[Draw your reader in with an engaging abstract. It is typically a short summary of the document. When you're ready to add your content, just click here and start typing.]

[MED POOL

[ALAITE COMPANY]

COMPUTER

ACKNOWLEDGEMENT

CONTENTS

Contents

DEFINITION OF TERMS

Authentication	This is the process of identifying the users' entities who are trying to access the system.
Client/Users	This is a professional of the healthcare centers and services and all patients of hospitals.
Confidentiality	This is the limited degree of access and disclosure to a given information that is given to every user of the system whereby every user is assigned a specific role.
Developers documentation	This is a document that is intended for software developers' use. It is contains the programing tools such as languages and hardware specifications used to create the system.
Documentation	This is a documentation that explains the various attributes regarding the attributes and properties related to the system.
Functional Requirements	This are all the specifications of functions and attributes of the system that meet the needs of the system users it also includes all the operations the system performs from the user inputs to the outputs in system user delivery.
GUI	This is the Graphical User Interface that is the interface that allows the user to access and use the system via graphical and animated icons and web apps that allows them to interact with the system.
Scalability	This is the ability of a computer application or product to work to

	function well if the size is changed in volume to meet the user needs.
Security	This is the protection of information from landing into the wrong hands, damage, alterations, exposure, disruptions or misdirection of services providence. It also includes controlling the physical access to hardware and protection against network threats such as unwanted IP addresses via the different types of network access.
Usability	This is the measurement of the system in-terms of effectiveness, efficiency and quality of a systems interface in meeting the users' requirement.
Validation	This is the process of investigating a system in-terms of design or data input. The validation can either be synchronous or asynchronous. Synchronous validation: This involves the running of algorithms against stored data in database to determine anomalies within the data. Asynchronous Validation: This involves the verification of all the data elements that are reported using both valid format and value.
Department	This are all the departments that are found in a registered hospital. They include Administration, Emergency, clinical services, public health, diagnostics, farewell parlor, finance, pharmacy and sores departments.

Blade	This is a directory that contains all the code that has been used to create a GUI
Database	This is a collection of information that is organized so that it can be easily accessed, managed and updated. Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information.
Routes	This is a function that maps all requests. Basic routing routes the request to the associated controllers. This chapter discusses routing.
Controllers	This is a function that acts as a directing traffic between Views and Models. In this chapter, you will learn about Controllers.

LIST OF ABBREVIATIONS

DBMS: DataBase Management System

DB: DataBase

UI: User Interface

HMIS: Health Management Information System

KNH: Kenyatta National Hospital

MCH: Mother and Child Health

1 INTRODUCTION

The Kenyan government intended mission is to make all the services and data information management of hospitals to be able to be accessed and managed online. This is to reduce paperwork in hospitals and to keep track of all hospitals payment and staff operations in hospital. The government also would like to track its citizens records from birth to death so as to enable the tracking and management of population census to date and to know the number of people born and dead in hospitals for the annual population evaluation.

1.1 GOAL OF MED POOL

1.2 PURPOSE OF MED POOL

1.3 SCOPE

The scope of Med Pool is to enable the users such as patients and workers in health centers such as hospitals to be able to input data digitally through forms and the data to be stored in online. The overall project is to enable tracking of patients from birth to death this is illustrated in the functionalities of the departments in hospitals.

Users can be able to interact with the system through the GUI by the use of filling in forms that can be accessed by that specific user who must be assigned a role. T

Hospitals sales can also be tracked as all the hospitals sales per day are accounted for by the end of the day for evaluation.

The online storage of data is implemented by the use of Data Servers that are offered by Oracle that also hosts the system application program.

The HMIS is divided into two phases (First Phase and Second Phase) with main and subsequent depending on hospital preference.

1.3.1 HMIS First phase.

Outpatient management

In-patient management

Outpatient management

Pharmacy management

Nurse observation room

Emergency room management

Procedures room management

Laboratory management

Phlebotomy

Radiology

Nurse station (inpatient clinical management)

Outpatient billing

In-patient billing

Discharge summary

Service management

Document management system

Digitization of patient records

Medical records department

Finance management

Store and inventory management

Supply chain management

Human resource management

1.3.2 HMIS PHASE 2

Insurance and claim management

Interface & integrate with third party applications eg mpesa

Operation theatre

Patient feedback management

Farewell home management

Biometric scanning

Diet management

Blood bank management

Guest management

Diagnostic management

Consultant management

Security management

Laundry management

Central registry file management

Queue management

Ambulance/ Fleet management

1.4 REVISION AND UPDATES

2 DEVELOPMENT AND FUNCTIONS

This is the section where requirements to be considered in the system development, implementation, support and maintenance of Med Pool systems are recorded. This section also entails both functional and nonfunctional requirements of the system.

2.1 TECHNICAL DOCUMENTATION

2.1.1 INFORMATION REQUIREMENT GATHERING

The Team used data collection methods such as observations and questionnaires to gather information. The field of study was the hospitals (KNH) and clinics. The team observed every activity in the field and identified the problems that were put to considerations after which the team's results were acknowledged by questioning the hospital staff who later gave us details of how their problems can be solved.

2.1.2 SYSTEM ANALYSIS

This is the act, process, or profession of studying an activity (such as a procedure, a business, or a physiological function) typically by mathematical means in order to define its goals or purposes and to discover operations and procedures for accomplishing them most efficiently.

The study of the hospital (KNH) was carried out and findings were recorded down in short notes after observing the daily activities of the hospital of what happens when a patient is admitted to the hospital up-to when he/she has been discharged. The problems encountered was that a lot of paperwork had to be done some of which whose records could be lost or hard to locate after a specific time for evaluation. The hospital used quick book for the finance department whose data was locally stored and encountered lots of both financial loss to the hospital because of biased hands.

These problems encountered were to be solved by creating an online system known as Electronic Health Record System known as Med Pool

that would reduce all the paperwork by enabling users to interact with the system by filling in each patient departmental forms online. Patients can also be tracked by creating an MCH sub department that records of birth can be recorded and also patients 'death can be added from the Farewell Parlor department and the records can be stored online. The system would also be able to calculate all sales the hospital has made for the day and keep records of pharmaceuticals and store medicines and goods for planning.

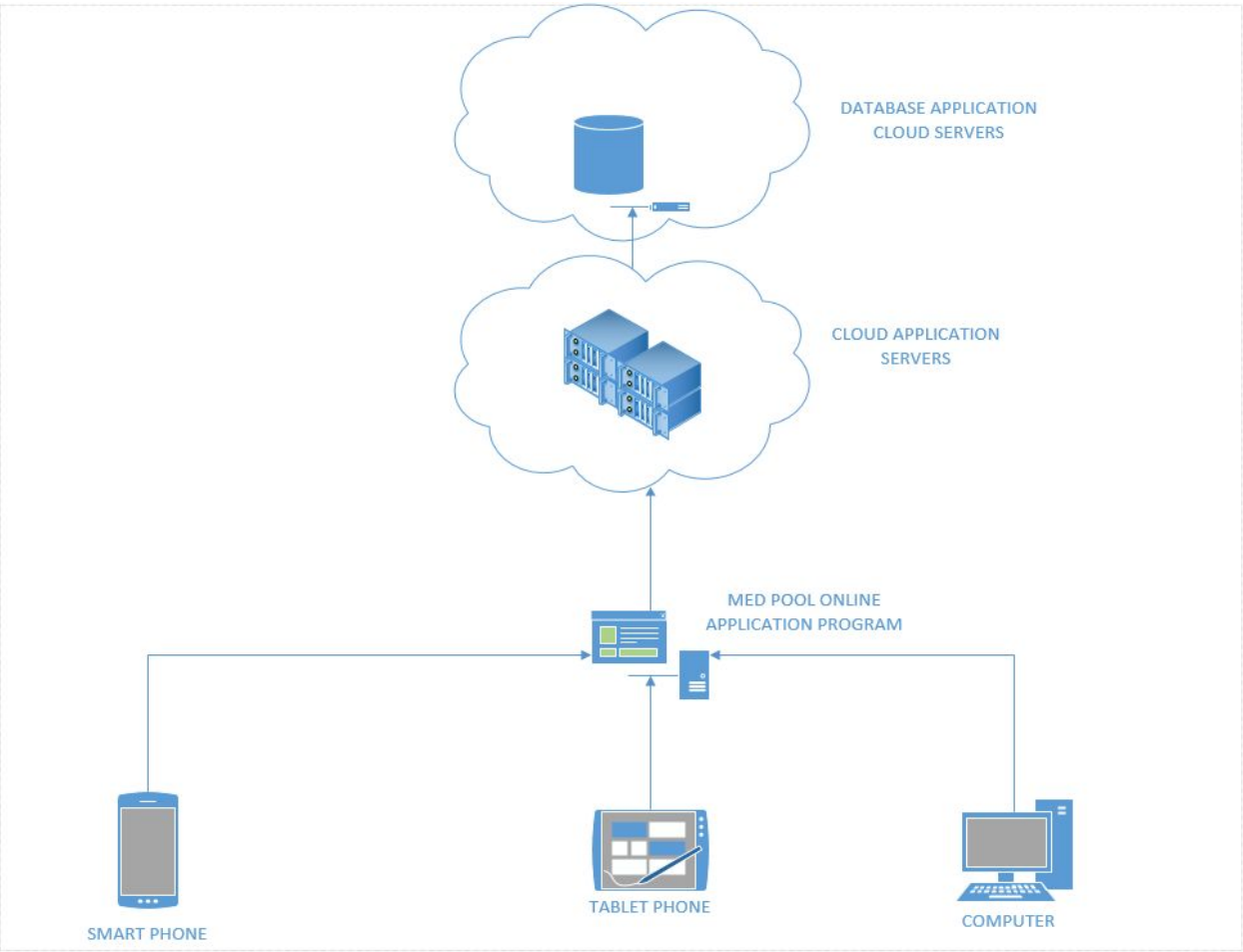
2.1.3 SYSTEM DESIGN

This is process of defining the elements of a **system** such as the architecture, modules and components, the different interfaces of those components and the data that goes through that **system**.

The system module is an EHR module whereby Single Board Computers types and all other devices that are designed and embedded to access real time systems that are online. It is also a system on module meaning it is a system on chip hence any real time device can access all the various modules that Med Pool can offer.

The system architecture include the conceptual models and views of the system. It also includes the behavioral process that the system will act when put to use. Med was designed in way that it could be interoperable and responsive. This is to mean that Med pool is designed to be accessed via all forms of communications such smartphones, tablets, laptops and computers as shown below.

UML



2.1.4 DEVELOPMENT AND IMPLEMENTATION

The team used Agile model for the development of Med Pool System. Agile model form of development status implies that the users opinions towards the development is more important compared to the developers opinion. The development team composed of six programmers and a project manager. The project manager would collect users opinions through questionnaires and interviews, then the programmers would create the system based on the users requirements after consultations of the programmers over the user views on the system.

Agile principles are all about being collaborative, flexible and adaptive. It's built on the premise that the world now changes regularly, and that means software teams no longer have years to bring new products to market. In that time, competitor offerings or customer expectations can change, and

the team risks irrelevance. Agile minimizes this risk by helping teams collaborate together more by adapting to what the team needs to be successful. It does this by encouraging teams to regularly show off their work and gather feedback so that they can adapt to change quickly.

Agile methodologies is based on four core principles as outlined below:

1. Prioritizing requirements based on risk since it's not possible to test everything
2. Automating tests to increase efficiency
3. Increasing the use of exploratory testing to accelerate the time from code delivery to test completion and to emphasize the need to create code that works
4. Adapting to changes from sprint to sprint

In general, there are four central tenets of the Agile Manifesto that are important for testers to remember:

1. Individuals and interactions over processes and tools
2. Working software over comprehensive documentation
3. Responding to change over following a plan
4. Collaborating with customers over contract negotiation

Therefore the system was based on the users opinion over the system idea.

2.1.4.1 DEVELOPMENT TOOLS

The six programmers designed and developed the Medpool System using various development tools as listed below.

1. The platform used to create Medpool is Known as Laravel which is a PHP Framework.
2. The programming Languages include: PHP, Javascript, HTML and laravel database language.
3. operating systems such as windows and Ubuntu linux were also used for the development.
4. Text editors for coding was PHP storm for jet brains company.

5. Gitlab is an online platform for updating the codes that are the various programming languages used to develop the system.

2.1.5 SYSTEM TESTING

When the development phase was done and the system was ready for operation, The Amut level 4 hospital decided to put the system to test whereby the programming team decided to use the Integration Testing as an alternative way to test the system.

Integration testing was chosen because:

•Unit tests only test the unit in isolation

•Many failures result from faults in the interaction of subsystems

•Often many Off-the-shelf components are used that cannot be unit tested

•Without integration testing the system test will be very time consuming

•Failures that are not discovered in integration testing will be discovered after the system is deployed and can be very expensive.

Integration testing refers to the practice of combining individually tested software components into an integrated whole. so different components of the system such as the GUI and database together with the functionalities were combined and tested all together. This is to technically verify proper interfacing between modules, and within sub-systems.

The team decided to use the sandwich method of integration testing to test the system hence the process include:

•Occurs both at the highest level modules and also at the lowest level modules

•Proceeds using functional groups of modules, with each group completed before the next

–High and low-level modules are grouped based on the control and data processing they provide for a specific program feature

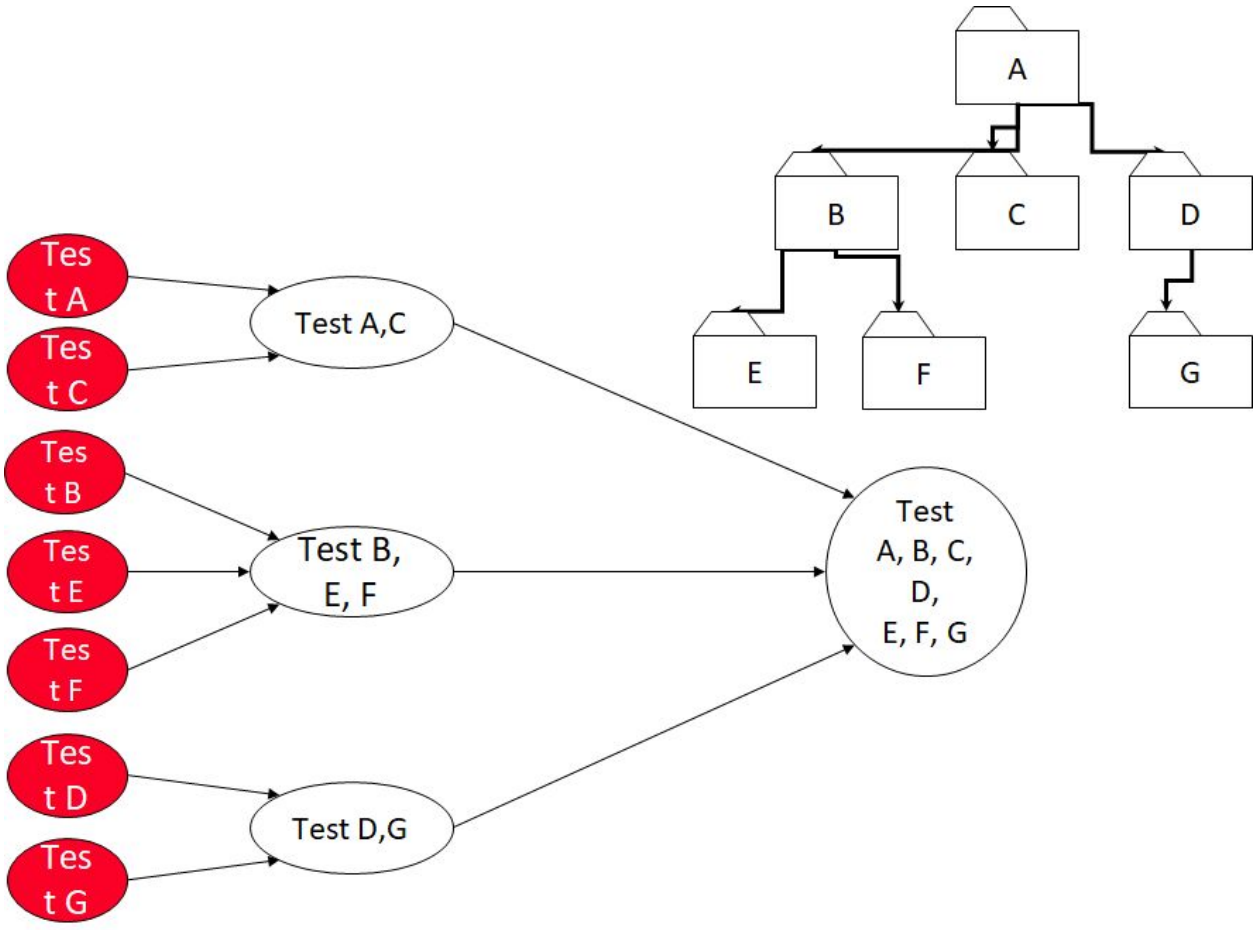
–Integration within the group progresses in alternating steps between the high and low level modules of the group

–When integration for a certain functional group is complete, integration and testing moves onto the next group

•Reaps the advantages of both types of integration while minimizing the need for drivers and stubs

•Requires a disciplined approach so that integration doesn't tend towards the "big bang" scenario.

Each module of the system was tested as shown below.



For validation process the blackbox testing was used because:

•Black-box test case design techniques were the most prevalent during integration, although a limited amount of white-box testing was used to ensure coverage of major control paths.

•After the system was integrated (constructed), a set of high-order tests were conducted. Validation criteria (established during requirements analysis) had to be tested. Validation testing provided final assurance that system met all functional, behavioral, and performance requirements.

2.1.6 MAINTENANCE

The system is maintained by the development team based on the users requirement whereby the user might require a change or an update on a various component of the system. The application and database program are all hosted at the Oracle Cloud Servers online hence both security, interoperability and database management are quite well handled. The only changes made are on the GUI and may be some functionalities.

2.1.7 MINIMUM MEDPOOL FUNCTIONAL REQUIREMENTS

This is the section where the functionalities of Medpool are explained for every department that is found in all registered hospitals. The system overall work is to reduce paperwork by enabling users to interact with the patient departmental forms and also keeps tracks of patients from birth to death and hospital sales of the day hence generating reports and analytics of data.

2.1.7.1 ADMINISTRATION

2.1.7.2 CLINICAL SERVICES DEPARTMENT

The clinical services department is the core of the Medpool system. The design of the system is such that all the information revolves around the patient. The development took into account existing standards issued by the ministry of health. All the forms recommended for use by the Ministry are included in the system. During the digitization of the forms, redundancy was well eliminated in order to save time for those involved in inputting data into the forms. The following is a list of the forms used in the system:

1. Orthopaedic examination form
2. Orthopaedic examination test
3. Orthopaedic examination patient standing
4. Orthopaedic examination length of motion
5. Diet sheet
6. Nutrition care process form
7. Occupational therapy initial assessment form
8. Ear nose throat examination form
9. Dental examination form
10. Oncology cbe results case management
11. Oncology cbe results discrete mass

12. Oncology cbe results final diagnosis
13. Oncology cbe results overall summary
14. Oncology cbe results physical exam
15. Oncology cbe results examination form
16. Morphine administration chart
17. Inpatient charge sheet
18. Allergy form
19. Investigation sheet
20. Ecg form
21. Secg request form
22. Allergy form
23. Audiogram
24. Treatment sheet
25. Pressure
26. Diabetic charts
27. Fluid in out chart
28. Four hourly temp chart
29. Morning and evening temp chart
30. Pulse chart
31. Diet chart
32. Nursing notes
33. Fall Assessment Form
34. Physical examination on admission
35. Pressure scorecard

36. Nursing Care Form
37. Morphine
38. Nursing
39. Laboratory Request Form
40. Maternity record
41. Admission form
42. Anaesthetic records
43. Infant record
44. Fluid intake output chart
45. Consent form
46. Foetal kit chart
47. Anc card
48. Audiogram
49. Blood transfusion observation form
50. Consultation request form
51. Continuation form
52. Diet requisition sheet
53. Eeg report
54. Head injury and craniotomy chart form
55. Icu observation chart
56. Intensive care unit respiratory sheet
57. Ipom chart
58. Laboratory report sheet patient file
59. Operation note

60. Partograph form
61. Patient assessment and progress card
62. Patient property declaration form
63. Pending patient file
64. Physiotherapy form
65. Preoperative checklist
66. Radiology report sheet patient file
67. Request for post modern examination
68. Secg request form
69. Ophthalmic general examination form
70. Blood pressure chart
71. Blood donation request form
72. Pharmacy withdrawal form
73. Radiotherapy treatment form
74. Case/Death Summary
75. Request for palliative care
76. Accident and emergency
77. Initial assessment form
78. General outpatient card
79. Maternity records
80. Initial nursing assessment form
81. Prescription Form
82. X Ray request form
83. Patient charge sheet

2.1.7.3 PUBLIC HEALTH DEPARTMENT

Medpool has a public health department that incorporates the capture of public health data as specified by the Ministry of Health(M.O.H). The following forms are included:

- MOH 240 Laboratory Register
- MOH 209 Radiology Register
- Child Health Card
- Child Immunization Card
- Vitamin A capsules form
- Public Health Development Milestones form
- BMI Index Calculator
- Previous pregnancy form
- Medical and Surgical history
- Physical examination form
- Health worker consultations form
- PMTCT form
- Child profile form

All the forms above have their corresponding reports and lists. Example is list of immunized children.

2.1.7.4 DIAGNOSTICS DEPARTMENT

Medpool has a diagnostics department that incorporates both the Laboratory Department and the Radiology Department. Forms in the Laboratory Department include:

- Blood Donation Unit Form
- General Lab Request Form
- Billed List
- Laboratory Test Request Forms
- Laboratory Report Sheets
- Laboratory Sample Forms
- Paid List
- MOH 240

Forms in the Radiology Department include:

- ECG Request Form
- MOH 209
- Radiology Request Form

2.1.7.5 FAREWELL PARLOUR DEPARTMENT

2.1.7.6 FINANCE DEPARTMENT

Medpool has a Finance Department that incorporates the following:

- Accounting
- Banking
- Sales
- Employee Salary Payment
- Invoices
- Patient Payment
- Insurance
- Billing
- Expenses
- Budget
- Taxes
- Orders

This department help to maintain a flexible and secure cash flow through every department in Medpool. Data Analytics and Reports are also made to help in decision making. Such include:

- Profit and Loss Charts
- Expenses Charts
- Income Charts
- Sales Charts
- Number of Patients in each Department
- Ratio on Patients in Different Departments

The finance department is flexible with will allow Medpool to work with any existing payment methods.

2.1.7.7 PHARMACEUTICALS DEPARTMENT

Medpool has a pharmaceuticals department module that helps in the management of drug administration to patients. The module also helps in inventory management of drugs and enables reporting of low supply of stock medicines. The department has the following forms:

- Add product/medicine drug form.
- Patient drugs order form.

The department module produces the following reports:

- Pharmacy billed list.
- Pharmacy dispensed list.

2.1.7.8 STORES DEPARTMENT

The stores department manages all the hospital inventory. This module allows the hospital to keep a record of all available items, the quantity and the price of each item.

the module allows for entry of new records once inventory is brought in and and updates automatically when items are used up.

The stores system ensures that items can only be requested for use if they're available.

Automatic alerts are issued to the store manager when inventory runs low for any item in the store. A lot of thought has gone into the design of this and other modules to allow them to work together.

2.1.8 MINIMUM MEDPOOL NON-FUNCTIONAL REQUIREMENTS

The development process of Medpool application conforms all the non-functional requirement of the system.

2.1.8.1 SECURITY

Medpool system ensures its users with security through various mechanism that ensures the system is secure from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording and destruction.

2.1.8.1.1 CONFIDENTIALITY

The system has mechanisms that offer secure authentication process by providing different access roles and users in sign ups.

Once a user accesses the system online he or she has to enter four different sign ups which include institutions, patients, staff, admins and contacts.

A user working for a specific hospital has to assign an institution that he or she is working in and then sign up as staff whereby she will be required to input the hospital name and roles he/she plays in the hospital which is a drop down entity of different hospital roles, a username which must be his/her email has to filled and password that only he/she knows is generated and then he/she will be able to access his/her roles in that specific department and hospital she has been assigned to.

Patients can also signup and create an account in the system and each account is protected as all patients must sign-up with an email account and a password is generated for that specific users and the same goes for all others.

There is a super administrator who is able to control the system user roles and requirements in the system. The super administrator controls the level of access of each user across the system and also has the power to make and remove the other users as administrator.

Each sales made during the day is also monitored and accounted as once a form and a patient is done with a specific department he/she has to pass through the finance department and pay for the services given. The total sales of the day are monitored and analyzed and reports generated. The finance department can only confirm the payment and send notifications back to the various department the patient is attending to.

Each user has different level of access as some include editing, adding, deleting, viewing and all rounded meaning he /she can perform all actions on the forms or page he/she can access.

2.1.8.1.2 INTEGRITY

Medpool system ensures client data is protected from alterations by unauthorized entities at all times, both during transmission and storage. This is achieved by the partnership that Oracle company has with Alaite Company that has the ownership of Medpool System. Oracle offers hosting services for both application and database programs that Medpool System has. This is done through:

Oracle Database 18c includes Oracle Real Application Security (RAS), the next generation Oracle Virtual Private Database (VPD). Oracle RAS is the industry's most advanced technology for supporting application security requirements. The out-of-the-box integration of Oracle RAS with Oracle Fusion Middleware and Oracle APEX eliminates custom development for securing application data thus providing end-to-end application security.

Oracle RAS provides a declarative model that enables security policies that encompass not only the business objects being protected but also the principals (users and roles) that have permissions to operate on those business objects. RAS is more secure, scalable, and cost effective than traditional Oracle VPD technology.

Oracle RAS Benefits include:

- End-user session propagation to the database
- Data security based upon application users, role, privileges, and various relationships
- Audit of end-user activity

- Simplified administration with declarative security

RAS allows developers to

- Define the data security policy in the database based on business objects
- Associate custom application privileges to authorize application-level operations on these business objects and
- Provision authorization to application users and roles which can be managed in LDAP compliant identity stores as well as in the database

With Oracle RAS, application users are authenticated in the application-tier as well as in the database. Irrespective of the data access path, the data security policies are enforced in the database kernel based on the end-user native session in the database. The privileges assigned to the user control the type of operations (select, insert, update and delete) that can be performed on rows and columns of the database objects.

Oracle Database 18c Virtual Private Database (VPD, first introduced in Oracle8i), provides an interface to associate PL/SQL packages with application tables. The PL/SQL package computes a predicate or "where" clause that is automatically appended to incoming SQL statements, restricting access to rows and columns within the table. VPD policies can be simple or complex depending on your security requirements, but almost always use an Oracle defined application context that is initialized by the application at runtime. VPD can be used to enforce row and/or column level security requirements for privacy and regulatory compliance. A simple VPD example might restrict access to data during business hours and a more

complex VPD example might read an application context during a login trigger and enforce row level security against an application table.

2.1.8.1.3 AVAILABILITY

Medpool system is a responsive system in that it can be accessed by any embedded real time device that can access real time online systems, this means that the system can be accessed via smartphones, tablets, laptops and computers as long as they are all connected to network/internet network.

2.1.8.2 SCALABILITY

Since the system is an EHR that is hosted by Oracle which provides online and cloud services the systems can be able to accomodate large amounts of data and users per hospital levels. This is done through:

2.1.8.2.1 High Availability

The availability of a system or any component in that system is defined by the percentage of time that it works normally. The formula for determining the availability for a system is:

Availability = average time to failure (ATTF) / [average time to failure (ATTF) + average time to recover (ATTR)]

For example, a system that works normally for twelve hours per day is 50% available. A system that has 99% availability is down 3.65 days per year on average. Critical systems may need to meet exceptionally high availability standards, and experience as little as four to five minutes of downtime per year.

Oracle Application Server is designed to provide a wide variety of high availability solutions, ranging from load balancing and basic clustering to providing maximum system availability during catastrophic hardware and software failures.

High availability solutions can be divided into three basic categories: local high availability, backup and recovery, and disaster recovery.

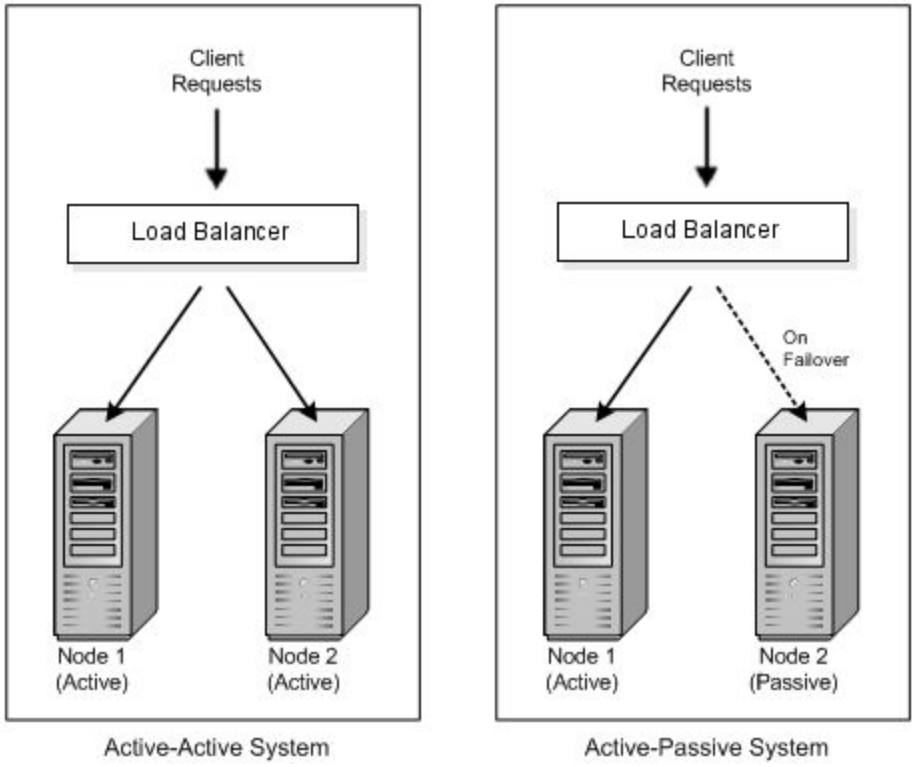
2.1.8.2.2 Local High Availability Solutions

Local high availability solutions ensure availability in a single data center deployment. These solutions guard against process, node, and media failures, as well as human errors. Local high availability solutions can be further divided into two types: active-passive and active-active.

Active-passive solutions deploy an active instance that handles requests and a passive instance that is on standby. When the active instance fails, the active instance is shut down and the passive instance is brought online, and resumes application services. At this point the active-passive roles are switched. This process can be done manually or it can be handled through vendor-specific clusterware. Active-passive solutions are generally referred to as cold failover clusters.

Active-active solutions deploy two or more active application server instances at all times. All instances handle requests concurrently.

The process is shown Below



In addition to architectural redundancies, other local high availability features include:

- **Process death detection and automatic restart:** Processes may die unexpectedly due to configuration or software problems. A proper process monitoring and restart system should monitor all system process constantly and restart them if there are problems.
- **Clustering:** Clustering components of a system together allows the components to be viewed functionally as a single entity from the client perspective. A cluster is a set of processes running on a single or multiple computers that share the same workload. A cluster contains one or more runtime instances of an Oracle Application Server with all of the cluster-wide configuration parameters set to the

same values. A cluster provides redundancy for one or more applications.

- **Configuration management:** A clustered group of similar components often need to share common configurations. Proper configuration management enables the components to synchronize their configurations and also provides highly available configuration management with less administrative downtime.
- **State replications and routing:** For stateful client requests, client state can be replicated to enable stateful failover of requests in the event that processes serving these requests fail.
- **Server load balancing and failover:** When multiple instances of identical server components are available, client requests to these components can be load balanced to ensure that the instances have roughly the same workload. With a load balancing mechanism in place, the instances are redundant. If any of the instances fail, requests to the failed instance can be sent to the surviving instances.
- **Connection failure management:** Clients often connect to services on the server and reuse these connections. When a process implementing one of these services on the server is restarted, the connection may need to be re-established. Correct re-connection management ensures that clients have uninterrupted service.

2.1.8.2.3 Backup and Recovery Solutions

Backup and recovery refers to the various strategies and procedures involved in guarding against hardware failures and data loss, and reconstructing data should a loss occur. There are failure scenarios that do not involve the catastrophic loss of an entire production environment. But regardless of the type of failure, once a failure has occurred in your system it is important to restore the failed component or process as quickly as possible.

User errors may cause a system to malfunction. In certain circumstances, a component or system failure may not be repairable. A backup and recovery facility should be available to backup the system at certain intervals and restore a backup when an irreparable failure occurs.

2.1.8.2.4 Disaster Recovery Solutions

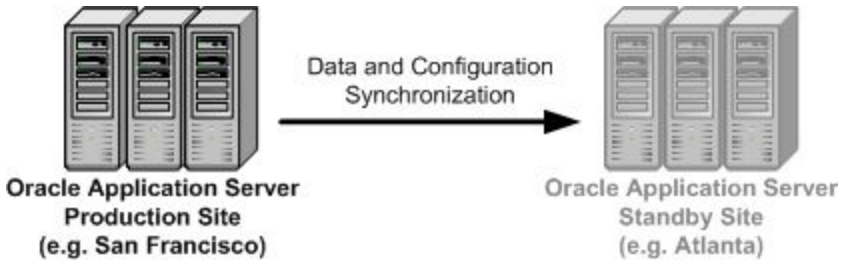
Disaster recovery solutions are usually geographically distributed deployments that protect your applications from disasters such as floods or regional network outages. Disaster recovery solutions typically set up two homogeneous sites, one active and one passive. Each site is a self-contained system. The active site is generally called the production site, and the passive site is called the standby site.

During normal operation, the production site services requests. In the event of a site failover or switchover, the standby site takes over the production role, and all requests are routed to that site.

To maintain the standby site for failover, not only must the standby site contain homogeneous installations and applications, but data and configurations must also be synchronized constantly from the production site to the standby site.

The figure below illustrates a geographically distributed disaster recovery solution.

Figure 8-2 Geographically Distributed Disaster Recovery



2.1.8.2.5 Oracle Application Server High Availability

Oracle Application Server provides local high availability, backup and restore, and disaster recovery solutions for maximum protection against any kind of failure with flexible installation, deployment, and security options.

Oracle Application Server local high availability is achieved by several active-active and active-passive solutions for the Oracle Application Server middle tier and the Oracle Application Server Infrastructure. With both active-active and active-passive high availability solutions, there are options that differ in ease of installation, cost, scalability, and security.

2.1.8.2.6 Oracle Application Server Backup and Recovery Solutions

Some failures require more involved recovery scenarios than simply restarting processes. In some cases, you will have to perform restoration operations based on backup procedures you have previously implemented.

A complete Oracle Application Server environment backup includes:

- A full backup of all files in the middle-tier Oracle homes (including Oracle software files and configuration files)
- A full backup of all files in the Infrastructure Oracle home (including Oracle software files and configuration files)
- A complete cold backup of the OracleAS Metadata Repository
- A full backup of the Oracle system files on each host in your environment

Failures that require the complete backup and restore solution for recovery include node failure where the node needs to be completely replaced, and the deletion or corruption of Oracle software or binary files. Failures that require this type of recovery solution also then require the manual restart of all processes.

2.1.8.2.7 Online Backup and Restore

Depending on the type of failure your system is experiencing, you may need to restore your system from an online backup. An online backup includes:

- An incremental backup of the configuration files in the middle tier Oracle homes
- An incremental backup of the configuration files in the Infrastructure Oracle home
- An online backup of the OracleAS Metadata Repository

Failures that require online backup and restore solutions for recovery include data failure in the metadata repository and deletion or corruption of Oracle Application Server component runtime configuration files. Failures that require this type of solution also then require one or more processes to be restarted.

2.1.8.2.7 Oracle Application Server Disaster Recovery Solutions

Built on top of the local high availability solutions is the Oracle Application Server disaster recovery solution. This solution requires homogeneous production and standby sites that mirror each other in Oracle Application Server and platform configurations. These configurations must be synchronized regularly to maintain the homogeneity.

2.1.8.3 USABILITY

Medpool is developed with the laravel PHP framework which is a platform where systems are easy to handle since it has an easy understandings for technical users from development to use.

This means that the system is easy to install in any hosting device for a specific hospital once all the requirements have been met for the policy and rights.

The platform also makes it easy to update the system based on the user requirements. since the codes to be changed and added are short and require less time to update, upload and merge online. This we can ascertain the user that it

will entirely depend on the programers analysis toward the change and the online platforms for merging and hosting of the system.

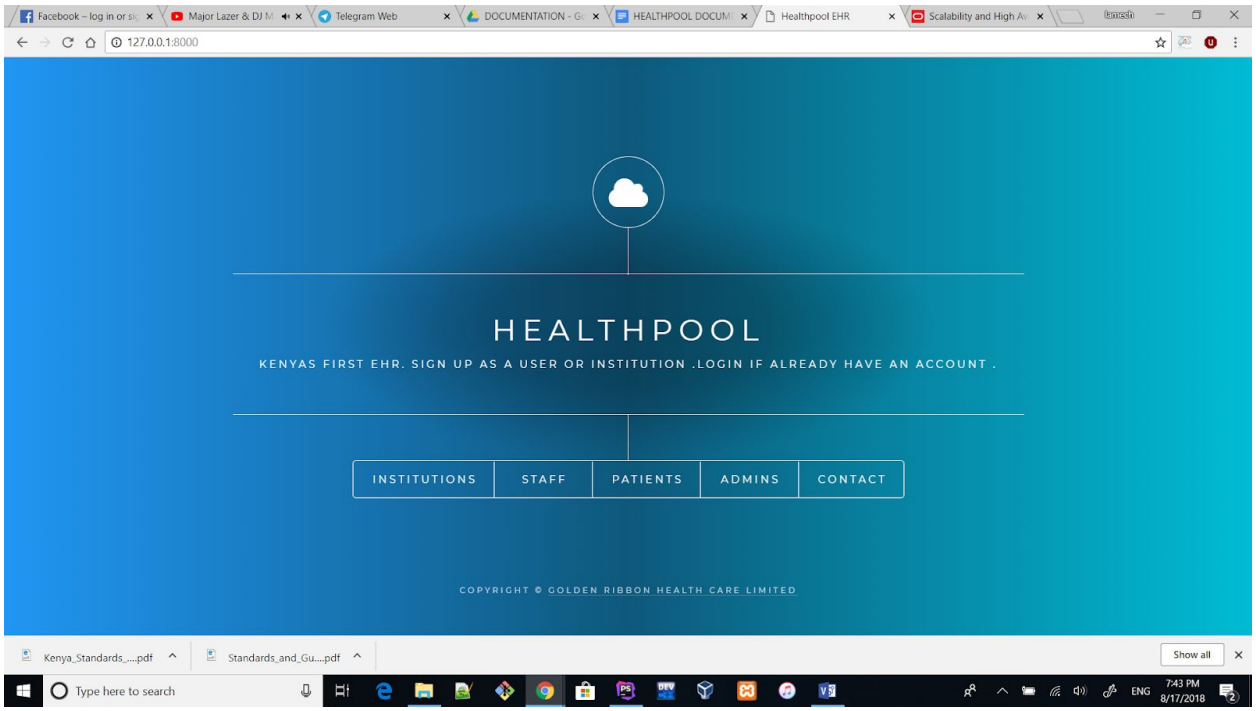
The system GUI was based on users requirements as during development the model used was Agile Methodology which valued users opinions over the developers' opinion hence the system should be easy and efficient to use.

2.1.8.4 DATA VALIDATION

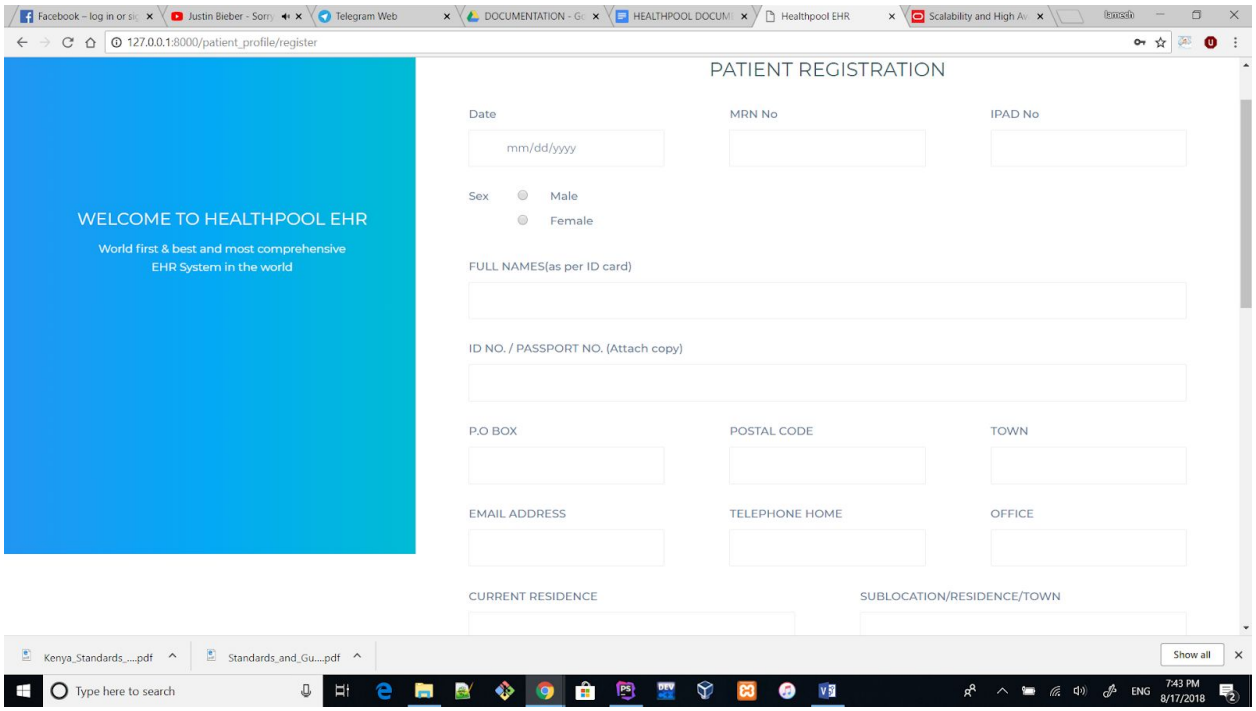
The system provides mechanisms for validating data during data entry at source by ensuring at the forms and pages where data are entered only allowed the specific type of input to be entered is accepted whether it is a name, text or number and so on. Hence every length of data is specified and the data is tracked for end users up to the database storage.

2.2 SAMPLE SCREEN SHOTS

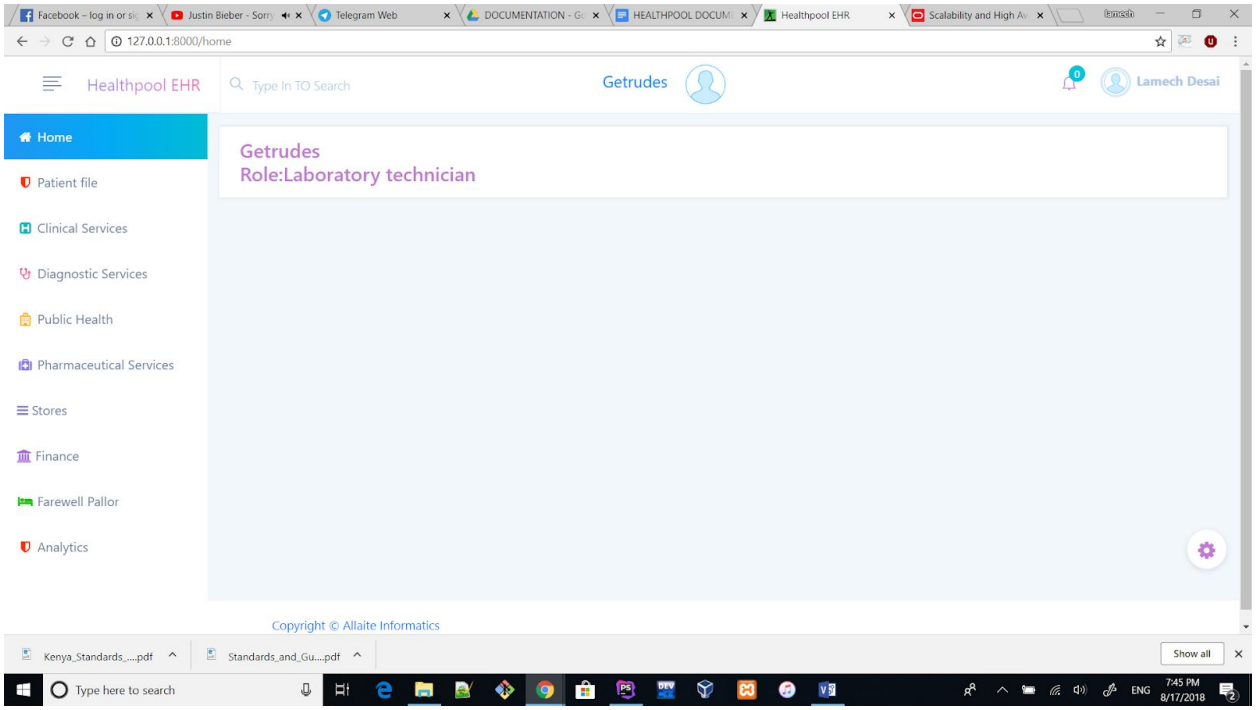
1. When a user accesses the system.

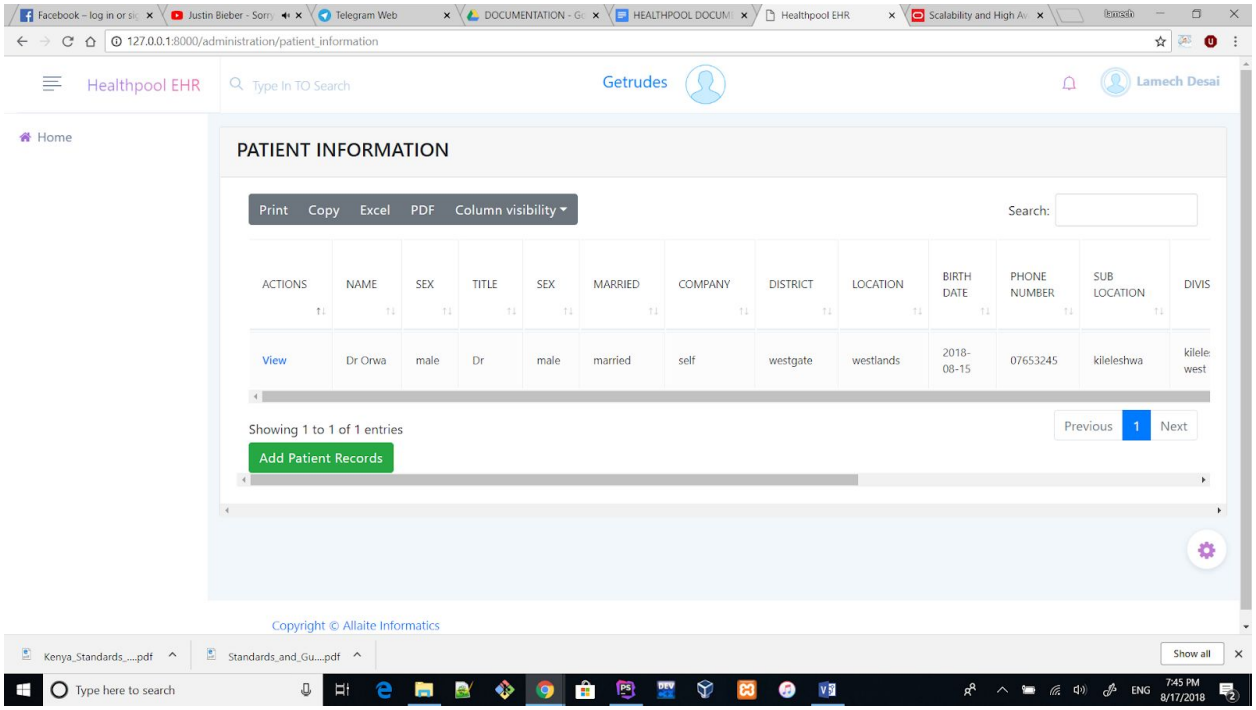


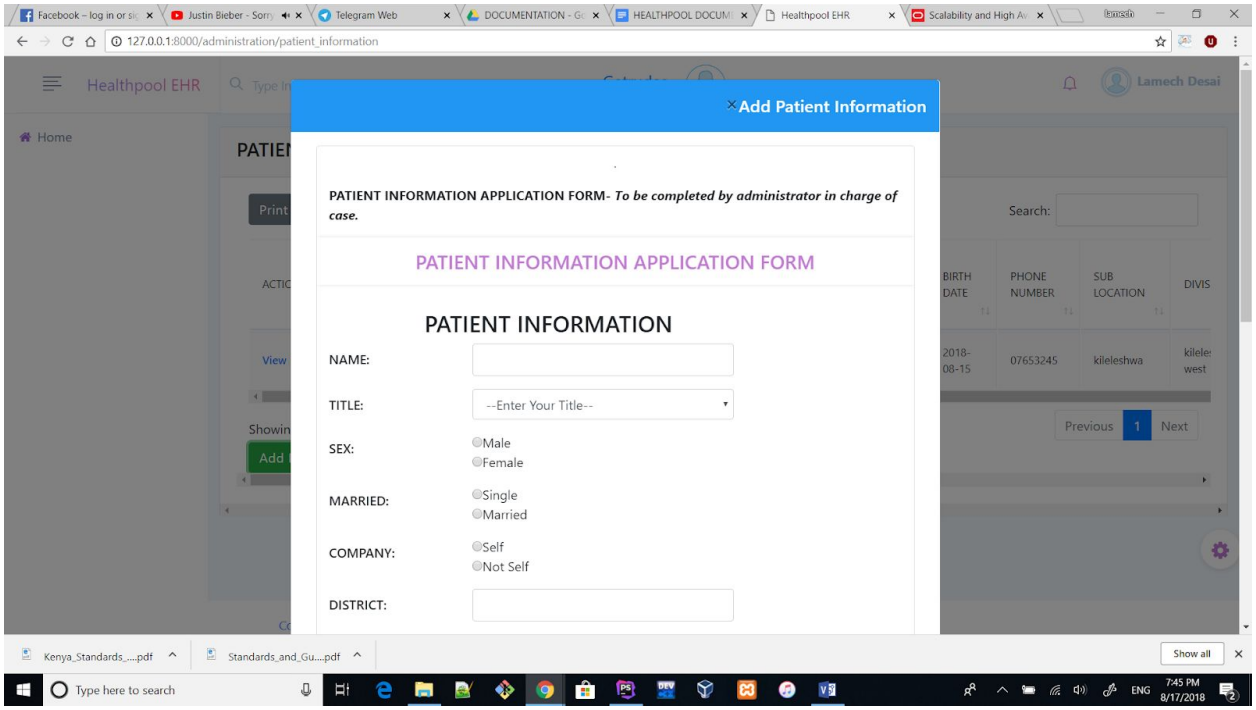
2. When a user signs-up as patient.



3. When a user has registered as lab technician and is assigned a hospital and a role he/she can access the system and access the forms assigned to him/her as you can see the user has accessed the ‘patient information form’ and clicked the add patient record button and the form has popped up.


Healthpool EHR
Type In TO Search
Getrudes
Lamech Desai
Home
Patient file
Clinical Services
Diagnostic Services
Public Health
Pharmaceutical Services
Stores
Finance
Farewell Pallor
Analytics
Getrudes
Role:Laboratory technician
Copyright © Allaite Informatics


Healthpool EHR
Type In TO Search
Getrudes
Lamech Desai
Home
PATIENT INFORMATION
Print
Copy
Excel
PDF
Column visibility
Search:
ACTIONS
NAME
SEX
TITLE
SEX
MARRIED
COMPANY
DISTRICT
LOCATION
BIRTH DATE
PHONE NUMBER
SUB LOCATION
DIVIS
View
Dr Orwa
male
Dr
male
married
self
westgate
westlands
2018-08-15
07653245
kileleshwa
kilele west
Showing 1 to 1 of 1 entries
Previous
1
Next
Add Patient Records
Copyright © Allaite Informatics



2.3 CONCLUSION

The system should be able to solve not all but a maximum of problems experienced encountered in the hospital and the ministry of health by both patients and hospital staff in general, as the main future prospects of Medpool as an EHR is to improve healthcare services across the world by providing online access of forms and data storage compared to the ERP which is an offline system.