$ServiceNumber',0,'$Fcode');");
                            $stmt3 = mysql_query("Delete From Templates Where
ClientNumber='$ServiceNumber1';");
                    }


                    break;
            }
}
?>
```

Waiting Bay CSS

.combo{

```css
        display:inline-block;
        white-space:nowrap;
        font-size:12px;
        margin:0;
        padding:0;
        border:1px solid #A4BED4;
}
.combo-text{
        font-size:12px;
        border:0px;
        line-height:20px;
        height:20px;
        padding:0px;
        *height:18px;
        *line-height:18px;
        _height:18px;
        _line-height:18px;
}
.combo-arrow{
        background:#E0ECF9 url('../images/combo_arrow.gif') no-repeat 3px 4px;
        width:18px;
        height:20px;
        overflow:hidden;
        display:inline-block;
        vertical-align:top;
        cursor:pointer;
        opacity:0.6;
        filter:alpha(opacity=60);
}
.combo-arrow-hover{
        opacity:1.0;
        filter:alpha(opacity=100);
}
.combo-panel{
        background:#fff;
        overflow:auto;
}
.combobox-item{
        padding:2px;
        font-size:12px;
        padding:3px;
        padding-right:0px;
}
.combobox-item-hover{
        background:#fafafa;
}
.combobox-item-selected{
        background:#FBEC88;
}.datagrid .panel-body{
        overflow:hidden;
}
.datagrid-wrap{
        position:relative;
}
.datagrid-view{
        position:relative;
        overflow:hidden;
}
.datagrid-view1{
        position:absolute;
```

```
		overflow:hidden;
		left:0px;
		top:0px;
		border-right:1px solid #ccc;
}
.datagrid-view2{
		position:absolute;
		overflow:hidden;
		left:210px;
		top:0px;
}
.datagrid-mask{
		position:absolute;
		left:0;
		top:0;
		background:#ccc;
		opacity:0.3;
		filter:alpha(opacity=30);
		display:none;
}
.datagrid-mask-msg{
		position:absolute;
		cursor1:wait;
		left:100px;
		top:50px;
		width:auto;
		height:16px;
		padding:12px 5px 10px 30px;
		background:#fff url('../images/pagination_loading.gif') no-repeat scroll 5px 10px;
		border:2px solid #6593CF;
		color:#222;
		display:none;
}
.datagrid-title{
		background:url('../images/datagrid_title_bg.png') repeat-x;
		border-bottom:1px solid #8DB2E3;
		border-top:1px solid #fff;
		position:relative;
		padding:5px 0px;
}
.datagrid-title-text{
		color:#15428b;
		font-weight:bold;
		padding-left:5px;
}
.datagrid-title-with-icon{
		padding-left:22px;
}
.datagrid-title-icon{
		position:absolute;
		width:16px;
		height:16px;
		left:3px;
		top:4px!important;
		top:6px;
}
.datagrid-sort-desc .datagrid-sort-icon{
		padding:2px 13px 3px 0px;
		background:url('../images/datagrid_sort_desc.gif') no-repeat center center;
}
```

```css
.datagrid-sort-asc .datagrid-sort-icon{
        padding:2px 13px 3px 0px;
        background:url('../images/datagrid_sort_asc.gif') no-repeat center center;
}
.datagrid-toolbar{
        height:28px;
        background:#efefef;
        padding:1px 2px;
        border-bottom:1px solid #ccc;
}
.datagrid-btn-separator{
        float:left;
        height:24px;
        border-left:1px solid #ccc;
        border-right:1px solid #fff;
        margin:2px 1px;
}
.datagrid-pager{
        background:#efefef;
        border-top:1px solid #ccc;
        position:relative;
}

.datagrid-header{
        overflow:hidden;
        background:#fafafa url('../images/datagrid_header_bg.gif') repeat-x left bottom;
        border-bottom:1px solid #ccc;
}
.datagrid-header-inner{
        float:left;
        width:10000px;
}
.datagrid-header td{
        border-right:1px dotted #ccc;
        font-size:12px;
        font-weight:normal;
        background:#fafafa url('../images/datagrid_header_bg.gif') repeat-x left bottom;
        border-bottom:1px dotted #ccc;
        border-top:1px dotted #fff;
}
.datagrid-header td.datagrid-header-over{
        background:#EBF3FD;
}
.datagrid-header .datagrid-cell{
        margin:0;
        padding:3px 4px;
        white-space:nowrap;
        word-wrap:normal;
        overflow:hidden;
        text-align:center;
}
.datagrid-header .datagrid-cell-group{
        margin:0;
        padding:4px 2px 4px 4px;
        white-space:nowrap;
        word-wrap:normal;
        overflow:hidden;
        text-align:center;
}
.datagrid-header-rownumber{
```

```
                width:25px;
                text-align:center;
                margin:0px;
                padding:3px 0px;
}
.datagrid-td-rownumber{
                background:#fafafa url('../images/datagrid_header_bg.gif') repeat-x left bottom;
}
.datagrid-cell-rownumber{
                width:25px;
                text-align:center;
                margin:0px;
                padding:3px 0px;
                color:#000;
}
.datagrid-body{
                margin:0;
                padding:0;
                overflow:auto;
                zoom:1;
}
.datagrid-view1 .datagrid-body-inner{
                padding-bottom:20px;
}
.datagrid-view1 .datagrid-body{
                overflow:hidden;
}
.datagrid-footer{
                overflow:hidden;
}
.datagrid-footer-inner{
                border-top:1px solid #ccc;
                width:10000px;
                float:left;
}
.datagrid-body td,.datagrid-footer td{
                font-size:12px;
                border-right:1px dotted #ccc;
                border-bottom:1px dotted #ccc;
                overflow:hidden;
                padding:0;
                margin:0;
}
.datagrid-body .datagrid-cell,.datagrid-footer .datagrid-cell{
                overflow:hidden;
                margin:0;
                padding:3px 4px;
                white-space:nowrap;
                word-wrap:normal;
}
.datagrid-header-check{
                padding:3px 6px;
}
.datagrid-cell-check{
                padding:3px 6px;
                font-size:1px;
                overflow:hidden;
}
.datagrid-header-check input{
                margin:0;
```

```css
		padding:0;
		width:15px;
		height:15px;
}
.datagrid-cell-check input{
		margin:0;
		padding:0;
		width:15px;
		height:15px;
}
.datagrid-row-collapse{
		background:url('../images/datagrid_row_collapse.gif') no-repeat center center;
}
.datagrid-row-expand{
		background:url('../images/datagrid_row_expand.gif') no-repeat center center;
}
.datagrid-row-alt{
		background:#EEEEFF;
}
.datagrid-row-over{
		background:#D0E5F5;
		background1:#FBEC88;
		cursor:default;
}
.datagrid-row-selected{
		background:#FBEC88;
}
.datagrid-resize-proxy{
		position:absolute;
		width:1px;
		top:0;
		height:10000px;
		background:red;
		cursor:e-resize;
		display:none;
}
.datagrid-body .datagrid-editable{
		padding:0;
}
.datagrid-body .datagrid-editable table{
		width:100%;
		height:100%;
}
.datagrid-body .datagrid-editable td{
		border:0;
		padding:0;
}
.datagrid-body .datagrid-editable .datagrid-editable-input{
		width:100%;
		font-size:12px;
		border:1px solid #A4BED4;
		padding:3px 2px;
}
.datebox .combo-arrow{
		background:url('../images/datebox_arrow.png') no-repeat center center;
}
.datebox-calendar-inner{
		height:180px;
}
.datebox-button{
```

```css
        height:18px;
        padding:2px 5px;
        font-size:12px;
        background-color:#fafafa;
        text-align:center;
}
.datebox-current,.datebox-close{
        float:left;
        color:#888;
        text-decoration:none;
        font-weight:bold;
}
.datebox-close{
        float:right;
}
.datebox-ok{
        color:#888;
        text-decoration:none;
        font-weight:bold;
}
.datebox-button-hover{
        color:#A4BED4;
}
.dialog-content{
        overflow:auto;
}
.dialog-toolbar{
        background:#fafafa;
        padding:2px 5px;
        border-bottom:1px solid #eee;
}
.dialog-tool-separator{
        float:left;
        height:24px;
        border-left:1px solid #ccc;
        border-right:1px solid #fff;
        margin:2px 1px;
}
.dialog-button{
        border-top:1px solid #eee;
        background:#fafafa;
        padding:5px 5px;
        text-align:right;
}
.dialog-button .l-btn{
        margin-left:5px;
}

.menu{
        position:absolute;
        background:#f0f0f0 url('../images/menu.gif') repeat-y;
        margin:0;
        padding:2px;
        border:1px solid #ccc;
        overflow:hidden;
}
.menu-item{
        position:relative;
        margin:0;
        padding:0;
```

```css
        height:22px;
        line-height:20px;
        overflow:hidden;
        font-size:12px;
        cursor:pointer;
        border:1px solid transparent;
        _border:1px solid #f0f0f0;
}
.menu-text{
        position:absolute;
        left:28px;
        top:0px;
}
.menu-icon{
        position:absolute;
        width:16px;
        height:16px;
        top:3px;
        left:2px;
}
.menu-rightarrow{
        position: absolute;
        width:4px;
        height:7px;
        top:7px;
        right:5px;
        background:url('../images/menu_rightarrow.png') no-repeat;
}
.menu-sep{
        margin:3px 0px 3px 24px;
        line-height:2px;
        font-size:2px;
        background:url('../images/menu_sep.png') repeat-x;
}
.menu-active{
        border:1px solid #7eabcd;
        background:#fafafa;
        -moz-border-radius:3px;
        -webkit-border-radius: 3px;
}
.menu-shadow{
        position:absolute;
        background:#ddd;
        -moz-border-radius:5px;
        -webkit-border-radius: 5px;
        -moz-box-shadow: 2px 2px 3px rgba(0, 0, 0, 0.2);
        -webkit-box-shadow: 2px 2px 3px rgba(0, 0, 0, 0.2);
        filter:
progid:DXImageTransform.Microsoft.Blur(pixelRadius=2,MakeShadow=false,ShadowOpacity=0.2);
}

.tree{
        font-size:12px;
        margin:0;
        padding:0;
        list-style-type:none;
}
.tree li{
        white-space:nowrap;
}
```

```css
.tree li ul{
        list-style-type:none;
        margin:0;
        padding:0;
}
.tree-node{
        height:18px;
        white-space:nowrap;
        cursor:pointer;
}
.tree-indent{
        display:inline-block;
        width:16px;
        height:18px;
        vertical-align:middle;
}
.tree-hit{
        cursor:pointer;
}
.tree-expanded{
        display:inline-block;
        width:16px;
        height:18px;
        vertical-align:middle;
        background:url('../images/tree_arrows.gif') no-repeat -18px 0px;
}
.tree-expanded-hover{
        background:url('../images/tree_arrows.gif') no-repeat -50px 0px;
}
.tree-collapsed{
        display:inline-block;
        width:16px;
        height:18px;
        vertical-align:middle;
        background:url('../images/tree_arrows.gif') no-repeat 0px 0px;
}
.tree-collapsed-hover{
        background:url('../images/tree_arrows.gif') no-repeat -32px 0px;
}
.tree-folder{
        display:inline-block;
        background:url('../images/tree_folder.gif') no-repeat;
        width:16px;
        height:18px;
        vertical-align:middle;
}
.tree-folder-open{
        background:url('../images/tree_folder_open.gif') no-repeat;
}
.tree-file{
        display:inline-block;
        background:url('../images/tree_file.gif') no-repeat;
        width:16px;
        height:18px;
        vertical-align:middle;
}
.tree-loading{
        background:url('../images/tree_loading.gif') no-repeat;
}
.tree-title{
```

```css
        display:inline-block;
        text-decoration:none;
        vertical-align:middle;
        padding:1px 2px 1px 2px;
        white-space:nowrap;
}

.tree-node-hover{
        background:#fafafa;
}
.tree-node-selected{
        background:#FBEC88;
}
.tree-checkbox{
        display:inline-block;
        width:16px;
        height:18px;
        vertical-align:middle;
}
.tree-checkbox0{
        background:url('../images/tree_checkbox_0.gif') no-repeat;
}
.tree-checkbox1{
        background:url('../images/tree_checkbox_1.gif') no-repeat;
}
.tree-checkbox2{
        background:url('../images/tree_checkbox_2.gif') no-repeat;
}
.tree-node-proxy{
        font-size:12px;
        padding:1px 2px 1px 18px;
        background:#fafafa;
        border:1px solid #ccc;
        z-index:9900000;
}
.tree-dnd-yes{
        background:url('../images/tree_dnd_yes.png') no-repeat 0 center;
}
.tree-dnd-no{
        background:url('../images/tree_dnd_no.png') no-repeat 0 center;
}
.tree-node-top{
        border-top:1px dotted red;
}
.tree-node-bottom{
        border-bottom:1px dotted red;
}
.tree-node-append .tree-title{
        border:1px dotted red;
}
.tree-editor{
        border:1px solid #ccc;
        font-size:12px;
        line-height:16px;
        width:80px;
        position:absolute;
        top:0;
}
.validatebox-invalid{
        background:#FFFFEE url('../images/validatebox_warning.png') no-repeat right 1px;
```

```
}
.validatebox-tip{
        position:absolute;
        width:200px;
        height:auto;
        display:none;
        z-index:9900000;
}
.validatebox-tip-content{
        display:inline-block;
        position:absolute;
        top:0px;
        left:10px;
        padding:3px 5px;
        border:1px solid #CC9933;
        background:#FFFFCC;
        z-index:9900001;
        font-size:12px;
}
.validatebox-tip-pointer{
        background:url('../images/validatebox_pointer.gif') no-repeat left top;
        display:inline-block;
        width:10px;
        height:19px;
        position:absolute;
        left:1px;
        top:0px;
        z-index:9900002;
}.window {
        font-size:12px;
        position:absolute;
        overflow:hidden;
        background:transparent url('../images/panel_title.png');
        background1:#878787;
        padding:5px;
        border:1px solid #99BBE8;
        -moz-border-radius:5px;
        -webkit-border-radius: 5px;
}
.window-shadow{
        position:absolute;
        background:#ddd;
        -moz-border-radius:5px;
        -webkit-border-radius: 5px;
        -moz-box-shadow: 2px 2px 3px rgba(0, 0, 0, 0.2);
        -webkit-box-shadow: 2px 2px 3px rgba(0, 0, 0, 0.2);
        filter:
progid:DXImageTransform.Microsoft.Blur(pixelRadius=2,MakeShadow=false,ShadowOpacity=0.2);
}
.window .window-header{
        background:transparent;
        padding:2px 0px 4px 0px;
}
.window .window-body{
        background:#fff;
        border:1px solid #99BBE8;
        border-top-width:0px;
}
.window .window-header .panel-icon{
        left:1px;
```

```
            top:1px;
}
.window .window-header .panel-with-icon{
            padding-left:18px;
}
.window .window-header .panel-tool{
            top:0px;
            right:1px;
}
.window-proxy{
            position:absolute;
            overflow:hidden;
            border:1px dashed #15428b;
}
.window-proxy-mask{
            position:absolute;
            background:#fafafa;
            filter:alpha(opacity=10);
            opacity:0.10;
}
.window-mask{
            position:absolute;
            left:0;
            top:0;
            width:100%;
            height:100%;
            filter:alpha(opacity=40);
            opacity:0.40;
            background:#ccc;
            display:none;
            font-size:1px;
            *zoom:1;
            overflow:hidden;
}
.tableTopLeft {
            background:url(../pictures/table_r1_c1.gif) no-repeat top right;
            width:12px;
            height:11px;
}

.tableTopMiddle {
            background:url(../pictures/table_r1_c2.gif) repeat-x top;
}

.tableTopRight {
            background:url(../pictures/table_r1_c3.gif) no-repeat top left;
            width:12px;
            height:11px;
}

.tableMiddleLeft {
            background:url(../pictures/table_r2_c1.gif) repeat-y top right;
            width:12px;
            height: 4ex;
}

.tableMiddleMiddle {
            border-bottom: 1px solid #CCCCCC;
}
```

```css
.tableMiddleRight {
        background:url(../pictures/table_r2_c3.gif) repeat-y top left;
        width:13px;
}

.tableBottomLeft {
        background:url(../pictures/table_r3_c1.gif) no-repeat bottom right;
        width:12px;
        height:15px;
}

.tableBottomMiddle {
        background:url(../pictures/table_r3_c2.gif) repeat-x bottom;
        height: 15px;
}

.tableBottomRight {
        background:url(../pictures/table_r3_c3.gif) no-repeat bottom left;
        width:12px;
        height:15px;
}

th {
        text-align:left;
}

.odd {
   background-color: #fff;
        font-size: 12px;
        padding: 3px 3px;
}
.highpriority {
   background-color: #ff0000;
        font-size: 12px;
        padding: 3px 3px;
}
.special {
   background-color: #fecd0f;
        font-size: 12px;
        padding: 3px 3px;
}
.even {
   background-color: #eef6ff;
        font-size: 12px;
        padding: 3px 3px;
}

.high-priority {
   background-color: red;
        color: #fff;
}

.save:active, .save:hover, .save:focus {
        outline:none;
        background: url(../pictures/btn_save_02.gif) 3px no-repeat;
}

.save {
        outline:none;
        background: url(../pictures/btn_save.gif) 3px no-repeat;
}
```

```
}

#frmSummary a {
        padding: 5px;
        vertical-align: top;
        height: 25px;
}

.error {
        color: #ff0000;
}

.failure {
        color: #ff0000;
}

.success {
        color: #005500;
}
.warning {
        color: #005500;
}
.hide {
        display:none;
}

.show {
        display: table-row;
}

*:not([type=image]):disabled {
        background-color: #F6F4F1;
        color: #666562;
}

input:not([readonly]):not([type=image]):focus, select:focus, textarea:focus {
        background-color: #FFFFD9;
}

*[readonly] {
        color:#B8B6B0
}

.sortBy {
    color: black;
    text-align: left;
}

.sortBy:link {
    color: black;
}

.calendarBtn {
        background-image: url(../icons/calendar.gif);
        background-repeat: no-repeat;
        background-position: center;
}

.confirmBox {
        margin: 10px 10px;
```

```css
        display: block;
}

.confirmInnerBox {
        background-color: #FAD163;
        padding: 3px 10px;
        font-weight: bold;
        width: 445px;
}

.confirmBox .selectable {
        text-decoration: underline;
        color: #0404CD;
        cursor: pointer;
}

.hidden {
        display: none;
}

.display-table-row {
        display: table-row;
}

.inputFormatHint {
        color: #D2D2D2
}
.table-sorter {
width: 100%;
margin: -5px 0 0;
border: 1px solid #0099ff;
}

.table-sorter td{
margin: 0;
font-size:12px;
border-bottom: 1px solid #0099ff;
}

.table-sorter thead tr {
height: 35px;
border: 1px solid #aaaaaa;
border-bottom: 1px solid #6DD704;
background: url(../images/table_sorter_header.png) repeat-x;
text-align: left;
text-indent: 10px;
cursor: pointer;
}

.table-sorter td {
padding: 3px 3px;
text-align: left;
text-indent: 10px;
}

.table-sorter input[type=image] {
margin-right: 10px;}

ul.tabbs {
        margin: 3px 10px 0 0;
```

```css
        padding: 0;
        float: right;
        list-style: none;
        height: 24px; /*--Set height of tabs--*/
        -webkit-border-radius: 5px;
        -moz-border-radius: 5px;
        border-radius: 5px;
        -webkit-box-shadow: 0 1px 0 #fff;
        -moz-box-shadow: 0 1px 0 #fff;
        box-shadow: 0 1px 0 #fff;
        border: 1px solid #ccc;
        font-weight: bold;
        text-shadow: 0 1px 0 #fff;
}
ul.tabbs li {
        float: left;
        margin: 0;
        padding: 0;
        line-height: 24px;
}
ul.tabbs li a {
        text-decoration: none;
        color: #999;
        display: block;
        padding: 0 10px;
        height: 24px;
}

ul.tabbs li a:hover {
        color: #44474F;
}

html ul.tabbs li.active a  {
        color: #44474F;
        }

html ul.tabbs li.active, html ul.tabbs li.active a:hover  {
        background: #F1F2F4;
        -webkit-box-shadow: inset 0 2px 3px #818181;
        -moz-box-shadow: inset 0 2px 3px #818181;
        box-shadow: inset 0 2px 3px #818181;
}

html ul.tabbs li:first-child, html ul.tabbs li:first-child a  {
        -webkit-border-top-left-radius: 5px; -webkit-border-bottom-left-radius: 5px;
        -moz-border-radius-topleft: 5px; -moz-border-radius-bottomleft: 5px;
        border-top-left-radius: 5px; border-bottom-left-radius: 5px;
}

html ul.tabbs li:last-child, html ul.tabbs li:last-child a  {
        -webkit-border-top-right-radius: 5px; -webkit-border-bottom-right-radius: 5px;
        -moz-border-radius-topright: 5px; -moz-border-radius-bottomright: 5px;
        border-top-right-radius: 5px; border-bottom-right-radius: 5px;
}
```

Client style CSS

```css
/* Telerik RadGrid default / embedded skin */
```

```css
div.RadGrid_Default
{
        background: #1081C8;
        border: solid 8px #e5e5e5;
        border-right: solid 2px #e5e5e5;
        border-top: 0px;
        font: normal 11px Arial, Verdana, Sans-serif;
        text-align: left;

}


.MasterTable_Default a
{
        font: 11px tahoma;
        color: #000000;
}

.MasterTable_Default
{
        border: 0px !important;
        border-collapse: separate !important;
        font: 11px tahoma;
        color: #000000;
        /*-moz-user-select: none;*/ /*disables text selecting in Firefox to combat unpleasant visual
appearance*/
}

th.GridHeader_Default,
th.ResizeHeader_Default
{
        font: bold 10px Verdana, Arial, Sans-serif;
        background: white url('Img/GridHeaderBg.gif') repeat-x bottom;
        border-top: solid 1px #e5e5e5;
        border-bottom: solid 1px #bbb;
        padding-left: 4px; /*more than items to compensate for item borders!*/
        height: 22px;
}

.GridHeader_Default a
{
        color: black;
        font: bold 10px Verdana, Arial, Sans-serif;
        text-decoration: none;
}

.GridRow_Default,
.GridAltRow_Default,
.SelectedRow_Default,
.ActiveRow_Default,
.GridEditRow_Default
{
        height: 22px;
}
.GridRow_Default td,
.GridAltRow_Default td,
.SelectedRow_Default td,
.ActiveRow_Default td,
.GridEditRow_Default td
{
```

```css
        padding-left: 4px;
}

.GridRow_Default
{
        background: #f7f7f7;
}
.GridRow_Default td
{
        border: solid 1px #f7f7f7;
        border-top: solid 1px #e9e9e9;
        border-bottom: solid 1px white;
}

.GridAltRow_Default
{
        background: #f7f7f7;
}
.GridAltRow_Default td
{
        border: solid 1px #f7f7f7;
        border-top: solid 1px #e9e9e9;
        border-bottom: solid 1px white;
}

.SelectedRow_Default
{
        background: #e5e5e5 !important;
}

.SelectedRow_Default td,
.GridEditRow_Default td
{
        border-top: solid 1px #e9e9e9;
        border-bottom: solid 1px white;
}

.GridEditRow_Default
{
        background: #ffffe1;
}

.ActiveRow_Default,
.ActiveRow_Default td
{
        background: white !important;
}


/*removes default borders for custom inner tables*/
.GridRow_Default td td,
.GridAltRow_Default td td,
.SelectedRow_Default td td,
.ActiveRow_Default td td
{
        border-top: none;
        border-bottom: none;
}

.GridPager_Default
```

```css
{
        background: white;
        height: 21px;
        color: #999;
}
.GridPager_Default td
{
        border: solid 1px white;
        border-top: 1px solid #c7c7c7;
        padding-left: 4px;
}

.GridFooter_Default
{
        background: #fbfbfb;
        height: 21px;
        color: #666;
}
.GridFooter_Default td
{
        border: solid 1px #fbfbfb;
        border-top: 1px solid #e8e6e6;
        padding-left: 4px;
}

.GridFooter_Default a
{
        color: #666;
}
.GridPager_Default a
{
        color: #999;
}
.GridPager_Default a:hover,
.GridFooter_Default a:hover
{
        color: #333;
}

tr.GroupHeader_Default
{
        background: white;
        height: 22px;
}
tr.GroupHeader_Default td
{
        border: solid 1px white;
        padding-left: 4px;
}

.GroupPanel_Default
{
        background-color: #e5e5e5;
        width: 100%;
        border-collapse: collapse;
        border: solid 1px #c6c6c6;
        border-bottom: 1px solid #aeaeae;
}

.GroupPanelItems_Default
```

```
{
        background: #efefef;
        color: #999999;
        border: solid 1px white;
        border-right: solid 1px #c6c6c6;
        border-bottom: solid 1px #c6c6c6;
        white-space:  nowrap;
        font-size: 11px;
}
td.GridHeader_Default input
{
        width: auto;
        float: left;
        border: solid 1px #666;
        background: #fafafa;
        font: bold 10px Verdana, Arial, Sans-serif;
        color: #989cb0;
        height: 14px;
        vertical-align:middle;
}
.grid
{
        font-family:Arial;
        font-size:8pt;
        /*border:thick #FF0000;*/
        /*text-decoration:none;*/
}
td{
color:#000000
}
.BRComboStandard
{
        background-color: Transparent;
        width:94%;
        height:150px;
        position:absolute;
        z-index:900;
        vertical-align:bottom;
}
.BRComboChanged
{
        background-color: Transparent;
        width:26.5%;
        height:150px;
        position:absolute;
        z-index:900;
        vertical-align:bottom;
}
.GridHeaderMainModule
{
        BACKGROUND-COLOR: #1081C8;
        color:White;
        font-size: 12px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
  position:relative;
  z-index: 20;
```

```
}
.GridHeaderSubModule
{
   BACKGROUND-COLOR: #1081C8;
        color:White;
        font-size: 12px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
   position:relative;
   z-index: 20;
}
.BREditWindowTitle
{
   FONT-WEIGHT: bolder;
   COLOR: white;
   HEIGHT: 30px;
   BACKGROUND-COLOR: Aqua;
}

.BREditNormalButton
{
   BORDER-RIGHT: gray 1px solid;
   BORDER-TOP: white 1px solid;
   BORDER-LEFT: white 1px solid;
   BORDER-BOTTOM: gray 1px solid;
}

.BREditPressedButton
{
   BORDER-RIGHT: 1px inset;
   BORDER-TOP: 1px inset;
   BORDER-LEFT: 1px inset;
   BORDER-BOTTOM: 1px inset;
}

.BREditOverButton
{
   BORDER-RIGHT: 1px outset;
   BORDER-TOP: white 1px solid;
   BORDER-LEFT: white 1px solid;
   BORDER-BOTTOM: 1px outset;
}

.BREditWindow
{
   BORDER-RIGHT: 3px ridge;
   BORDER-TOP: 3px ridge;
   BORDER-LEFT: 3px ridge;
   WIDTH: 300px;
   BORDER-BOTTOM: 3px ridge;
   HEIGHT: 200px;
   BACKGROUND-COLOR: white;
}

.BREditWindowStatus
{
   BORDER-RIGHT: 1px inset;
```

```css
    BORDER-TOP: 1px inset;
    MARGIN: 2px;
    BORDER-LEFT: 1px inset;
    BORDER-BOTTOM: 1px inset;
    HEIGHT: 20px;
    BACKGROUND-COLOR: Gray;
}


.ErrorTextBox
{
        border: 1px #7F9DB9 solid;
        font-size:12px;
        vertical-align: middle;
        background-color:#F9F6E0;
}

.ErrMessage
{

}

/*Newly Updated Styles */

A
{
   color: #000000;
   text-decoration:none;
   cursor: hand;
   border:"0"
}

A:Visited
{
   color: #000000;
   text-decoration:none;
   border:0;
}

A:hover
{
   color: #000000;
   text-decoration:none;
   cursor: hand;
   border:0;
}

.TotalPgBorder
{
        border: #1081C8;
        border-style: solid;
        border-top-width: 0px;
        border-left-width: 0px;
        border-right-width: 0px;
        border-bottom-width: 0px;
        BACKGROUND-COLOR: #FFFFFF;
}
```

```
.TotalPgBorderRight
{
        border: #1081C8;
        border-style: solid;
        border-top-width: 0px;
        border-left-width: 0px;
        border-right-width: 1px;
        border-bottom-width: 0px;
        BACKGROUND-COLOR: #FFFFFF;
}


.PgTitle
{
        font-size: 14px;
        font-weight: bold;
        color:White;
        text-indent:5px;
        vertical-align: middle;
        BACKGROUND-COLOR: #1C73BC;
}


.RgtSideTable
{
        BACKGROUND-COLOR: #F7FCFF;
        border: #7DC5EE;
        border-style: solid;
        border-top-width: 0px;
        border-left-width: 1px;
        border-right-width: 0px;
        border-bottom-width: 0px;
}
.DataTable
{
        padding-bottom: 0px;
        BACKGROUND-COLOR: Transparent;
        border: 0px #669999 solid;
        height:auto;
}
.InsideDataTable
{
        padding-bottom: 0px;
        BACKGROUND-COLOR: Transparent;
        height:auto;
        border: 1px solid #1081C8;
        vertical-align:top;
        -webkit-border-top-left-radius: 5px; -webkit-border-top-right-radius: 5px;
        -moz-border-radius-topleft: 5px; -moz-border-radius-topright: 5px;
        border-top-left-radius: 5px; border-top-right-radius: 5px;
}
.DataTableLogin
{
        padding-top: 0px;
        BACKGROUND-COLOR: Transparent;
        border: 0px #669999 solid;
        background:url(../Images/background.gif);
}
.LoginDataTableContent
{
```

```
        padding: 0px;
        BACKGROUND-COLOR: Transparent;
        border: 0px #1081C8 solid;
        border-left:1px;
        font-size:12px;
}

.DataTableContent
{
        padding: 0px;
        /*BACKGROUND-COLOR: #EDF6FB;*/
        BACKGROUND-COLOR: Transparent;
        border: 1px #1081C8 solid;
        border-left:1px;
        border-bottom:1px #1081C8 solid;
        font-size:12px;
        /*vertical-align:top;*/
}
.Orient-tr
{
        display: block;
        -webkit-transform: rotate(-90deg);
        -moz-transform: rotate(-90deg);
        filter: progid:DXImageTransform.Microsoft.BasicImage(rotation=3);
        font-size:12px;
        padding:45px 5px 0;
        position:relative;
        float:left;
}
.InsideDataTableContent
{
        padding: 0px;
        /*BACKGROUND-COLOR: #EDF6FB;*/
        BACKGROUND-COLOR: Transparent;
        border: 1px #1081C8 solid;
        border-left:1px;
        font-size:12px;
}
.DataTableRemarks
{
        padding-bottom: 1px;
        BACKGROUND-COLOR: #EDF6FB;
}

.DataTableTitle
{
        BACKGROUND-color:#000;
        background: url(../images/DemosHome.gif) repeat-x;
        color:#fff;
        font-size: 12px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
}
.DtTableTitle
{
        background: url(../images/DemosHome.gif) repeat-x;
        color:#fff;
```

```css
        font-size: 12px;
        font-weight: Bold;
        text-indent: 2pt;
        padding-left:0px;
        height:20px;
        vertical-align:middle;
        border: 1px #1081C8 solid;
}
.DataTableFoot
{
        BACKGROUND-COLOR: #B6D2F9;
        color:#000;
        font-size: 11px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
}
.DataTableTitleInfo
{
        BACKGROUND-COLOR: #f5f5f5;
        color:#666666;
        font-size: 10px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
}
.Marquee
{
        BACKGROUND-COLOR: #f5f5f5;
        color:Black;
        font-size: 12px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
}

.BhndTheScene
{
        padding-bottom: 1px;
        BACKGROUND-COLOR: #F2F2F2;
        border: 1px #949494 solid;
}

.BhndTheSceneTitle
{
        BACKGROUND-COLOR: #D5D4D4;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        text-transform:capitalize;
}

.Label
{
```

```
        font-family: Arial, Verdana, Helvetica, sans-serif;
        font-size:12px;
        text-align:left;
        text-transform:capitalize;
}

.DataGrid
{
        font-family: Arial, Verdana, Helvetica, sans-serif;
        font-size:18px;
        font-weight: normal;
        text-align:right;
        text-transform:capitalize;
}


.Mandatory
{
        font-family: Arial, Verdana, Helvetica, sans-serif;
        font-weight: Bold;
        font-size:11px;
        text-align:left;
        text-transform:capitalize;
        color:Blue;
}
.TextBold
{
        font-family: Arial, Verdana, Helvetica, sans-serif;
        font-weight: Bold;
        font-size:12px;
        text-align:left;
        text-transform:capitalize;
        color:Black;
}
.TextNormal
{
        font-family: Arial, Verdana, Helvetica, sans-serif;
        font-weight: Normal;
        font-size:11px;
        text-align:left;
        text-transform:capitalize;
        color:Black;
}
.CondMandatory
{
        font-family: Arial, Verdana, Helvetica, sans-serif;
        font-weight: Bold;
        font-size:12px;
        text-align:left;
        text-transform:capitalize;
        color:Black;
}

.TextBox
{
        border: 1px #7F9DB9 solid;
        font-size:12px;
        vertical-align: middle;
}
```

```
.TextBoxAlgnRgt
{
        border: 1px #7F9DB9 solid;
        font-size:12px;
        vertical-align: middle;
        text-align:right;
}

.ComboBox
{
        border: 1px #99A1A9 solid;
        font-size:12px;
        vertical-align: middle;
}

.ButtonText
{
        font-size: 11px;
        font-weight: bold;
        text-align:center;
        text-transform:capitalize;
}

A.ButtonText:link
{
        font-size: 11px;
        font-weight: bold;
        text-align:left;
        text-transform:capitalize;
}

A.ButtonText:hover
{
        font-size: 11px;
        font-weight: bold;
        text-align:left;
        text-transform:capitalize;
}

A.ButtonText:visited
{
        font-size: 11px;
        font-weight: bold;
        text-align:left;
        text-transform:capitalize;
}

.BottomDisplayMsg
{
        font-size: 11px;
        color: #000000;
        padding-left:5px;
        font-weight: bold;
        vertical-align:  middle ;
        BACKGROUND-COLOR: #D3EBF9;
}


.LoginDeclaration
```

```
{
        font-size: 11px;
        color: #000000
}

.LoginFields:link
{
        font-size: 11px;
        color: #000000;
        text-Decoration:none;
        height:20px;
}
.LoginFields:hover
{
        font-size: 11px;
        color: #015E99;
        text-Decoration:underline;
        height:20px;
}
.LoginFields:visited
{
        font-size: 11px;
        color: #000000;
        text-Decoration:none;
        height:20px;
}

.LoginFields
{
        font-weight: bold;
        color:#000000;
        padding-top: 0px;
        height:20px;
        vertical-align:middle;
}


.LoginPgTitle
{
        font-size: 18px;
        font-style: normal;
        font-weight: bold;
        vertical-align:middle;
        padding-left:10px
}

.Copyright
{
        font-size: 10px;
        text-align:center;
        color: #000000
}

.rightAlign
{
 text-align:right ;
 vertical-align :top ;
}
.tdAlign
{
```

```css
        text-align:right;
        padding-right:10px;
        text-indent:5px;
}
.tdAlignLeft
{
        text-align:left;
        padding-left:15px;
        text-indent:5px;
}
.tdRightPadding
{
        text-align:right;
        padding-right:17px;
}
.cursor
{
   cursor:move;
}

.buttonCursor
{
   cursor:pointer;

}

.divButton
{
   position:absolute;
   left:283px;
   top:3px;
   height:31px;
}

.GridHeader
{
        background:#507CD1;
        color:White;
        font-weight:bold;
}

.HiddenStyle
{
   border: 1px #7F9DB9 solid;
        font-size:12px;
        vertical-align: middle;
   display:none;
}

.DBContentDiv
{

   border-left-width :1px;
   border-left-color:#65B8EC;
   border-right-width:1px;
   border-right-color:#65B8EC;
   border-left-style:solid;
   border-right-style:solid;
 }
.DBGridViewStyle
```

```
{
    font-family:Tahoma, Verdana;
    padding:1px 3px 1px 3px;
    background-color:#FFFFFF;
    cursor:default;

}
.BoldItem
{
    font-weight:bold;
}
.ErrorMsg
{
        color:Red;
}

.DBGridViewRowStyle{padding:0px 3px 0px 3px;background-color:#FFFFFF;font-size:9px;font-
weight:normal; font-family:Tahoma, Verdana;}
.TaskbarDivStyle {position:absolute;top:572px;font-family:Arial;font-weight:bold;
left:100px;visibility:hidden;cursor:default}
.DBItemHeader{font-family:Tahoma , Verdana; font-size:11px;font-weight:bold;vertical-
align:middle;background-color:#65B8EC}
.DBItemFooter{background-color:#65B8EC;}
/*.DBDataGridFixedHeader {font-family:Tahoma ,Arial,Verdana;font-size:10px;font-weight:bold;background-
color: #AED5EE; position:relative; top:expression(this.offsetParent.scrollTop);} */
.DBGridViewAlterRowStyle{background-color:#E3E3E3;font-size:10px;font-family:Tahoma,
Verdana;padding:0px 3px 0px 3px}
.DBTaskbarText{font-family:Tahoma, Verdana;font-size:10;font-weight:bold;vertical-align:middle;}


                div.rounded{background:#65B8EC;}

.CboTableStyle{  border:none 0px #000000}
.CboStyle{}
.CboLabelStyle{cursor:default}
.CboLabelDivStyle{border:solid 1px #7f9db9;font-family:Verdana,Tahoma, Arial}
.CboTableDivStyle{}
.CboArrowStyle{}
.CboArrowDivStyle{}
.CboTableRowStyle{cursor:default;border:0;border-style:none; background-color:#E8E8E8;font-
family:Verdana,Tahoma, Arial;font-size:10px;}
.CboTableARowStyle{cursor:default;border:0;border-style:none; background-color:#FFFFFF;font-
family:Verdana,Tahoma, Arial;font-size:10px;}
.CboMouseOverStyle{background:blue}
.CboMouseOutStyle{}
/*.CboCellStyle{ nowrap:nowrap;cursor:default; border-right:solid 1px #000000}              */
.DtWithoutBotBorder{padding-bottom: 1px;BACKGROUND-COLOR: #EDF6FB;border: #1081C8;border-
style: solid;border-top-width: 1px;border-left-width: 1px;     border-right-width: 1px;border-bottom-width:
0px;}

.HiddenStyleDate{border-style:solid;border-color:#99A1A9;border-width:1px;font-size:12px;vertical-align:
middle;display:none;}

.LftSideTable
{
        BACKGROUND-COLOR: #F7FCFF;
        border: #7DC5EE;
        border-style: solid;
        border-top:solid 1px white;
        border-left-width: 0px;
```

```
        border-right-width: 1px;
        border-bottom-width: 0px;
}


.LftMnuTitle
{
        background:#7DC5EE;
        font-weight: bold;
        text-indent: 5pt;
        vertical-align: middle;
        BACKGROUND-COLOR: #7DC5EE;
        text-transform:capitalize;
        border:0
        height:22px;
        border: #7DC5EE;
        border-style:solid;
        border-top-width: 1px;
        border-left-width: 1px;
        border-right-width: 1px;
        border-bottom:solid 1px white;
        height:22px;
}


.LftMnuTitleOver
{
        font-weight: bold;
        text-indent: 5pt;
        vertical-align: middle;
        BACKGROUND-COLOR: #A9D5EF;
        text-transform:capitalize;
        border: #A9D5EF;
        border-style:solid;
        border-top-width: 1px;
        border-left-width: 1px;
        border-right-width: 1px;
        border-bottom:solid 1px white;
        height:22px;
        cursor:hand;
}


.LftMnuTitleDown
{
        font-weight: bold;
        text-indent: 5pt;
        color:White;
        vertical-align: middle;
        BACKGROUND-COLOR: #1081C8;
        text-transform:capitalize;
        border:#1081C8;
        border-style: solid;
        border-top-width: 1px;
        border-left-width: 1px;
        border-right-width: 1px;
        border-bottom-width: 1px;
        height:22px;
        cursor:hand;
}
```

```
.LftSideSubMnu
{
        text-indent: 5pt;
        font-size:12px;
        vertical-align: middle;
        background-color:#F7FCFF;
        text-transform:capitalize;
        border:0;
        height:20px;
        text-align:left;
        cursor:hand;
}

.LftSideSubMnuOver
{
        text-indent: 5pt;
        font-size:12px;
        vertical-align: middle;
        background-color:#DCEDF7;
        text-transform:capitalize;
        border:0;
        height:20px;
        text-align:left;
        cursor:hand;
}

.LftSideSubMnuDown
{
        text-indent: 5pt;
        font-size:12px;
        vertical-align:middle;
        background-color:#AFD0E4;
        text-transform:capitalize;
        border:0;
        height:20px;
        text-align:left;
        cursor:hand;
}

.CalendarLayoutStyle
{
        border:solid 2px #65B8EC;
        background-color:#65B8EC;
        font-family:Arial;
        font-size:11px;
        width:190px;
        font-weight:normal;
}
.CalendarMainHeading
{
        font-size:12px;
        font-weight:bold;
        text-align:center;
        height:20px;
}

.CalendarDayHeaderStyle
{
        background-color:#747474;
        font-weight:bold;
```

```
        color:White;
        height:20px;
        font-size:10px;
}

.CalendarDayStyle
{
        background-color:#FFFFFF;
        color:Black;
        font-weight:normal;
        height:20px;
        border:solid 1px #65B8EC;
}

.CalendarFooterStyle
{
        background-color:#65B8EC;
        font-size:11px;
        padding-left:5px;
        height:20px;
        vertical-align:middle;
}

.CalendarOtherMonthDayStyle
{
        background-color:#E6E6E6;
        color:Black;
        height:20px;
        border:solid 1px #65B8EC;
}

.CalendarSelectedDayStyle
{
        background-color:#D8EBF5;
        color:Black;
        border:solid 1px #65B8EC;
        font-weight:normal;
        height:20px;
}

.AddItemtLayout
{
        background-color:#EFF0F2;
        border:solid 1px #1C73BC;
        font:Arial normal 12px;
        font-weight:normal;
}

.AddItemtTitleHover
{
        font-weight:Bold;
        cursor:hand;
}

.AddItemsHover
{
        background-color:#1C73BC;
        color:White;
        text-align:left;
        font-size:12px;
```

```
		font-weight:bold;
		cursor:hand;
}

.Node
{
		font:Arial normal 12px;
		color:Black;
		height:20px;
}

.HoverNode
{
		cursor:hand;
		color:White;
		background-color:#316AC5;
}

.SelectedNode
{
		background:#CCCCCC;
		color:Black;
}

.StmtViewHeader
{
		color: black;
		font-weight: Bold;
		vertical-align:middle;
		font-size:12px;
		padding-right:3px;
	padding-left:3px;
}
.DataTableTitleSV
{
		BACKGROUND-COLOR: #1081C8;
		color:White;
		font-weight: Bold;
		text-indent: 5pt;
		height:20px;
		vertical-align:middle;
		text-transform:capitalize;
}
/* This is for reminder popup window body tag */
.PopupWindow
{
		margin: 0;
	padding: 0;
	background: #FFFFFF;
	color: #000;
	height: 100%;
	padding-bottom:3px;
		padding-left:5px;
	padding-right:2px;
	padding-top:5px;
}
.DataTableContentTitle
{
		BACKGROUND-COLOR:#009900;
		color:White;
```

```css
        font-size: 12px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
        border: 1px #0e0e0e;
}
.DataTableCell
{
        BACKGROUND:url(../images/button.gif) repeat-x;
        color:black;
        font-size: 10px;
        font-weight: Bold;
        text-indent: 5pt;
        height:20px;
        vertical-align:middle;
        text-transform:capitalize;
        border: 1px #0e0e0e;
}
.NormalButton
{
   BORDER-RIGHT: gray 1px solid;
   BORDER-TOP: white 1px solid;
   BORDER-LEFT: white 1px solid;
   BORDER-BOTTOM: gray 1px solid;
   background:url(../images/button.jpg) repeat-x;
}
.FindButton
{
   color:#ffffff;
   text-align:center;
   background:url(../images/findbutton.jpg) no-repeat;
}

.PressedButton
{
   BORDER-RIGHT: 1px inset;
   BORDER-TOP: 1px inset;
   BORDER-LEFT: 1px inset;
   BORDER-BOTTOM: 1px inset;
   background:url(../images/button.jpg) repeat-x;
}
.sop {
        font-family: Arial;
        font-size: 11px;
        font-weight: bold;
        color: #FFFFFF;
        text-decoration: none;
        background-image: url(../images/sop.png);
        background-repeat: no-repeat;
        margin: 0px;
        float: left;
        height: 18px;
        width: 34px;
        padding-top: 4px;
        padding-right: 0px;
        padding-bottom: 0px;
        padding-left: 0px;
}
```

```css
.sop:hover {
        font-family: Arial;
        font-size: 11px;
        font-weight: bold;
        color: #FFFFFF;
        text-decoration: none;
        background-image: url(images/sop1.png);
        background-repeat: no-repeat;
        margin: 0px;
        float: left;
        height: 18px;
        width: 34px;
        padding-top: 4px;
        padding-right: 0px;
        padding-bottom: 0px;
        padding-left: 0px;
}
.OperationsBackground {
        height:auto;
}
input([type=text]):([type=date]):([type=number]):focus,textarea:focus,select:focus{
        /*background-color:#FF0;*/
        border: 1px solid #77BACE;
        color:#000;
        }
/*
        td:focus{
        background-color:#FF0;
        border:1px solid #f1f1f1;
        }
*/
.main-content
{
        left:15%;
        width:85%;
        min-height: 500px;
        height:80%;
        overflow:auto;
        background: url(../images/sidebar_shadow.png) repeat-y left top;
        float: left;
        margin-top: -2px;
}
.action_btn
{
        background:url(../images/btn_Bg.png) no-repeat;
        width:80px;
        height:26px;
        border:none;
        color:white;
        padding-bottom:4px;
        font-family:Arial, Helvetica, sans-serif;
        font-size:12px;
        cursor:pointer;
        margin-left:3px;
        margin-right:3px;
        text-align: center;
}
.action_btnA
{
        background:url(../images/btn_BgA.png) no-repeat;
```

```css
            width:60px;
            height:26px;
            border:none;
            color:white;
            padding-bottom:4px;
            font-family:Arial, Helvetica, sans-serif;
            font-size:12px;
            cursor:pointer;
            margin-left:3px;
            text-align: center;
}
/*
button:hover
{
            background:url(../images/btn_bg_hover.png) no-repeat;

}
*/
```

Demo CSS

```css
*{
            font-size:12px;
}
body {
   font-family:helvetica,tahoma,verdana,sans-serif;
   padding:20px;
   font-size:13px;
   margin:0;
}
h2 {
   font-size:18px;
   color:#333;
   font-weight:bold;
   margin:0;
   margin-bottom:15px;
}
.demo-info{
            background:#FFFEE6;
            color:#8F5700;
            padding:12px;
}
.demo-tip{
            width:24px;
            height:16px;
            float:left;
}
```