Web Based Chronic Kidney Disease Surveillance System

A dissertation submitted for the Degree of Master of Information Technology

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Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of Mr. A.M.S.M.Atapattuunder my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

Certified by:

Supervisor Name: Mr. G.K.A. Dias

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Signature: Date:

Abstract

This Web base Application, developed based on comprehensive evidences and the expertise of the specialist doctors in the country, is intended to be used by the primary care doctors. The intention of these Web base Application is to help doctors in decision making in low resource settings ensuring the best plan of management for every patent.

The shared care by the primary care doctors in the referral health care facilities and the specialist doctors based in tertiary care facilities will maximize the benefits to both patients and the Health Service.

Here, we describe the process and methods used to establish this national Chronic Kidney Disease Surveillance System. The major Chronic Kidney Disease components covered include burden (incidence and prevalence), risk factors, awareness, health consequences, processes and quality of care, and health system capacity issues. Goals include regular reporting of the data collected, plus development of a dynamic project web site and periodic issuance of a Chronic Kidney Disease fact sheet.

This system will provide an important foundation for widespread efforts toward primary prevention, earlier detection, and implementation of optimal disease management strategies, with resultant increased awareness of Chronic Kidney Disease, decreased rates of Chronic Kidney Disease progression, lowered mortality, and reduced resource utilization.

A Web-based consultation system enables family physicians to consult a nephrologist about a patient with chronic kidney disease. Relevant data are exported from the patient's electronic file to a protected digital environment from which advice can be formulated by the nephrologist. The primary purpose of this study was to assess the potential of telenephrology to reduce in-person referrals.

This System used in technologies are PHP, CSS, Bootstrap and Java scripts languages. Data based Designed in MYSQL.

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LIST OF ABBREVIATIONS

CKD	-	Chronic Kidney Disease
GUI	-	Graphical user Interface
OS	-	Operation System
RAM	-	Random Access Memory
CPU	-	Central Processing Unit
HD	-	Hard Disk
RDHS	-	Regional Director of Health Service
MOH	–	Medical Officer of Health
PHN	-	Personal health Number
RDE	-	Recipient Donor Evaluations

Chapter 1: Introduction

Surveillance of Chronic Kidney Disease Management System is powerful, flexible, and easy to use and is designed and developed to deliver real conceivable benefits to hospitals.

Surveillance of Chronic Kidney Disease Management System is designed for multispecialty hospitals, to cover a wide range of kidney patient's administration and management processes. It is an integrated end-to-end Surveillance of Chronic Kidney Disease Management System that provides relevant information across the hospital to support effective decision making for kidney patient's administration.

This web based application is designed to accommodate electronic kidney disease clinical patient management. It is a dedicated clinical and patient management system designed specifically to satisfy the exacting demands of different members of the renal multidisciplinary team.

1.1 Problem Introduction

Lack of immediate retrievals: -

The information is very difficult to retrieveand to find particular information like- E.g. - To find out about the patient's medical history, the user has to go through various registers. This results in inconveniencesand wastage of time.

Lack of immediate information storage: -

The information generated byvarious transactions takes time and efforts to be stored at right place.

Lack of prompt updating: -

Various changes to information like patientdetails or immunization details of child are difficult to make as paper work isinvolved.

Preparation of accurate and prompt reports: -

This becomes a difficulttask as information is difficult to collect from various registers.

1.2 Objective

Overview of the available functions

Component	Component Name	Sub Components
	Patient Management	Register new patient Update patient information Search patient information
	Patient follow up	**Clinic visit** Add clinic visit **Hospital Admission** Add hospital admission **Dialysis** Add Dialysis event **Recipient Donor Evaluation** Add RDE event Add Death Notification
	Report Generation	Institutional Reports Patient Count Report Gender Distribution of count District Reports Patient Count Report Gender Distribution of count Province Reports Patient Count Report Gender Distribution of count DS Division/MOH Report Patient Count Report Gender Distribution of count Individual Patient Reports

Table 1 : Functions of proposed system

Project is related to Surveillance of Chronic Kidney Disease Management System.

The project maintains two levels of users:-

- Administrator Level
- User Level
  I. Hospital Level
  II. RDHS Level
  III. Provincial Level
  IV. MOH Level

Main facilities available in this project are:-

- Maintaining records of hospitalization /clinic visits patients.
- Maintaining patients diagnosis details, advised tests to be done.
- Providing different test facilities to a doctor for diagnosis of patients.
    i. X-Ray Report
    ii. Urine Test Report
    iii. Stool Test Report
    iv. Sonography Test Report
    v. Gastroscopy Test Report
    vi. Colonoscopy Test Report
    vii. Blood Test Report
    viii. Biochemistry Test Report
    ix. Death Notification Reports
- Maintaining patient's injection entry records.
- Maintaining patient's prescription, medicine and diet advice details.
- Maintaining backup of data as per user requirements (between mentioned dates).
- If user forgets his/her password then it can be retrieved by hint question.
- In this project collection of data is from different pathology labs.
- Results of tests, prescription, precautions and diet advice will be automatically updated in the database.
- Related test reports, patient details report, prescription and billing reports can be generated as per user requirements.
- User or Administrator can search a patient's record by his/her name or their registration date.

Chapter 2: Background

2.1 Proposed System

This software application is designed to electronically manage kidney disease patient information. It is a dedicated clinical and patient management system designed specifically to satisfy the exacting demands of different members of the real multidisciplinary team. The proposed system consists of four major components. The following table gives an overview of components and subcomponents of the intended system.

Component	Component Name	Sub Components
1.	Patient Management	Register new patient Update patient information Search patient information
	User Management	Manage Users Create new user (Including adding user level and basic information) View all users Manage user Groups Create new user group View all user groups View all users according to groups
	Patient follow up	**Clinic visit** Add clinic visit Update clinic visit Delete clinic visit View clinic visit **Hospital Admission** Add hospital admission Edit hospital admission Delete hospital admission

		View hospital admission **Dialysis** Add Dialysis Edit Dialysis event Delete Dialysis event View Dialysis event **Recipient Donor Evaluation** Add RDE event Edit RDE event Delete Dialysis event View Dialysis event **Post KT clinic** Add Post KT clinic visit Edit Post KT clinic visit Delete Post KT clinic visit View Dialysis event **Death Notification** Add Death Notification event Edit Death Notification event Delete Death Notification event View Death Notification event
	Report Generation	Institutional Reports Patient Count Report Age Distribution(Median, Mode) Gender Distribution Clinic visits report District Reports Patient Count Report

		Age Distribution (Median, Mode) Gender Distribution Province Reports Patient Count Report Age Distribution (Median, Mode) Gender Distribution DS Division/MOH Report Patient Count Report Age Distribution (Median, Mode) Gender Distribution Individual Patient Reports Reports according to ICD-10 code Reports according to selected variables in the History/ Examination/ Investigation and treatment plan Audit Reports All Generate Reports can be Downloadable in Excel/PDF format.

Table 2 : Proposed System Requirements

2.2 Functional Requirements

2.2.1 Register patients

Available functionality in the current system along with;

The system produced a unique number for each patient (Number configuration) which will be available just after registering a new patient in printable format with bar code compatibility.

The unique number shall comply with the PHN (Personal health Number) specified by the national e-health guidelines and standards- NeGS 1.0[8]

Point of Issue number	Serial Number	Check Digit
XXXX (4 digit alpha numeric number)	XXX XXX (6 digit numeric)	C

Table 3 : Register Patient

2.2.2 User Management

The system created new users with the following basic information

1. Name
2. Age
3. Gender
4. Position
5. Institution
6. Password
7. User level

- The system has a user to create a new password and edit/ update the user profile.
- The system has a list all the users who are registered.
- The system has a list all user groups.
- The system has a create new user group levels and reallocate users to new user groups.
- The system has a list all the registered users according to the user levels.
- The system has the administrator level users to edit/delete user profiles/ user levels and user level profiles.
- The system allocated specific functionalities (In above all four components) to different user levels.

2.2.3 Patient follow-up

Search patient

- The system searched registered patient profiles by using the unique number the system is generating/ NIC number/ a part or the full surname, by institution.
- The searched patient profile should list all the clinic visits/ hospital admission events/ Dialysis events/ RDE events/ Post KT clinic visits/ Death Notifications which are relevant to that particular patient.

Clinic Visits

- The system add the clinic visit to a registered patient depending on searching for the relevant patient by the unique ID, NIC number or the surname or institution.
- The system update/edit the relevant information of a clinic visit.
- The system delete the relevant information of a clinic visit after confirmation.

Hospital Admission

- The system add the hospital admission event to a registered patient depending on searching for the relevant patient by the unique ID, NIC number or the surname or institution.
- The system update/edit the relevant information of a hospital admission event.
- The system delete the relevant information of a hospital admission event after confirmation.

Dialysis event

- The system add the Dialysis event to a registered patient depending on searching for the relevant patient by the unique ID, NIC number or the surname or institution.
- The system update/edit the relevant information of a Dialysis event.
- The system delete the relevant information of a Dialysis event after confirmation.

Recipient Donor Evaluation

- The system add the Recipient Donor Evaluation event to a registered patient depending on searching for the relevant patient by the unique ID, NIC number or the surname or institution.
- The system update/edit the relevant information of a Recipient Donor Evaluation event.

- The system delete the relevant information of a Recipient Donor Evaluation event after confirmation.

Post Kidney Transplant clinic

- The system add the Post Kidney Transplant clinic visit to a registered patient depending on searching for the relevant patient by the unique ID, NIC number or the surname or institution.
- The system update/edit the relevant information of a Post Kidney Transplant clinic visit.
- The system delete the relevant information of a Post Kidney Transplant clinic visit after confirmation.

Death Notification

- The system add the Death Notification to a registered patient depending on searching for the relevant patient by the unique ID, NIC number or the surname or institution.
- The system update/edit the relevant information of a Death Notification.
- The system delete the relevant information of a Death Notification after confirmation.
- The Immediate Cause of Death, Underlying Cause of Death and Contributory Causes of death has entered in ICD-10.

2.2.3 Reports

- Reports generated for individual patients and aggregate reports as described below.
- Report generation has a selected/different user levels.
- All reports downloaded in excel/ pdf format.

Aggregate Reports:

- Patient counts depicted as count, percentage and density in pivot tables, trend lines and in maps according to the institution/ MOH/ RDHS/District/ Provincial and Island wide values depending on the time period.
- Patient lists generated according to the institution/ MOH/ RDHS/ Provincial and Island wide values depending on the time period.

- The selection of the time distribution, location, information type and data view type shall be according to the below mock-up.

Figure 1:proposed system interface

Patient lists and counts (as count, percentage and density in pivot tables, trend lines and in maps according to the institution/ MOH/ RDHS/District/ Provincial and Island wide values depending on the time periodfigure 2

Individual Reports:

The system generated individual reports inclusive of registration details, a summary of Clinic Visits, Hospital Admissions, Dialysis events, Recipient Donor Evaluations, Post Kidney Transplant clinic visits and Death Notification. (This summary has a tabulated format where each event is summarized into date, event and the location→ e.g. 2016/07/10 --------Clinic Visit 01 ----------TH Anuradhapura)

The summary events has a linked with the original entry.

The individual report has an inclusive of all the history, examination, investigation and intervention details regarding the patient.
Individual reports/ parts of the individual reports/ entries of the reports shall be editable and delectable by permitted user levels.

2.2.5 Home

The home page contains Main article and news tag lines leading to articles and those should be deleted/ updated or changed by administrative level users.

The home page also contains important links to relevant sites and download links to necessary documents/ literature.

The home page contain view/edit profile, change password and log out links to the logged in user.

2.2.6 About

The 'about' page contain the links to contact details of necessary units and personnel along with a map and other preferred details by the Epidemiology unit.

2.3Non- Functional Requirements

These are the non-functional requirements of this project:-

- The system scalable depending on the future requirements.
- The software interface follow reputed international design conventions which allow for familiar location of drop down menus, help buttons (radio buttons and other user friendly interface options etc.)
- Usability standards maintained (i.e. proper and accepted screen element density, layout and flow, colours, UI metaphors, keyboard shortcuts)
- More than five attempts at login and failure has a produce a red flag to system administrator.
- The system log off of the current profile if there's no detectable user activity within five minutes.
- The system comply with the latest security guidelines in coding [9] to protect from any possible threat to the nationally important data.

- The software technically safeguarded according to HIPAA [30] rules as this contains individual and sensitive clinical data.
- The system fine-tuned to minimize the resource utilization while functioning.
- The system reliable and not lose any data in any transaction while functioning.
- All the functions of the system has a accurate and robust.
- Inputs validated according to the preference of the relevant authorities of the Epidemiology Unit and the input errors has a returned in red with appropriate message box and alert sound.
- The system maintain an audit trail to visualize the timestamps and user details per specific transaction.
- The system scalable to accommodate Sinhala and Tamil languages
- The system independent of the operating system and the browser platforms of individual users.
- The system adopt the Lanka Interoperability Framework where necessary[31]
- The system used the HL7 (Health Level 7) standard for the purpose of Data Exchange [32]
- The system a comply with the national e-health standards and guidelines [33] where necessary.
- The system send automatic back-ups of the system and the database to a referenced location on weekly basis
- Response times, Processing times and Query and Reporting times has a not lag more than 5 seconds.

2.4Goals of proposed system

1. **Planned approach towards working: -** The working in the organization will be well planned and organized. The data will be stored properly in data stores, which will help in retrieval of information as well as its storage.

2. **Accuracy: -** The level of accuracy in the proposed system will be higher. All operation would be done correctly and it ensures that whatever information is coming from the center is accurate.

3. **Reliability: -** The reliability of the proposed system will be high due to the above stated reasons. The reason for the increased reliability of the system is that now there would be proper storage of information.

4. **No Redundancy: -** In the proposed system utmost care would be that no information is repeated anywhere, in storage or otherwise. This would assure economic use of storage space and consistency in the data stored.

5. **Immediate retrieval of information: -** The main objective of proposed system is to provide for a quick and efficient retrieval of information. Any type of information would be available whenever the user requires.

6. **Immediate storage of information: -** In manual system there are manyproblems to store the largest amount of information.

7. **Easy to Operate:** - The system should be easy to operate and should be suchthat it can be developed within a short period of time and fit in the limited budget of the user.

2.5 Software Requirement Specification

Client-Server environment is used to deploy the Surveillance of Chronic Kidney Disease Management System.

Server environment:-

Toshiba notebook is used as "Development server" on Windows 7 system environment. The Following software versions are used to setup the "Development Server".

- Apache version: 2.2.21
- PHP version: 5.3.8
- MySQL version: 5.5.16

After doing the extensive research on a cost basis, Linux platform is chosen for "Live Server" OfSurveillance of Chronic Kidney Disease Management System. A Linux Shared Hosting account is purchased to deploy the live site. The following software versions are used in the Shared Hosting Live Server.

- Apache version: 2.2.15
- PHP version: 5.2.13
- MySQL version: 5.0.92

Client environment:-

Any modern web browsers could be used as client tool from any modern Operating systems Such as Windows, Linux & Mac.

2.6 Feasibility Study

Depending on the results of the initial investigation the survey is now expanded to a more detailed feasibility study. "FEASIBILITY STUDY" is a test of system proposal according to its workability, impact of the organization, ability to meet needs and effective use of the resources. It focuses on these major questions:

- What are the user's demonstrable needs and how does a candidate system meet them?
- What resources are available for given candidate system?
- What are the likely impacts of the candidate system on the organization?
- Whether it is worth to solve the problem?
- During feasibility analysis for this project, following primary areas of interest are to be considered.
- Investigation and generating ideas about a new system does this.

Steps in feasibility analysis: Eight steps involved in the feasibility analysis are:

1) Form a project team and appoint a project leader.
2) Prepare system flowcharts.
3) Enumerate potential proposed system.
4) Define and identify characteristics of proposed system.
5) Determine and evaluate performance and cost effective of each proposed system.
6) Weight system performance and cost data.
7) Select the best-proposed system.
8) Prepare and report final project directive to management.

Technical feasibility

A study of resource availability that may affect the ability to achieve an acceptable system. This evaluation determines whether the technology needed for the proposed system is available or not.

1) Can the work for the project be done with current equipment existing software technology & available personal?
2) Can the system be upgraded if developed?
3) If new technology is needed then what can be developed?
4) This is concerned with specifying equipment and software that will successfully satisfy the user requirement.

The technical needs of the system may include:Front-end and back-end selection

An important issue for the development of a project is the selection of suitable front-end and back-end. When we decided to develop the project we went through an extensive study to determine the most suitable platform that suits the needs of the organization as well as helps in development of the project. The aspects of our study included the following factors.

Front-end selection:

1) It must have a graphical user interface that assists employees that are not from IT background.
2) Scalability and extensibility.
3) Flexibility.
4) Robustness.
5) According to the organization requirement and the culture.
6) Must provide excellent reporting features with good printing support.
7) Platform independent.
8) Easy to debug and maintain.
9) Event driven programming facility.
10) Front end must support some popular back end like MY SQL. According to the above stated features we selected Bootstrap as the front-end for developing our project. Surveillance of Chronic Kidney Disease Management System.

Back-end Selection:

1) Multiple user support.
2) Efficient data handling.
3) Provide inherent features for security.
4) Efficient data retrieval and maintenance.
5) Stored procedures.

6) Popularity.
7) Operating System compatible.
8) Easy to install.
9) Various drivers must be available.
10) Easy to implant with the Front-end.

According to above stated features we selected MY SQL as the backend. The technical feasibility is frequently the most difficult area encountered at this stage. It is essential that the process of analysis and definition be conducted in parallel with an assessment to technical feasibility. It centers on the existing computer system (hardware, software etc.) and to what extent it can support the proposed system.

Economic feasibility

Economic justification is generally the "Bottom Line" consideration for most systems. Economic justification includes a broad range of concerns that includes cost benefit analysis. In this we weight the cost and the benefits associated with the candidate system and if it suits the basic purpose of the organization i.e. profit making, the project is making to the analysis and design phase. The financial and the economic questions during the preliminary investigation are verified to estimate the following:

1) The cost to conduct a full system investigation.
2) The cost of hardware and software for the class of application being considered.
3) The benefits in the form of reduced cost.
4) The proposed system will give the minute information, as a result the performance is improved which in turn may be expected to provide increased profits.
5) This feasibility checks whether the system can be developed with the available funds. The Surveillance of Chronic Kidney Disease Management System does not require enormous amount of money to be developed. This can be done economically if planned judicially, so it is economically feasible. The cost of project depends upon the number of manhours required.

Operational Feasibility

It is mainly related to human organizations and political aspects. The points to be considered are:

1) What changes will be brought with the system?
2) What organization structures are disturbed?
3) What new skills will be required? Do the existing staff members have these skills? If not, can they be trained in due course of time?
4) The system is operationally feasible as it very easy for the End users to operate it. It only needs basic information about Windows platform.

Schedule feasibility

Time evaluation is the most important consideration in the development of project. The time schedule required for the developed of this project is very important since more development time effect machine time, cost and cause delay in the development of other systems.

A reliable Surveillance of Chronic Kidney Disease Management System can be developed in the considerable amount of time.

2.7 Architecture of the proposed system

Mainly, the system is divided into three components: user interfaces, programs (modules) and database. Surveillance of Chronic Kidney Disease Management System have been used for all the components, as Surveillance of Chronic Kidney Disease Forms for user interfaces, Surveillance of Chronic Kidney Disease for source codes (modules), and Surveillance of Chronic Kidney Disease database for database. Therefore, the *front end* and *back end*, of the system are independently behaved. The interaction of three components are shown in the Figure 2

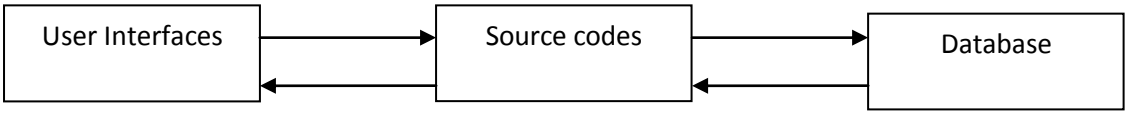

Figure 2:Architecture of Proposed System

The system runs on Windows environment. MY SQL commands have also been used in the 4gl modules.

2.7.1 Proposed System Phase

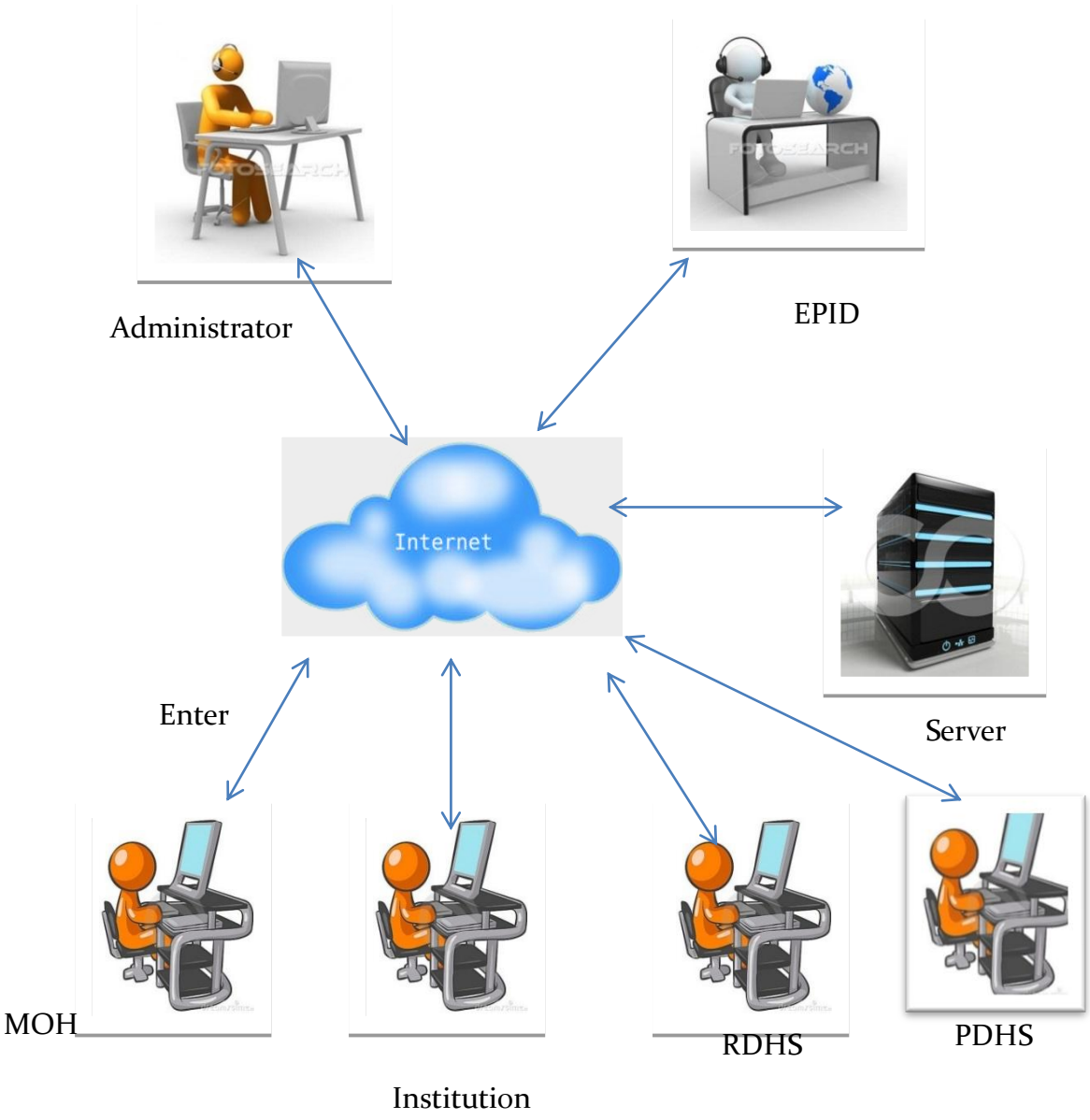

Figure 3 :propose system phase

2.8 work breakdown structure of the proposed system

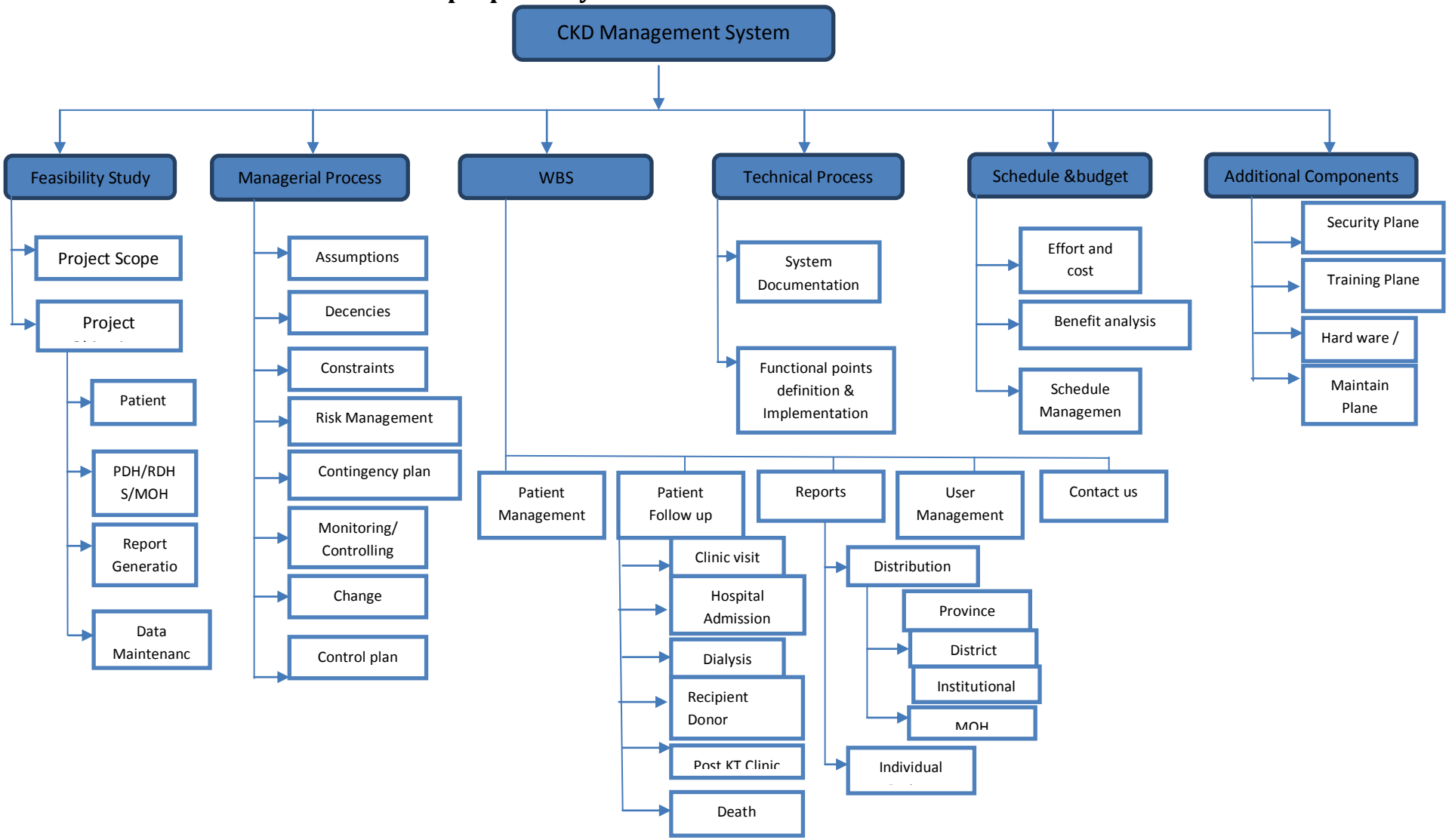

Figure 4:Work brake down diagram

2.9 Use Case of proposed system

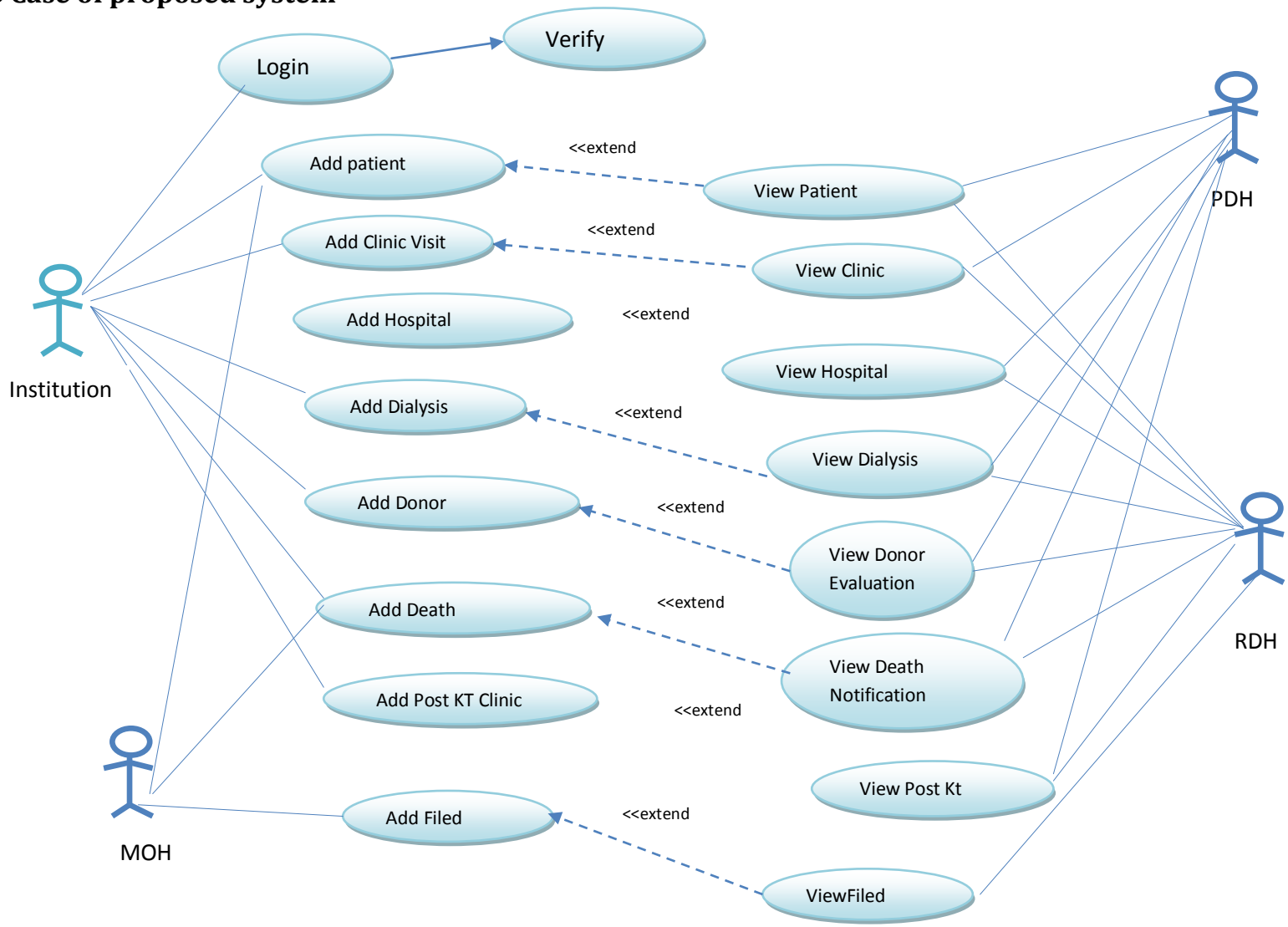

Figure 5:System Use case Diagram

2.10 Activity diagram of the proposed system

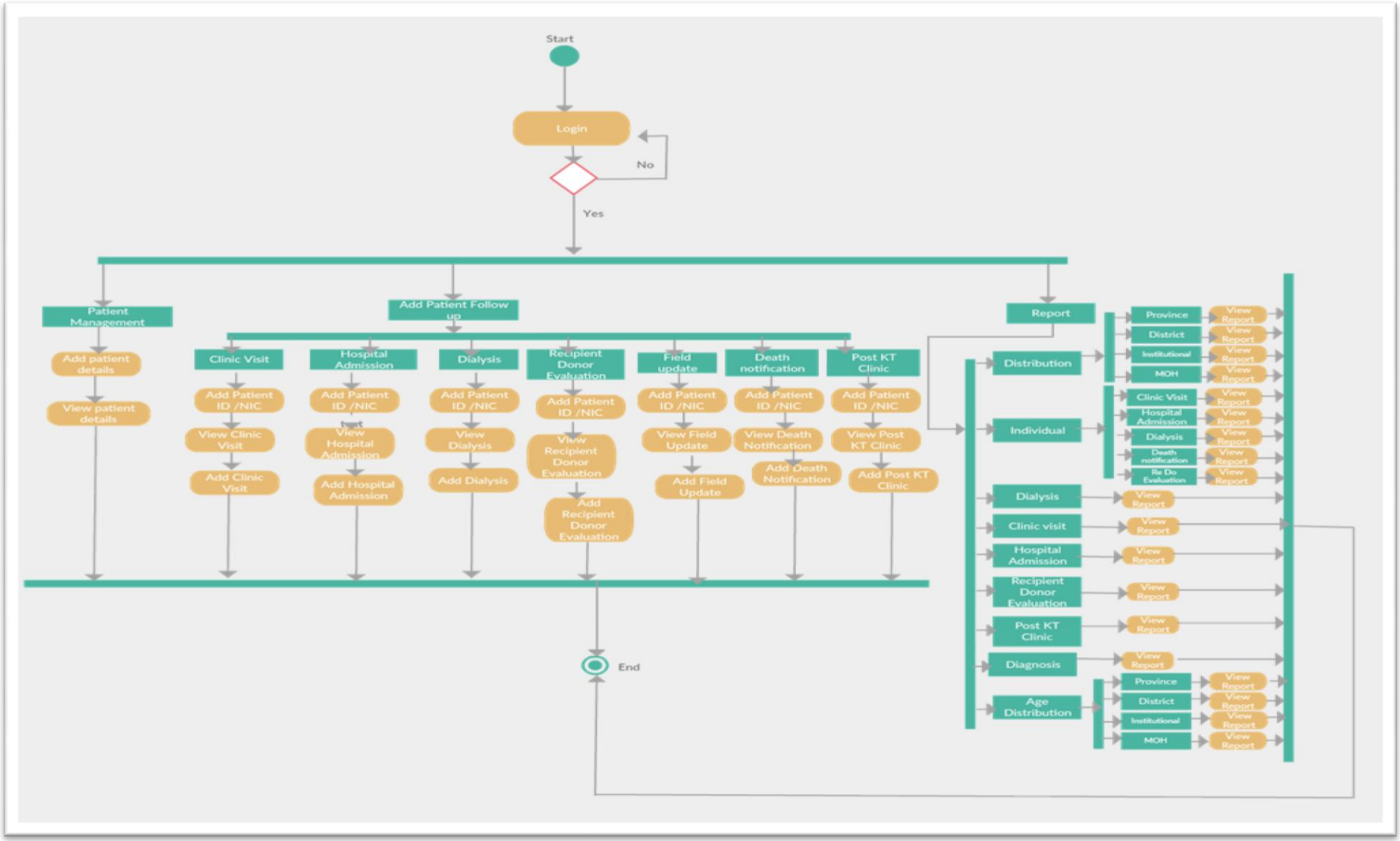

Figure 6:System Activity Diagram

Chapter 3: Methodology /Analysis and Design

What is a Methodology?

Software engineering is carry out of using preferred procedure techniques to progress the quality of a software development effort. A methodology is defined as a collection of procedures, techniques, tools, and documentation aids which will help developers in their efforts (both product and process related activities) to implement a new system. For successful implementation, a well-organized and systematic approach is crucial. Therefore, several methodologies were developed to encourage the systematic approach to planning, analysis, design, testing and implementation. Methodologies offer various tools and techniques to assist in analysis, design and testing in terms of detailed design of software, data flowcharts and database design.

Why Methodology?

1. To complete a project within time and budget with the expected scope and quality we need methodologies which provide for a framework.
2. Most methodologies have a general planning, developing and managing stages in common. They suggest the development team the ways of thinking, learning and arriving at a regular feasible solution.

To select an ideal methodology was based on project requirements and goals.

- Functional Decomposition: The methodology should have stages according to the interrelated activities which can be grouped into different functional areas.
- Requirement Changes: If required, methodology provides scope to change the requirement.
- Manage Risks: Determined the risk is an important activity to develop a project.
- Iterative approach: Iteration allows refinement of requirement as well as design.
- Documentation: Methodology provides support for large documentation.
- Analysis and Design Support: A well-defined structure of the methodology helps for analysis and designing to development process.
- Implementation: The system should be implemented as per plan.
- Testing Support: More testing, more reliable the product is.
- Object Oriented Approach: Object oriented concepts will be used in developing the project as it supports component reusability.

Suitable Methodologies:

Waterfall Methodology: All projects can be managed better when segmented into a hierarchy of chunks such as phases, stages, activities, tasks and steps. It follows a linear structure starting from requirement analysis, through design, implementation and maintenance. Most widely accepted methodology for student projects, this model has been well tried and tested. Each phase of it has sub phases which produce deliverables. Requirements are fixed at initial stages before proceeding with development plans in system development projects; the simplest rendition of this is called the "waterfall" methodology, as shown in the following Figure 7:

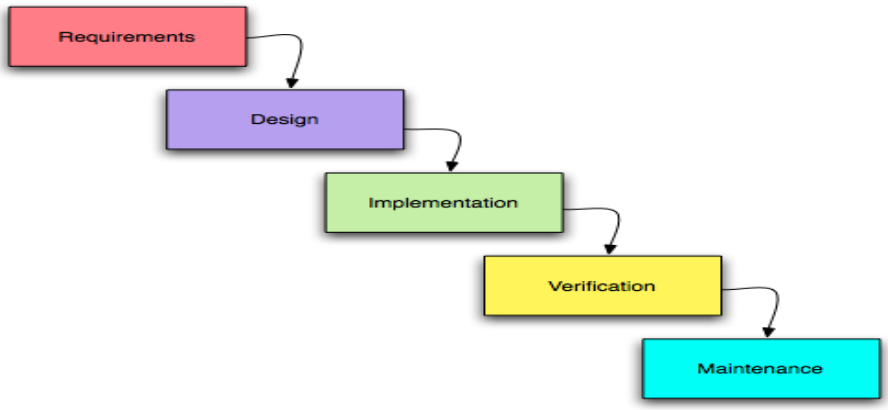

Figure 7:Waterfall model

The graphic illustrates a few critical principles of a good methodology:

- Work is done in stages,
- Content reviews are conducted between stages, and
- Reviews represent quality gates and decision points for continuing.

The waterfall provides an orderly sequence of development steps and helps ensure the adequacy of documentation and design reviews to ensure the quality, reliability, and maintainability of the developed software. While almost everyone these days disparages the "waterfall methodology" as being needlessly slow and cumbersome, it does illustrate.

3.1 Methodology Followed

Waterfall Methodology of Systems Developments Life Cycle Method (SDLC) was followed by me for developing the new system. It is a world recognized very popular methodology. Waterfall Methodology of Systems Developments Life Cycle Method is more suitable for this project because this system is a widely using Transaction Processing System.

"The Systems Development Life Cycle (SDLC) is a conceptual model used in project management that describes the stages involved in an information system development project from an initial feasibility study through maintenance of the completed application. Various SDLC methodologies have been developed to guide the processes involved including the waterfall model (the original SDLC method), rapid application development (RAD), joint application development (JAD), the fountain model and the spiral model. Mostly, several models are combined into some sort of hybrid methodology.

The image below is the classic Waterfall model methodology, which is the first SDLC method and it describes the various phases involved in development, as shown in the following
Figure 8:

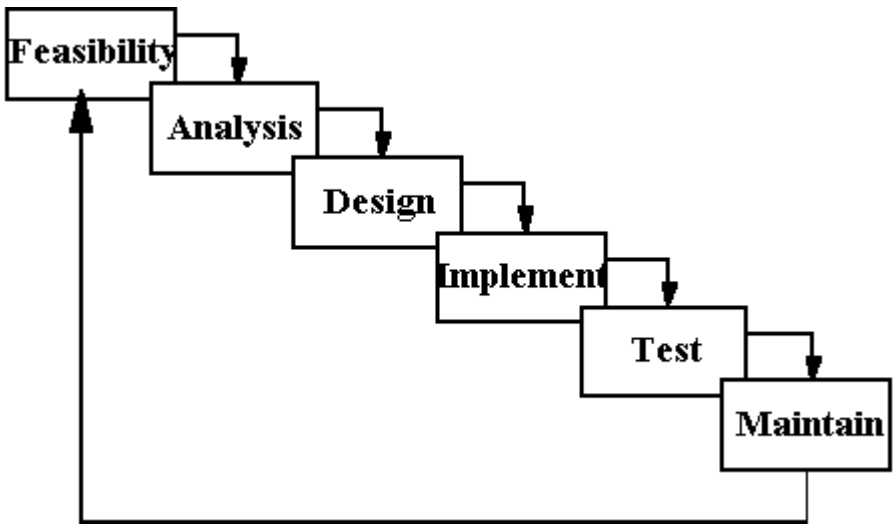

Figure 8:Waterfall Methodology of System Development Life Cycle

3.2 Analysis and Design

In this section, detailed description is given for the process of creating the layout of the Surveillance of Chronic Kidney Disease Management System.

User Levels

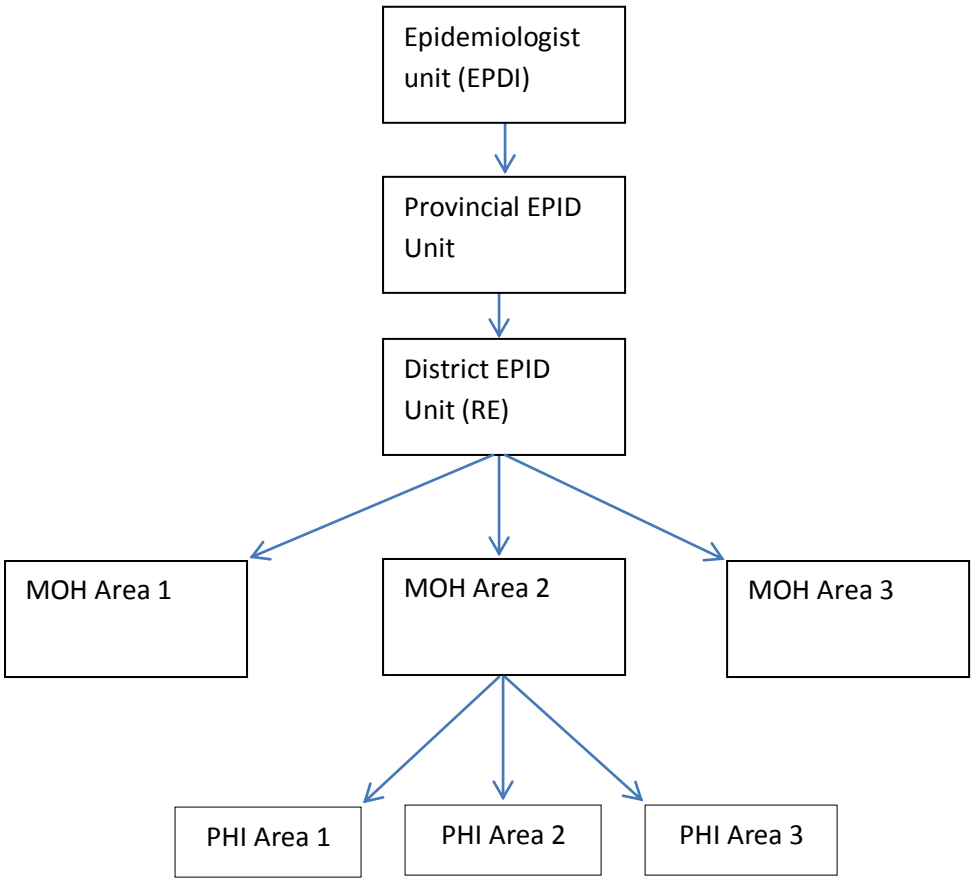

Figure 9: System User level

Overall system dataflow diagram

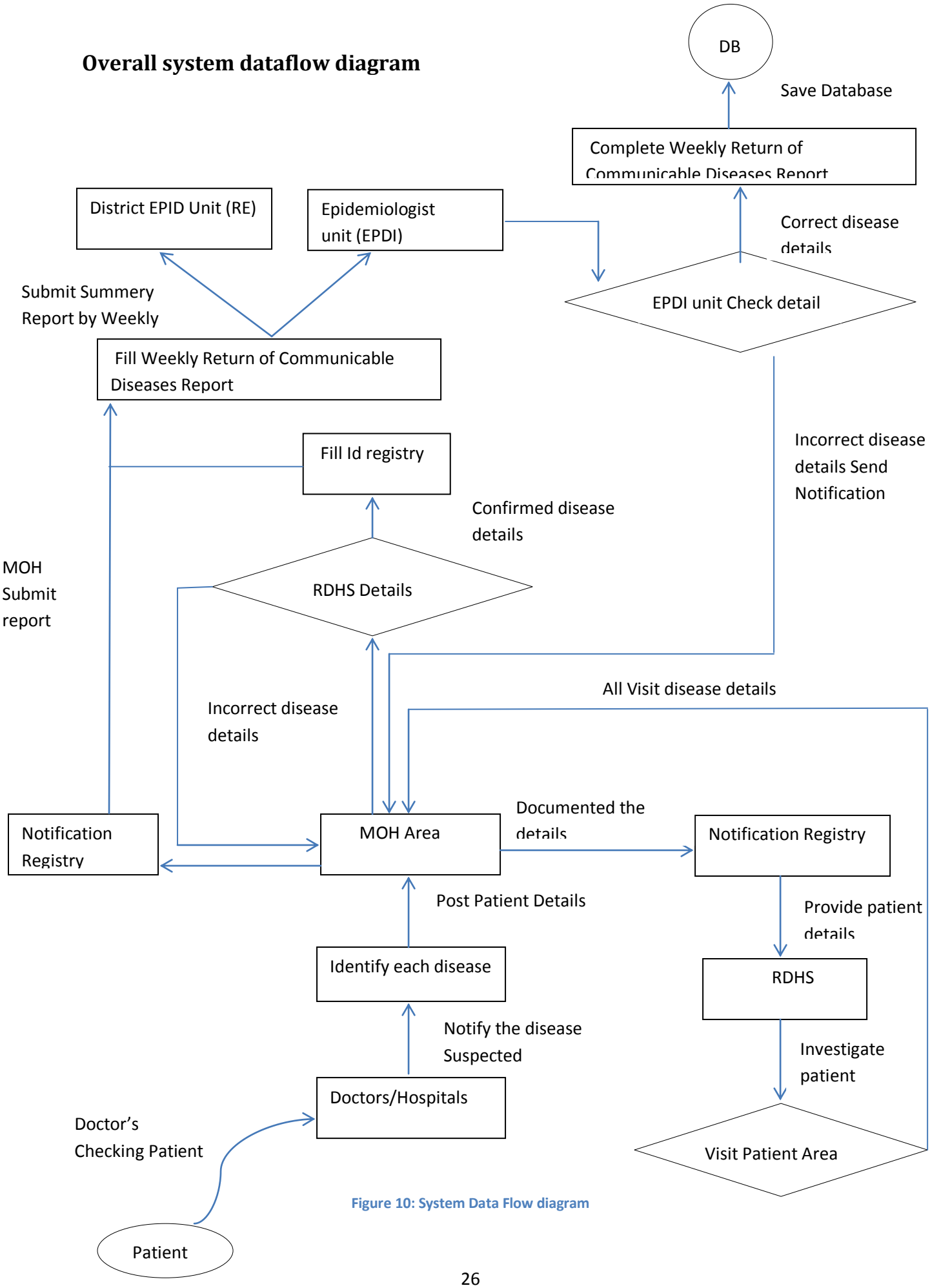

Figure 10: System Data Flow diagram

Institution Level Activity Diagram

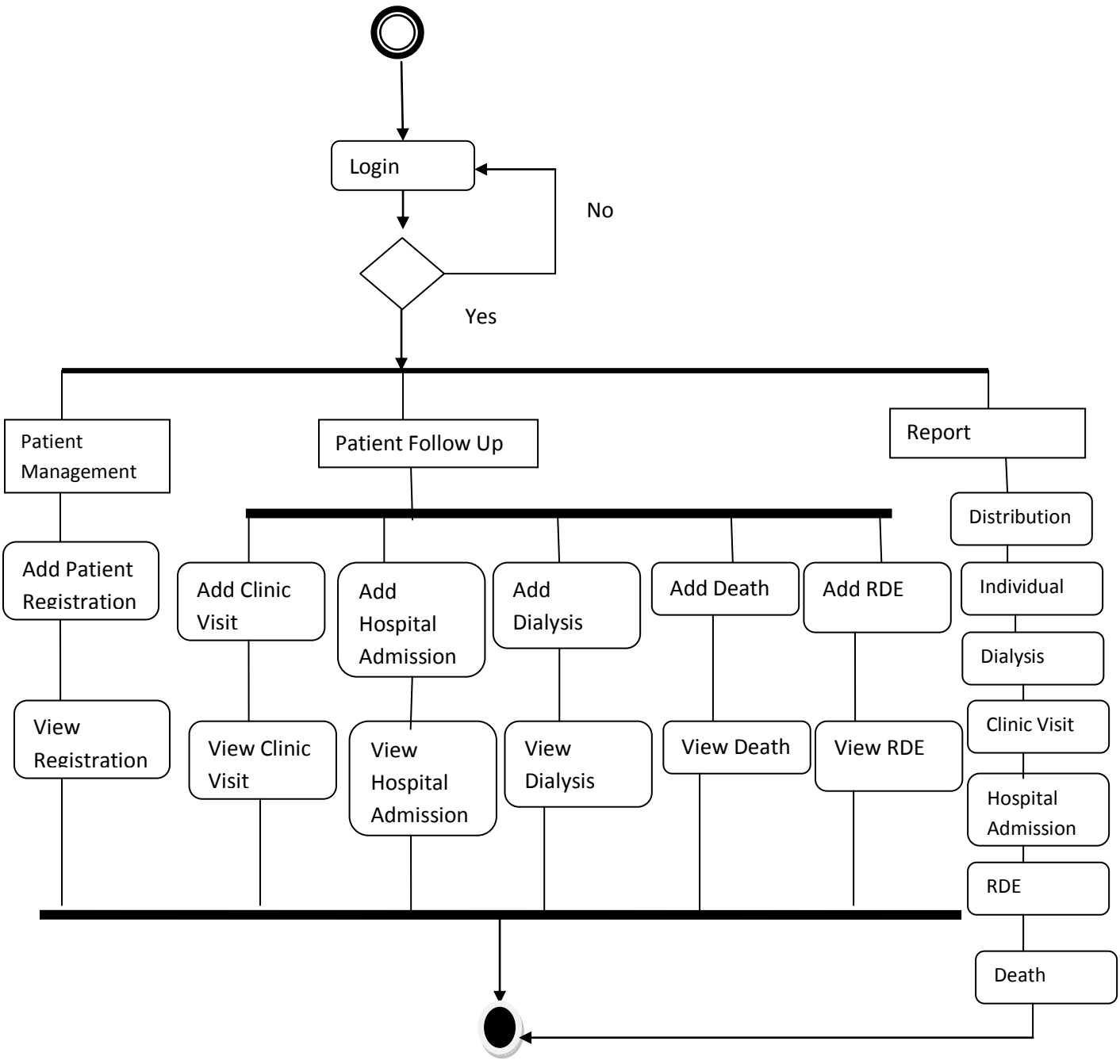

Figure 11: Institutional level Activity diagram

Moh Level Activity diagram

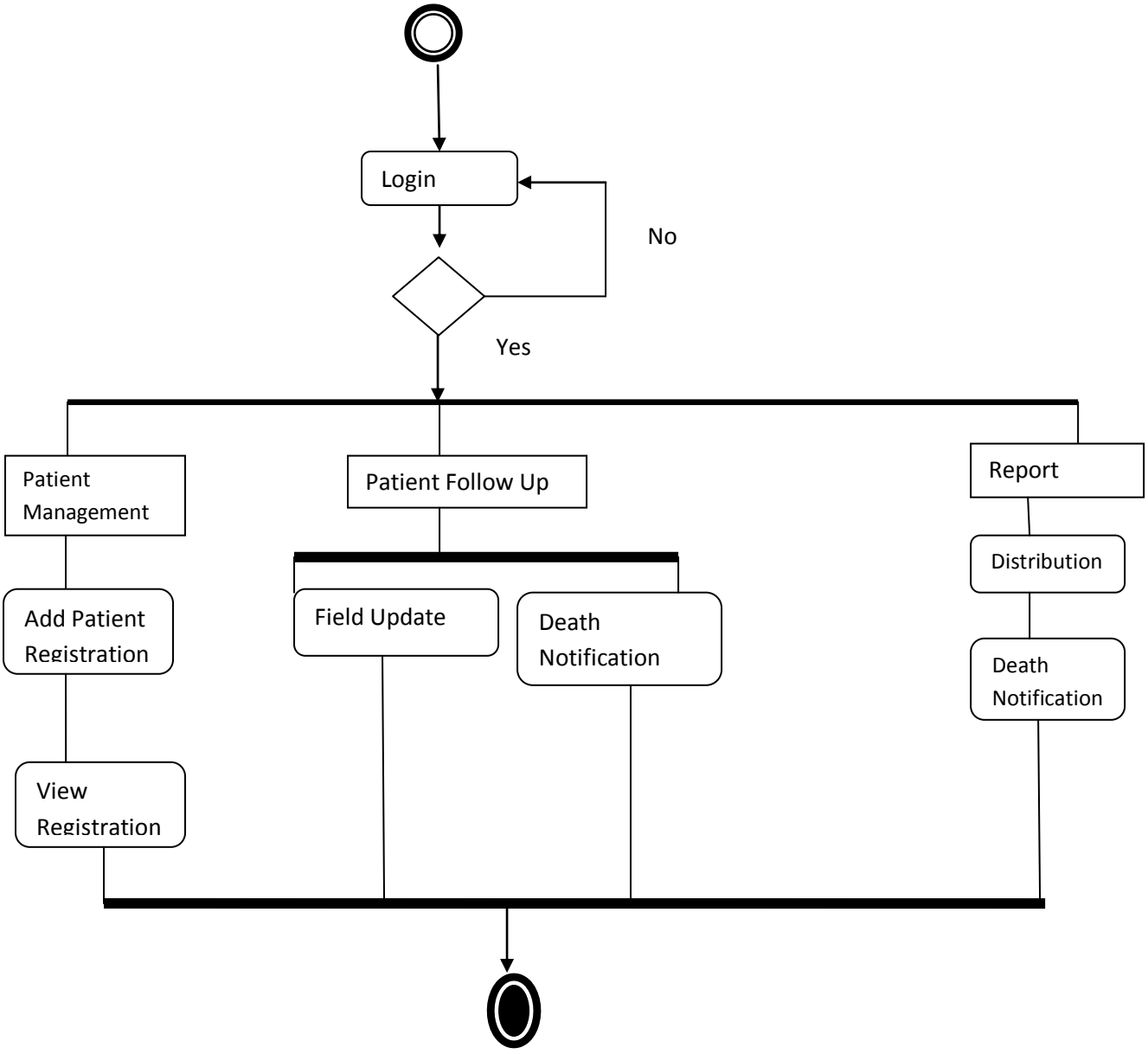

Figure 12: Moh level activity diagram

3.3 Sketching

Sketching of Surveillance of Chronic Kidney Disease Management System is designed in such way where all the search boxes, menus, header and footer should be placed on.
Sketching of the main webpage to the Surveillance of Chronic Kidney Disease Management SystemFigure13.

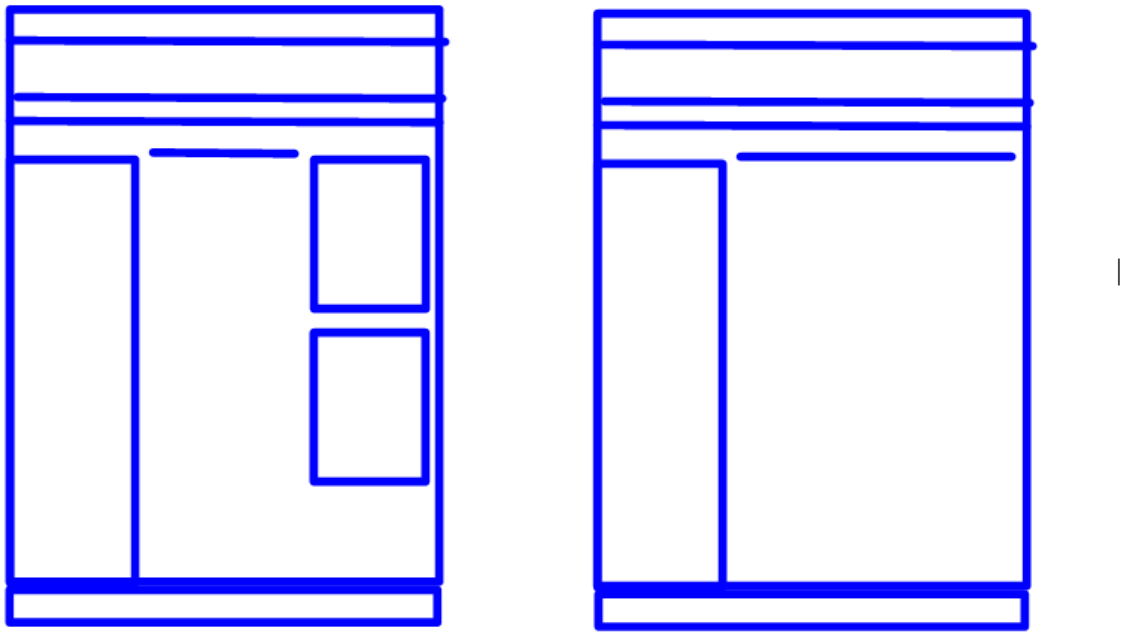

Figure 13:Sketches showing different pages for the application

3.4 Designing in Photoshop

After the sketching of layout which would be the first step to make this Surveillance of Chronic Kidney Disease Management System as working model, the main page graphic interference is created using Photoshop. First mock-ups are created in Photoshop. The main page is designed such one could easily identify the functionality and purpose of this site by just looking at it. In order to show the similarity between the website and the application, Cascading Style Sheet (CSS) was created for the prototype in this thesis. The main page was shown with home page which would easily give the user the main idea of this site. The background color is selected in such way; the site would look more attractive. The mock-ups have been createdwith the 960 pixels.
The below screen shot shows how the main graphic user interface looksFigure 14:

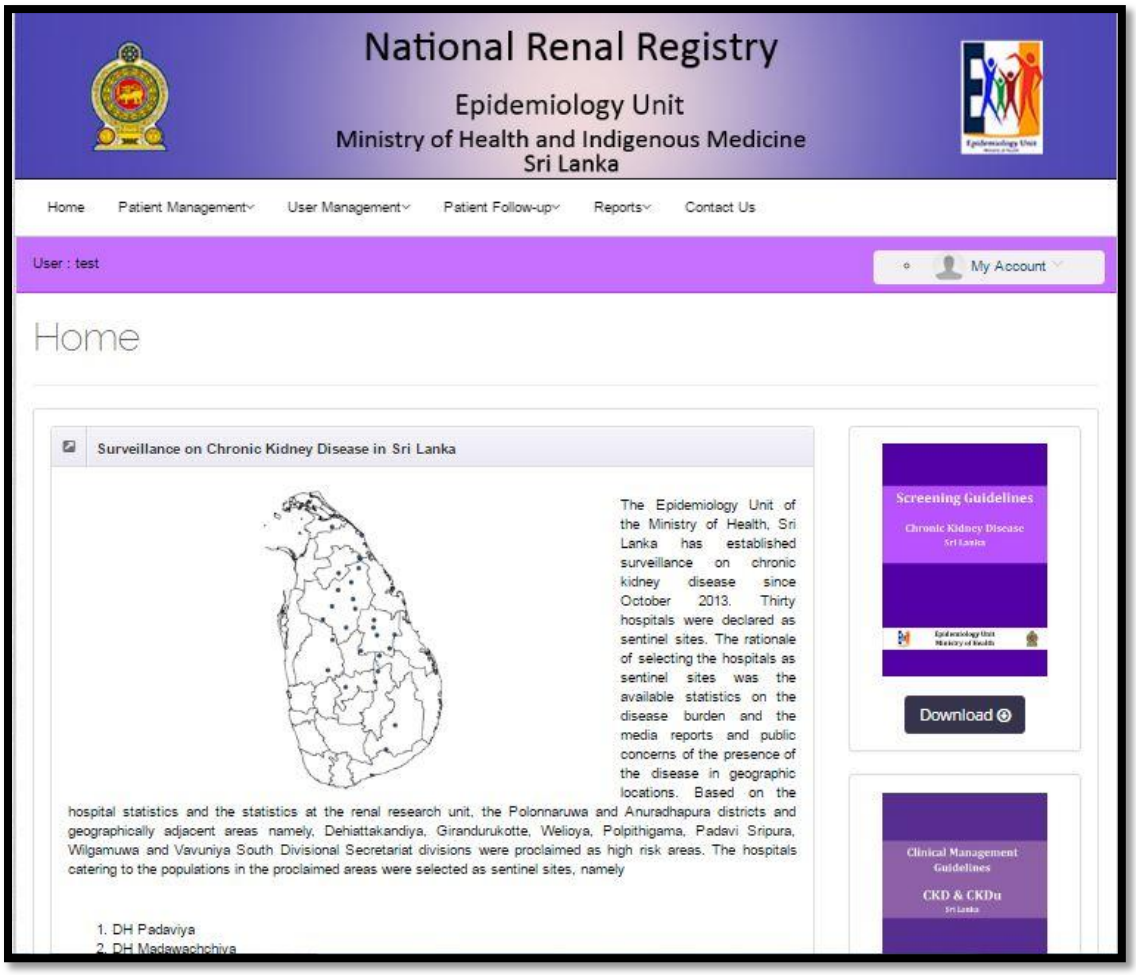

Figure 9:Main Interface

3.5 Implementation

This study was conducted to implement a Surveillance of Chronic Kidney Disease Management System. It was coded in mainly HTML/XHTML, CSS, PHP 5 and using MySQL as the database. JavaScript was also used for front-end works.

3.5.1. HTML/XHTML

HTML is by far the most popular language on the Web today. Without it, the Internet would not be anything like it is now. HTML can be thought of as the building blocks of the Internet like the bricks and mortar of a house.

Producing hypertext for the Web is accomplished by creating documents with a language CalledHyperText Markup Language, or HTML. With HTML, tags are placed within the text to accomplish document formatting, visual features such as font size, italics and bold, and the creation of hypertext links. Graphics and multimedia may also be incorporated into an HTML document. HTML is an evolving language, with new tags being added as each upgrade of the

language is developed and released. The World Wide Web Consortium (W3C), led by Web founder Tim Berners-Lee, coordinates the efforts of standardizing HTML. The W3C now calls the language XHTML (eXtensible Hypertext Markup Language) andconsiders it to be an application of the XML (eXtensible Markup Language) language standard.

3.5.1.1 HTML Tags

Tags make up the 'words' of the html language. Attributes define the properties of the tags used. HTML tags are typically used in pairs and each is surrounded by < and > characters. Grammatically, they belong to any of the patterns described below[11]:

- Basic tag
- Single tag/ empty tag
- Attribute tag

3.5.1.1.1 Basic Tag:

For this type of tag an opening tag is used before a character string and a closing tag is used after it.

<TAG> ……. </TAG>

(Opening tag / Start tag) (String/ Text/ Character String) (Closing tag/ End tag)

3.5.1.1.2 Single Tag:

For this type of tag an opening tag is used either before or after a character string.

For example:

 Line Break Tag

3.5.1.1.3 Attribute Tag:

<TAG *attribute1 attribute2*…. >…… **</TAG>**

This type of tag is used to specify attributes within a tag for detailed specification. Depending on the type of tag, the attributes that could be used are different. Multiple attributes could be specified in random order. Attributes are separated by a single-byte space.

For example:

<BODY bgcolor="#FFFFFF"> ……. </BODY>

3.5.1.2 Basic structure of a HTML page

The following sample html code sets the title for the document and adds some text as content for the page. This is the basic structure of a HTML page.

```
<html>
<head>
<title>My First Web page</title>
</head>

<body>
<p>Hello World</p>
</body>
</html>
```

3.5.2. CSS

At the same time W3C was standardizing HTML, some help in keeping content separate frompresentation was offered in the form of another W3C complementary presentation language called Cascading Style Sheets (CSS). This language, introduced in 1996, was specifically designed to help "style" or present HTML pages. The general result is that the presentation details (kept in the CSS document) are separate from the content (kept in the HTML document)[12].

3.5.2.1 Rule

A rule or "rule set" is a statement that tells browsers how to render particular elements on an HTML page. A CSS rule consists of two main parts: selector ('h1') and declaration ('color: red'). The declaration has two parts: property ('color') and value ('red')[13].

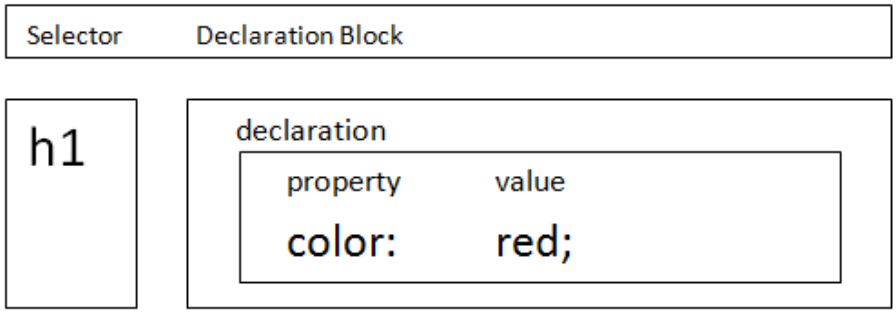

Figure 10:CSS Rule Structure

3.5.2.2 Selector and Declaration block

The selector "selects" the elements on an HTML page that are affected by the rule set. The selector consists of everything up to (but not including) the first left curly bracket. The declaration block is a container that consists of anything between (and including) the curly brackets.

For Example:

```
h1 { color: blue; margin-top: 1em; }
p { padding: 5px; }
td { background-color: #ddd; }
```

Styles can be specified in details using the following methods [*,*]:

- **Type Selector/ Element Selector** - This selects elements in the document according to type.
- **Class Selector** - The class selector is used to assign properties to a named class.
- **ID Selector** - This type of selector is used to assign properties to an element with a specific and unique identifier.
- **Group Selector** - This selects a group of elements and applies the same declarations to all of them.
- **Context Selector/ Descendant Selector** - This selects elements that are descendents of another element within the document tree.
- **Universal Selector** - This will select any element.
- **Child Selector** - This will select any element with a specific parent.
- **Combining class and type selectors** – This allow to use class and Type selectors together.
- **Pseudo-classes -** The :link, :visited, and :active are called pseudo classes and are used to assign properties to link states such as unvisited, visited, active and hover. These are all associated with the ‘a’ anchor element[14].

3.5.2.3 CSS Implementation

Following are the 4 methods of implementing the CSS.

Inline Style Sheet - Specifying style directly by using the style attributes.

Embedded Style Sheet - Defining style in advance to STYLE element, then applyingit.

Linking Style Sheet - By using LINK elements link the external file where style has been defined.

Import Style Sheet - By using STYLE element, specify the external file (define style) to be imported.

3.5.2.4 How to put CSS into web pages

CSS can use three special attributes in a webpage. The attribute style (style="...") is for direct style definitions. Attributes class (class="...") and id (id="...") are for external (linked), import and embedded style sheets.

For example:

```
<p style="font-family:bamini"> …… </p>
<p class= "class_selector_name"> ……</p>
<p id= "id_selector_name"> ……</p>
```

3.5.3. PHP

PHP (recursive acronym for “PHP: Hypertext pre-processor”) is a widely-used Open Source general purpose scripting language that is especially suited for Web development and could be embedded into HTML. It also has evolved to include a command-line interface capability and can be used in standalone graphical applications. PHP can be deployed on most web servers and as a standalone interpreter, on almost every operating system and platform free of charge. A competitor to Microsoft's Active Server Pages (ASP) server-side script engine andsimilar languages, PHP is installed on more than 20 million websites and 1 million web servers[15].

3.5.4. MySQL

MySQL is the world's most popular open source database. Whether you are a fast growing web property, technology ISV or large enterprise, MySQL can cost-effectively help you deliver high performance, scalable database applications[16].

3.5.5. Javascript

JavaScript is an object-oriented scripting language used to enable programmatic access to objects within both the client application and other applications[17].

3.5.6. AJAX

AJAX = Asynchronous JavaScript and XML.

AJAX is not a new programming language, but a new way to use existing standards. It is the art of exchanging data with a server, and update parts of a web page - without reloading the whole page[18].

3.5.7. jQuery

jQuery is a fast and concise JavaScript Library that simplifies HTML document traversing, event handling, animating, and Ajax interactions for rapid web development. jQuery is designed to change the way that you write JavaScript[19].

3.6. Preparation of Development Environment

3.6.1. Apache Server 2.2.21

The Apache HTTP server project is a robust server which provides free availability of source code. Apache server is one of the popular web servers which support scripting languages like PHP to create dynamic pages. The initial release of Apache was made in the year 1995. PhpMyAdmin is a free software tool written in PHP intended to handle the administration of MySQL over the World Wide Web. It supports a wide range of operations with MySQL[20].
Steps for installing Apache Server 2.2.21 (WampServer 2.2a)[20]:
i. Download WampServer 2.2a. The WampServer package has eight components which includes

- Apache 2.2.21
- Php 5.3.8
- Mysql 5.5.16
- XDebug 2.1.2
- XDC 1.5
- PhpMyadmin 3.4.5
- SQLBuddy 1.3.3
- webGrind 1.0

ii. Run the WampServer 2.2a setup wizard.
iii. Click "Next" on the first screen.
iv. Select "I Accept the Agreement". For legal reasons, and my own education, advise reading the agreement first. Click "Next".
v. Select where want WAMP to be installed on the computer. The default, c:\wamp is a good, easy place. Click "Next".
vi. Select any shortcuts may want. Click "Next".
vii. Review my selections, then click "Install". Installation may take a few minutes.
viii. After a little while, will be prompted to choose a default web browser for WAMP. I

recommend Firefox, both because it's good and WAMP auto-detects it, saving my time. If you want to choose something else then i am going to have to browse for the .exe.

ix. Another prompt will come up asking if you want to overwrite index.php with a new WAMP homepage. Select "No".

x. The next information will be prompted for is SMTP data. Leave the defaults then click "Next".

xi. Leave the box for "Launch WampServer 2.2a now" checked, then click "Finish".

3.6.2. MySQL Server and connectivity

MySQL can be characterized as a reliable open source which is robust by nature. MySQL is also known as RDBMS (Relational Database Management System)[16]. MySQL is the most preferred database for web applications. Many third party applications (front ends) integrate with MySQL for developing database structure. One among the popular front end is PhpMyAdmin which is used in my application. It is a web based front end developed in PHP. MySQL function is used to connect to the MySQL database[21].

ckdepid_db_new MySQL database is connected using the following code:

```php
<?php
function dbConnect(){
    $con = mysqli_connect('localhost', 'root', '','ckdepid_db_new');


    if(!$con){
        die("Failed to connect to MySQL.");
    }
    return $con;
}

function dbConnectionClose($dbServer){
    mysqli_close($dbServer);
}
?>
```

Figure 11:Data base Connection File

The username and password (username is root and password is none) are given during the installation of MySQL server.

3.7. Database Design

Databases are now an integral part of the internet and many web sites use databases in the background to control their contents. MySQL is one of the most commonly used open source database management systems[16].

3.7.1. Database Architecture

The database architecture is the set of specifications, rules, and processes that dictate how data is stored in a database and how data is accessed by components of a system.

3.7.2. Data Definition Language

A data definition language or data description language (DDL) is a syntax similar to a computer programming language for defining data structures, especially database schemas[24].

3.7.3 Database schema

A database schema of a database system is its structure described in a formal language supported by the database management system (DBMS) and refers to the organization of data to create a blueprint of how a database will be constructed (divided into database tables)[25].

3.8. Structure of files

After running JetBrainsPhpStrome 6.o, the window is opened with the welcome screen as the start page.The user is prompted to select a workspace. The webpage is carefully designed to provide the users with clearly named links, labels and informative navigation tools. The Surveillance of Chronic Kidney Disease Management System web site architecture structures are structured in way which would be easier for the users to understand where they are, how to go back to previous page or how to move forward to new pages. Surveillance of Chronic Kidney Disease Management Systemweb site contents are grouped in a very organizational method to provide the user with clear and efficient use of the applications. Even, the behind the scenes folders are structured in very organized manner with full clarity of the groups which would make life of the administrator much easy when they are up-dating sites. Structure file isShown in Figure 13:

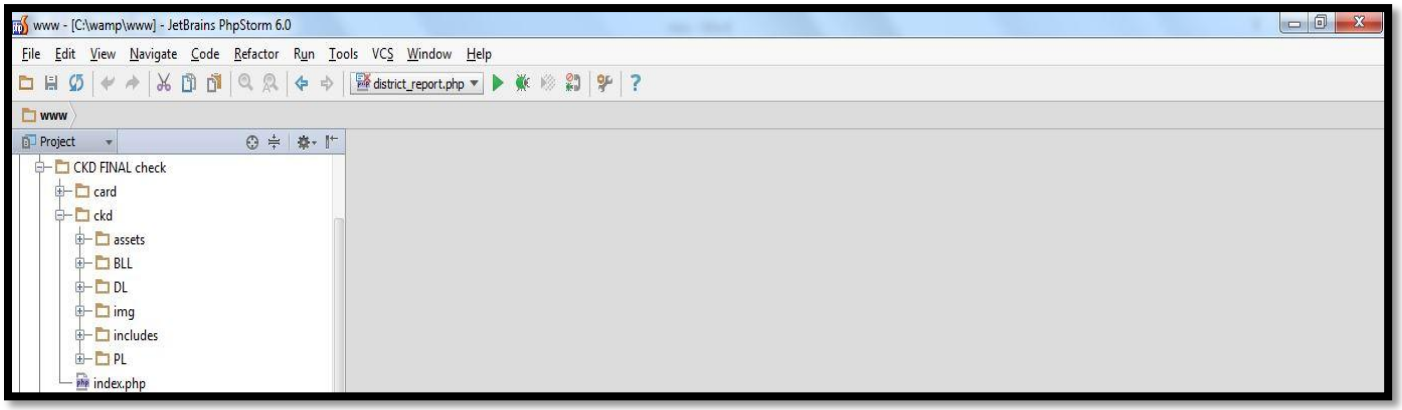

Figure 12:StructureFile

3.8.1. Login page

This file is responsible for the welcome page of the website.

This system deals with the various login options available. The login option is common for the users and the administrators. When user logs in, user is redirected to the Home page with

The project maintains two levels of users:-

• Administrator Level -As an administrator, has full control over registered users.

They could view user information, upgrade/demote user levels, delete users, delete inactive users, and ban users.

• User Level - Now users can be differentiated by what level they are (user, administrator, etc.)

i. Hospital Level
ii. RDHS Level
iii. Provincial Level
iv. MOH Level

The script determines whether username or email is entered and it checks for existing account.When the user enters his password, the script converts the password to md5 string and thencompares this to the md5 of the password stored in the database. Surveillance of Chronic Kidney Disease Management System never want to know or store the real password of users. That is why it isimplemented in such way to use md5.

Login Page is shown in Figure 17.

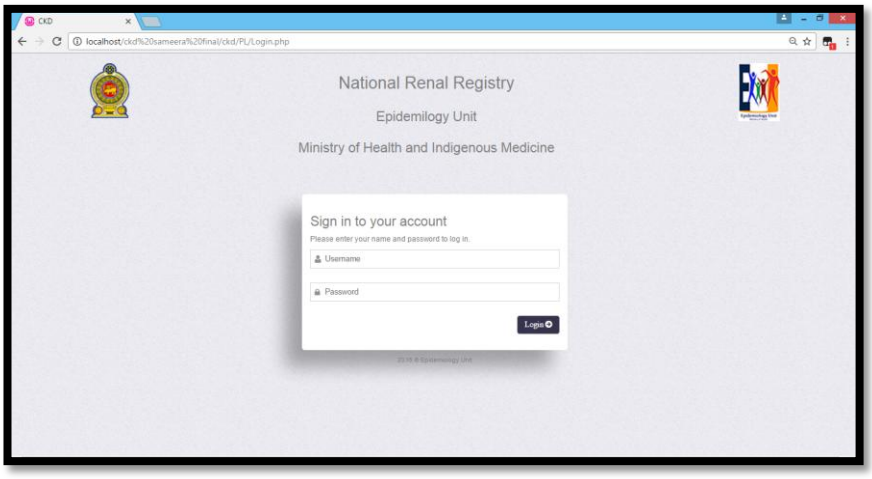

Figure 13:Login Page

3.8.1.1 Home Page

This file is responsible for the welcome page of the website. The links of Home, Patient Management, User Management, Patient Follow up, Reports and Contact us displayed on top side of the main header section. The links screening guidelines Pdf document and clinical management guidelines Pdf document. Main content has the short description about the web site.Home Page is shown in Figure 18.

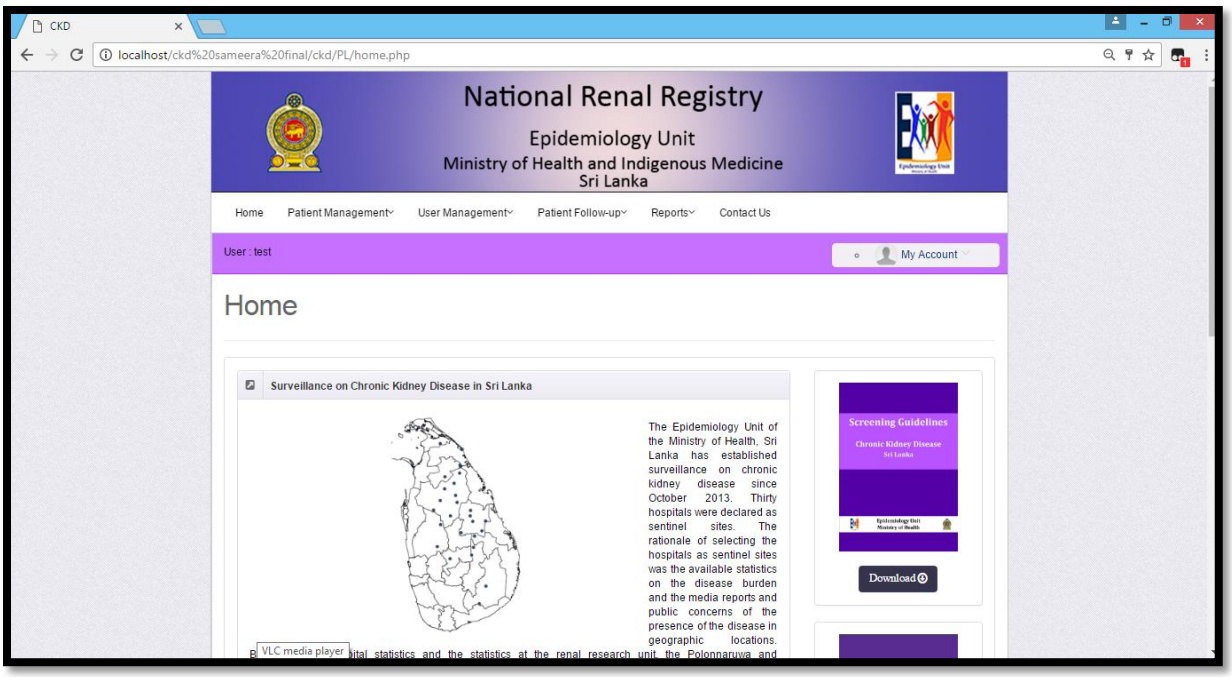

Figure 14 : Home Page

3.8.1.2 Patient Registration

Patient registers with their personal details (Registered date, Institutional Name, First name ,Middle Name Last Name, Age, Date of Birth , Gender, Address, Province, District, Ds Division , Gn Division, Occupation ,Contact number, Civil statues and Renal Diagnosis) . After System is Generate Automatically Patient Id number.

In the first part, it would cover creation of the registration form and storing the data in a MySQL database. Patient Registration pages are shown in Figure 18, Figure 19 and Figure 20.

Figure 15 : Patient Registration – part1

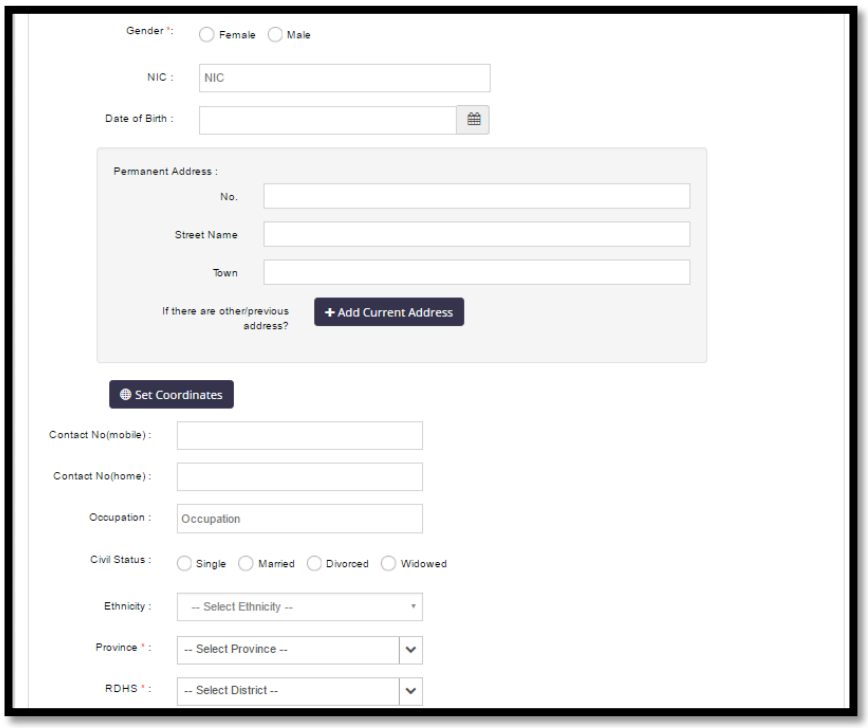

Figure 16 : Patient Registration -part2

Figure 17 : Patient Registration -part3

3.8.1.3 Patient Follow up

Patient follow up with their patient clinic visits , patient hospital admission ,dialysis ,recipient and donor evolution ,post kt clinic ,field update and death notification.

- In the first part, it would cover creation of the patient clinic visits form and storing the data in a MySQL database. Patient clinic visits pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the patient hospital admission form and storing the data in a MySQL database. Patient hospital admission pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the patient hospital admission form and storing the data in a MySQL database. Patient hospital admission pages are shown in annexed in Appendix B.
- In the Third part, it would cover creation of the patient dialysis form and storing the data in a MySQL database. Patient dialysis pages are shown in annexed in Appendix B.
- In the Fourth part, it would cover creation of the recipient and donor evaluation form and storing the data in a MySQL database. Recipient and donor evaluation pages are shown in annexed in Appendix B.
- In the Fifth part, it would cover creation of the post kt clinic form and storing the data in a MySQL database. Post kt clinic pages are shown in annexed in Appendix B.
- In the Sixth part, it would cover creation of the field update form and storing the data in a MySQL database. Field update pages are shown in annexed in Appendix B.

- In the Seventh part, it would cover creation of the death notification form and storing the data in a MySQL database. Death notification pages are shown in annexed in Appendix B.

3.8.1.4 User Management

User registers with their chosen username, email and password. The script checks for existing username, if exists, it denies them registering an account. The username is restricted to only alphabets, numbers and underscore. No special characters allowed.
The password is stored in md5 format during registration and sends a 4 digit random activation code to their email address.
Creating a membership based site seems like a daunting task at first. The whole process consists of two big parts:

- user registration
- user authentication

In the first part, it would cover creation of the registration form and storing the data in a MySQL database. In the second part, it would create the login form and use it to allow users access in the secure area.
User Management pages are shown in annexed in Appendix B.

3.8.1.5 Report Generation

3.8.1.5.1 Distribution Reports

Reports with their Provincial distribution reports, District distribution reports, Institutional distribution reports and MOH distribution reports.

- In the first part, it would cover creation of the provincial patient count form, provincial patient list form, provincial death count form ,provincial death list ,provincial audit count form and provincial audit list form andsearching the data in a MySQL database. Provincial distribution reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the district patient count form, district patient list form, district death count form,district death list,district audit count form and district audit list form andsearchingthe data in a MySQL database. District distribution reports pages are shown in annexed in Appendix B.

- In the Third part, it would cover creation of the institutional patient count form, institutional patient list form, institutional death count form,institutional death list,institutional audit count form and institutional audit list form andsearching the data in a MySQL database. Institutional distribution reports pages are shown in annexed in Appendix B.
- In the Fourth part, it would cover creation of the Moh/ Ds-division patient count form, Moh/ Ds-division patient list form, Moh/ ds-division death count form,Moh/ Ds-division death list, Moh/ Ds-division audit count form and moh/ ds-division audit list form andsearchingthe data in a MySQL database. Moh/ Ds-division distribution reports pages are shown in annexed in Appendix B.

3.8.1.5.2 Individual Patient Reports

Reports with their Individual clinic report, Individual hospital admission report,Individual recipient and donor evaluation report,IndividualDialysisreport, Individual post kt clinic report and Individual death notification report.

- In the first part, it would cover creation of the Individual clinic report and searching the data in a MySQL database. Individual clinic report pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the Individual hospital admission report form andsearchingthe data in a MySQL databaseIndividual hospital admission report pages are shown in annexed in Appendix B.
- In the Third part, it would cover creation of the Individual recipient and donor evaluation report form andsearchingthe data in a MySQL database. Individual recipient and donor evaluation report pages are shown in annexed in Appendix B.
- In the Fourth part, it would cover creation of the , Individual post kt clinic report form andsearchingthe data in a MySQL database. , Individual post kt clinic report pages are shown in annexed in Appendix B.
- In the Fifth part, it would cover creation of the Individual recipient and donor evaluation report form andsearchingthe data in a MySQL database. Individual recipient and donor evaluation report pages are shown in annexed in Appendix B.

- In the Sixth part, it would cover creation of the Individual death notification form andsearchingthe data in a MySQL database. Individual death notification pages are shown in annexed in Appendix B.

3.8.1.5.3 Age Distribution Reports

Reports with their Provincial Age distribution reports, District Age distribution reports, Institutional Age distribution reports and MOH Age distribution reports.

- In the first part, it would cover creation of the provincial average age form, provincial standard deviation form, provincial age category form and searching the data in a MySQL database. Provincial age distribution reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the district average age form, district standard deviation form, district age category form and searching the data in a MySQL database. District age distribution reports pages are shown in annexed in Appendix B.
- In the Thirdpart,it would cover creation of the institutional average age form, institutional standard deviation form, institutional age category form and searching the data in a MySQL database. Institutional age distribution reports pages are shown in annexed in Appendix B.
- In the Fourth part, it would cover creation of the Moh / Ds-diviation average age form, Moh / Ds-diviation standard deviation form, Moh / Ds-diviation age category form and searching the data in a MySQL database. Moh / Ds-diviation age distribution reports pages are shown in annexed in Appendix B.

3.8.1.5.4 Diagnosis Reports

Reports with their Diagnosis reports.

- In the first part, it would cover creation of the diagnosis wise age count form and searching the data in a MySQL database. Diagnosis reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the diagnosis wise age category form and searching the data in a MySQL database. Diagnosis reports pages are shown in annexed in Appendix B.

3.8.1.5.5 Dialysis Reports

Reports with their Dialysis reports.

- In the first part, it would cover creation of the dialysis patient count form and searching the data in a MySQL database. Dialysis reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the dialysis patient list form and searching the data in a MySQL database. Dialysis reports pages are shown in annexed in Appendix B.

3.8.1.5.6 Clinic visit Reports

Reports with their Clinic visit reports.

- In the first part, it would cover creation of the clinic visit patient count form and searching the data in a MySQL database. Clinic visit reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the clinic visit patient list form and searching the data in a MySQL database. Clinic visit reports pages are shown in annexed in Appendix B.

3.8.1.5.7 Hospital Admission Reports

Reports with their Hospital Admission reports.

- In the first part, it would cover creation of the hospital admission patient count form and searching the data in a MySQL database. Hospital admission reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the hospital admission patient list form and searching the data in a MySQL database. Hospital admission reports pages are shown in annexed in Appendix B.

3.8.1.5.8 Recipient Donor Evolution Reports

Reports with their Recipient donor evolution reports.

- In the first part, it would cover creation of the recipient donor evolution patient count form and searching the data in a MySQL database. Recipient donor evolution reports pages are shown in annexed in Appendix B.

- In the Second part, it would cover creation of the recipient donor evolution patient list form and searching the data in a MySQL database. Recipient donor evolution reports pages are shown in annexed in Appendix B.

3.8.1.5.9 Post KT Clinic Reports

Reports with their Post KT Clinic reports.

- In the first part, it would cover creation of the post kt clinic patient count form and searching the data in a MySQL database. Recipient donor evolution reports pages are shown in annexed in Appendix B.
- In the Second part, it would cover creation of the recipient donor evolution patient list form and searching the data in a MySQL database. Post KT Clinic reports pages are shown in annexed in Appendix B.

3.8.1.6 Contact us

The ‘contact us’ tab of the main site is to provide all the contact details of the site administrators of the website. In case, if the user has questions regarding the content of the web site or how to use the applications, they could always contact the site administrators via email. Contact us page is shown in annexed in Appendix B.

3.8.1.7 Logout

A logout option is placed in all the pages and this file contains the code for logout function. If the user wishes to logout, it would clear the session and redirect to the page login.php.

3.9ER Diagram of proposed system

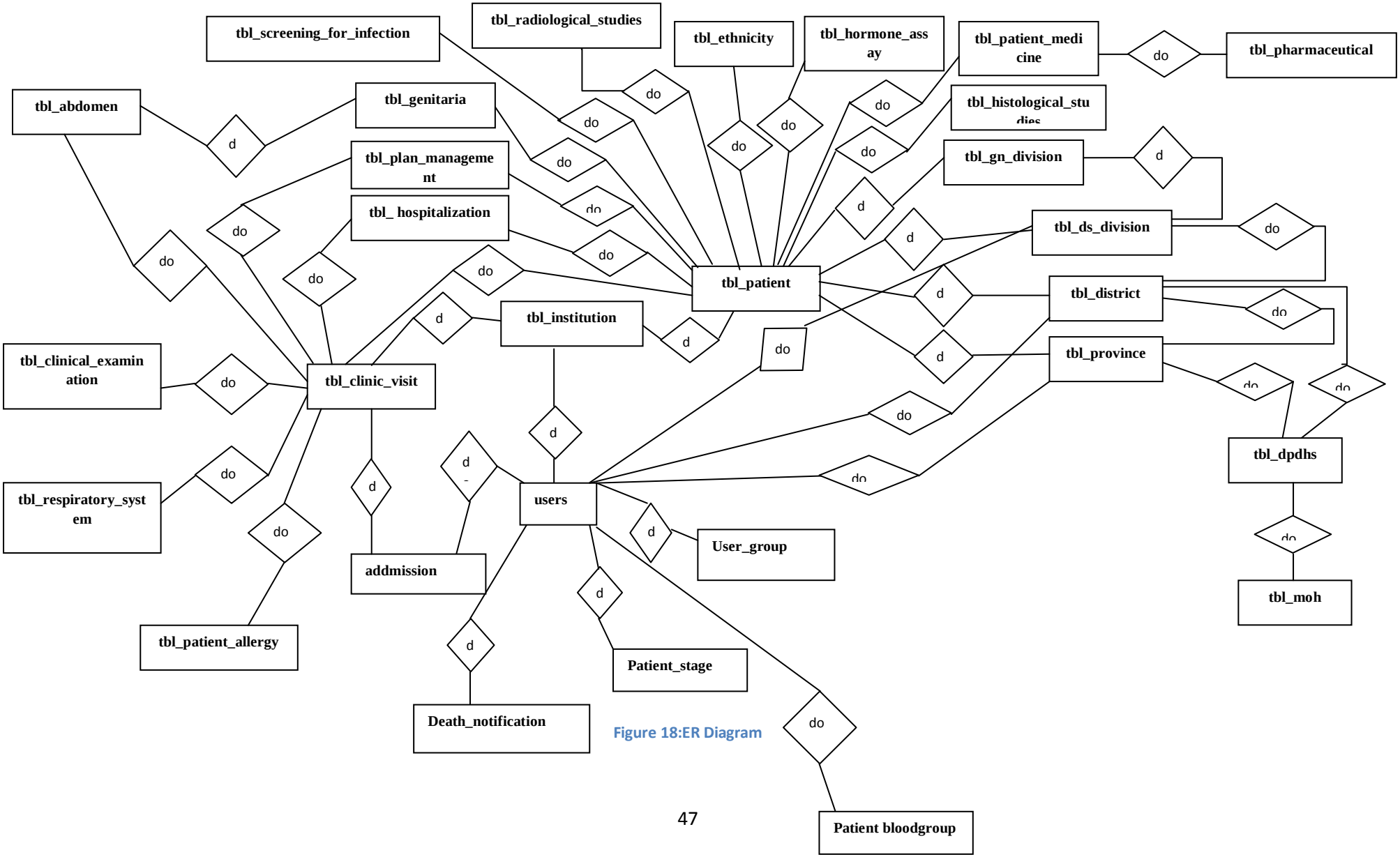

Figure 18:ER Diagram

3.10 Data base table structures of proposed system

1. Abdomen Table

Field Name	Data Type	Description
p_id	int(6)	Patient ID
clinic_id	int(6)	Clinic ID
clinic_type	Enum	Clinic Type
abdominal_distension	int(6)	Abdominal distension
flank_horseshoe	int(6)	Flank horseshoe
liver	int(6)	Liver
spleen	int(6)	Spleen
Kidney	int(6)	Kidney
bowel_bound	int(6)	Bowel bound
bladder	int(6)	Bladder

Table 4 : Abdomen Table

2. Admission Table

Field Name	Data Type	Description
admission_id	int(6)	Admission id
institute_id	int(6)	Institute id
p_id	int(6)	Patient id
admission_no	int(6)	Admission no
admission_date	Date	Admission date
discharge_date	Date	Discharge date
added_by	int(6)	Added by

Table 5 : Admission Table

3. Biochemistry Table

Field Name	Data Type	Description
p_id	int(11)	Patient ID
clinic_id	int(11)	Clinic ID
clinic_type	int(1)	Clinic Type
date_time	Datetime	Clinic Date
Tc	decimal(10,4)	Tc value
Hdl	decimal(10,4)	Hdl value
Idl	decimal(10,4)	Idl value
Tag	decimal(10,4)	Tag value
Vidl	decimal(10,4)	Vidl value
ch_ratio	decimal(10,4)	Ch ratio value
sodium	decimal(10,4)	Sodium value
calcium	decimal(10,4)	Calcium value
potassium	decimal(10,4)	Potassium value

phosphate	**decimal(10,4)**	**Phosphate value**
chlorine	**decimal(10,4)**	**Chlorine value**
Mg	**decimal(10,4)**	**Mg value**
Fbs	**decimal(10,4)**	**Fbs value**
ppbs	**decimal(10,4)**	**Ppbs value**
hbaic	**decimal(10,4)**	**Hbaic value**
Sp	**decimal(10,4)**	**Sp value**
Alb	**decimal(10,4)**	**Alb value**
Glb	**decimal(10,4)**	**Glb value**
Crp	**decimal(10,4)**	**Crp value**
Esr	**decimal(10,4)**	**Esr value**
s_cr	**decimal(10,4)**	**S_cr value**
egfr	**decimal(10,4)**	**Egfr value**
Ua	**decimal(10,4)**	**Ua value**
Bu	**decimal(10,4)**	**Bu value**

Table 6 : Biochemistry Table

4. Clinical examination

Field Name	Data Type	Description
p_id	**int(11)**	**Patient id**
clinic_id	**enum('1', '2', '3')**	**Clinic ID**
clinic_type	**int(11)**	**Clinic Type**
dyspneic	**int(1)**	**Dyspneic Value**
febrile	**int(1)**	**Febrile Value**
pale	**int(1)**	**Pale Value**
ankleoedema	**int(1)**	**Ankleoedema Value**
pulse_rate	**int(3)**	**Pulse_rate Value**
rhythm	**int(1)**	**Rhythm Value**
Systolic	**int(3)**	**Systolic Value**
Diastolic	**int(3)**	**Diastolic Value**
s1	**int(1)**	**S1 value**
s2	**int(1)**	**S2 value**
additional_sound	**int(1)**	**Additional_sound value**
additional_sound_text	**varchar(100)**	**Additional_sound_text**
respiratory_rate	**int(3)**	**Respiratory_rate value**
left_air_entry	**int(1)**	**Left_air_entry value**
left_vesicular_breathing	**int(1)**	**Left_vesicular_breathing**
left_bronchial_breathing	**int(1)**	**Left_bronchial_breathing**
left_crackles	**int(1)**	**Left_crackles value**
left_ronchi	**int(1)**	**Left_ronchi value**
right_air_entry	**int(1)**	**Right_air_entry value**

right_bronchial_breathing	int(1)	Right_bronchial_breathing value
right_crackles	int(1)	Right_crackles value
right_ronchi	int(1)	Right_ronchi value
abdominal_distension	int(1)	Abdominal_distension value
flank_horseshoe	int(1)	Flank_horseshoevalue
Liver	int(1)	Livervalue
Spleen	int(1)	Spleenvalue
Kidney	int(1)	Kidneyvalue
bowel_bound	int(1)	Bowel_boundvalue
Bladder	int(1)	Bladdervalue
Conscious	int(1)	Consciousvalue
Rational	int(1)	Rationalvalue
Orientation	int(1)	Orientationvalue
focal_neurological_signs	int(1)	Focal_neurological_signs
focal_neurological_signs_value	varchar(100)	Focal_neurological_signs_value
gcs_value	int(3)	Gcs_value
genital_abnormality	int(1)	Genital_abnormalityvalue
Prostate	int(1)	Prostatevalue
genital_abnormality_value	varchar(100)	Genital_abnormality_value
prostate_value	varchar(100)	Prostate_value
Ecg	varchar(255)	Ecgvalue
stressEcg	varchar(255)	Stressecgvalue
Echocardiogram	varchar(255)	Echocardiogramvalue

Table 7 : Clinical Examination

5. Clinic visit Table

Field Name	Data Type	Description
clinic_id	int(11)	Clinic Id
p_id	int(11)	Patient Id
institute_id	int(11)	Institution Id
clinic_no	int(5)	Clinic No
next_clinic_date	Datetime	Next clinic Date
clinic_date	Datetime	Clinic date
Attendance	int(1)	Attendance(Persent or Absent)
added_by	int(11)	Add user

Table 8 : Clinic Visit

6. Comobidities Table

Field Name	Data Type	Description
c_id	int(3)	Comobidities ID
c_name	varchar(60)	Comobidities Name

Table 9 : Comobidities Table

7. Comobidities subsections Table

Field Name	Data Type	Description
Id	int(11)	Comobidities subsections ID
Subsection	varchar(40)	Comobidities subsections

Table 10 : Comobidities Subsection Table

8. Dates Table

Field Name	Data Type	Description
date_id	int(2)	Dates ID
date_name	varchar(11)	Date Name

Table 11 : Dates Table

9. Death notification Table

Field Name	Data Type	Description
d_id	int(11)	Death notification Id
p_id	int(11)	Patient ID
death_date	Date	Death date
immediate_cause	varchar(255)	Immediate_cause
underlying_cause	varchar(255)	Underlying_cause
Contributory	varchar(255)	Contributory
added_by	int(11)	Add User

Table 12 : Death Notification Table

10. Diagnosis Table

Field Name	Data Type	Description
d_id	int(3)	Diagnosis ID
d_name	varchar(60)	Diagnosis Name
Date	Date	Diagnosis Date

Table 13 : Diagnosis Table

11. Dialysis Table

Field Name	Data Type	Description
dialysis_id	int(11)	Dialysis ID
p_id	int(11)	Patient ID
institute_id	int(5)	Institution ID
dialysis_no	int(5)	Dialysis_no
dialysis_date	Datetime	Dialysis_date
Attendance	int(1)	Attendance
added_by	int(11)	Added_by

Table 14 : Dialysis Table

12. District Table

Field Name	Data Type	Description
dis_id	int(3)	District Id
dis_pub_id	int(11)	District Public Id
dis_name	varchar(20)	District name
dis_lifecode	varchar(11)	District life Code
pro_id	int(2)	Province ID
dis_isActive	int(1)	District Active(Active=1,DisActive=0)

Table 15 : District Table

13. Dpdhs Table

Field Name	Data Type	Description
dpdhs_id	int(11)	RDHS ID
dpdhs_name	varchar(20)	RDHS Name
dpdhs_district	int(3)	RDHS District ID
dpdhs_pro	int(2)	RDHS Provice ID
dpdhs_isActive	int(1)	RDHS Active(Active=1,DisActive=0)

Table 16 : Dpdhs Table

14. Ds division Table

Field Name	Data Type	Description
ds_id	int(11)	DS Division ID
ds_pub_id	int(11)	DS Division Public Id
ds_name	varchar(40)	DS Division Name
ds_lifecode	varchar(20)	Ds Division life Code
dis_id	int(11)	District ID
ds_active	int(4)	DS Division Active(Active=1,DisActive=0)

Table 17 : Ds Division Table

15. Genitaria Table

Field Name	Data Type	Description
p_id	int(11)	Patient ID
clinic_type	enum('1', '2', '3')	Clinic Type
clinic_id	int(11)	Clinic ID
genital_abnormality	int(1)	Genital_abnormality
Prostate	int(1)	Prostate
prostate_txt	varchar(255)	Prostate_txt

Table 18 : Genitaria Table

16. Gn division Table

Field Name	Data Type	Description
gn_id	int(11)	GN Division Id
gn_pub_id	int(11)	GN Division Public Id
gn_name	varchar(100)	GN Division Name
gn_life_code	varchar(40)	GN Division Life Code
ds_id	int(11)	DS Division Id
gn_active	int(1)	GN Division Active(Active=1,DisActive=0)

Table 19 : Gn Division Table

17. Histological studies Table

Field Name	Data Type	Description
p_id	int(11)	Patient ID
clinic_type	int(1)	Clinic Type
clinic_id	int(11)	Clinic ID
clinic_date	Datetime	Clinic Date
histo_value	varchar(300)	Histological studies Value

Table 20 : Histological Table

18. Hormone assay Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
clinic_type	int(1)	Clinic Type
clinic_id	int(11)	Clinic Id
clinic_date	Datetime	Clinic Date
Pth	decimal(10,5)	Pth value
Tsh	decimal(10,5)	Tsh value
t3	decimal(10,5)	t3 value
t4	decimal(10,5)	t4 value
d3	decimal(10,5)	d3 value

Table 21 : Hormone Assay Table

19. Hospitalization Table

Field Name	Data Type	Description
hospitalization_id	int(11)	Hospitalization id
clinic_id	int(11)	Clinic id
p_id	int(11)	Patient id
date_of_admission	Date	Admission Date
date_of_discharge	Date	Discharge Date
institution_type	enum('1', '2', '0')	Institution type
institution_name	int(5)	Institution name
blood_transfusion	enum('1', '2', '0')	Blood transfusion(1-Yes,2-

		No)
Reason	varchar(300)	Reason- Blood transfusion
is_related_ckd	enum('1', '2', '0')	Is_related_ckd
reason1	varchar(300)	Reason- Related Ckd
admission_type	enum('1', '2', '0')	Admission_type

Table 22 : Hospitalization Table

20. Institutions Table

Field Name	Data Type	Description
institute_id	int(11)	Institution Id
institute_name	varchar(50)	Institution Name
institute_active	int(1)	Institution Active(Active=1,DisActive=0)

Table 23 : Institutions Table

21. Moh Table

Field Name	Data Type	Description
moh_id	int(11)	MOH Id
moh_name	varchar(30)	MOH Name
dpdhs_id	int(4)	RDHS Id
moh_IsActive	int(1)	Moh Active(Active=1,DisActive=0)

Table 24 : Moh Table

22. Months Table

Field Name	Data Type	Description
month_id	int(2)	Month Id
month_name	varchar(10)	Month Name

Table 25 : Months Table

23. Nerve system Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
clinic_type	enum('1', '2', '3')	Clinic Type
clinic_id	int(11)	Clinic Id
conscious	int(1)	Nerve systemconscious
rational	int(1)	Nerve system rational
orientation	int(1)	Nerve system orientation
Gcs	int(5)	Nerve system Gcs
focal_neurological_signs	int(1)	Nerve system focal_neurological_signs
focal_neurological_signs_txt	varchar(255)	Nerve system focal_neurological_signs_txt

Table 26 : Nerve System Table

24. Other comobidities Table

Field Name	Data Type	Description
Id	int(11)	Other comorbidities Id
p_id	int(11)	Patient Id
clinic_type	enum('1', '2', '3')	Clinic Type
clinic_id	int(11)	Clinic ID
other_comobidity	varchar(100)	Other comorbidities
cm_subsection	int(2)	Comorbidities Subsection

Table 27 : Other Comobidities Table

25. Patient Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_institute	int(11)	Patient Institution Id
p_fname	varchar(50)	Patient First Name
p_mname	varchar(60)	Patient Midle Name
p_lname	varchar(60)	Patient Last Name
p_gender	enum('f', 'm')	Gender
p_nic	varchar(10)	Patient NIC
p_dob	Date	Patient Date of Birth
per_addr1	varchar(50)	Patient Address -No
per_addr2	varchar(150)	Patient Address -Street
per_addr3	varchar(150)	Patient Address -Town
cur_addr1	varchar(50)	Current Patient Address
cur_addr2	varchar(150)	Current Patient Address
cur_addr3	varchar(250)	Current Patient Address
p_ethnicity	enum('1', '2', '3', '4', '5','0')	Patient Ethnicity
weight	decimal(5,2)	Patient Weight
height	decimal(5,2)	Patient Height
diagnosis	varchar(50)	Patient Diagnosis
p_district	int(11)	Patient District
p_pro	int(11)	Patient Province
p_ds	int(11)	Patient Ds Division
p_moh	int(11)	Patient Moh
p_gn	int(11)	Patient GN Division
longitude	decimal(15,13)	Patient longitude
latitude	decimal(15,13)	Patient latitude
p_contact1	varchar(10)	Patient Contact Number
p_contact2	varchar(10)	Patient Contact Number
p_occupation	varchar(20)	Patient Occupation
p_civil_status	enum('s', 'm', 'd', 'w')	Patient Civil status
smoking	int(1)	Patient Habits
alcohol	int(1)	Patient Habits

betel chewing	int(1)	Patient Habits
next_of_kin_contact	varchar(10)	Next_of_kin_contact
rec_add_date	Datetime	Record_add_date
rec_add_by	int(11)	Record_add_by
add_year	int(4)	Patient Register Year
add_month	int(2)	Patient Register Month
add_date	enum('1', '2', '3', '4', '5','0')	Patient Register Date

Table 28 : Patient Table

26. Patient address Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_no	varchar(255)	Patient Number
p_street	varchar(255)	Patient Street
p_town	varchar(255)	Patient Town
permenent_address	varchar(255)	Patient Address

Table 29 : Patient Address Table

27. Patient allergy Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
clinic_id	int(11)	Clinic Id
drug_allergy	int(1)	Drug allergy
specify_drug_allergy	varchar(255)	Specify drug allergy
food_allergy	int(1)	Food allergy
specify_food_allergy	varchar(255)	Specify food allergy

Table 30 : Patient Allergy Table

28. Patient blood group Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
blood_group	enum('A', 'B', 'AB', 'O')	Patient Blood group
Rh	enum('p', 'n')	Patient Rh
added_by	int(11)	Record_add_by

Table 31 : Patient Blood Group Table

29. Patient bp Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
add_date	Datetime	Register date
systolic	int(3)	Systolic
diastolic	int(3)	Diastolic
clinic_type	int(1)	Clinic type
institution_id	int(11)	Institution id
clinic_id	int(11)	Clinic id

Table 32 : Patient BP Table

30. Patient comobidities Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_comobidity	int(3)	Patient comobidities
value	varchar(255)	Patient comorbidities Value
clinic_type	int(1)	Clinic type
clinic_id	int(11)	Clinic id
start_year	int(4)	Start year
start_month	int(2)	Start month

Table 33 : Patient Comobidities Table

31. Patient contacts Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_contact	varchar(10)	Patient Contact

Table 34 : Patient Contact Table

32. Patient diagnosis Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_diagnosis	int(11)	Patient diagnosis
p_diog_date	Datetime	Patient diagnosis date

Table 35 : Patient Diagnosis Table

33. Patient dialysis Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
dialysis_id	int(11)	Dialysis id
dialysis	enum('1', '2', '3', '0')	Dialysis
dialysis_access	int(1)	Dialysis access
dry_weight	decimal(5,2)	Dry weight
current_weight	decimal(5,2)	Current weight
dialysis_plan	varchar(300)	Dialysis plan

Table 36 : Patient Dialysis Table

34. Patient medicine Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
medicine_id	int(11)	Medicine id
clinic_id	int(11)	Clinic id
dosage	float(6,2)	Dosage
frequency	varchar(20)	Frequency

Table 37 : Patient Medicine Table

35. Patient other comobidities Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_comobidity	varchar(40)	Patient other comobidities
clinic_type	int(1)	Clinic Type
clinic_id	int(11)	Clinic Id

Table 38 : Patient Other Comobidities Table

36. Patient stage Table

Field Name	Data Type	Description
p_id	int(11)	Patient Id
p_stage	enum('0','1', '2', '3', '4', '5')	Patient stage
add_date	Date	Add date
clinic_type	enum('1', '2', '3')	Clinic type
clinic_id	int(11)	Clinic id
added_by	int(11)	Added by

Table 39 : Patient Stage Table

37. Pharmaceutical Table

Field Name	Data Type	Description
phar_id	int(11)	Pharmaceutical Id
phar_name	varchar(70)	Pharmaceutical Name

Table 40 : Pharmaceutical Table

38. Plan of management Table

Field Name	Data Type	Description
clinic_id	int(11)	Clinic Id
p_id	int(11)	Patient Id
consecutive_management	int(1)	Consecutive management
medical_management	int(1)	Medical management
Rrt	int(1)	Rrt
hemodialysis	int(1)	Hemodialysis
ambulatory_pertoneal_dialysis	int(1)	Ambulatory pertoneal_dialysis
renal_transport	int(1)	Renal transport

Table 41 : Plan of Management Table

39. Province Table

Field Name	Data Type	Description
pro_id	int(2)	Province Id
pro_name	varchar(20)	Province Name
pro_lifecode	int(11)	Province life code
pro_pub_id	int(11)	Province public Id
p_IsActive	int(1)	Province Active(1-

		Active,DisActive-0
dis_id	int(3)	District Id

Table 42 : Province Table

40. Radiological studies Table

Field Name	Data Type	Description
p_id	int(11)	Patient id
clinic_id	int(11)	Clinic id
clinic_type	varchar(255)	Clinic type
date_time	Datetime	Date time
xrayKUB	varchar(255)	Xraykub
dtpa	varchar(255)	Dtpa
ussKUB	varchar(255)	Usskub
rentalAngiogram	varchar(255)	Rentalangiogram

Table 43 : Radiological Studies Table

41. Respiratory system Table

Field Name	Data Type	Description
p_id	int(11)	Patient id
clinic_id	int(11)	Clinic id
clinic_type	enum('1', '2', '3')	Clinic type
respiratory_rate	int(4)	Respiratory rate
left_air_entry	int(1)	Left air entry
left_vesicular_breathing	int(1)	Left vesicular breathing
left_bronchial_breathing	int(1)	Left bronchial breathing
left_crakles	int(1)	Left crakles
left_ronchi	int(1)	Left ronchi
right_vesicular_breathing	int(1)	Right vesicular breathing
right_bronchial_breathing	int(1)	Right bronchial breathing
right_crakles	int(1)	Right crakles
right_ronchi	int(1)	Right ronchi

Table 44 : Respiratory System Table

42. Screening for infection Table

Field Name	Data Type	Description
p_id	int(11)	Description
clinic_id	int(11)	Patient id
clinic_type	int(1)	Clinic id
date_time	Datetime	Clinic type
hbsag	enum('p', 'n', 'NULL')	Screening for infection Date
anti_hcv_igm	enum('p', 'n', 'NULL')	Hbsag
hiv_serology	enum('p', 'n', 'NULL')	Anti hcv igm
Igg	enum('p', 'n', 'NULL')	Hiv serology
ebv_serology	enum('p', 'n', 'NULL')	Igg
vdrl	enum('p', 'n', 'NULL')	Ebv serology
toxoplasmalgM	enum('p', 'n', 'NULL')	Vdrl

mantoux	enum('p', 'n', 'NULL')	Toxoplasmalgm
		Mantoux

Table 45 : Screening for Infection Table

43. Urin analysis Table

Field Name	Data Type	Description
p_id	int(11)	Patient id
clinic_id	int(11)	Clinic id
clinic_type	int(1)	Clinic type
Pc	varchar(255)	Pc
Rbc	varchar(255)	Rbc
hyaline_cast	int(1)	Hyaline cast
epithelial_casts	int(1)	Epithelial casts
granular_casts	int(1)	Granular casts
caco3	varchar(255)	Caco3
calcium_oxalate	varchar(255)	Calcium oxalate
upcr	varchar(255)	Urin pcr
uarc	varchar(255)	Urin arc
u_microalbumin	varchar(255)	Urin microalbumin

Table 46 : Urine Analysis Table

44. User group Table

Field Name	Data Type	Description
ug_id	int(11)	User group id
ug_name	varchar(255)	User group name
accarea	int(1)	Accarea
hos_access	enum('0','1', '2', '3', '4', '5','6','7')	Hos_access
crud_comobidities	int(1)	Crud comobidities
crud_institutions	int(1)	Crud institutions
crud_provinces	int(1)	Crud provinces
crud_districts	int(1)	Crud districts
crud_ds	int(1)	Crud ds
crud_moh	int(1)	Crud moh
add_patient	int(1)	Add patient
update_patient	int(1)	Update patient
delete_patient	int(1)	Delete patient
view_patient	int(1)	View patient
add_clinicdata_doc	int(1)	Add clinicdata doc
view_clinicdata_doc	int(1)	View linicdata doc
add_hosAd	int(1)	Add hosad
delete_hosAd	int(1)	Delete hosad
add_dialysis	int(1)	Add dialysis
update_dialysis	int(1)	Update dialysis
delete_dialysis	int(1)	Delete dialysis
add_rdEvaluation	int(1)	Add rdevaluation
update_rdEvaluation	int(1)	Update rdevaluation
delete_rdEvaluation	int(1)	Delete

		rdevaluation
add_postkt	int(1)	Add postkt
update_postkt	int(1)	Update postkt
delete_postkt	int(1)	Delete postkt
add_ug	int(1)	Add User group
edit_ug	int(1)	Edit User group
delete_ug	int(1)	Delete User group
add_user	int(1)	Add user
edit_user	int(1)	Edit user
delete_user	int(1)	Delete user
change_any_pw	int(1)	Change any password
change_own_pw	int(1)	Change own password

Table 47 : User Group Table

45. Users Table

Field Name	Data Type	Description
u_id	int(11)	Users id
u_title	int(2)	Users title
u_group	int(11)	Users group
u_fname	varchar(25)	Users fname
u_lname	varchar(20)	Users lname
u_email	varchar(40)	Users email
u_destination	varchar(30)	Users destination
u_gender	int(1)	Users gender
u_dob	Date	Users dob
u_nic	varchar(10)	Users nic
u_province	int(2)	Users province
u_institution	int(11)	Users institution
u_division	int(6)	Users division
u_addr1	int(5)	Users addr1
u_addr2	varchar(40)	Users addr2
u_addr3	varchar(40)	Users addr3
u_name	varchar(40)	Users name
u_pwd	varchar(26)	Users pwd
u_active	varchar(30)	Users active
u_status	int(1)	Users status

Table 48 : Users Table

46. User contacts Table

Field Name	Data Type	Description
u_id	int(11)	Users Id
u_contact	varchar(10)	Users Contact

Table 49 : User Contacts Table

Chapter 4: Evolution

4.1. TESTING

Testing is integral part of any application development. A proper testing plan and execution produces the more reliable robust system which also meets the required expectations.Different processes are followed to ensure the systems meet the required specifications. Whenever software is developed it is required to check whether it fulfills those needs. Testing typically consumes 40~50% of development efforts, and consumes more effort for systems that require higher levels of reliability, it is a significant part of the software engineering. As the amount of maintenance and upgrade of existing systems grow, significant amount of testing would also be needed to verify systems after changes are made. Hence it is important to check its potential. The main goal of software testing is to know the errors of the software before the user finds them[29].

4.2. The Testing Spectrum

Testing is involved in every stage of software life cycle, but the testing done at each level of software development is different in nature and has different objectives. Unit Testing is done at the lowest level. It tests the basic unit of software, which is the smallest testable piece of software, and is often called “unit”, “module”, or “component” interchangeably.

4.3. Test Plan

The system test is carried out to check whether the system meets the required specification whether it can operate successfully. The following checklist was done during the project execution time.

ID No	Description of Test	Test	Result
A	**Function Testing**		
	Check all links		
1	Whether outgoing links from all the pages from the specific domain are tested?	Yes	OK
2	Whether all internal links are tested?	Yes	OK
3	Whether links are jumping on the same pages?	Yes	No
4	Whether there are any orphan pages?	Yes	No
5	Whether any broken links are in all above mentioned links?	Yes	No

	Test for all pages		
6	Whether all validations on each field are checked?	Yes	OK
7	Whether default values of the field are checked?	Yes	OK
8	Whether invalid inputs to the fields in the forms are checked?	Yes	OK
	Database Testing		
9	Whether data consistency is existed?	Yes	OK
10	Whether data integrity and no error are in the data?	Yes	OK
11	Whether database queries are executed correctly?	Yes	OK
12	Whether data is retrieved correctly?	Yes	OK
13	Whether data is updated correctly	Yes	OK
B	**Usability Testing**		
	Navigation		
1	Whether web sites are easy to use?	Yes	OK
2	Whether instructions are provided clearly, correct meaning and satisfy the purpose?	Yes	OK
3	Whether main menu are provided in each pages and consistent?	Yes	OK
	Content Testing		
4	Whether contents are logical, meaningful, understand easily, free from spelling and grammatical mistakes?	Yes	OK
5	Whether dark color and unsuitable fonts are used?	Yes	OK
6	Whether all the anchor links are worked properly?	Yes	OK
7	Whether images are placed properly with proper size?	Yes	OK
C	**Interface Checking**		
1	Whether all the interactions between severs are executed properly and errors are handled properly?	Yes	OK
2	If database or web server returns any error message for any quarry by application server, whether application server catches and display these message approximately to users?	Yes	OK
D	**Compatibility Testing**		
	Browser compatibility		
1	Whether web application is tested on internet explorer, Firefox, Google chrome, Opera, Safari browsers with different versions?	Yes	OK

Table 50 :WebTesting Checklist

4.4. Test Cases

This section describes an input, action or event and an expected response, to determine if a feature of in this application system is working correctly. This test plan contains particulars such as test case ID, module name, objective, expected result and the actual result.

Test Case ID: 01	**Test Case:** Login module	
Activity	**Expected result**	**Actual result**
Valid User name and valid password	Display the respective main page.	Display the respective main page.
Attempt to login without user name and/or password	Display Login failure error message and direct to login.php	Display Login failure error message and direct to login.php

Table 51:Test plan for login module

Test Case ID: 02	**Test Case:** Patient Registration	
Activity	**Expected result**	**Actual result**
Registration for new patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to register without first name ,last name, institution, gender, province, district, registered year and month	Display Register failure error message and direct to patient_registration.php	Display Register failure error message and direct to patient_registration.php

Table 52:Test plan for patient registration

Test Case ID: 03	**Test Case:** ViewPatient Registration	
Activity	**Expected result**	**Actual result**
View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to patient_view_registration.php	Display View failure error message and direct to patient_view_registration.php

Table 53:Test plan for view patient registration

Test Case ID: 04	**Test Case:** Patient Clinic Visit Registration	
Activity	**Expected result**	**Actual result**
View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to clinic_visit.php	Display View failure error message and direct to clinic_visit.php
Attempt to patient clinic visit register without institution, present clinic visit ,next clinic visit	Display Register failure error message and direct to clinic_visit.php	Display Register failure error message and direct to clinic_visit.php

Table 54:Test plan for clinic visit registration

Test Case ID: 05	**Test Case:** Patient Hospital Admission Registration	
Activity	**Expected result**	**Actual result**
View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to hospital_admission.php	Display View failure error message and direct to hospital_admission.php
Attempt to patient hospital admission register without institution	Display Register failure error message and direct to hospital_admission.php	Display Register failure error message and direct to hospital_admission.php

Table 55:Test plan for hospital admission registration

Test Case ID: 06	**Test Case:** Add Dialysis	
Activity	**Expected result**	**Actual result**
View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to adddialysis.php	Display View failure error message and direct to adddialysis.php
Attempt to patient add dialysis without institution	Display Register failure error message and direct to adddialysis.php	Display Register failure error message and direct to adddialysis.php

Table 56:Test plan for add dialysis

Test Case ID: 07	**Test Case:** Add Donor Recipient Evaluation	
Activity	**Expected result**	**Actual result**
View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to add_donor_recipient.php	Display View failure error message and direct to add_donor_recipient.php
Attempt to patient donor recipient register without donor name,gender	Display Register failure error message and direct to add_donor_recipient.php	Display Register failure error message and direct to add_donor_recipient.php

Table 57:Test plan for Add donor recipient evaluation

Test Case ID: 08	**Test Case:** Field update	
Activity	**Expected result**	**Actual result**
View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to field_update.php	Display View failure error message and direct to field_update.php
Attempt to field update without district, ds division	Display Register failure error message and direct to field_update.php	Display Register failure error message and direct to field_update.php

Table 58:Test plan for field update

Test Case ID: 09	**Test Case:** Death Notification	
Activity	**Expected result**	**Actual result**

View for patient: field validity	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without Patient id or Patient NIC	Display View failure error message and direct to death_notification.php	Display View failure error message and direct to death_notification.php
Attempt to death notification without death date, gender, province, district, ds division	Display Register failure error message and direct to death_notification.php	Display Register failure error message and direct to death_notification.php

Table 59:Test plan for death notification

Test Case ID: 10	**Test Case:** Report Generation for Province Wise	
Activity	**Expected result**	**Actual result**
Province Wised Patient count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without province name, year, Time distribution	Display View failure error message and direct to province_report.php	Display View failure error message and direct to province_report.php
Province Wised Patient list Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without province name, year, month	Display View failure error message and direct to province_report_list.php	Display View failure error message and direct to province_report_list.php
Province Wised Death count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without province name, year, Time distribution	Display View failure error message and direct to death_notification.php	Display View failure error message and direct to death_notification.php
Province Wised Age distribution Average Age Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without province name, year, Time distribution	Display View failure error message and direct to agedistribution.php	Display View failure error message and direct to agedistribution.php
Province Wised Age distribution Standard Deviation Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without province name, year, Time distribution	Display View failure error message and direct to agedistribution_std.php	Display View failure error message and direct to agedistribution_std.php
Province Wised Age distribution Age Category Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without province name, year, Time distribution	Display View failure error message and direct to agedistribution_cate.php	Display View failure error message and direct to agedistribution_cate.php

Table 60:Test plan for report generation province wise

Test Case ID: 11	**Test Case:** Report Generation for District Wise	
Activity	**Expected result**	**Actual result**
District Wised Patient count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without district name, year, Time distribution	Display View failure error message and direct to district_report.php	Display View failure error message and direct to district_report.php
District Wised Patient list Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without district name, year, month	Display View failure error message and direct to district_report_list.php	Display View failure error message and direct to district_report_list.php
District Wised Death count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without district name, year, Time distribution	Display View failure error message and direct to death_notification_dis.php	Display View failure error message and direct to death_notification_dis.php
District Wised Age distribution Average Age Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without district name, year, Time distribution	Display View failure error message and direct to agedistribution_dis.php	Display View failure error message and direct to agedistribution_dis.php
District Wised Age distribution Standard Deviation Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without district name, year, Time distribution	Display View failure error message and direct to dis_agedistribution_std.php	Display View failure error message and direct to dis_agedistribution_std.php
District Wised Age distribution Age Category Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without district name, year, Time distribution	Display View failure error message and direct to dis_agedistribution_cate.php	Display View failure error message and direct to dis_agedistribution_cate.php

Table 61:Test plan for report generation district wise

Test Case ID: 12	**Test Case:** Report Generation for Institution Wise	
Activity	**Expected result**	**Actual result**
Institution Wised Patient count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to institution_report.php	Display View failure error message and direct to institution _report.php
Institution Wised Patient list Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, month	Display View failure error message and direct to institution _report_list.php	Display View failure error message and direct to institution _report_list.php

Institution Wised Death count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to death_notification_ins.php	Display View failure error message and direct to death_notification_ins.php
Institution Wised Age distribution Average Age Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to agedistribution_ins.php	Display View failure error message and direct to agedistribution_ins.php
Institution Wised Age distribution Standard Deviation Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to ins_agedistribution_std.php	Display View failure error message and direct to ins_agedistribution_std.php
Institution Wised Age distribution Age Category Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to ins_agedistribution_cate.php	Display View failure error message and direct to ins_agedistribution_cate.php
Institution Wised Dialysis Patient Count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to dialysis.php	Display View failure error message and direct to dialysis.php
Institution Wised Dialysis Patient List Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, month	Display View failure error message and direct to dialysis_list.php	Display View failure error message and direct to dialysis_list.php
Institution Wised clinic visit Patient Count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to clinic_visit.php	Display View failure error message and direct to clinic_visit.php
Institution Wised Clinic Visit Patient List Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, month	Display View failure error message and direct to clinic_visit.php	Display View failure error message and direct to clinic_visit.php
Institution Wised hospital admission Patient Count Search	Display error/warning message to required fields	Display error/warning message to required fields

Attempt to view without institution name, year, Time distribution	Display View failure error message and direct to hospital_admission.php	Display View failure error message and direct to hospital_admission.php
Institution Wised Hospital Admission Patient List Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without institution name, year, month	Display View failure error message and direct to hospital_admission.php	Display View failure error message and direct to hospital_admission.php

Table 62:Test plan for report generation Institution wise

Test Case ID: 13	**Test Case:** Report Generation for MOH Wise	
Activity	**Expected result**	**Actual result**
Moh Wised Patient count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without moh name, year, Time distribution	Display View failure error message and direct to moh_report.php	Display View failure error message and direct to moh _report.php
Moh Wised Patient list Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without moh name, year, month	Display View failure error message and direct to moh _report_list.php	Display View failure error message and direct to moh _report_list.php
Moh Wised Death count Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without moh name, year, Time distribution	Display View failure error message and direct to death_notification_moh.php	Display View failure error message and direct to death_notification_moh.php
Moh Wised Age distribution Average Age Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without moh name, year, Time distribution	Display View failure error message and direct to agedistribution_moh.php	Display View failure error message and direct to agedistribution_moh.php
Moh Wised Age distribution Standard Deviation Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without moh name, year, Time distribution	Display View failure error message and direct to moh_agedistribution_std.php	Display View failure error message and direct to moh_agedistribution_std.php
Moh Wised Age distribution Age Category Search	Display error/warning message to required fields	Display error/warning message to required fields
Attempt to view without moh name, year, Time distribution	Display View failure error message and direct to moh_agedistribution_cate.php	Display View failure error message and direct to moh_agedistribution_cate.php

Table 63:Test plan for report generation moh wise

4.4 Concluding Remarks

- Surveillance of Chronic Kidney Disease Management System not only provides an opportunity to the hospital to enhance their patient care but also can increase the profitability of the organization
- Surveillance of Chronic Kidney Disease Management System would enable hospitals to serve the rapidly growing number of health care consumers in a cost-effective manner.
- Surveillance of Chronic Kidney Disease Management System can also save extra money on your current computer hardware shopping. Check up with our executive to more on this.
- Hospital administrators would be able to significantly improve the operational control and thus streamline operations.
- This would enable to improve the response time to the demands of patient care because it automates the process of collecting, collating and retrieving patient information.
- Accounting sometimes becomes awfully pathetic and complex. This product will eliminate any such complexity, since the retrieval of information through its MIS will become virtually on the tip of your fingers

Very important for some, the reduced cost of the manpower would pay for the cost of this product within a short time after its implementation.

4.5. Evaluation of the Achievement

The objective of the project is to explore the possibility of entering Chronic Kidney Disease patients' detailsusing Chronic Kidney Disease Management Systembased on Astrological and Numerologicalaspects which were successfully achieved to fullest support and satisfaction of the supervisorat the completion of the project.

Extensive study and research were done to understand the treatment to the patient, understand the diagnosis name, understand the kidney transparent and understand the prescriptions name as well as the technologies used in each oftheir sites. Further studies helped to gather information regarding the availability ofapplication development tools and different types of data structure. More than 60% of theproject time spent on entering parts of Kidney patients details and limitations in each sitesOnce method and tools are found to the system

requirements; implementing methods and theprogram code according to the Baby name Database is toughest task. Even after finding thecomponents need to build the solution, putting everything together and make the system aworking model is a challenging and time consuming task. There are many commercial andopen source software tools and standards available in market. Among available technologies,selecting proper tool and technology is another challenging work.

4.6. Lesson Learned During the Project

The time management and communication are vital to deliver on time. Since most of the time spent in depth research, caused problem in keeping up with deliveries in later stages of the project. Also, the fundamental of Numerological and Astrological aspects are learned throughout the project.Though Open Source projects are good to work, sometime too much time spend to solveissues or find solutions due to lack of help or documentation of the open source product usedin the project. However without the proper documentation, the time spent and the hard workhelped to achieve a successful customized solution for this project.

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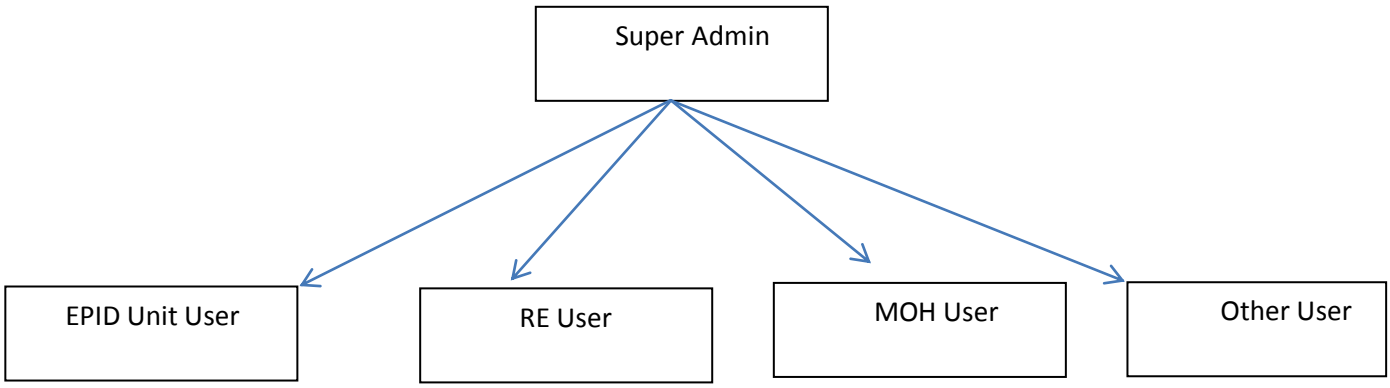
Appendix A

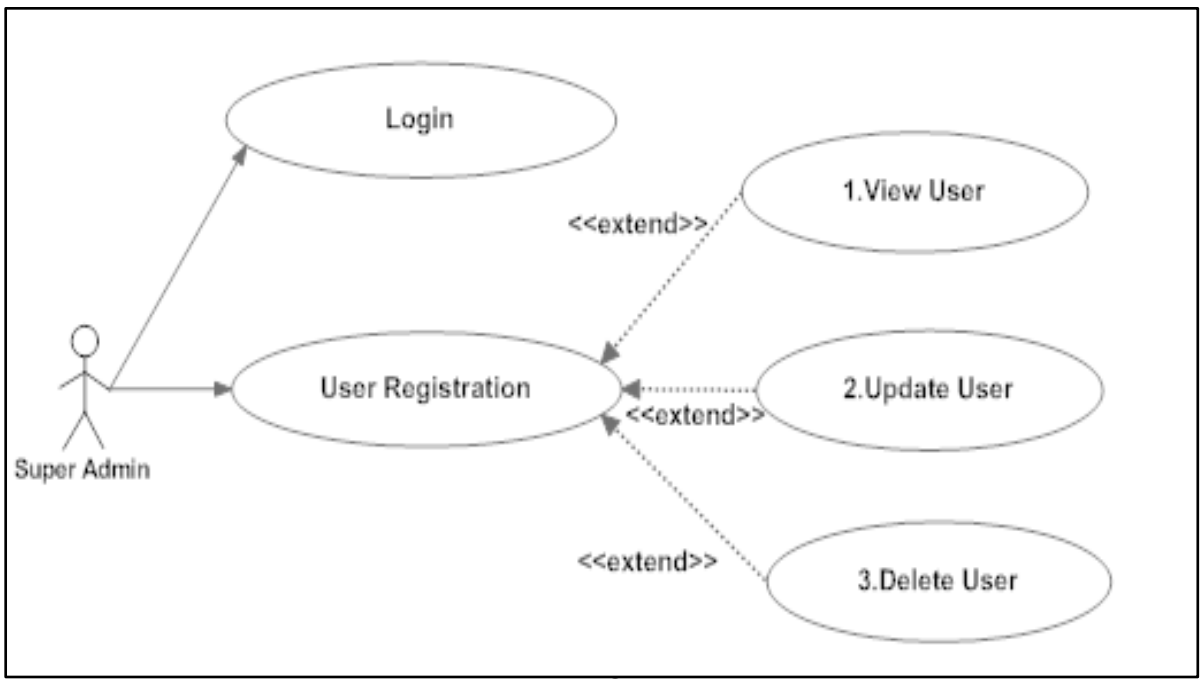
Registration Function

This System is mainly included the four registration Area. All Registration's done by System Administration.

- EPID User Registration
- PDHS User
- RE user Registration
- MOH User Registration
- Others User



User Registration



Use case name	Login Details
Main Flow	1. Super Admin Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	Super Admin
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	User Registration Information
Main Flow	1. Super Admin will register the user in the system with following details. • user ID • First Name • Last Name • DOB • Work In • User Group • User Level • User Name • Password 2.Save User Details
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	

Post -condition	User Account Created
Use case name	View User Registration Information
Main Flow	1. Super Admin Will Enter The User Level Or Users' Name. User Level • EPID • MOH • RDHS • PDHS • Institution • Other 2. View The Existing Registration Initiation Details Of users
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display Registered Users.

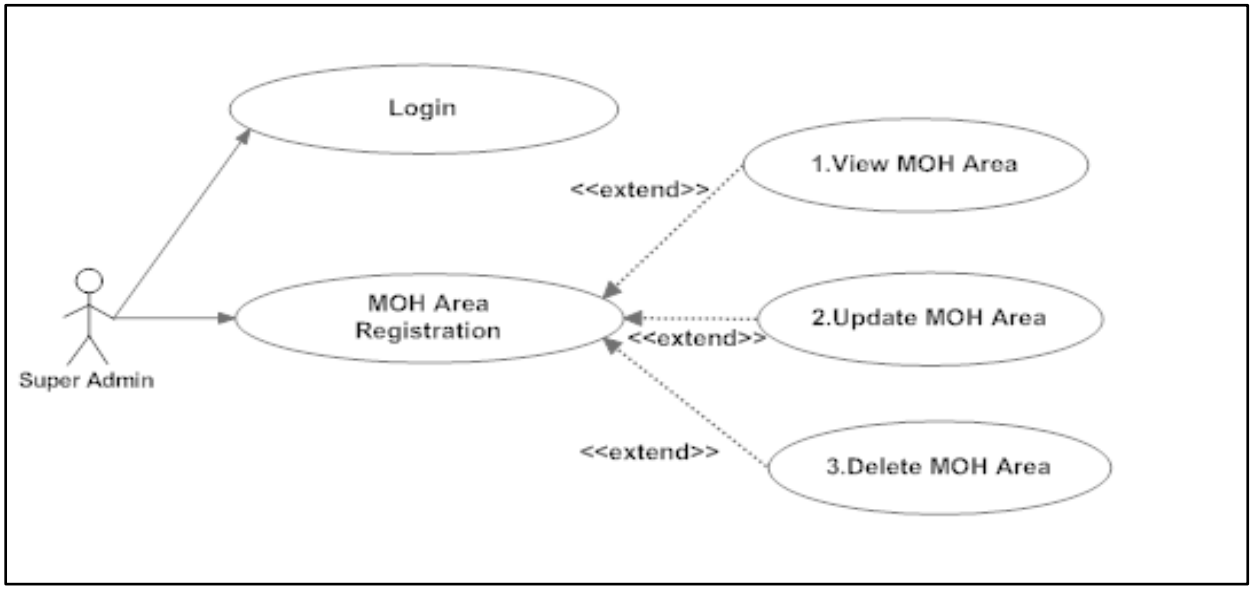
Use case name	Update User Registration Information
Main Flow	1. Super Admin Will Enter The User Level Or Users' Name. User Level • EPID • MOH • RDHS • PDHS • Institution • Other 2. View The Existing Registration Initiation Details Of users 3. Update Details in particular user.

Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display Registered Users.

Use case name	Delete User Registration Information
Main Flow	1. Super Admin Will Enter The User Level Or Users' Name. User Level • EPID • MOH • RDHS • PDHS • Institution • Other 2. View The Existing Registration Initiation Details Of users 3. Change Only The Status From Active To Inactive.
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display only Active Users.

Use case name	Login Details
Main Flow	1. Super Admin Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	Super Admin
Pre-condition	
Extensions	
Post -condition	Login to the System

MOH Area Registration



Use case name	Login Details
Main Flow	1. Super Admin Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	Super Admin
Pre-condition	
Extensions	
Post -condition	Login to the System

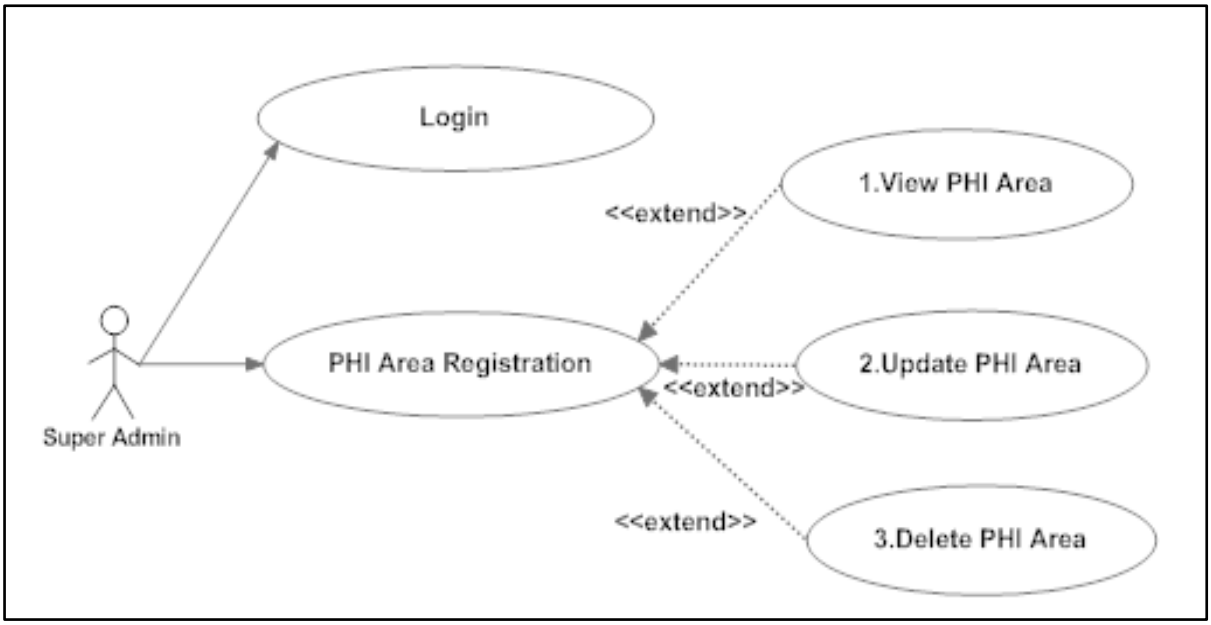
Use case name	MOH Area Registration Information
Main Flow	1. Super Admin will register the MOH Area in the system with following details. • Province • District • MOH ID • MOH Area Name 2.Save MOH AreaDetails
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	MOH Area Details Save Database

Use case name	View MOH AreaRegistration Information
Main Flow	1. Super Admin Will Enter The MOH Name or MOH ID 2. View The Existing Registration Initiation Details Of MOH Area
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display Registered MOH Area.

Use case name	Update MOH Area Registration Information
Main Flow	1. Super Admin Will Enter The MOH Area Name or MOH Area ID 2. View The Existing Registration Initiation Details Of MOH Area 3. Update Details in particular MOH Area.
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display Registered MOH Area.

Use case name	Delete MOH Area Registration Information
Main Flow	1. Super Admin Will Enter The MOH Area Name or MOH Area ID 2. View The Existing Registration Initiation Details Of MOH Area 3. Change Only MOH Area Status From Active To Inactive.
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display only Active MOH Area.

PHI Area Registration



Use case name	Login Details
Main Flow	1. Super Admin Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	Super Admin
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	PHI Area Registration Information
Main Flow	1. Super Admin will register the PHI Area in the system with following details. • Province • District • MOH Area ID • PHI Area ID • PHI Area Name 2.Save PHI AreaDetails
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	PHI Area Details Save Database

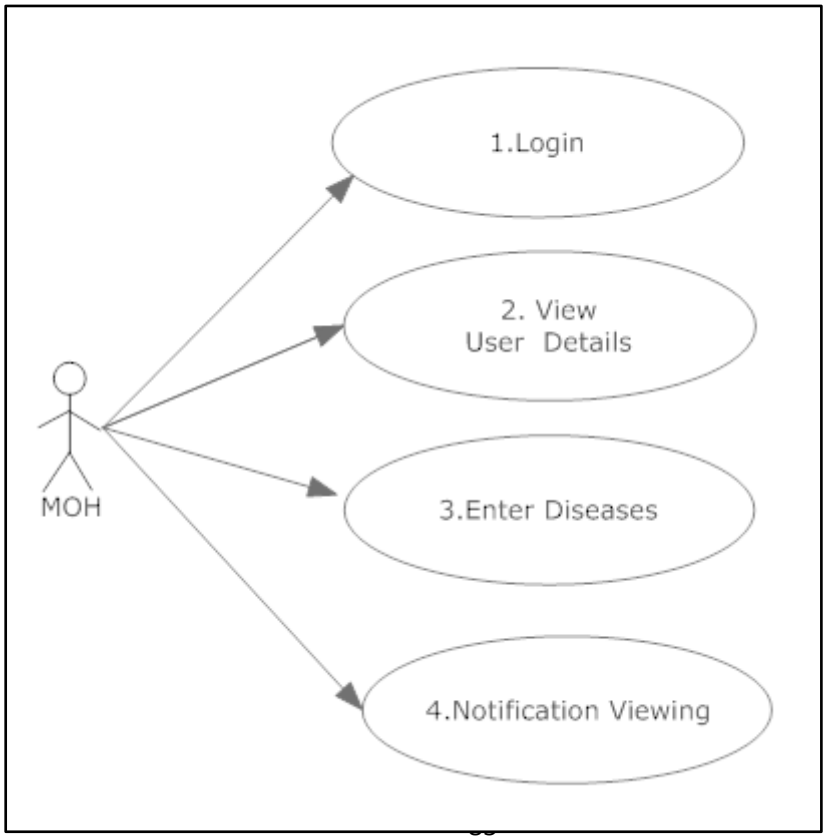
Use case name	View PHI AreaRegistration Information
Main Flow	1. Super Admin Will Enter The PHI Name or PHI ID 2. View The Existing Registration Initiation Details Of PHI Area
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display Registered PHI Area.

Use case name	Update PHI Area Registration Information
Main Flow	1. Super Admin Will Enter The PHI Area Name or PHI Area ID 2. View The Existing Registration Initiation Details Of PHI Area 3. Update Details in particular PHI Area.
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display Registered PHI Area.

Use case name	Delete PHI Area Registration Information
Main Flow	1. Super Admin Will Enter The PHI Area Name or PHI Area ID 2. View The Existing Registration Initiation Details Of PHI Area 3. Change Only PHI Area Status From Active To Inactive.
Actor	Super Admin
Pre-condition	1. Super Admin Login to the System
Extensions	
Post -condition	Display only Active PHI Area.

Login Function

MOH User Login



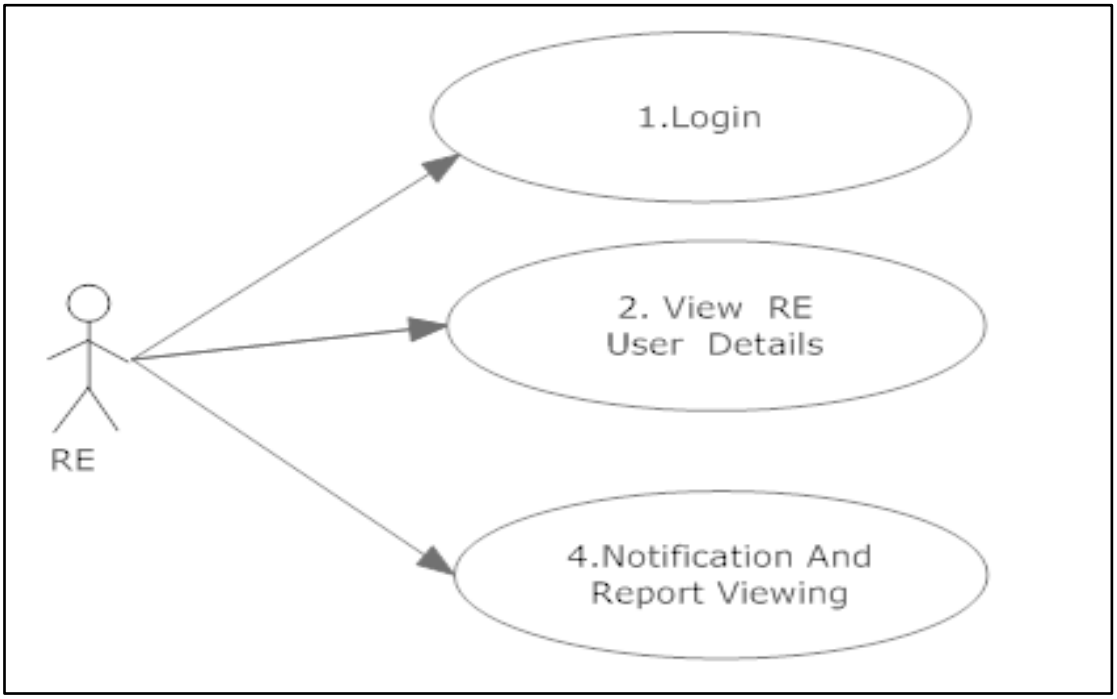
Use case name	MOH User Login
Main Flow	1. MOH Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	MOH User
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	MOH View User Detail
Main Flow	1. User Will be able to view the User Details. (User profile Details).
Actor	MOH User
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	Enter Diseases Details
Main Flow	1. User will login to the system and enter 399 report details. 2. Following Details need to be entered. • Cases notified count
Actor	MOH User
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	View Notification Details
Main Flow	1. MOH User will login to the system and view notification details. 2. Following Details need to be entered. • Notified Details
Actor	MOH User
Pre-condition	
Extensions	
Post -condition	Login to the System

RDHS User Login

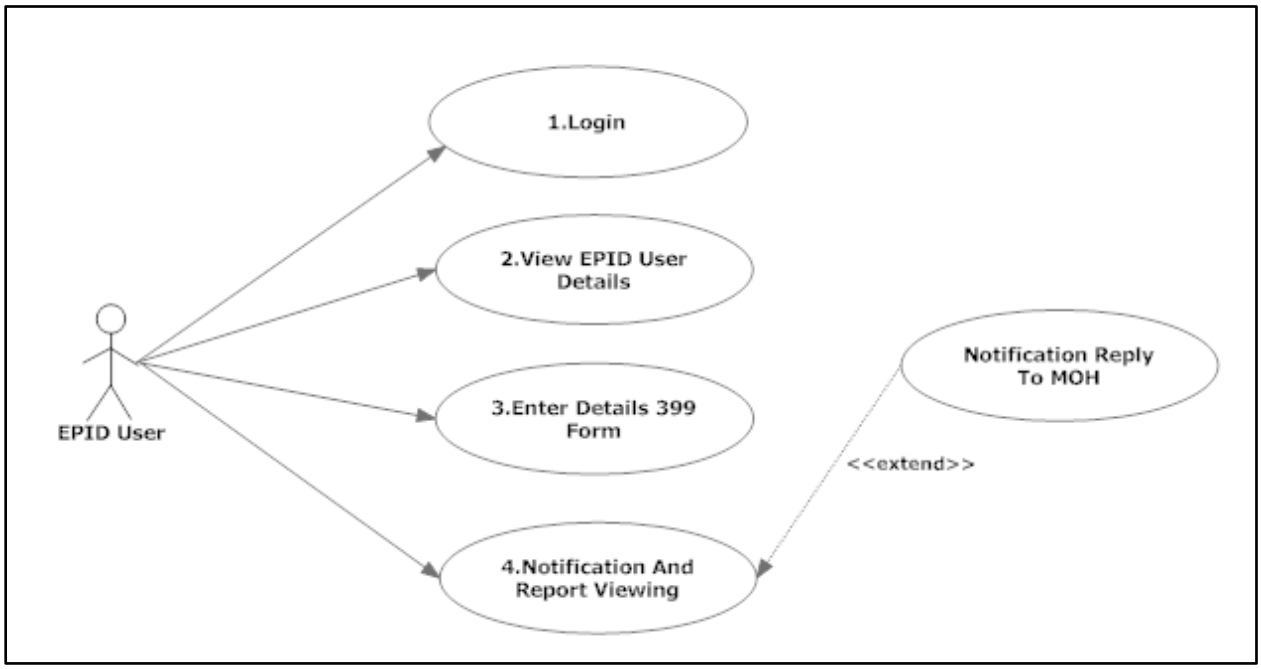


Use case name	RE User Login
Main Flow	1. RDHS Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	RDHS User
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	RDHS View User Detail
Main Flow	1. User Will be able to view the User Details. (User profile Details).
Actor	RDHS User
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	View Report
Main Flow	1. RDHS User will login to the system and get the report. 2. Following Details need to be entered. • Week end date
Actor	RDHS User
Pre-condition	
Extensions	
Post -condition	Login to the System

EPID User Login

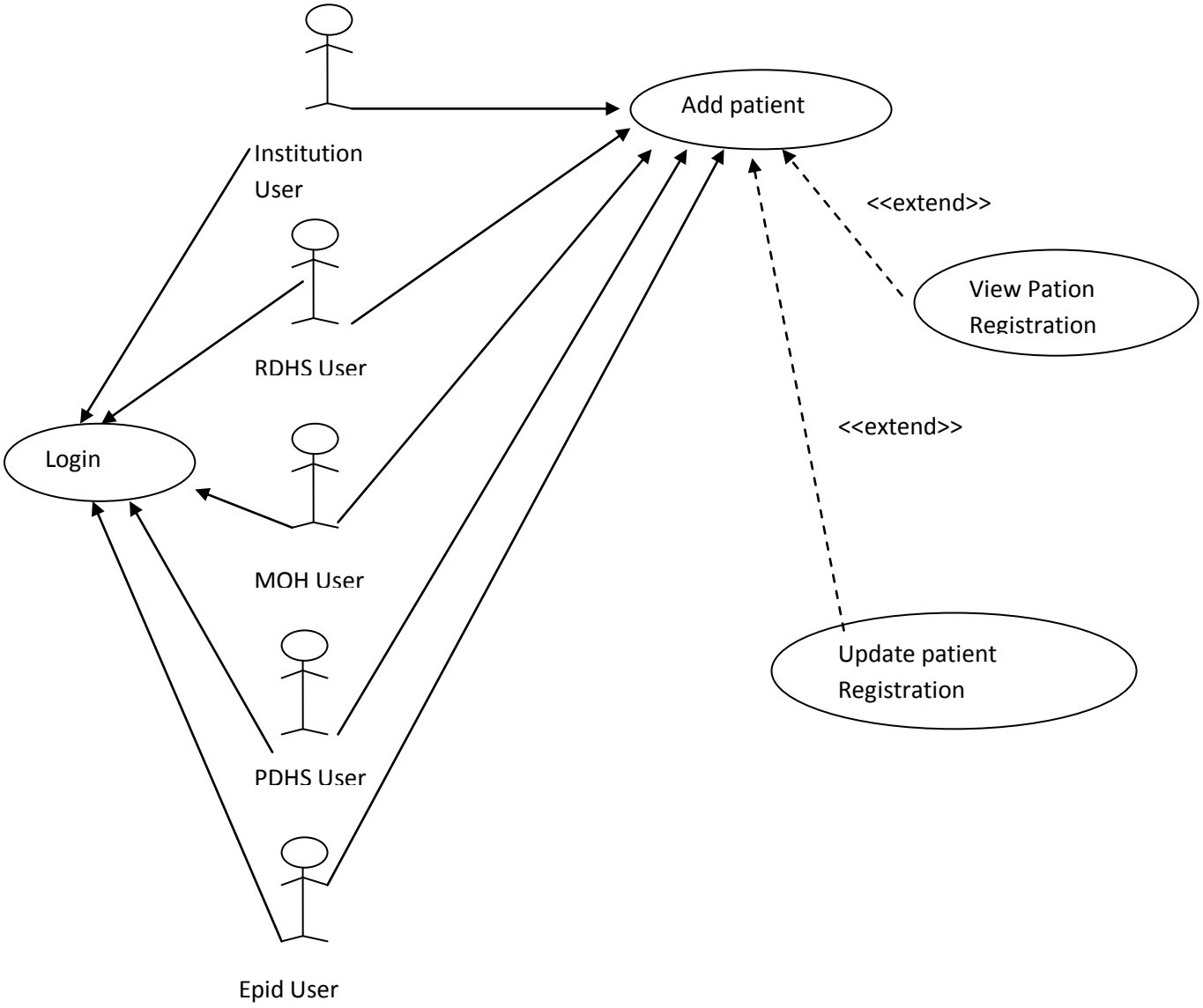


Use case name	EPID User Login
Main Flow	1. EPID User Will Enter The Following Primary Login Details • User Name • Password 2. Validation required with the user registration module at the Super Admin Level.
Actor	EPID User
Pre-condition	
Extensions	
Post -condition	Login to the System

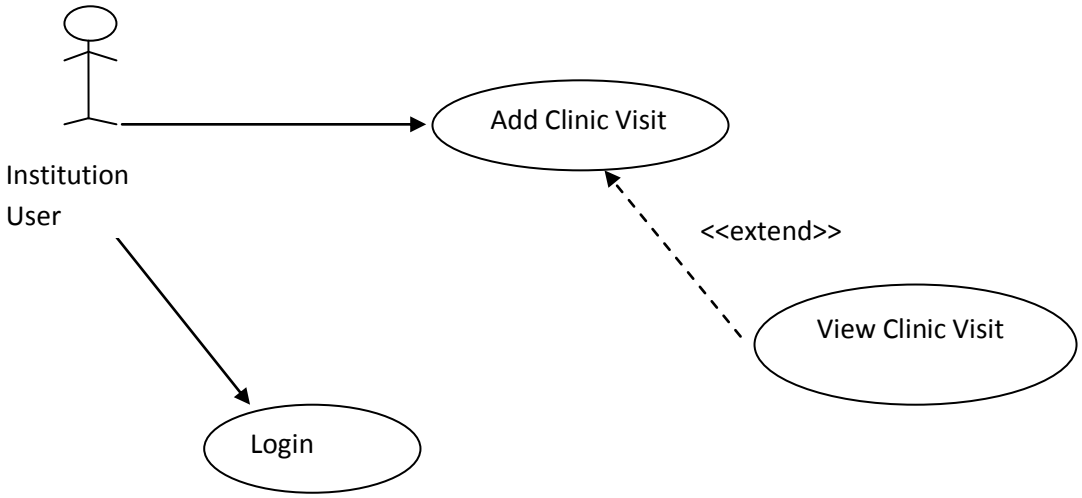
Use case name	EPID User View Detail
Main Flow	1. User Will be able to view the User Details. (User profile Details).
Actor	EPID User
Pre-condition	
Extensions	
Post -condition	Login to the System

Use case name	EPID User View Detail
Main Flow	1. User Will be able to view the User Details. (User profile Details).
Actor	EPID User
Pre-condition	
Extensions	
Post -condition	Login to the System

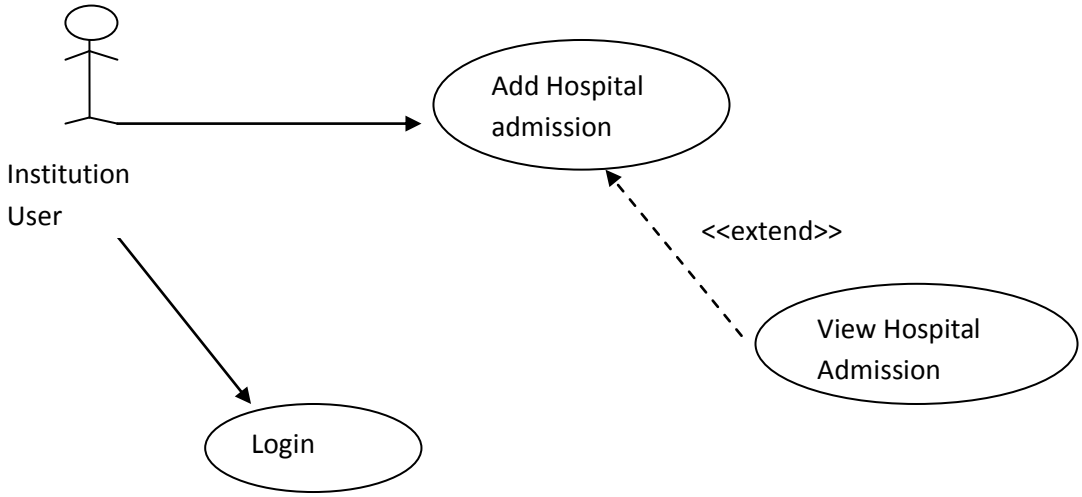
Patient Registration Use Case Diagram



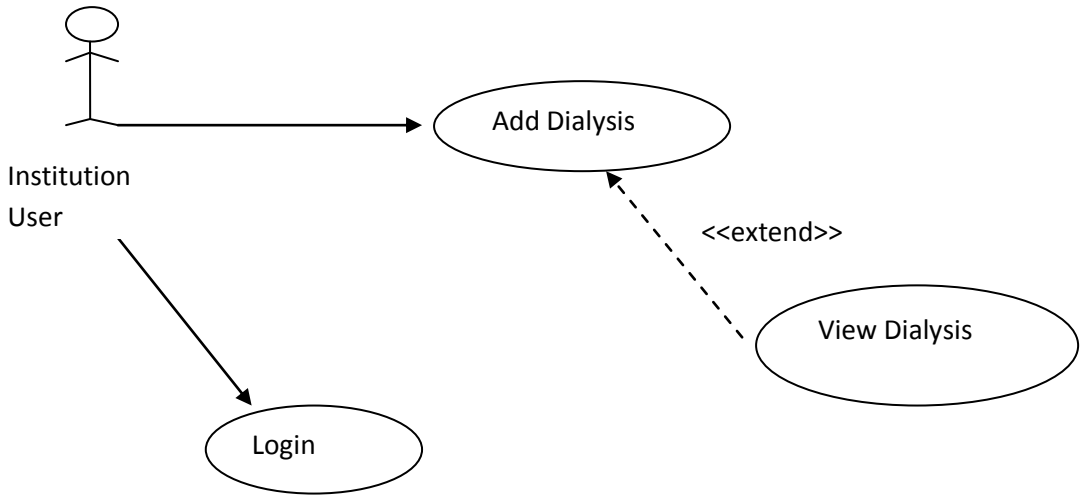
Clinic Visit Use Case Diagram



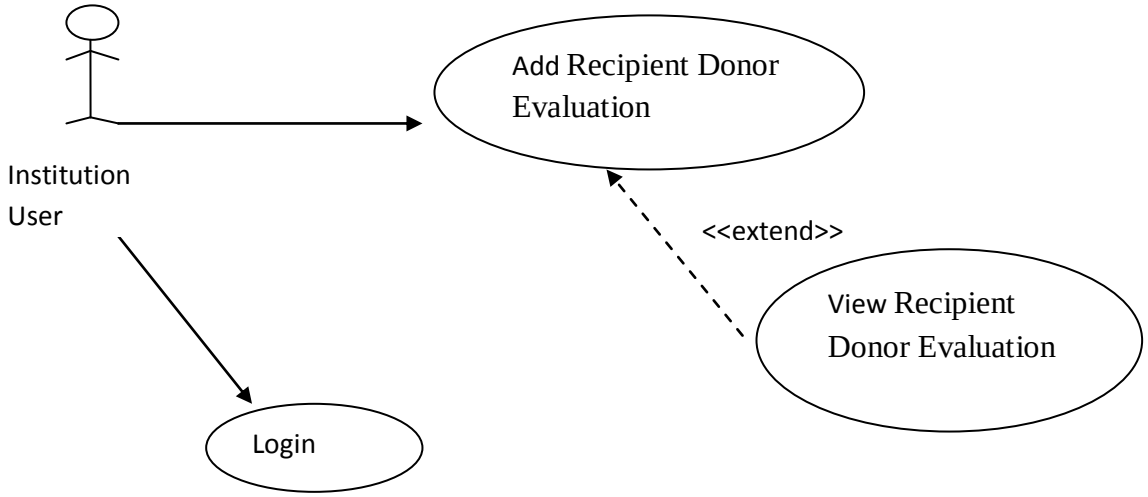
HospitalAdmission Use Case Diagram



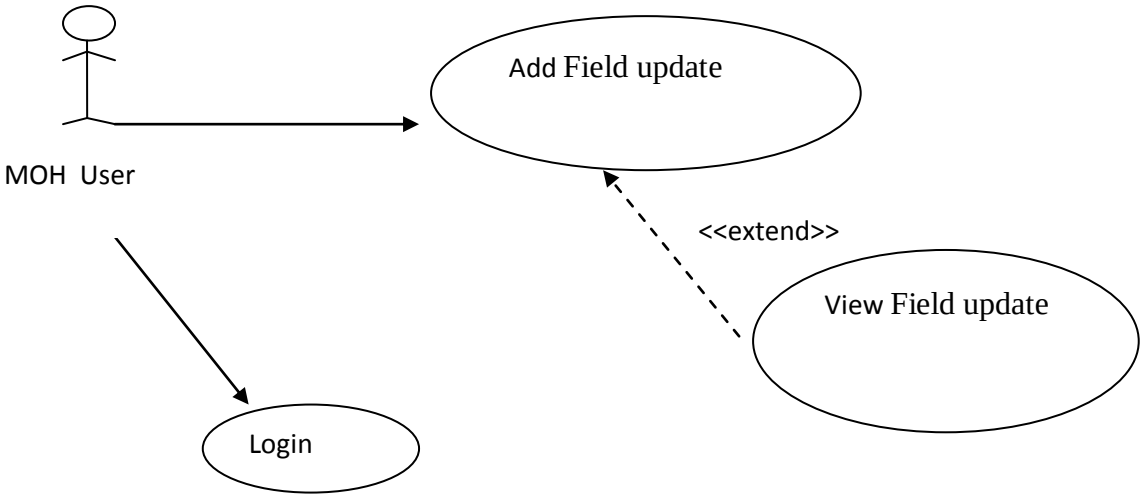
Dialysis Use Case Diagrams



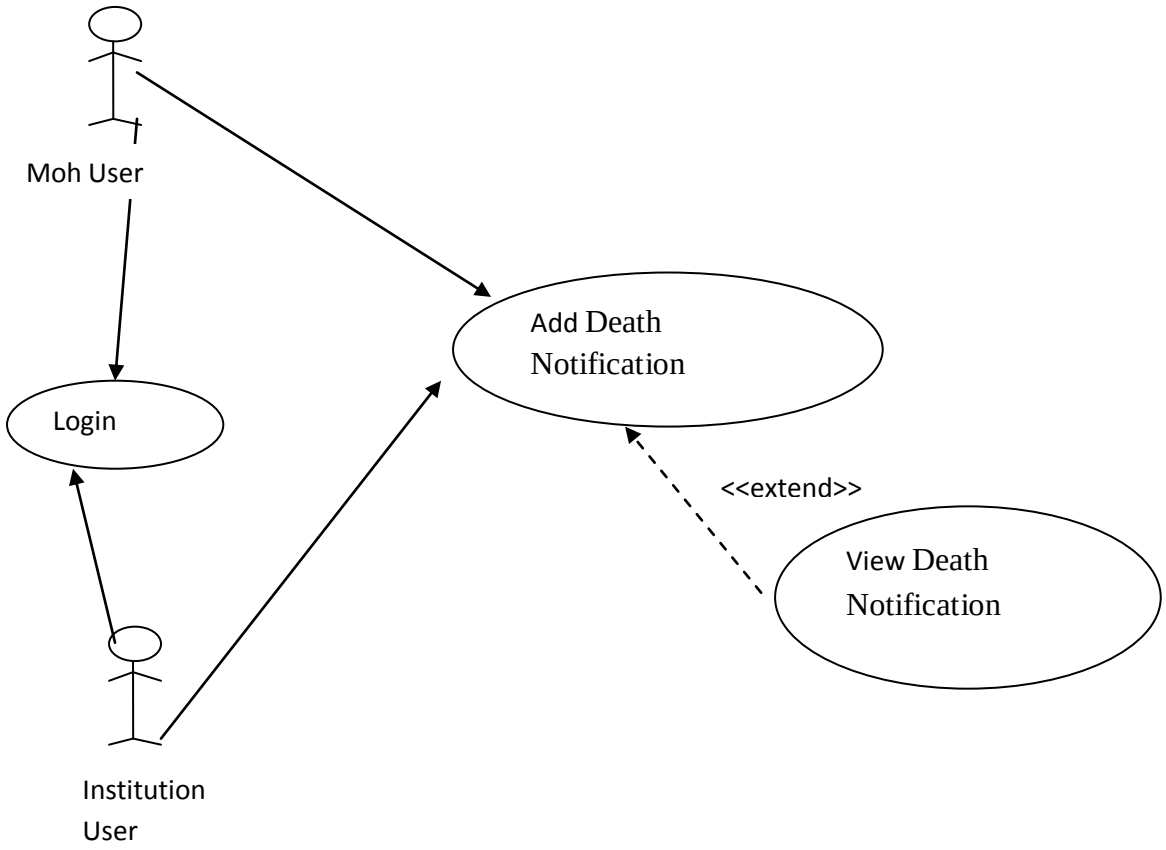
Recipient Donor Evaluation Use Case Diagrams



Field updates Use Case Diagrams

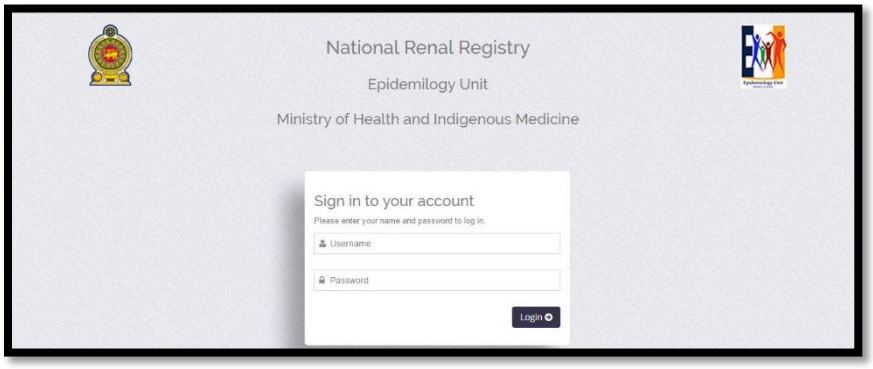


Death Notification Use Case Diagrams



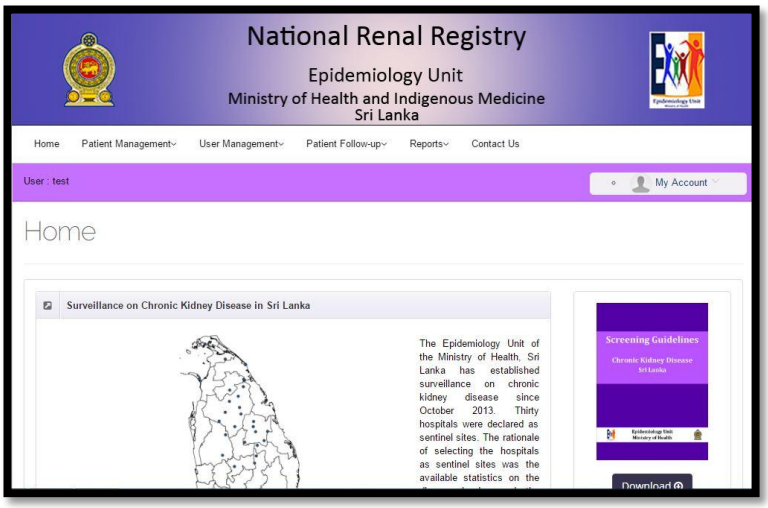
Appendix B- User Manual

1. Login Page

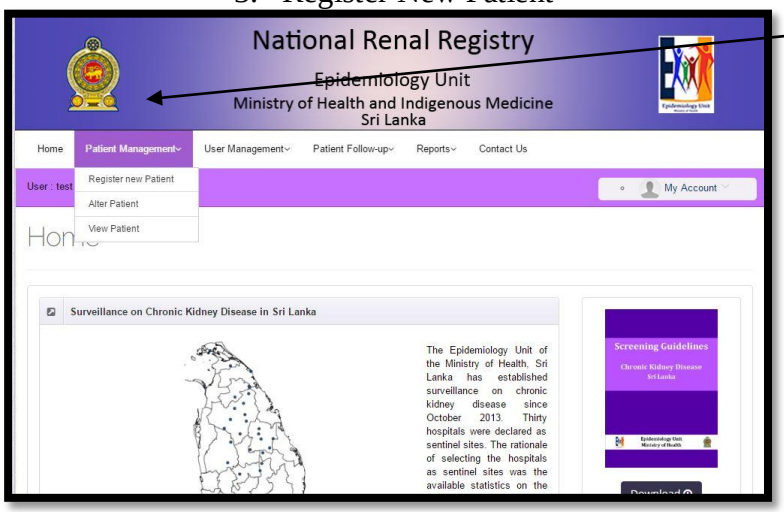


- For MOH type your user name and password Click **"Login"**
- For Institution type your user name and password Click **"Login"**
- For RDHS type your user name and password Click **"Login"**
- For PDHS type your user name and password Click **"Login"**

2. **Home Page**



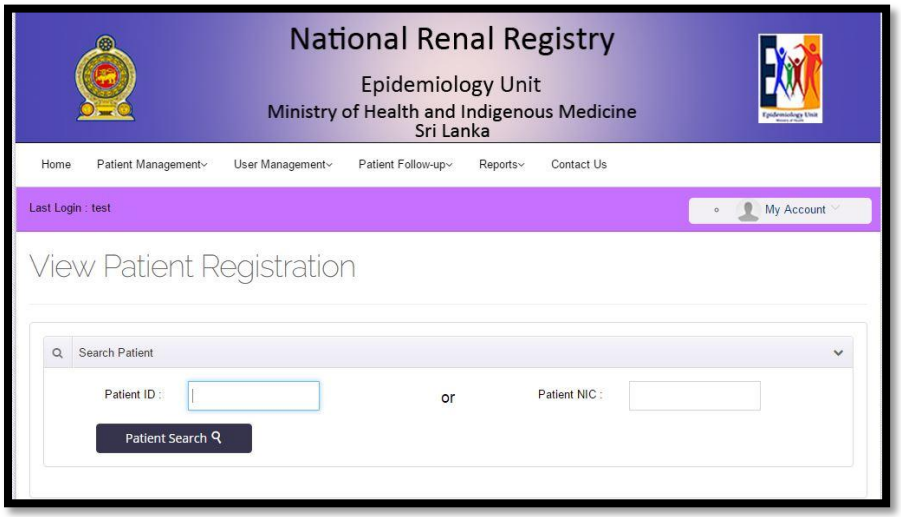
3. Register New Patient



Place Cursor on "Register New Patient"

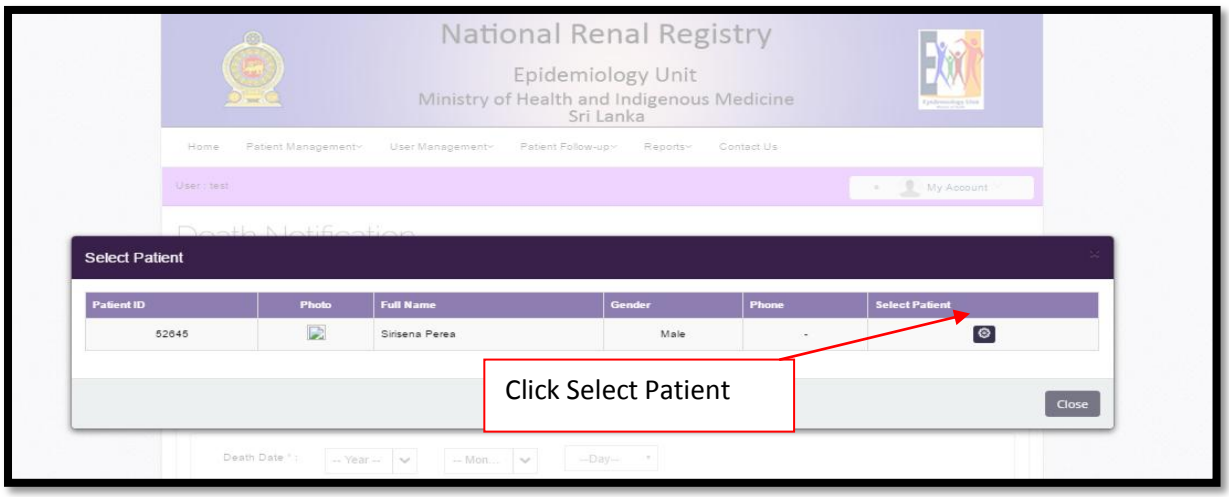
Patient Register Form

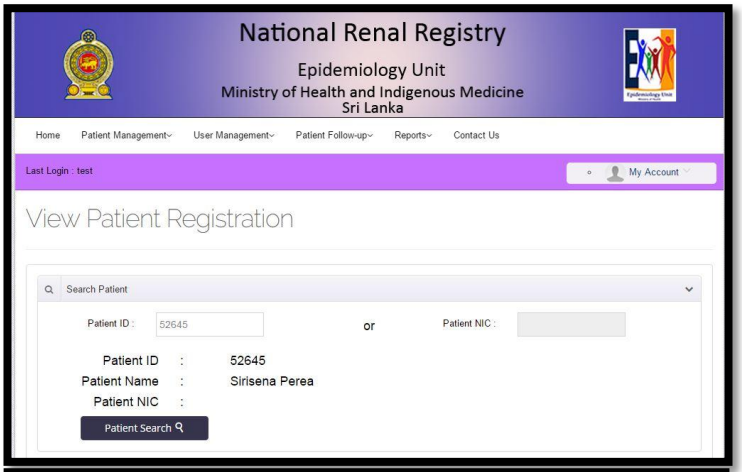
4. View Patient

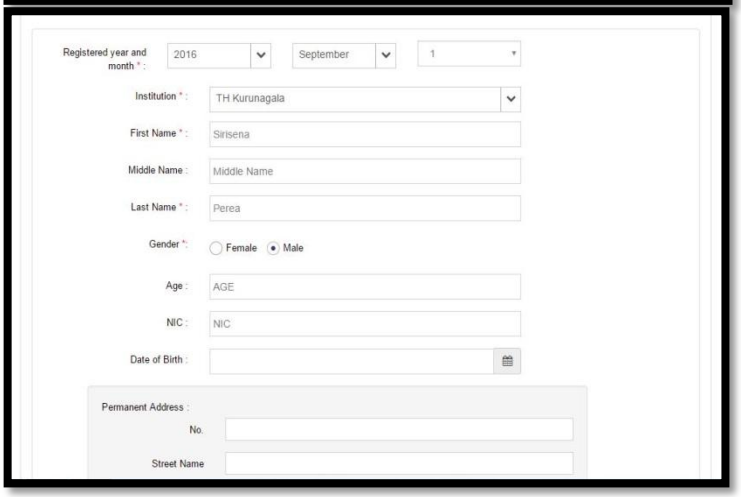


Enter Patient ID or Patient NIC ------> Click “Patient Search”

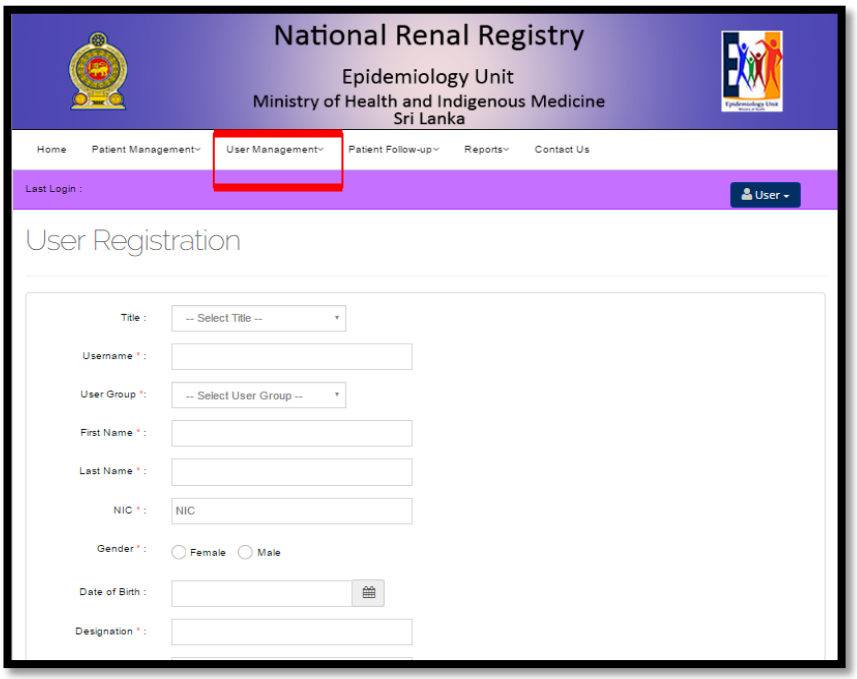
Then after Click Conform Patient button



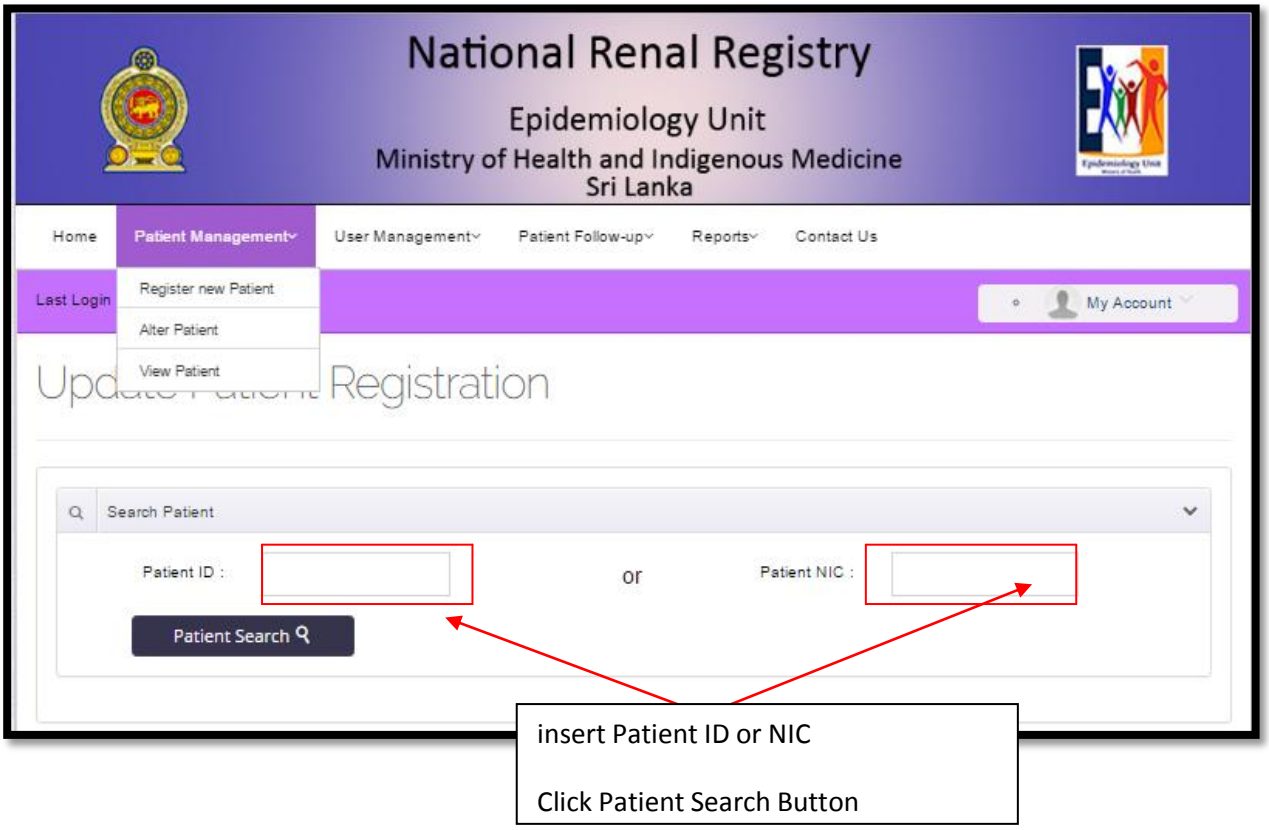




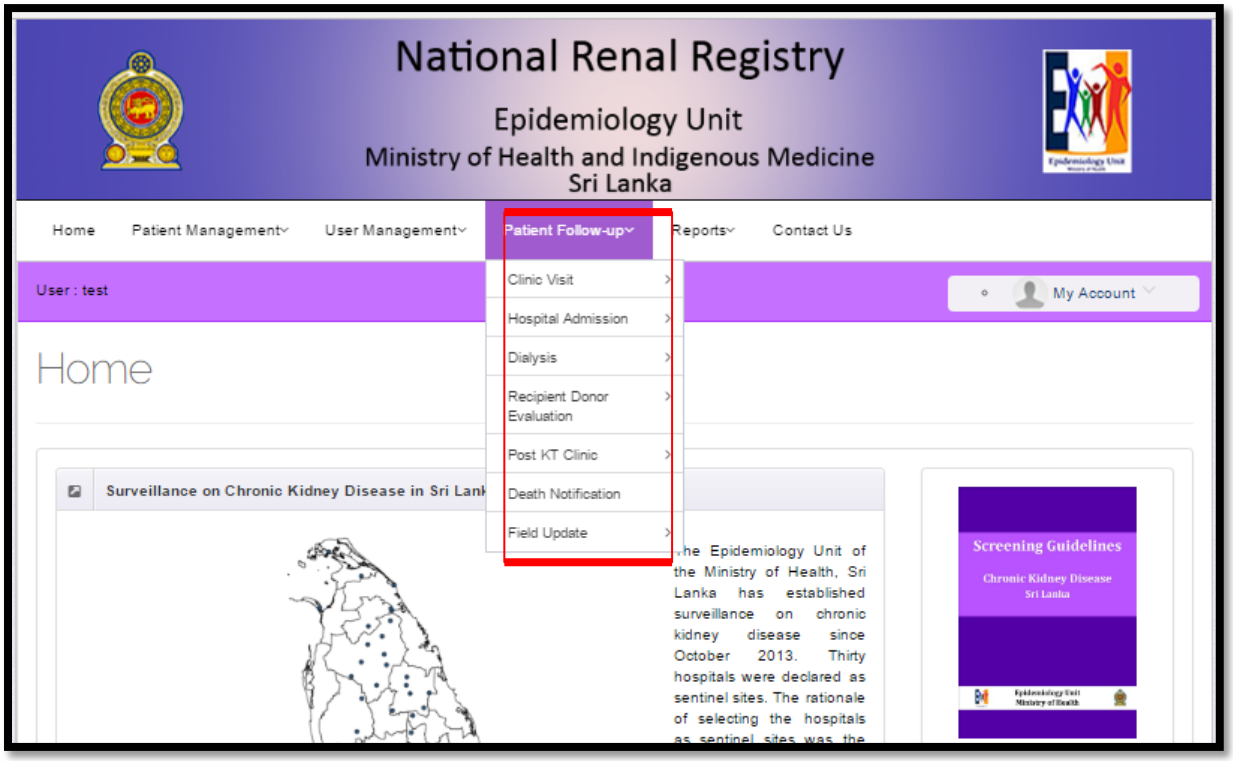
User Registration



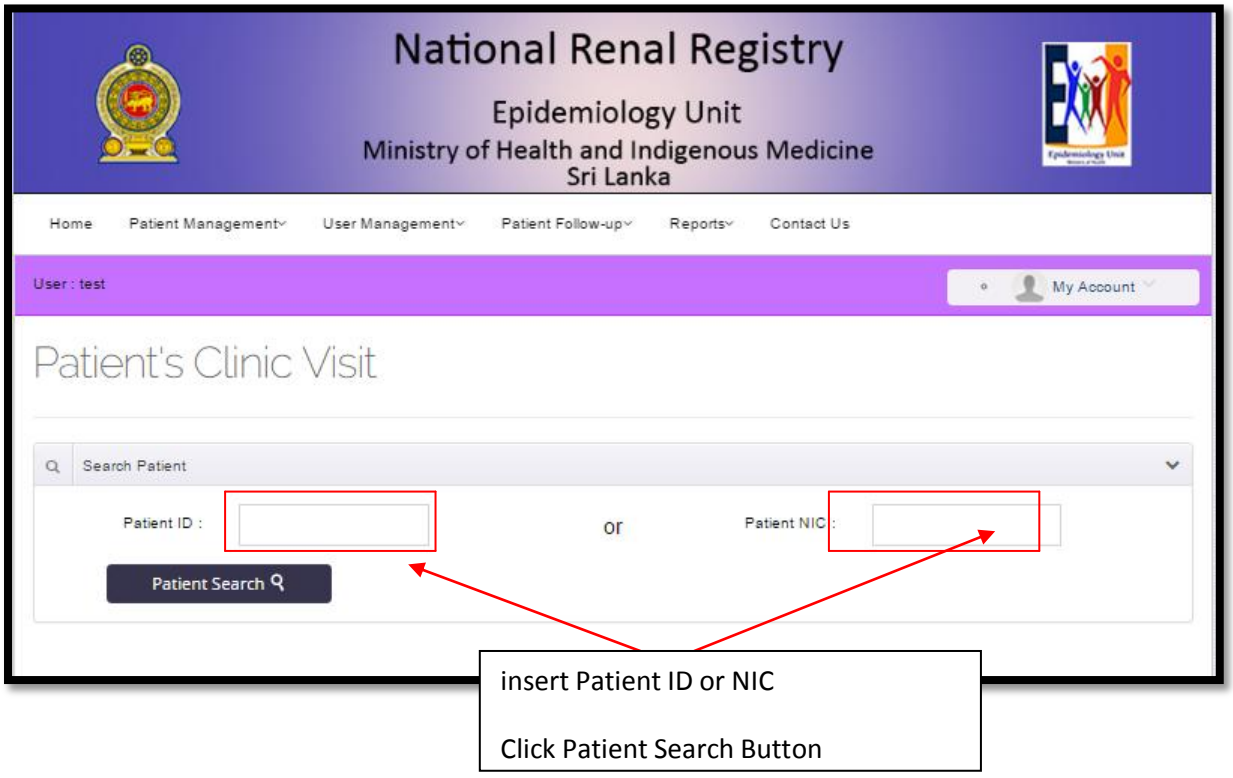
5. Update Patient Registration Page

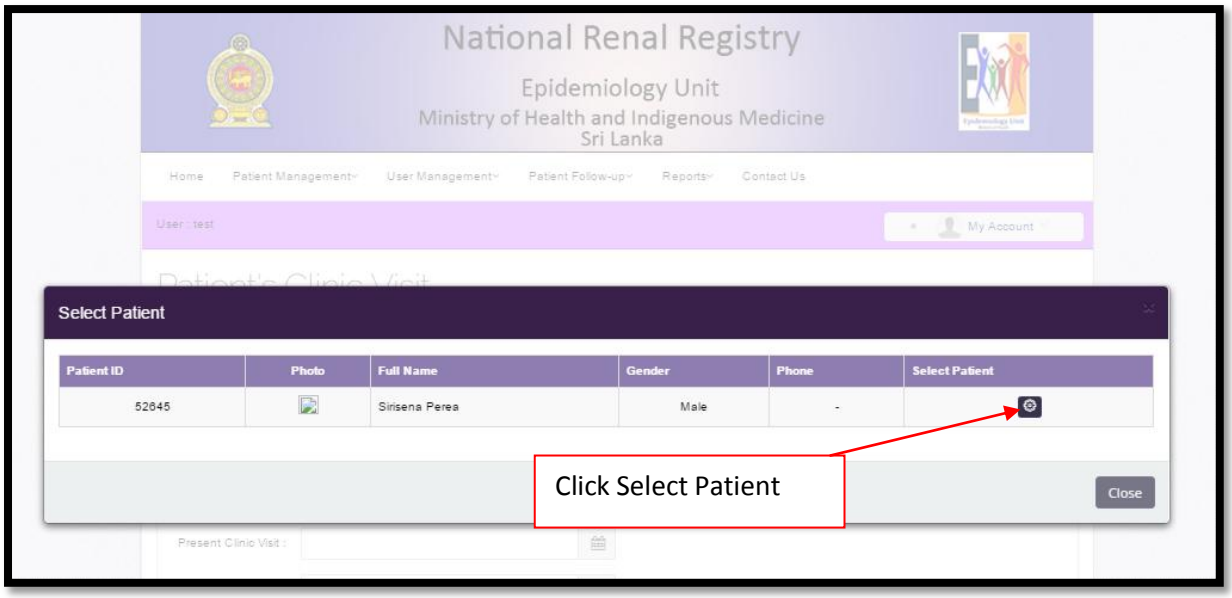


6. Patient Follow up Menu

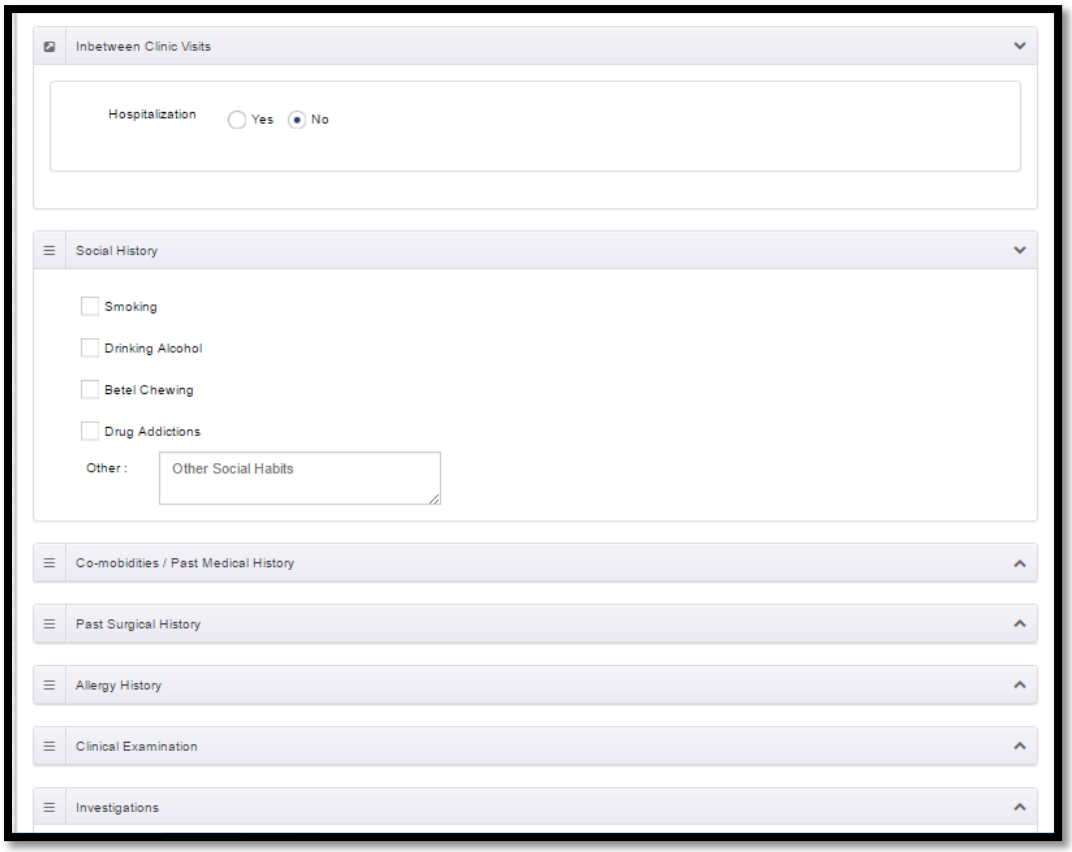


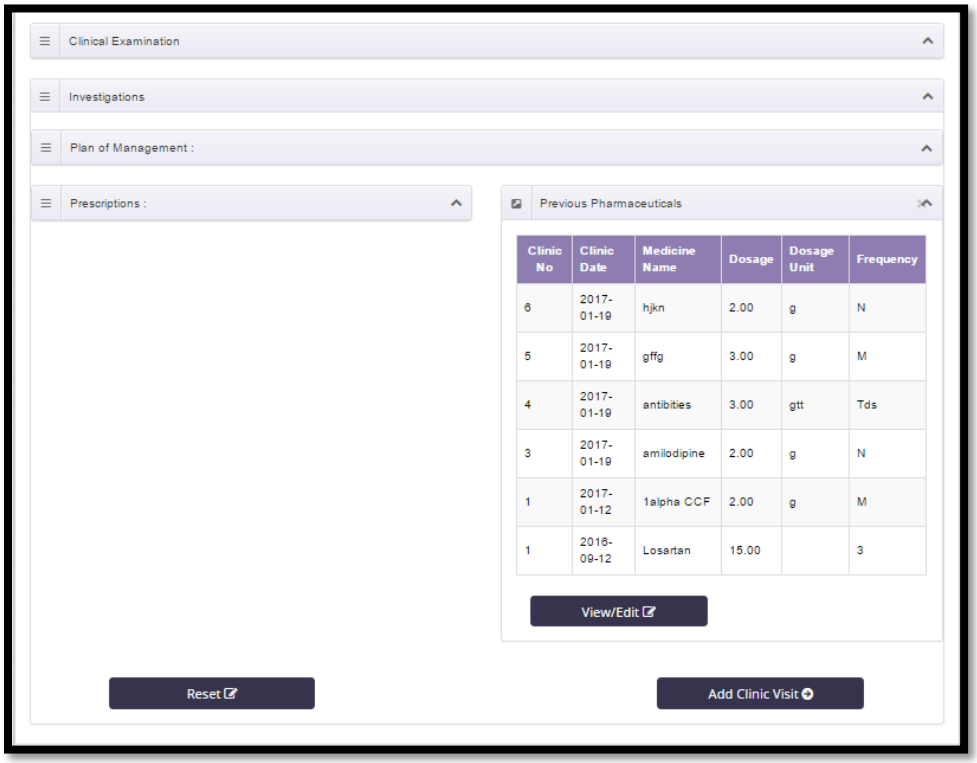
i. Patient Clinic Visit Page



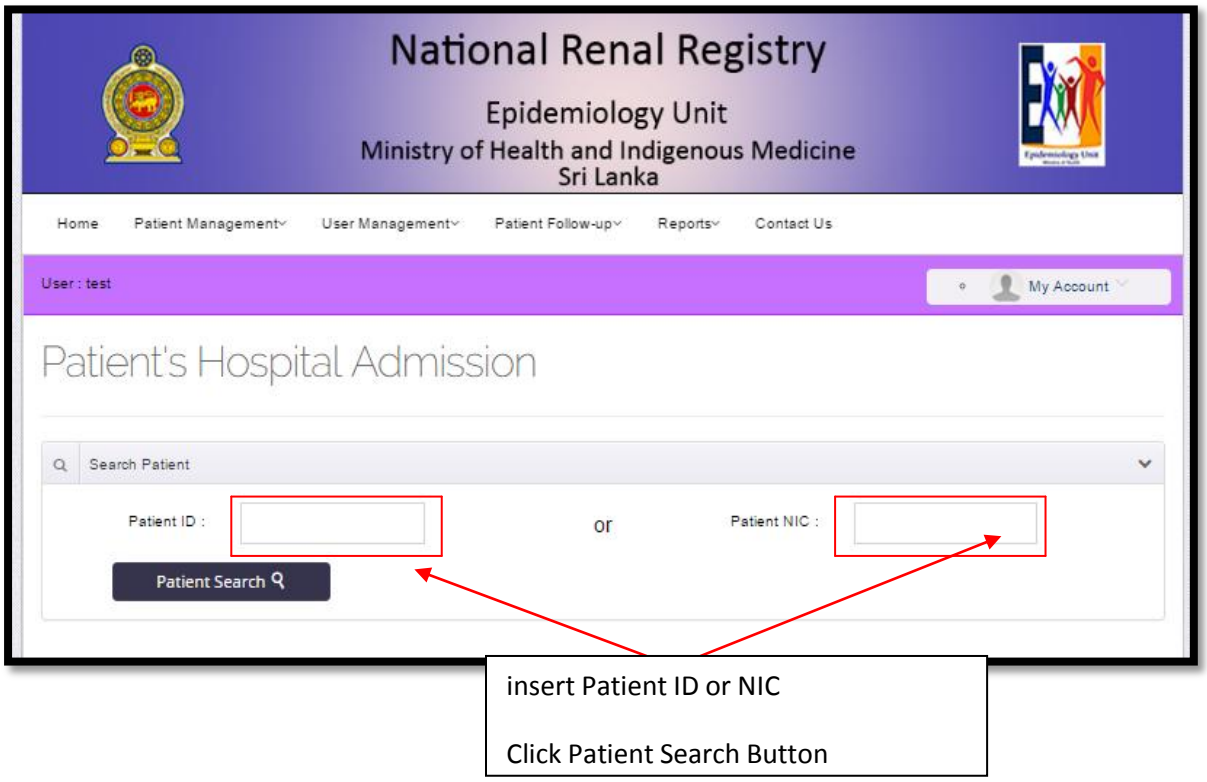

National Renal Registry
Epidemiology Unit
Ministry of Health and Indigenous Medicine
Sri Lanka
Home
Patient Management
User Management
Patient Follow-up
Reports
Contact Us
User : test
My Account
Select Patient
Patient ID
Photo
Full Name
Gender
Phone
Select Patient
52645
Sirisena Perea
Male
-
Click Select Patient
Close
Present Clinic Visit :

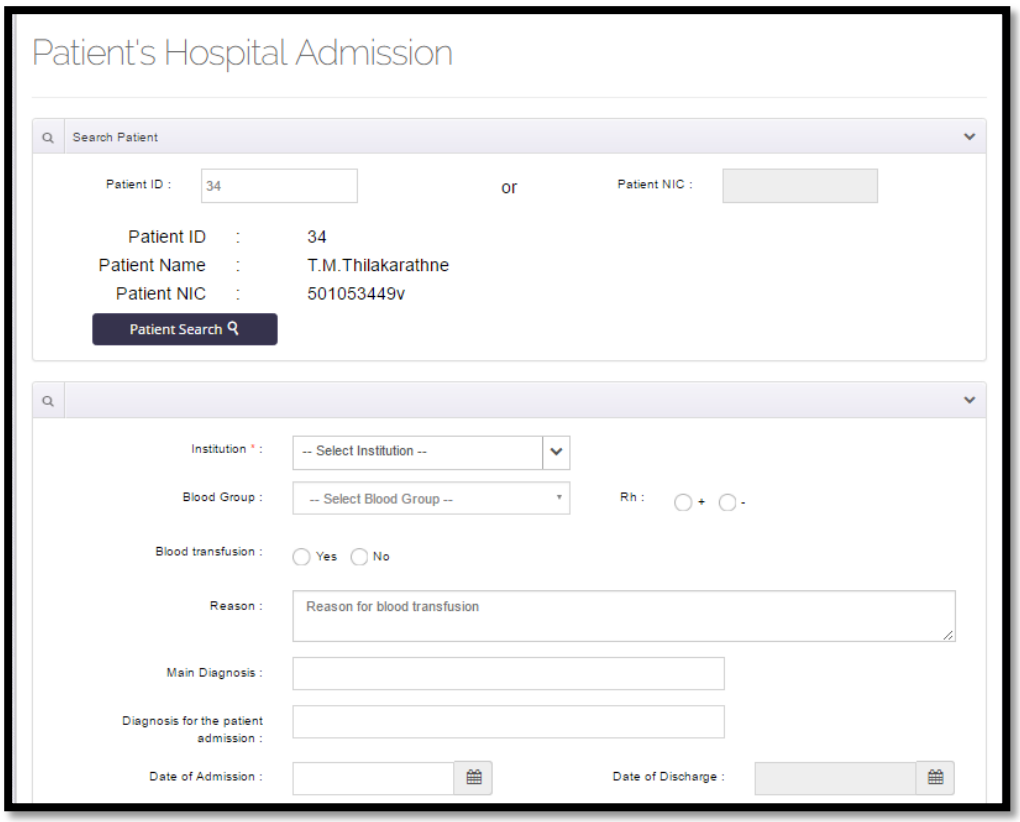

National Renal Registry
Epidemiology Unit
Ministry of Health and Indigenous Medicine
Sri Lanka
Home
Patient Management
User Management
Patient Follow-up
Reports
Contact Us
User : test
My Account
Patient's Clinic Visit
Search Patient
Patient ID :
52645
or
Patient NIC :
Patient ID : 52645
Patient Name : Sirisena Perea
Patient NIC : 784567902V
Patient Search
Present Clinic Visit :
Next Clinic Visit :
Institution * :
-- Select Institution --

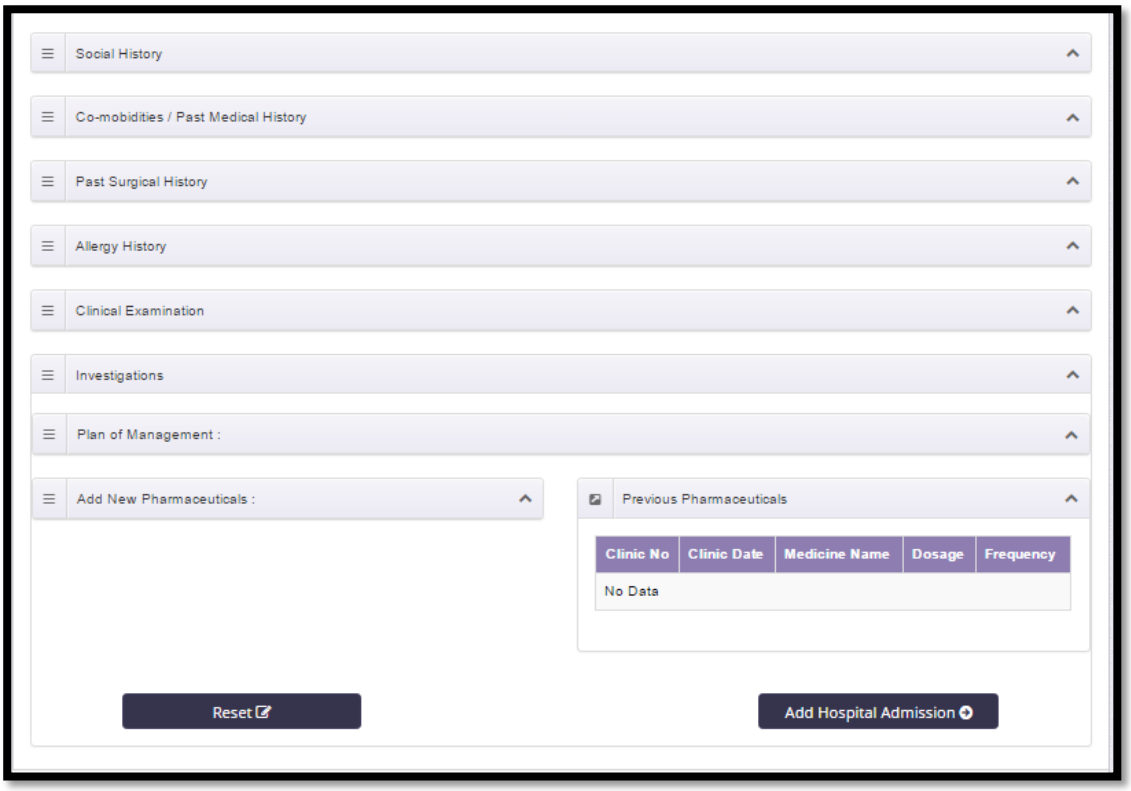

Inbetween Clinic Visits
Hospitalization
Yes
No
Social History
Smoking
Drinking Alcohol
Betel Chewing
Drug Addictions
Other :
Other Social Habits
Co-mobidities / Past Medical History
Past Surgical History
Allergy History
Clinical Examination
Investigations


Clinical Examination
Investigations
Plan of Management :
Prescriptions :
Previous Pharmaceuticals
Clinic No
Clinic Date
Medicine Name
Dosage
Dosage Unit
Frequency
6
2017-01-19
hjkn
2.00
g
N
5
2017-01-19
gffg
3.00
g
M
4
2017-01-19
antibities
3.00
gtt
Tds
3
2017-01-19
amilodipine
2.00
g
N
1
2017-01-12
1alpha CCF
2.00
g
M
1
2016-09-12
Losartan
15.00
3
View/Edit
Reset
Add Clinic Visit

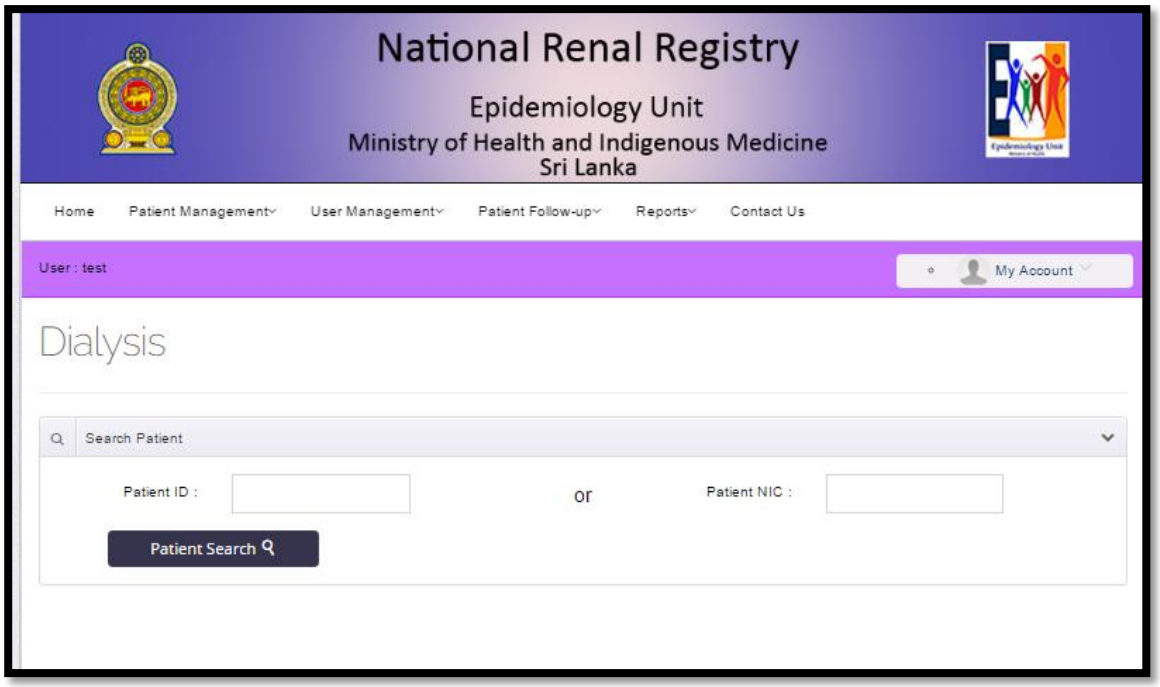
ii. Patient Hospital Admission

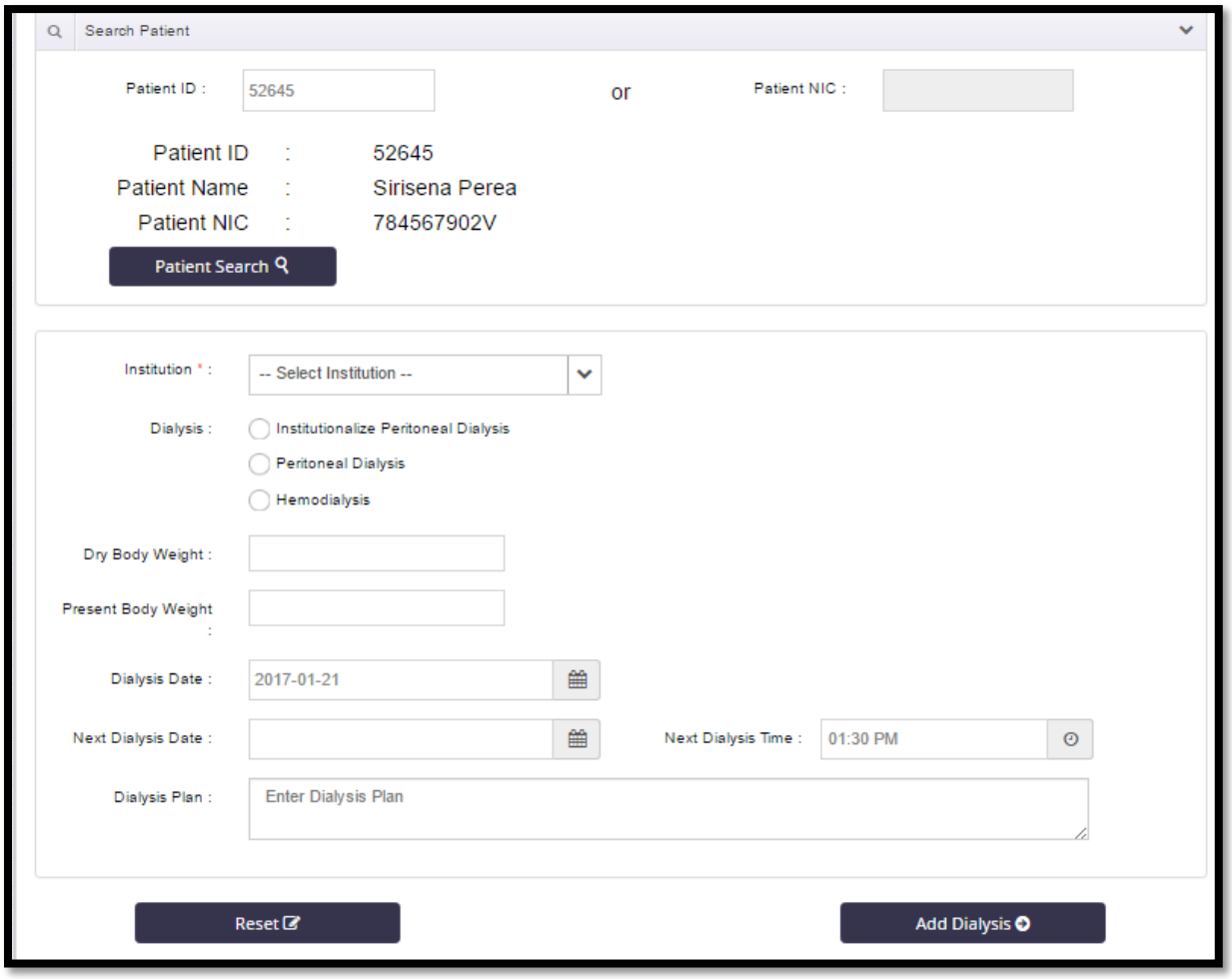




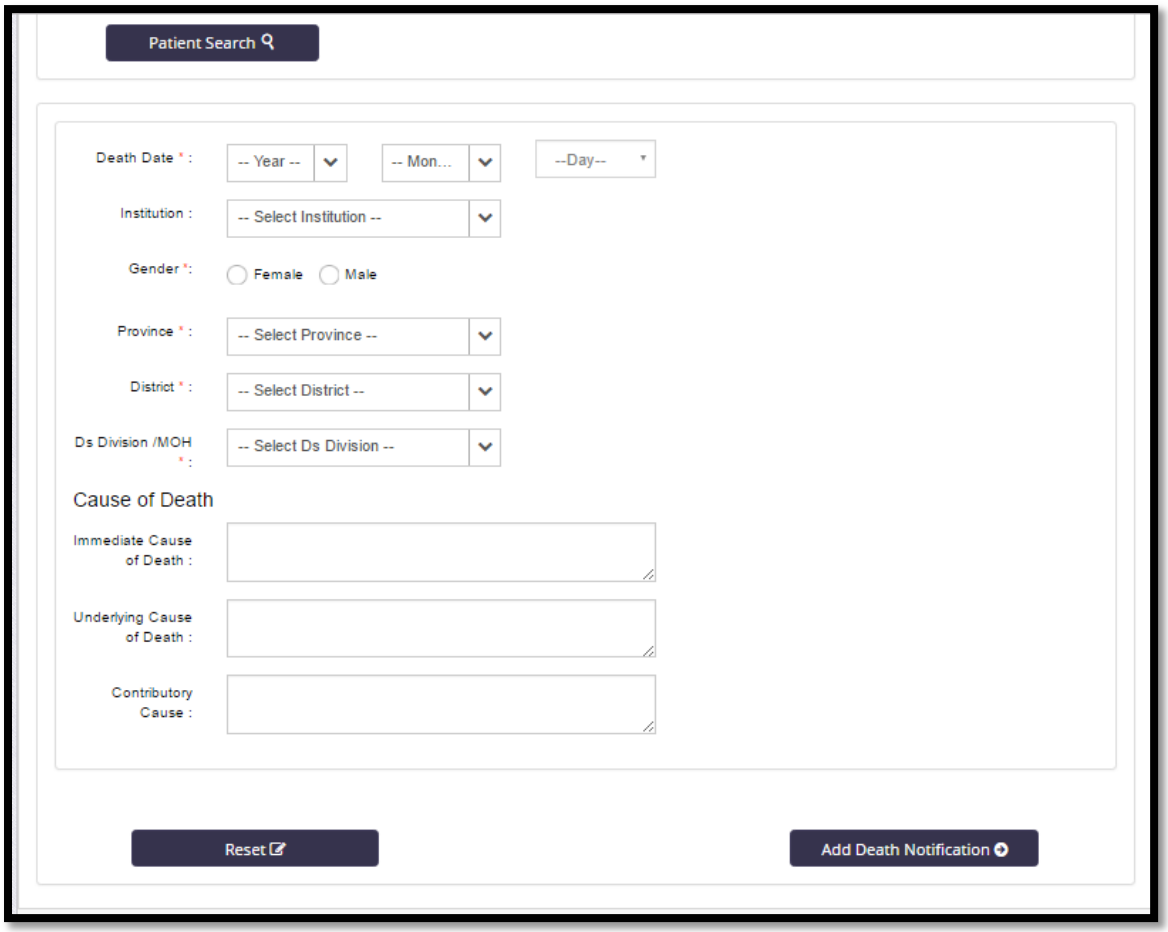


iii. Add Dialysis Patient

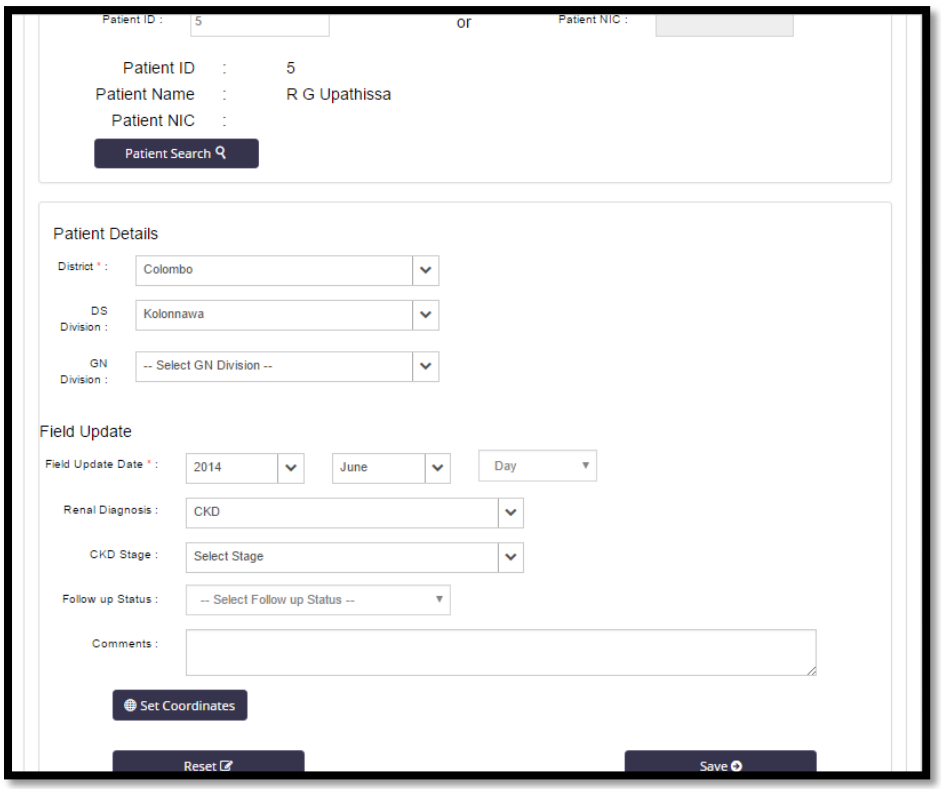




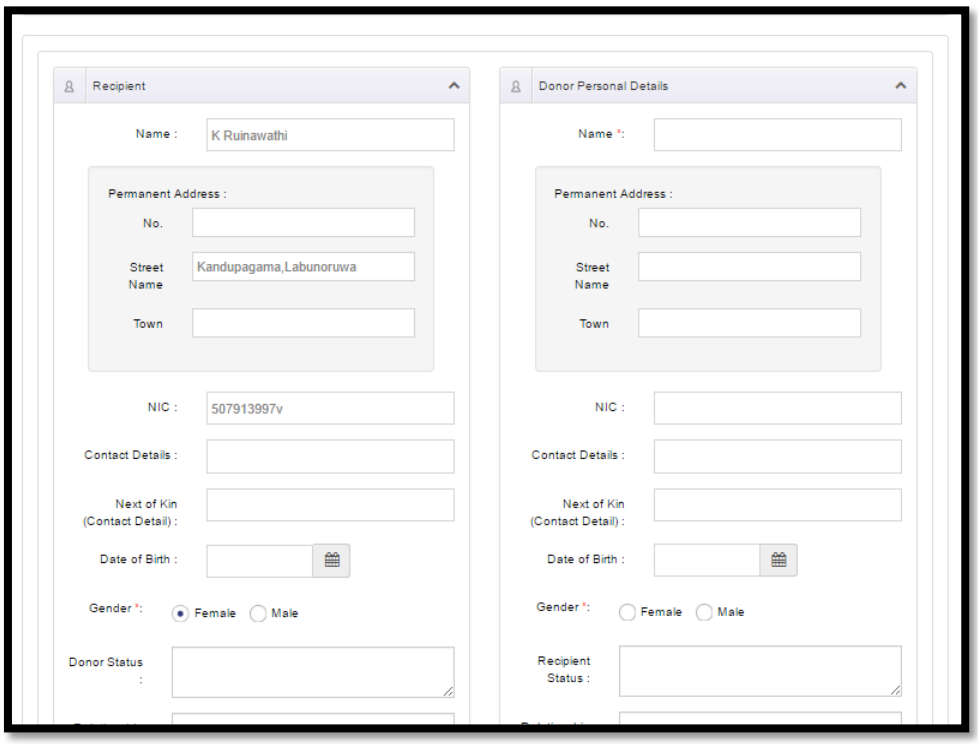
iv. Add Death Notification

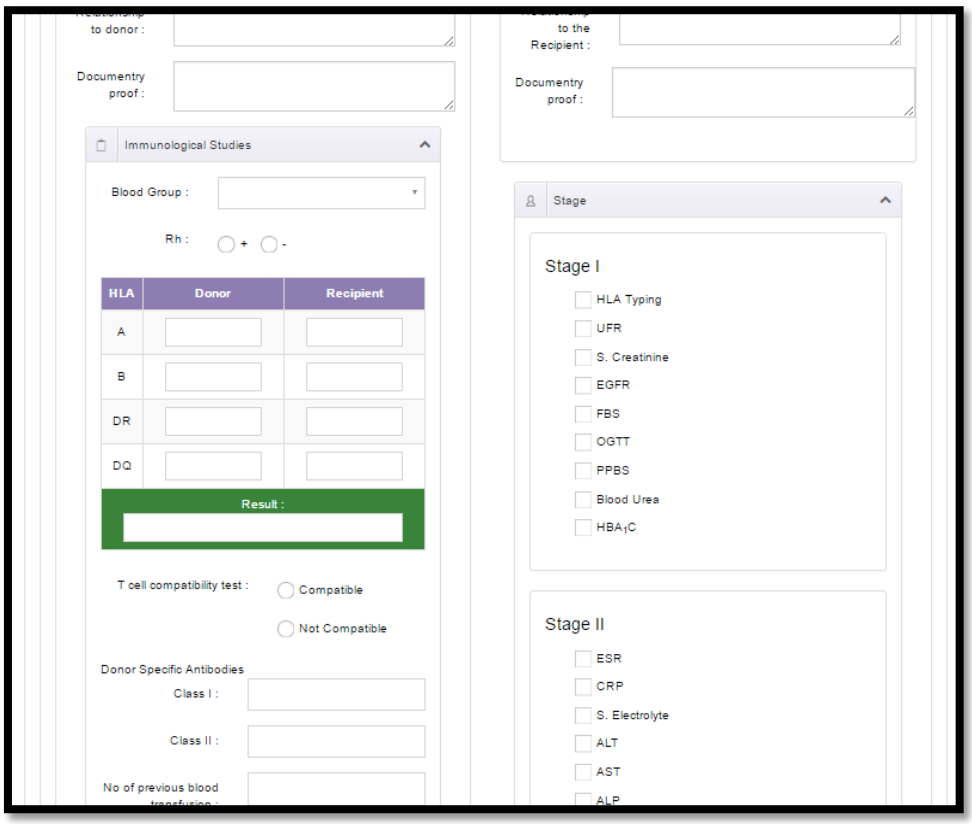


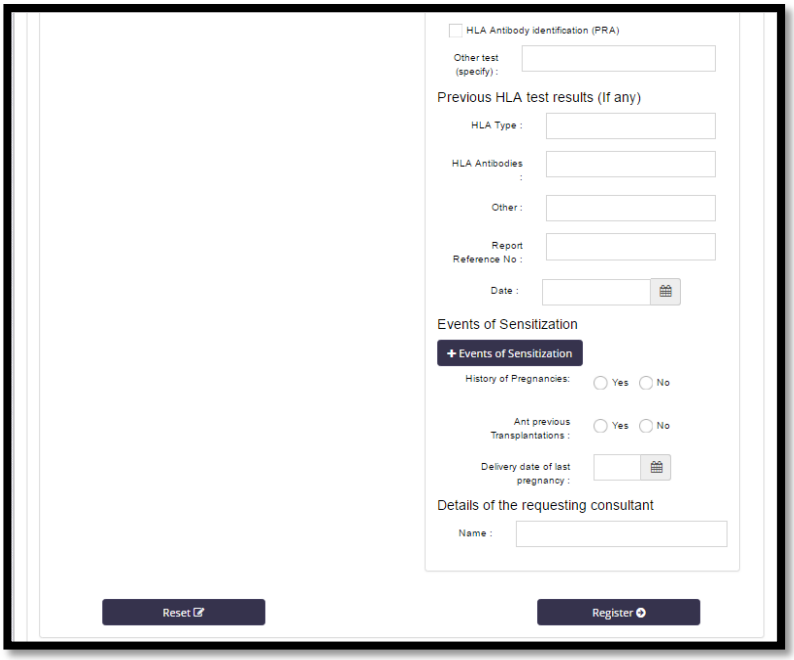
v. Add field update details



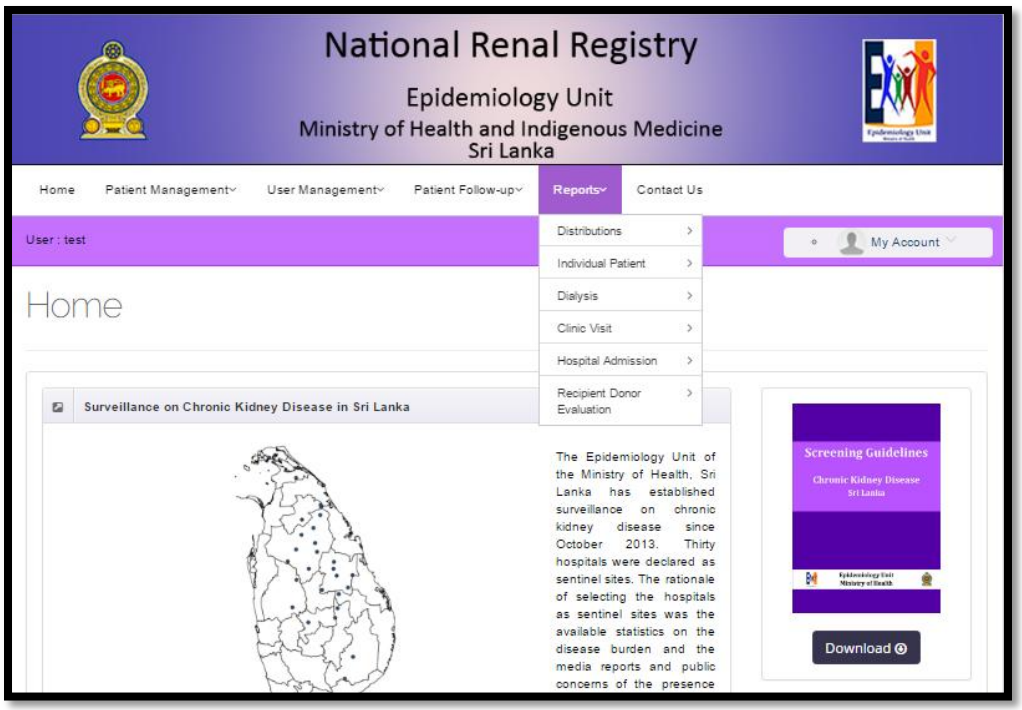
vi. Add Recipient donor evaluation details


Recipient
Name :
K Ruinawathi
Permanent Address :
No.
Street Name
Kandupagama,Labunoruwa
Town
NIC :
507913997v
Contact Details :
Next of Kin (Contact Detail) :
Date of Birth :
Gender *:
Female
Male
Donor Status :
Donor Personal Details
Name *:
Permanent Address :
No.
Street Name
Town
NIC :
Contact Details :
Next of Kin (Contact Detail) :
Date of Birth :
Gender *:
Female
Male
Recipient Status :

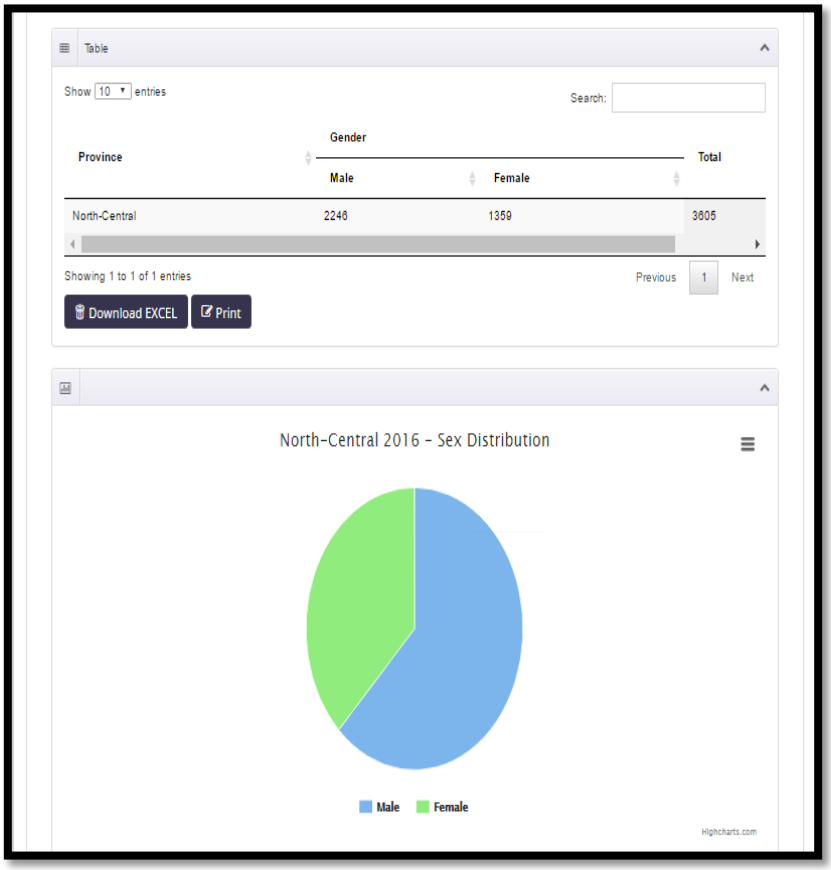

to donor :
Documentry proof :
to the Recipient :
Documentry proof :
Immunological Studies
Blood Group :
Rh :
+
-
HLA
Donor
Recipient
A
B
DR
DQ
Result :
T cell compatibility test :
Compatible
Not Compatible
Donor Specific Antibodies
Class I :
Class II :
No of previous blood
Stage
Stage I
HLA Typing
UFR
S. Creatinine
EGFR
FBS
OGTT
PPBS
Blood Urea
HBA1C
Stage II
ESR
CRP
S. Electrolyte
ALT
AST
ALP



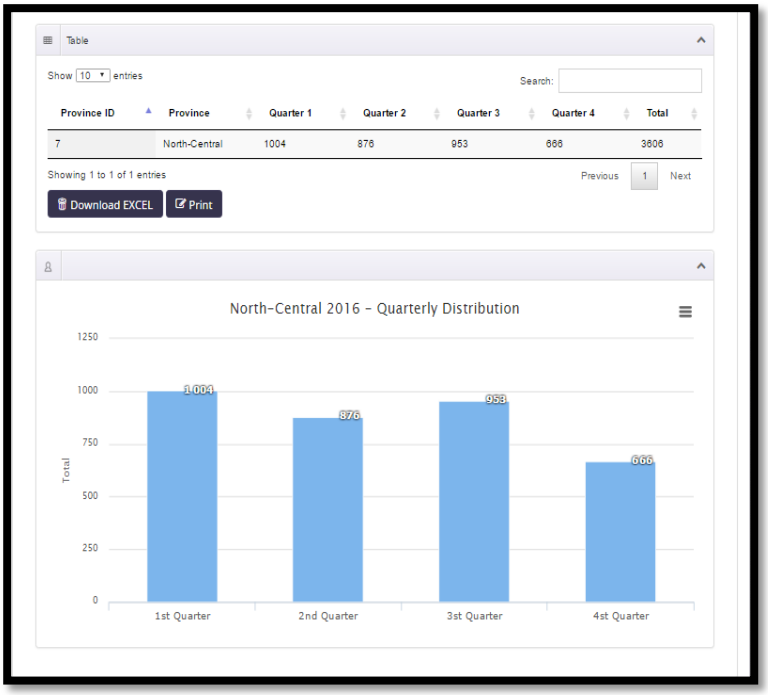
7. Report Generation



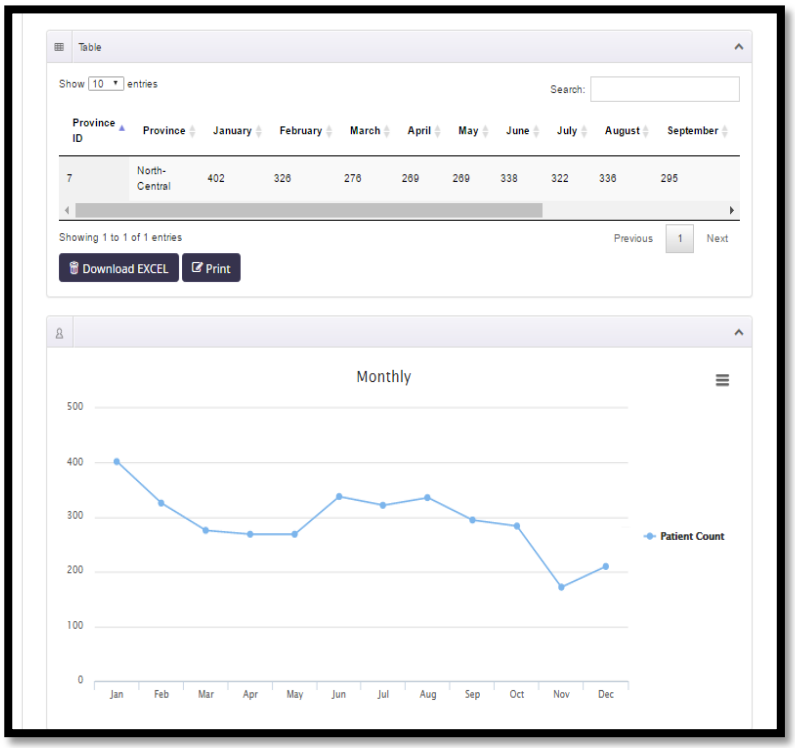
Distribution Report Generation - Province Reports



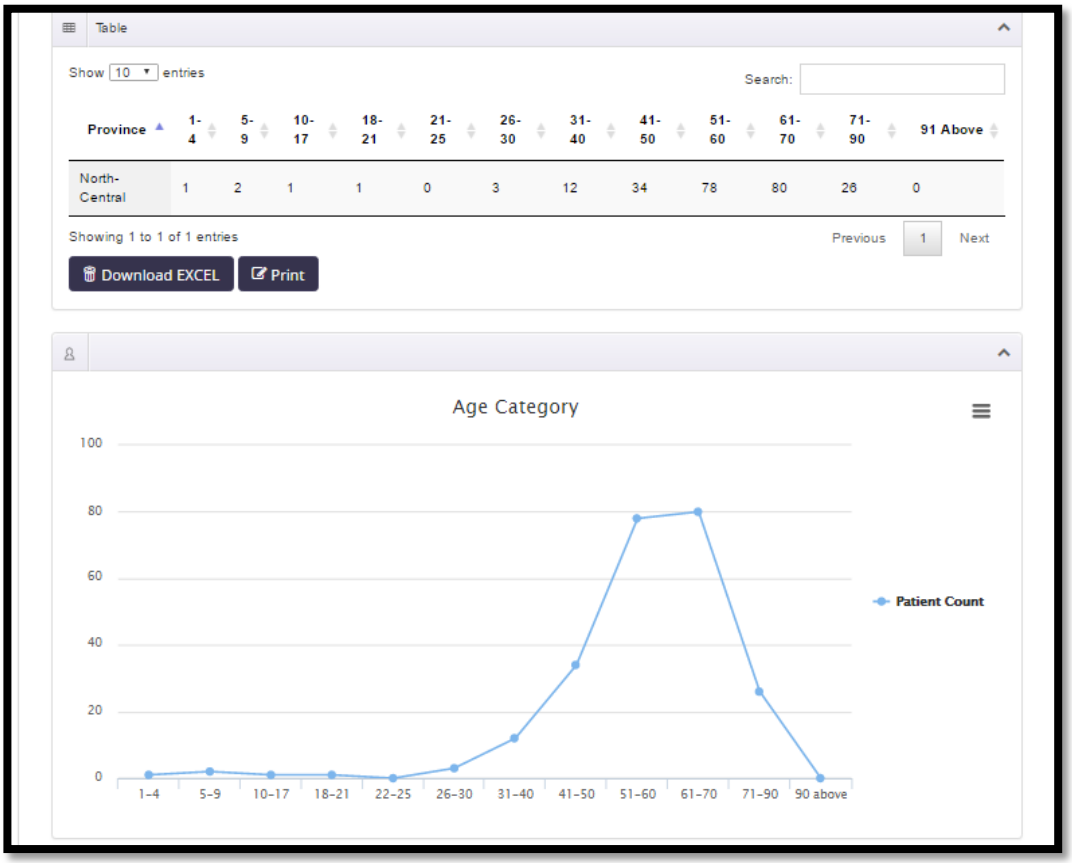
Province Report Quarterly



Province Report Monthly

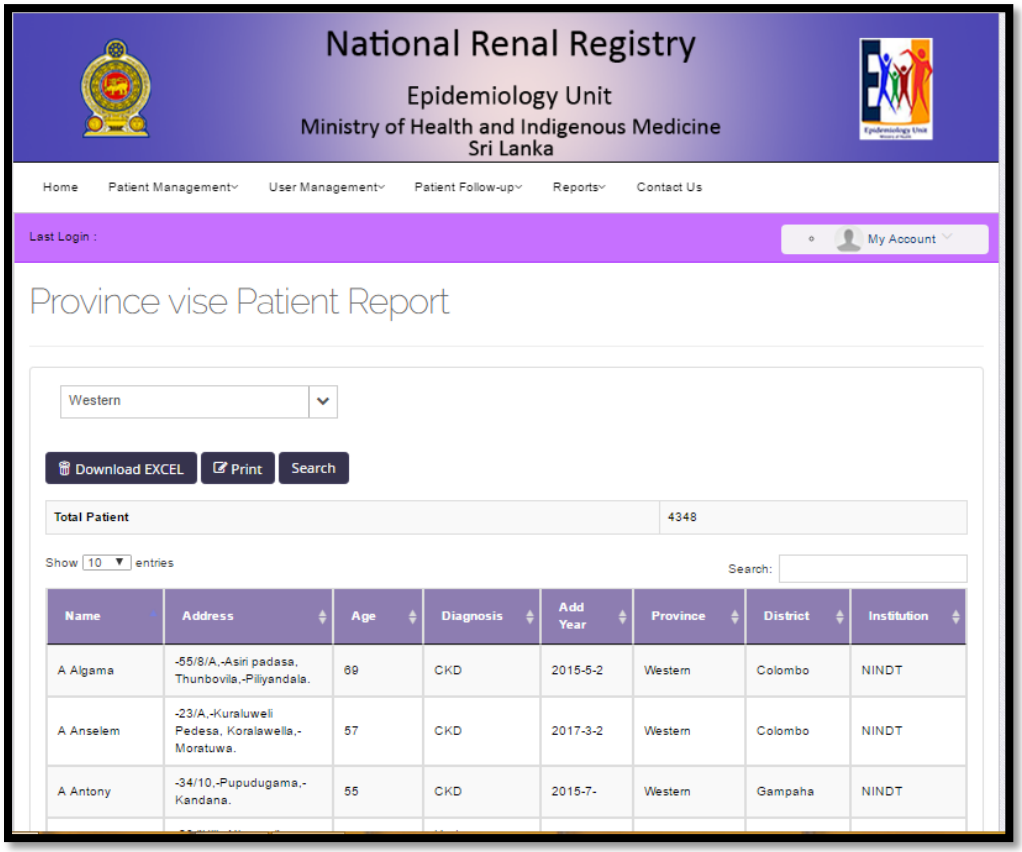


Province Age Category



Province Wise patient registration list

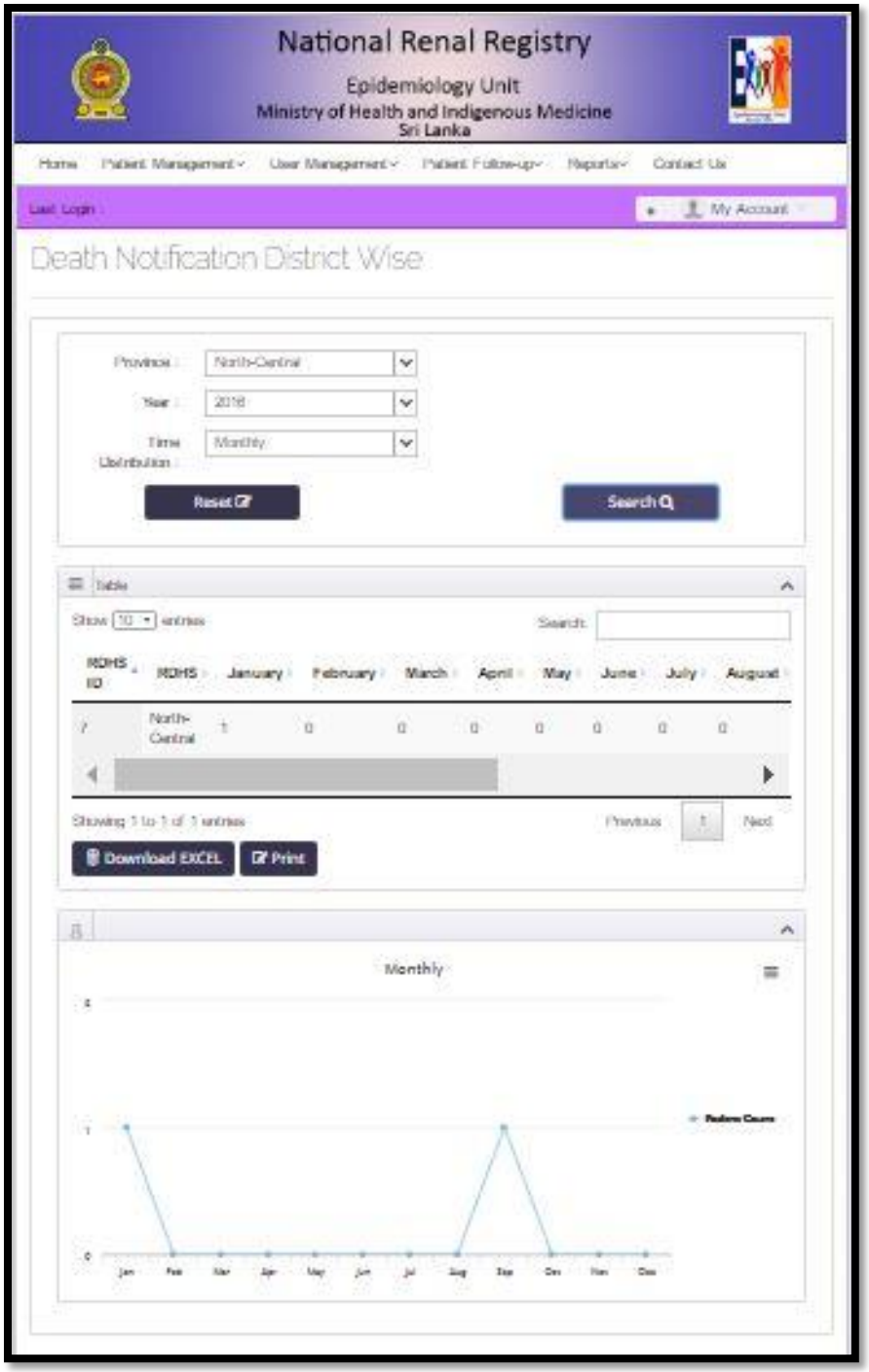
Select Province Name -----→ Click Search Button



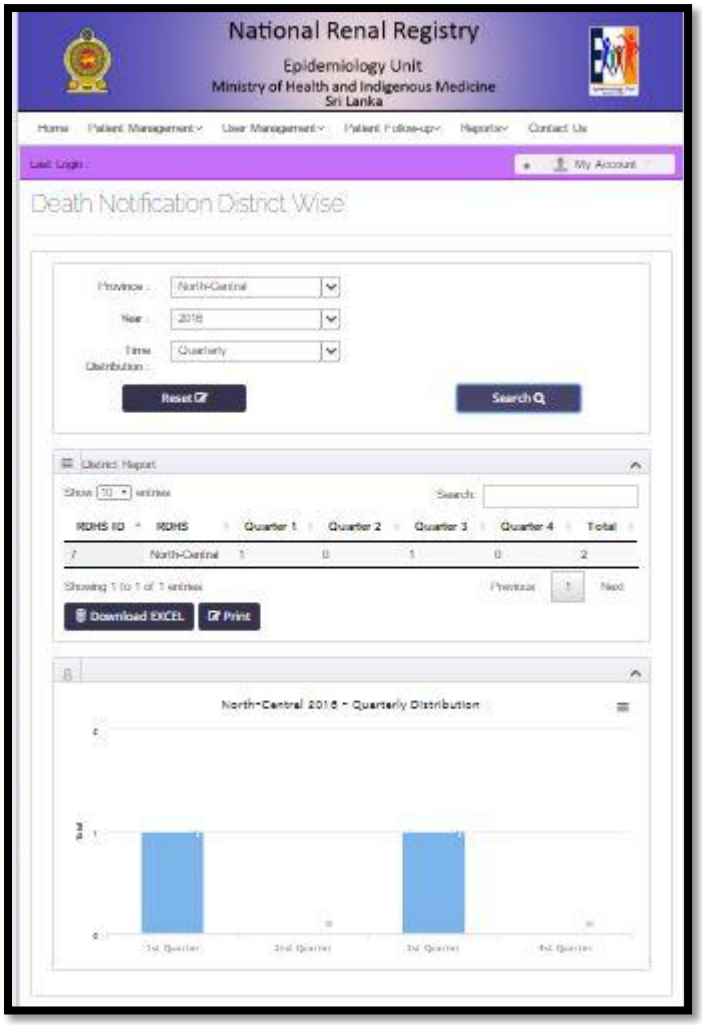
Province Wise Death Notification –Report

Select Province Name --→ Select Year ---→Select Time Distribution--→Click Search Button

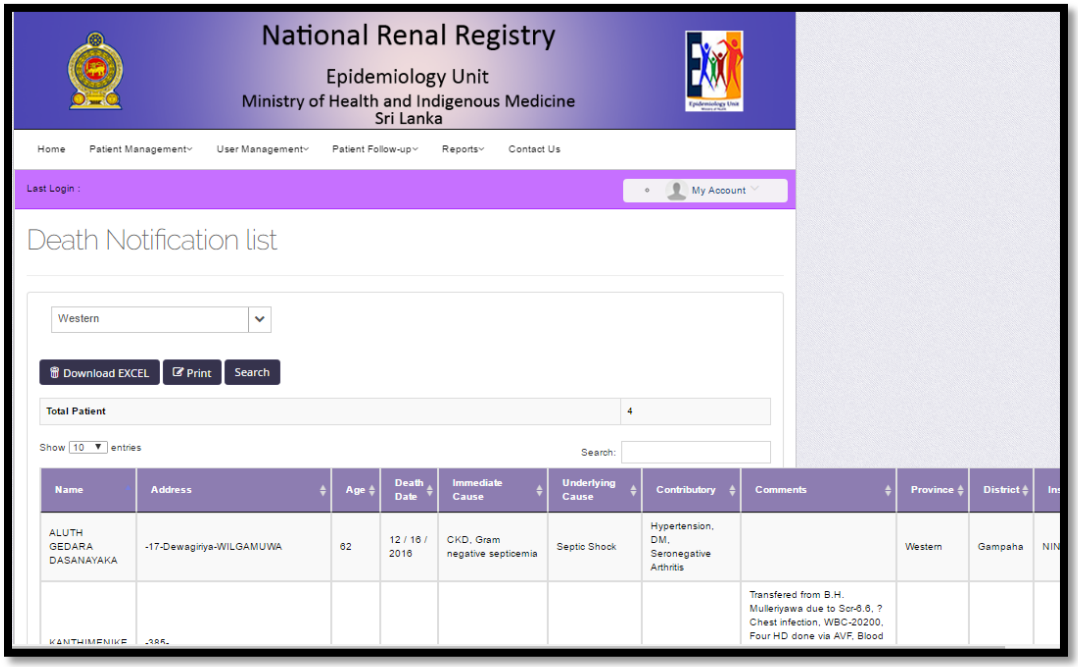
(Yearly,Quarterly, Monthly)



Province Wise Death Notification – Quarterly Report



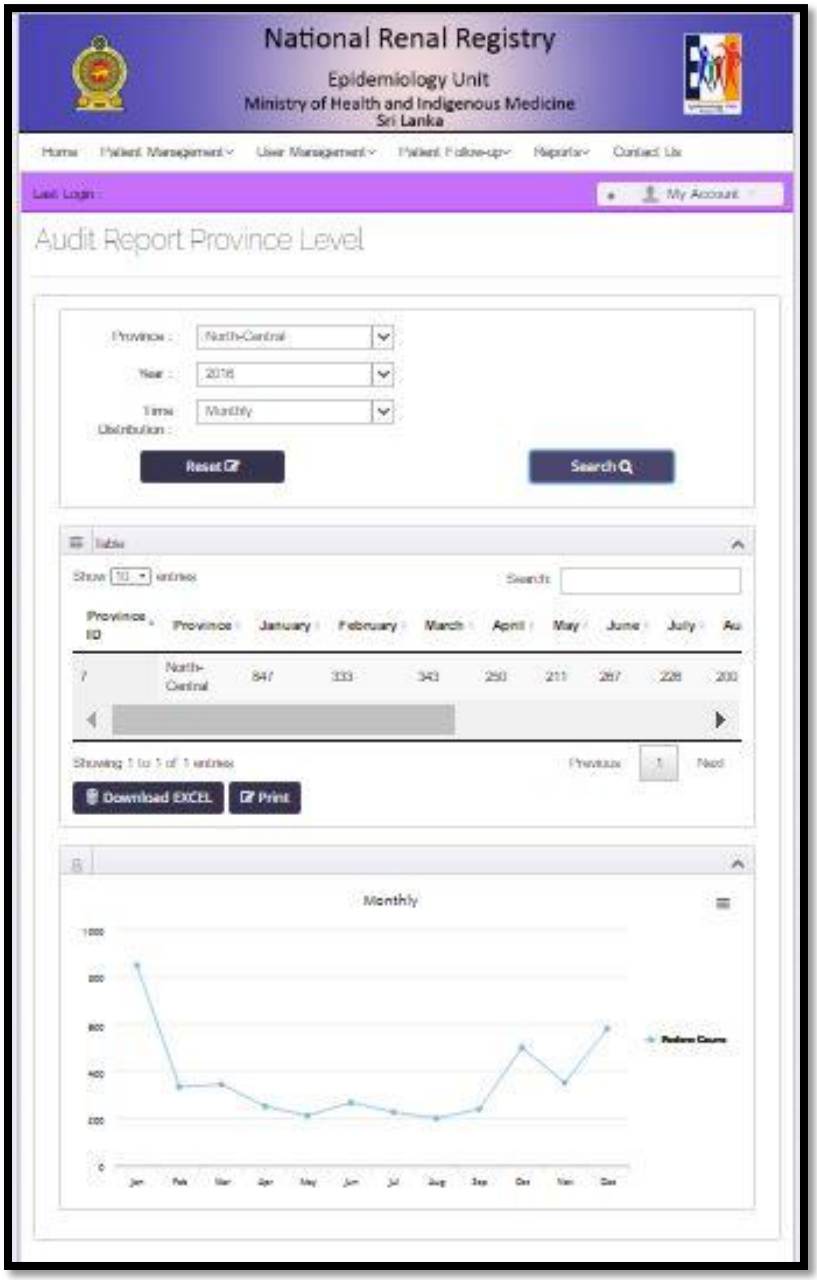
Province Wise Death Notification list



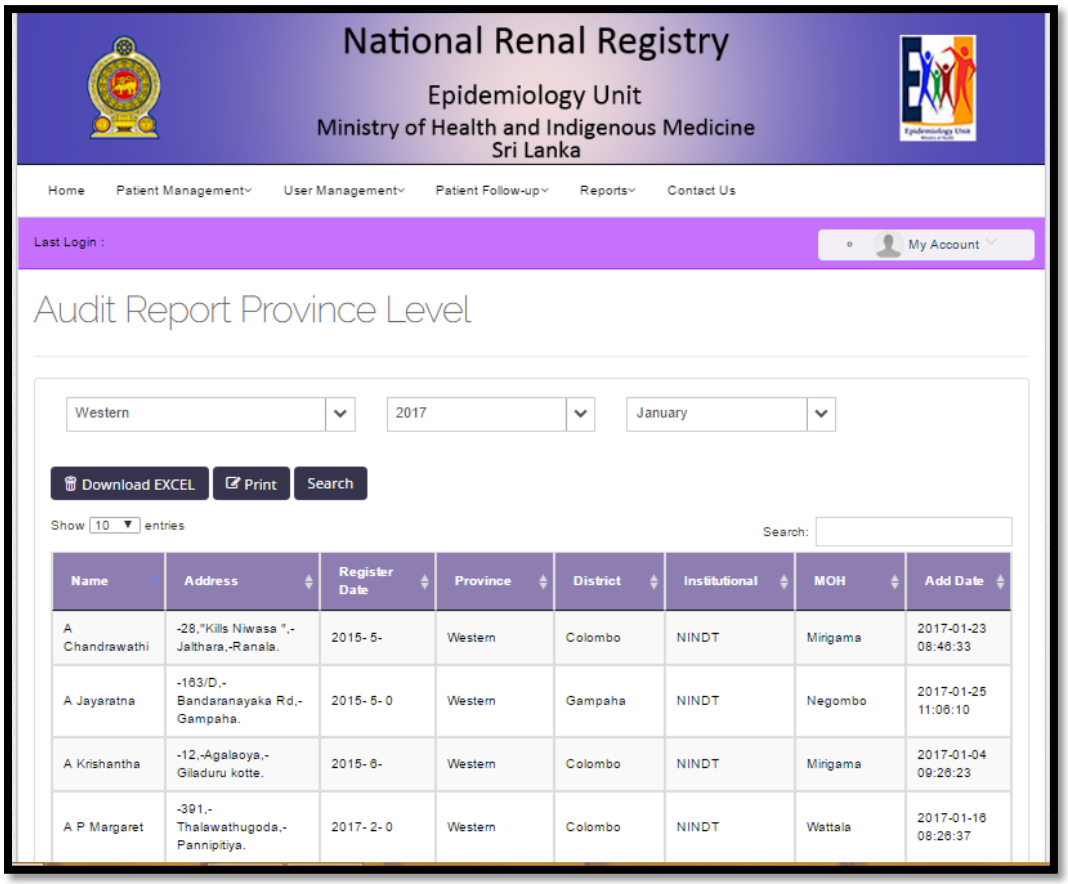
Province Wise Audit Report

Select Province Name --→ Select Year -→ Select Time Distribution --→Click Search Button

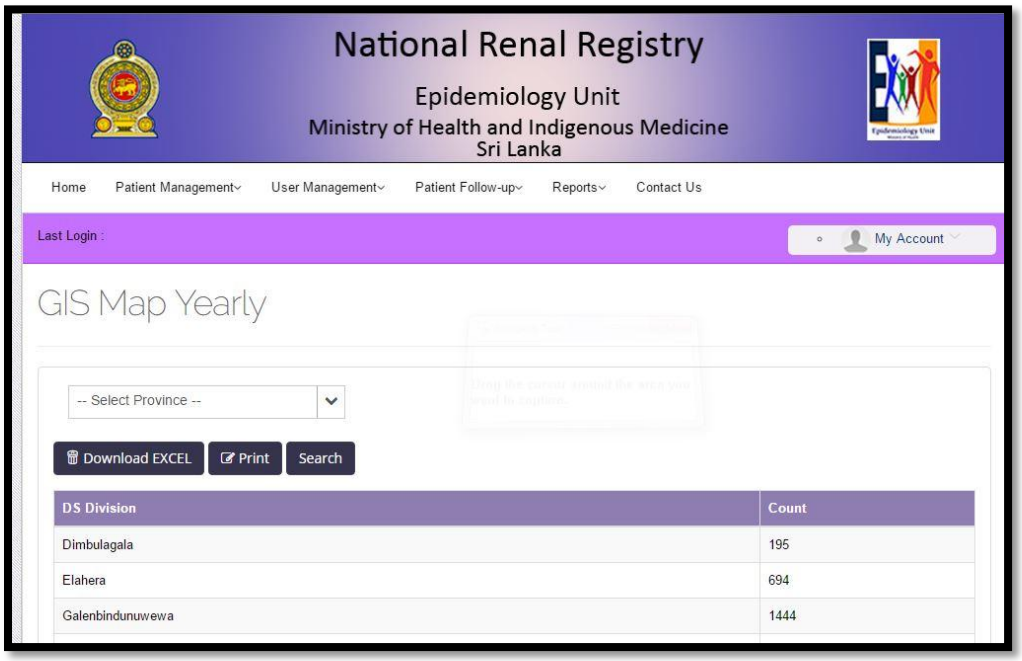
(Yearly,Quarterly, Monthly)



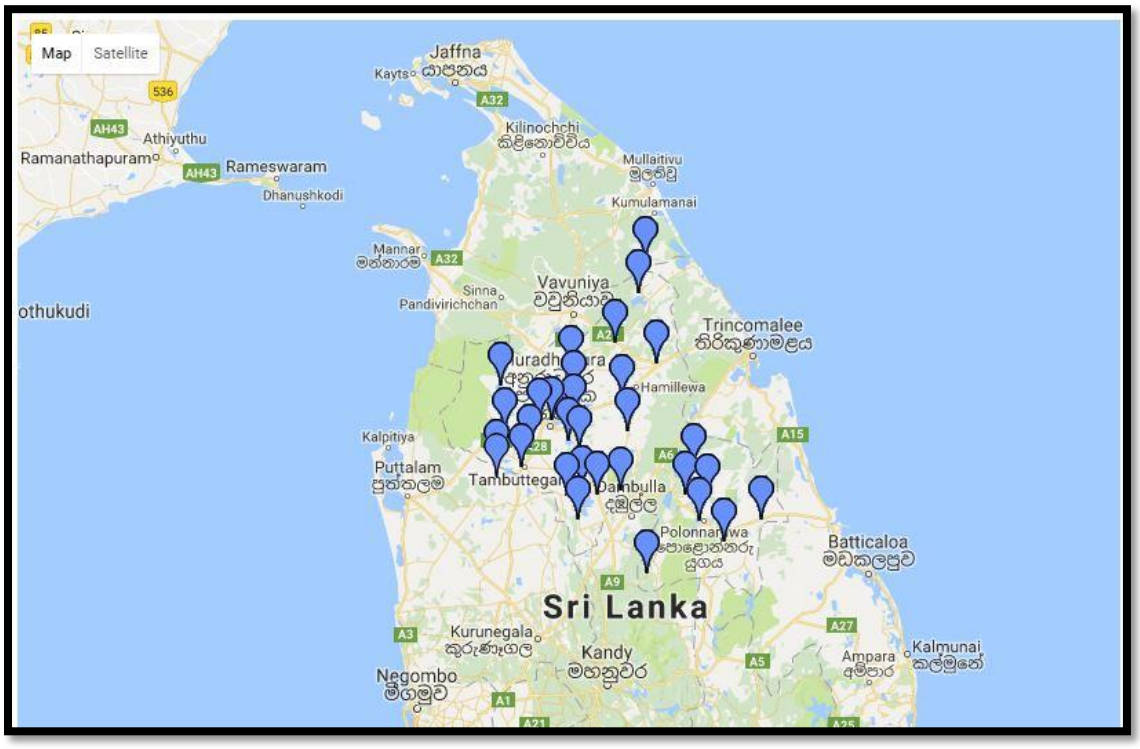
Province Wise Audit Patient Name List



Province Wise GIS Map



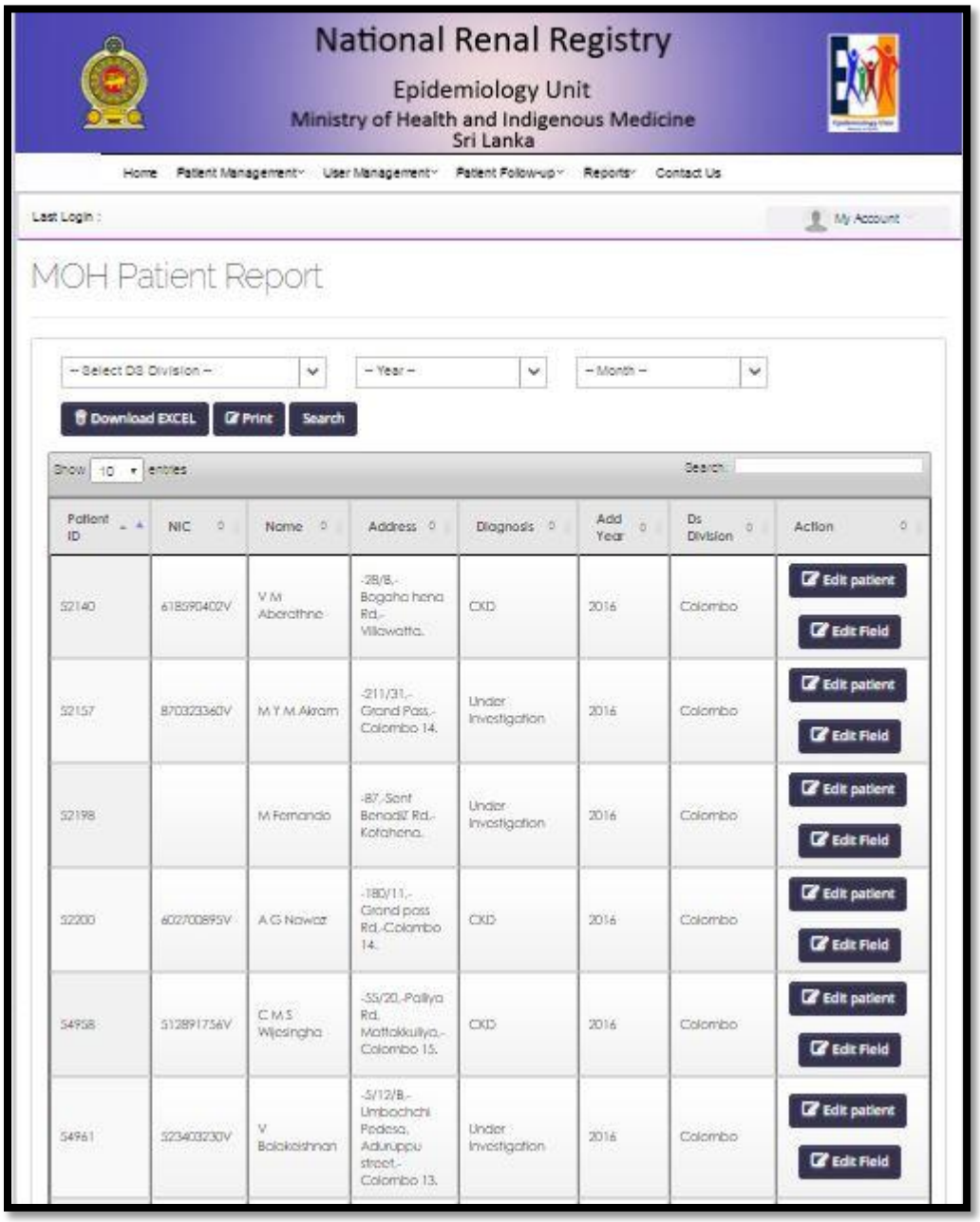
Mihinthale	401
Nachchadoowa	213
Nochchiyagama	516
Nuwaragam Palatha Central	1133
Nuwaragam Palatha East	212
Padaviya	1056
Palagala	164
Palugaswewa	9
Rajanganaya	228
Rambewa	1532
Thalawa	841
Thamankaduwa	586
Thambuttegama	247
Thirappane	821
Welikanda	545
Welioya	329
Total Patient	17599



MOH Patient List

Select Ds Division Name ----→Select Year and Moth ----→Click Search Button

If you Want to update patient details **"Click edit patient"** Button and you want to update field update date detals **" Click Edit Field "**Button



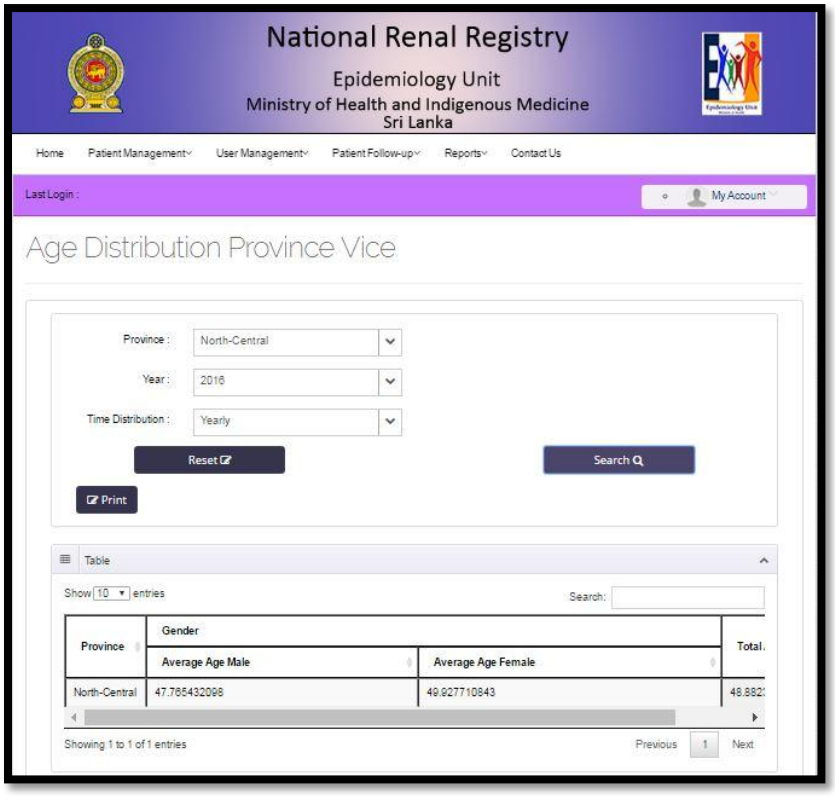
MOH Field update Count Yearly Report

Select Ds Division Name→Select Year-> Select Time distribution -> Click Search Button

Moh Field update list

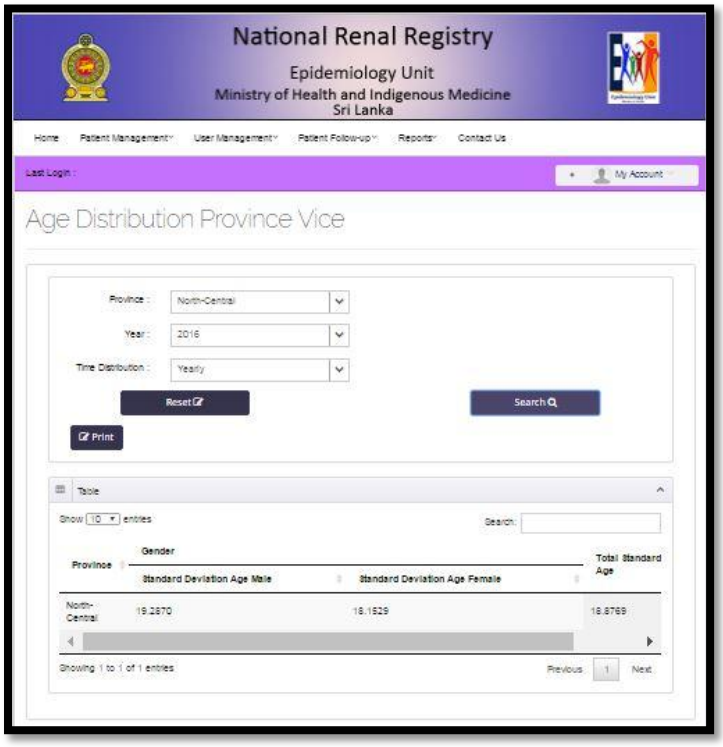
Province Wise Average Age Report

Select Province Name→Select Year-> Select Time distribution -> Click Search Button



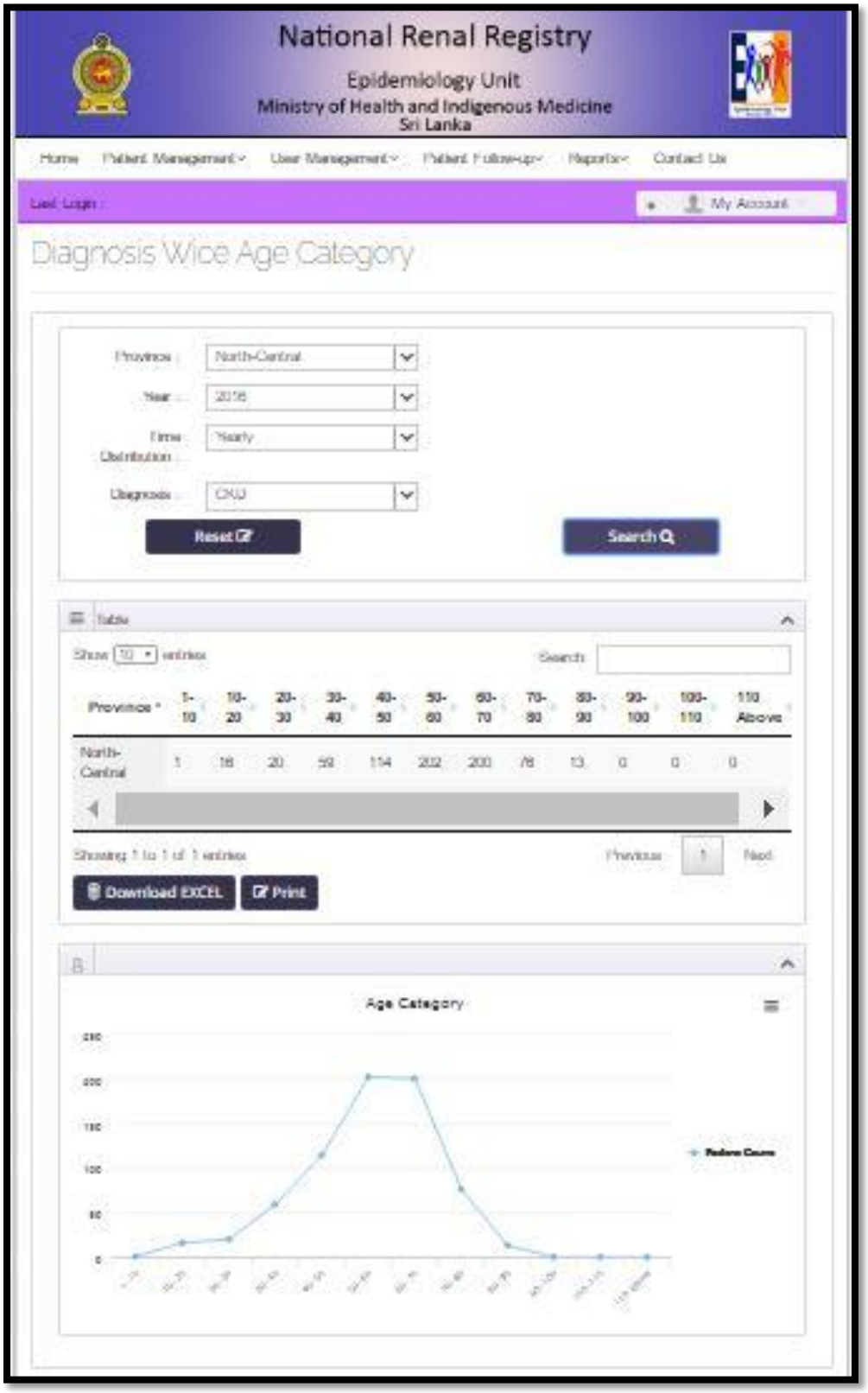
Province Wise Standard diviation Age Report

Select Province Name→Select Year-> Select Time distribution -> Click Search Button



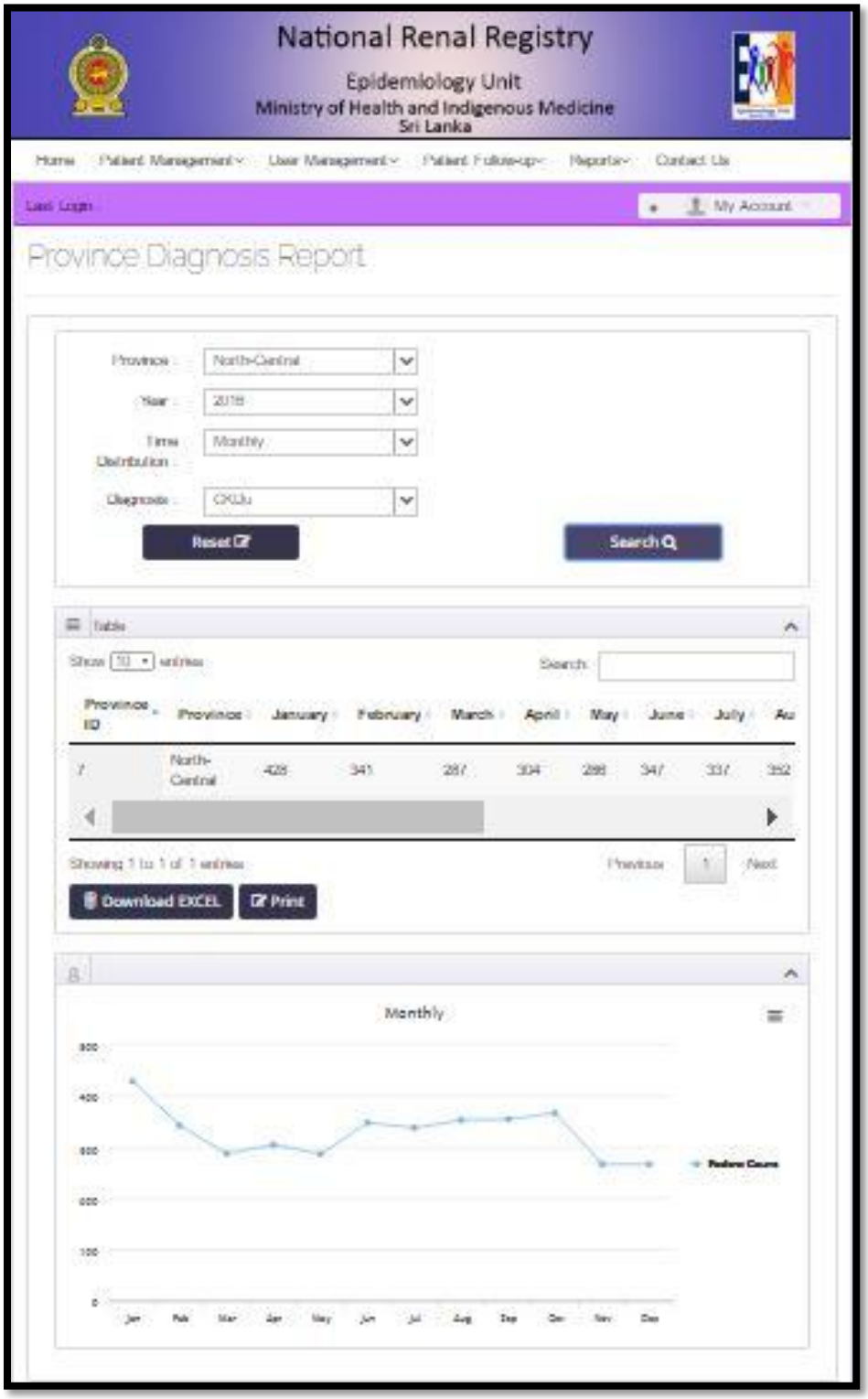
Province Wise Diagnosis age category report

Select Province name→Select year and Time distribution ->select diagnosis name->click search button



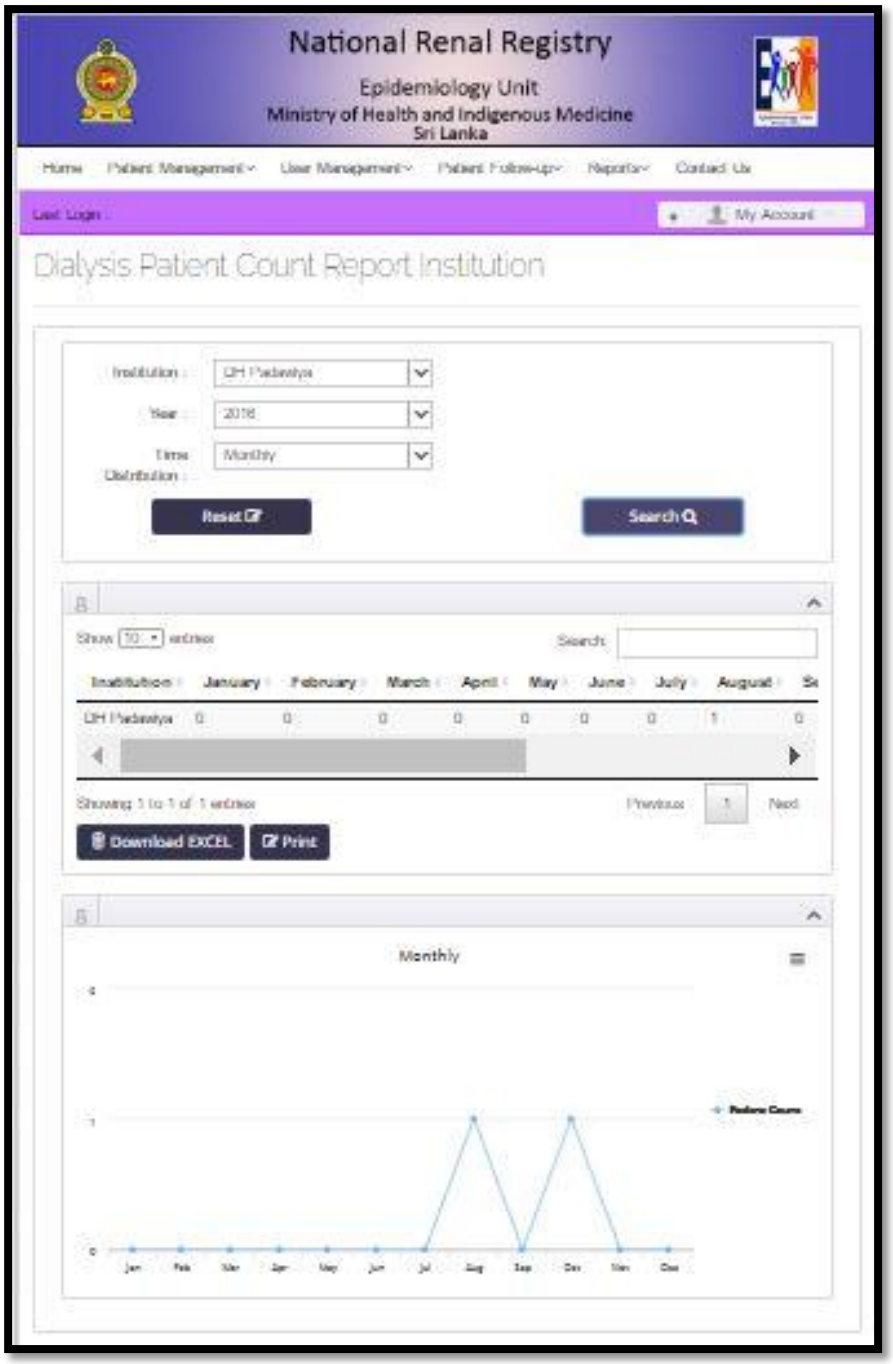
Province Wise Diagnosis patient count report

Select Province name→Select year and Time distribution ->select diagnosis name->click search button



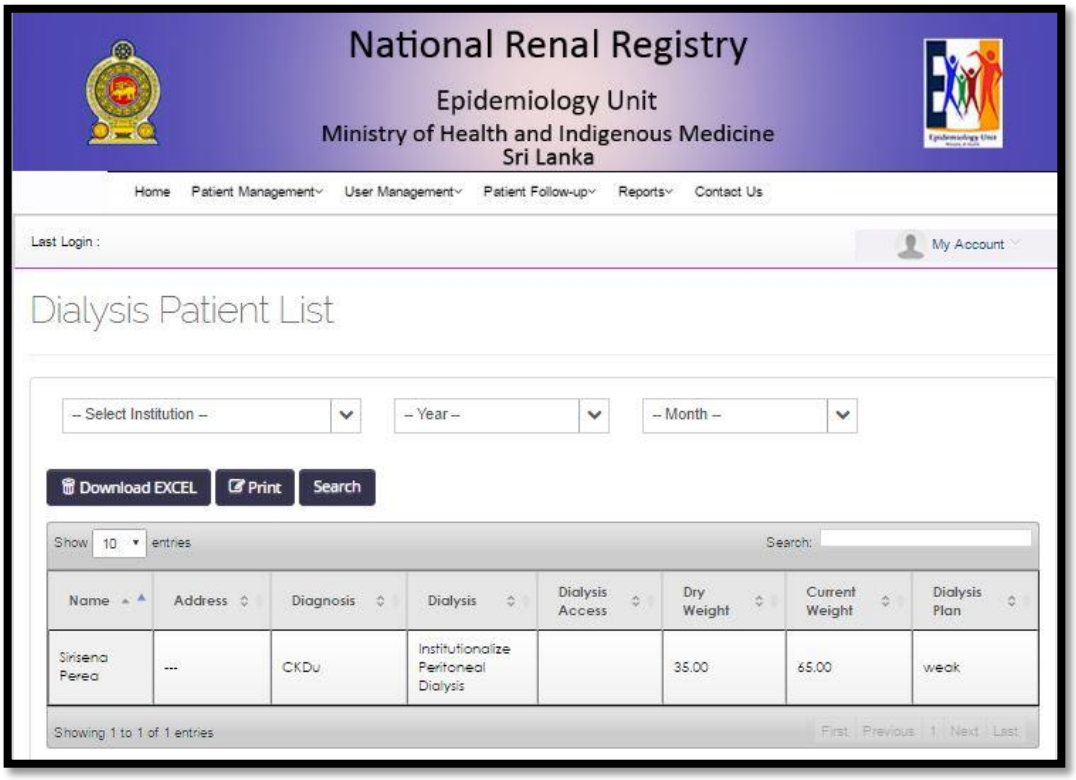
Dialysis Patient Count Report

Select Institution name ->Select year -> Select Time distribution(Yearly ,Quaterly,Monthly)->Click Search Button



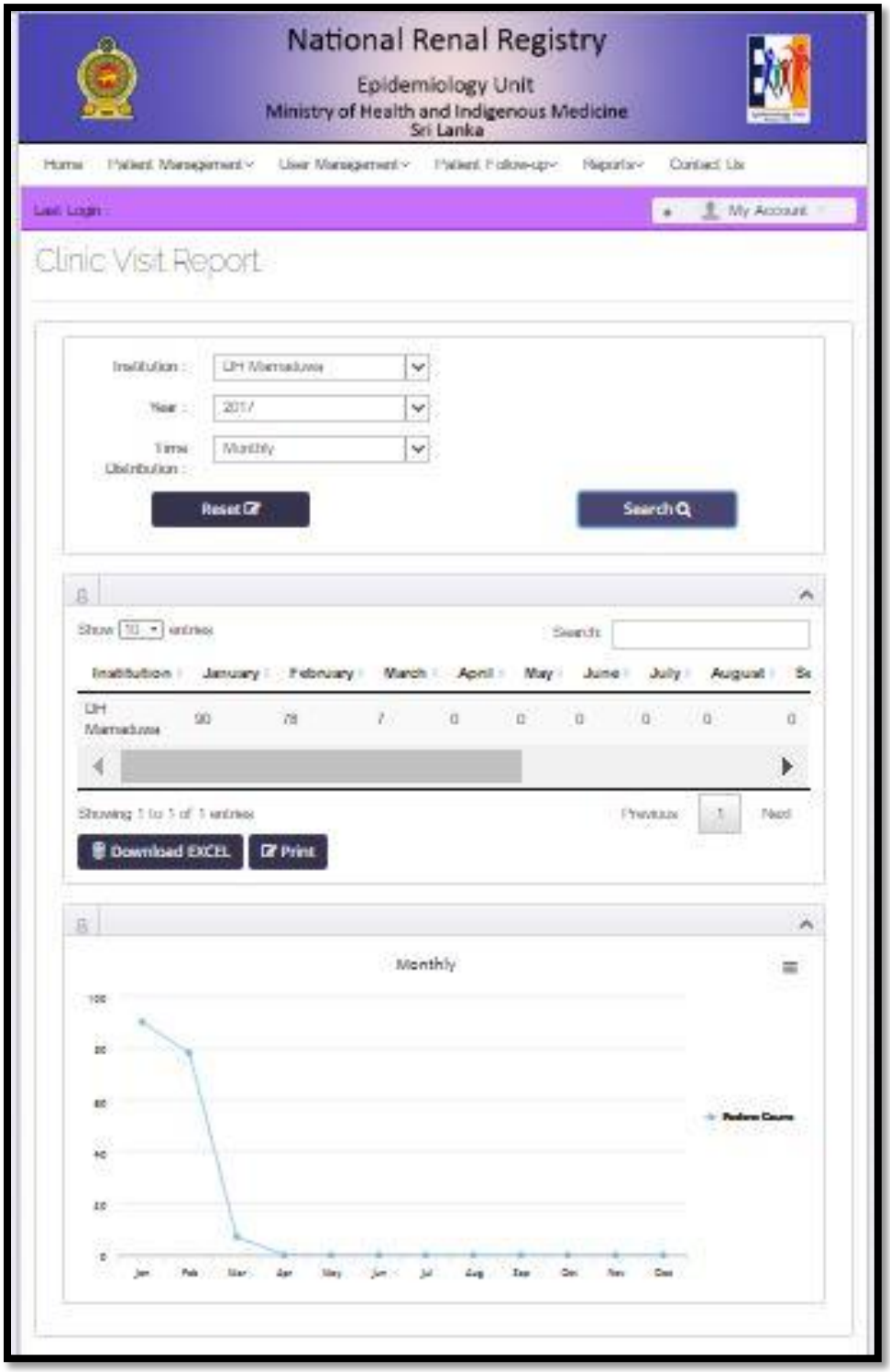
Dialysis Patient Name List Report

Select Institution Name ->Select Year and Month -> Click Search Button



Clinic Visit Patient Name List Report

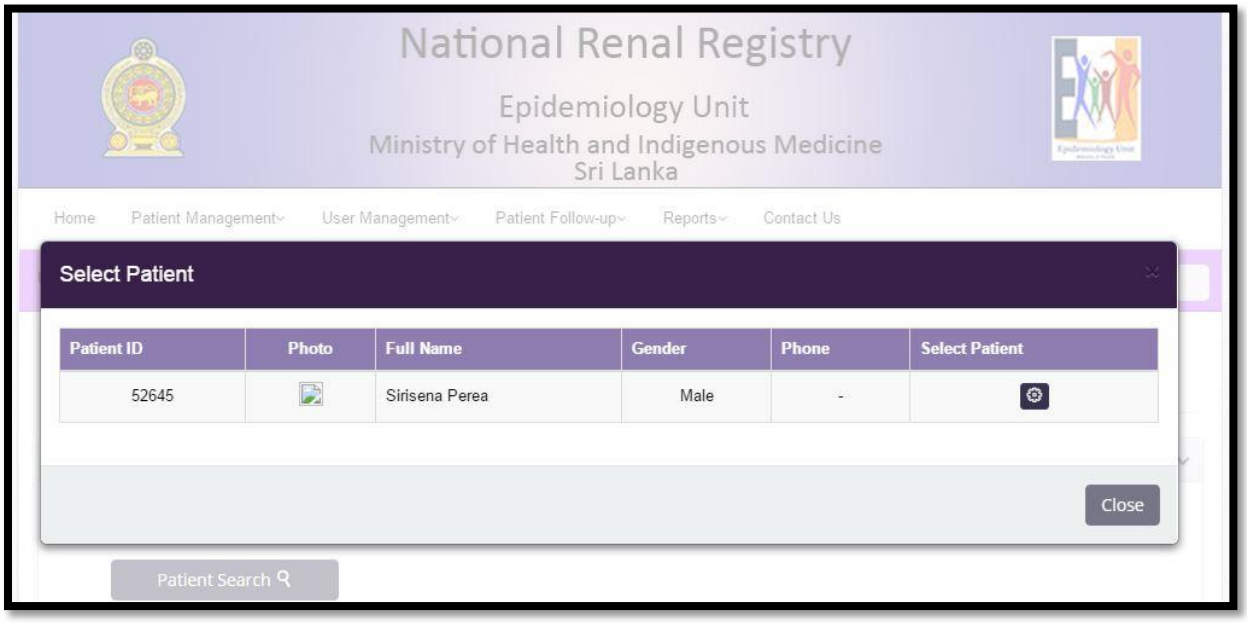
Clinic Visit Patient Count Report



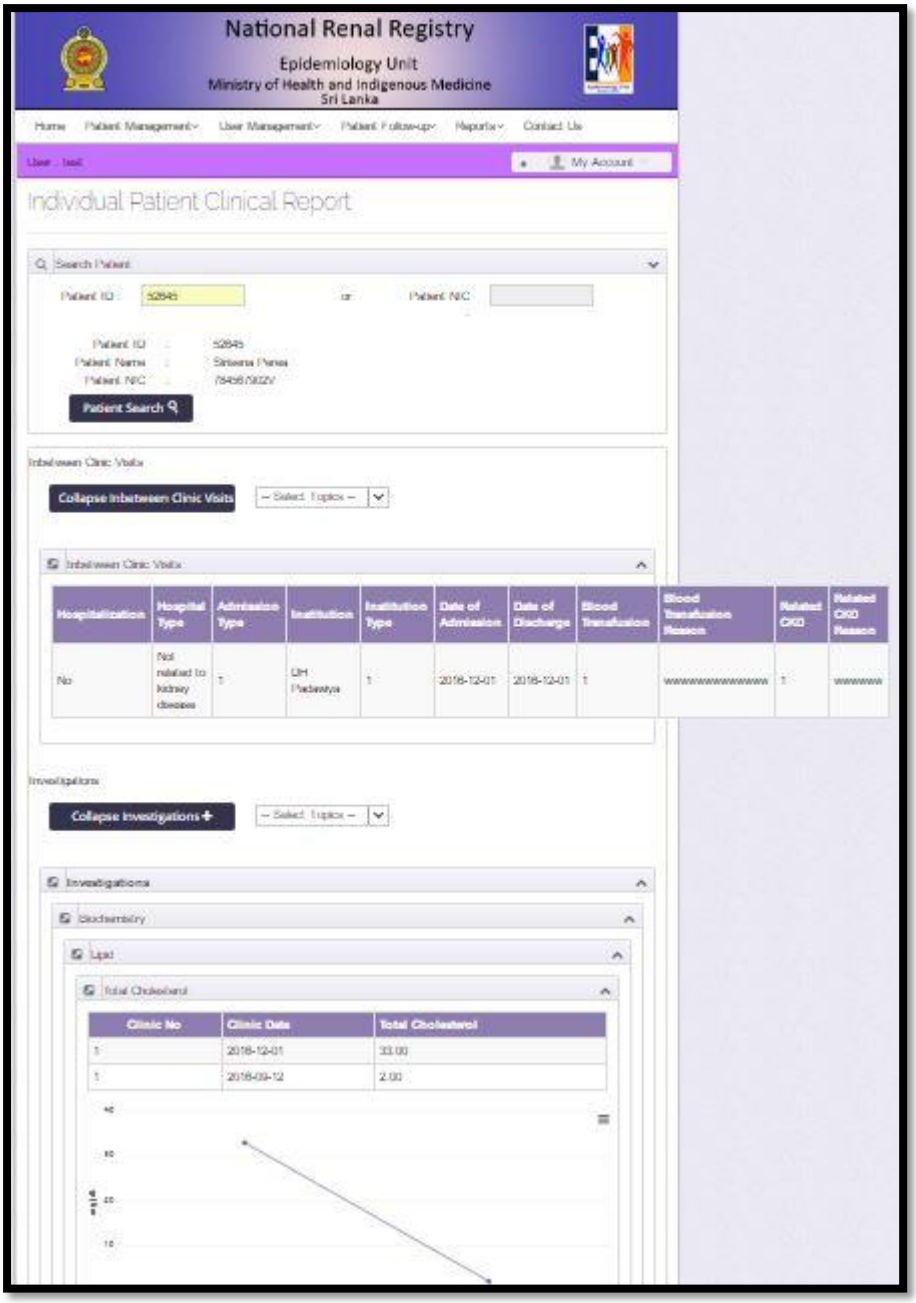
Individual Patient Reports

i. Individual Patient Clinic visit report

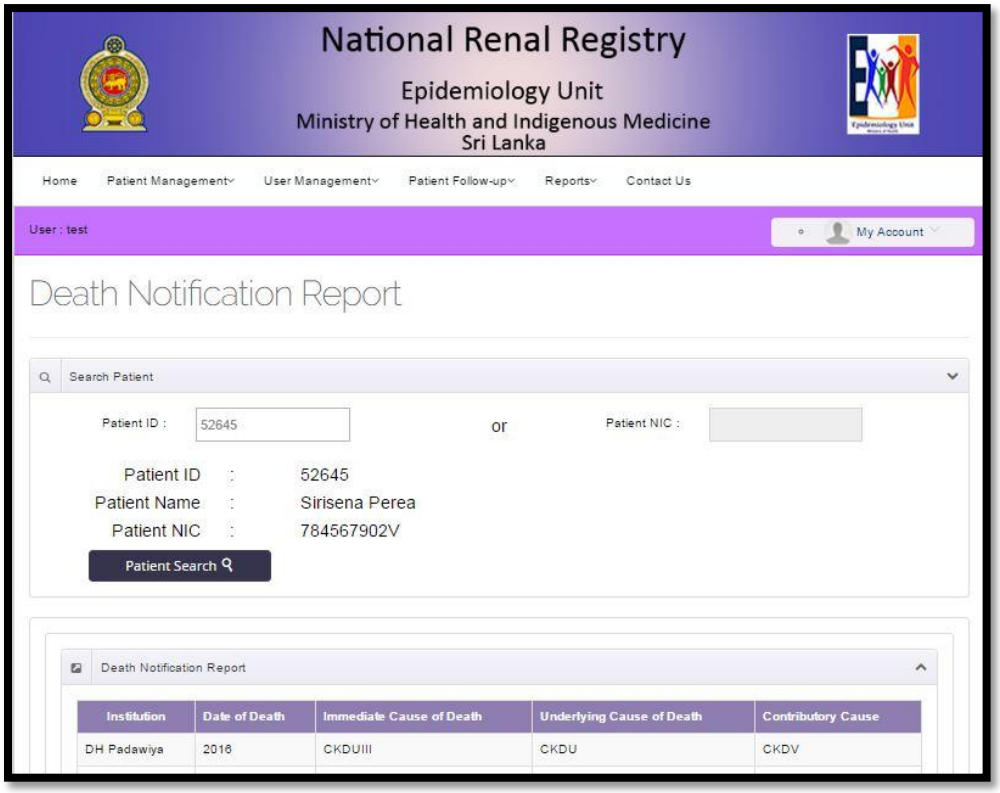
ii. Conform Correct Patient



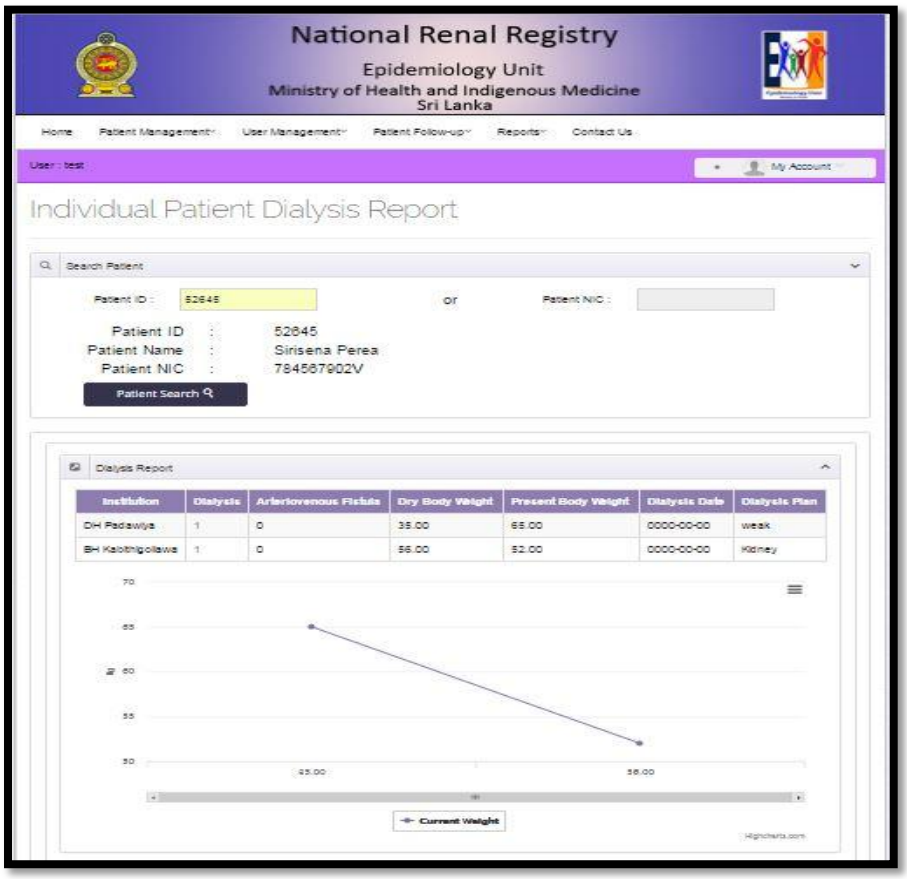
iii. Report Part



Individual Patient Death Notification Report



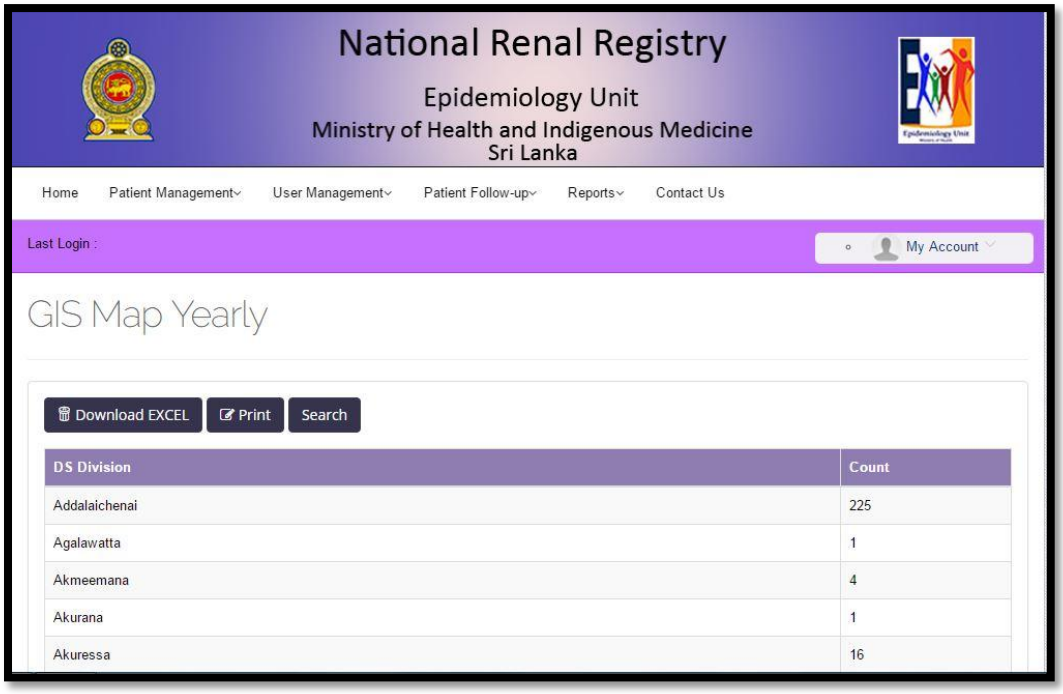
Individual Patient Dialysis Report



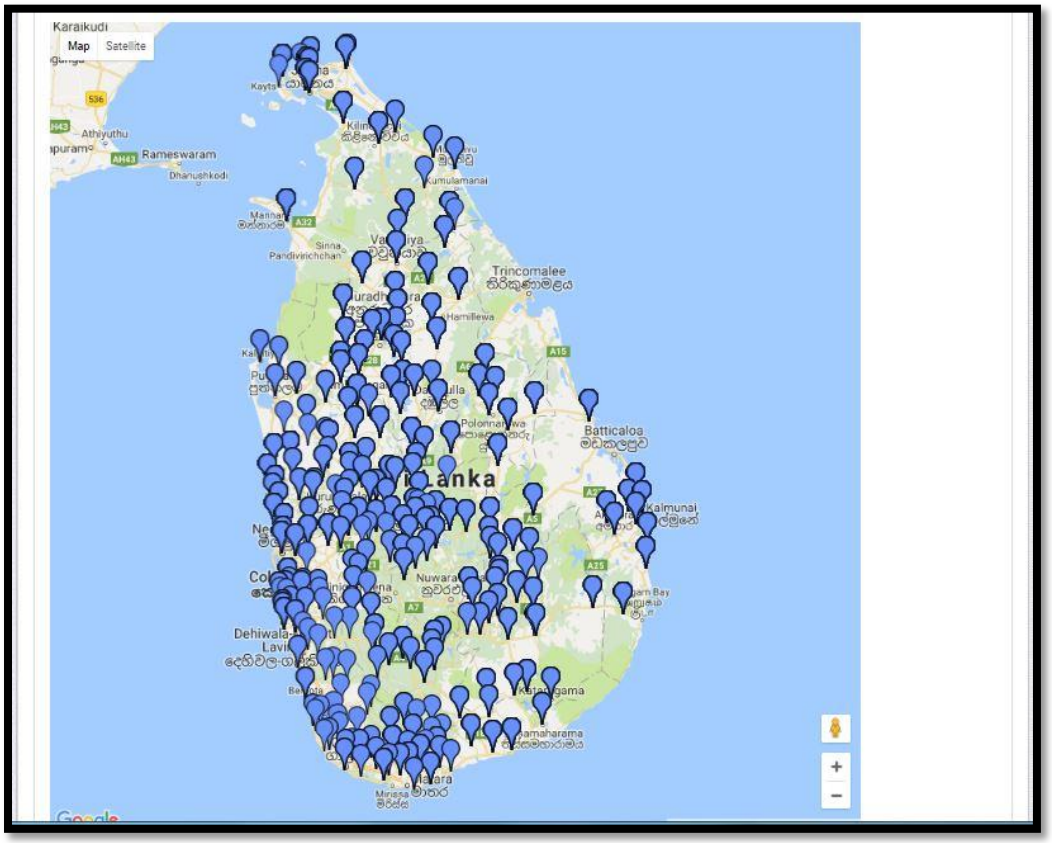
All Island Patient list Report

All Island Death Report

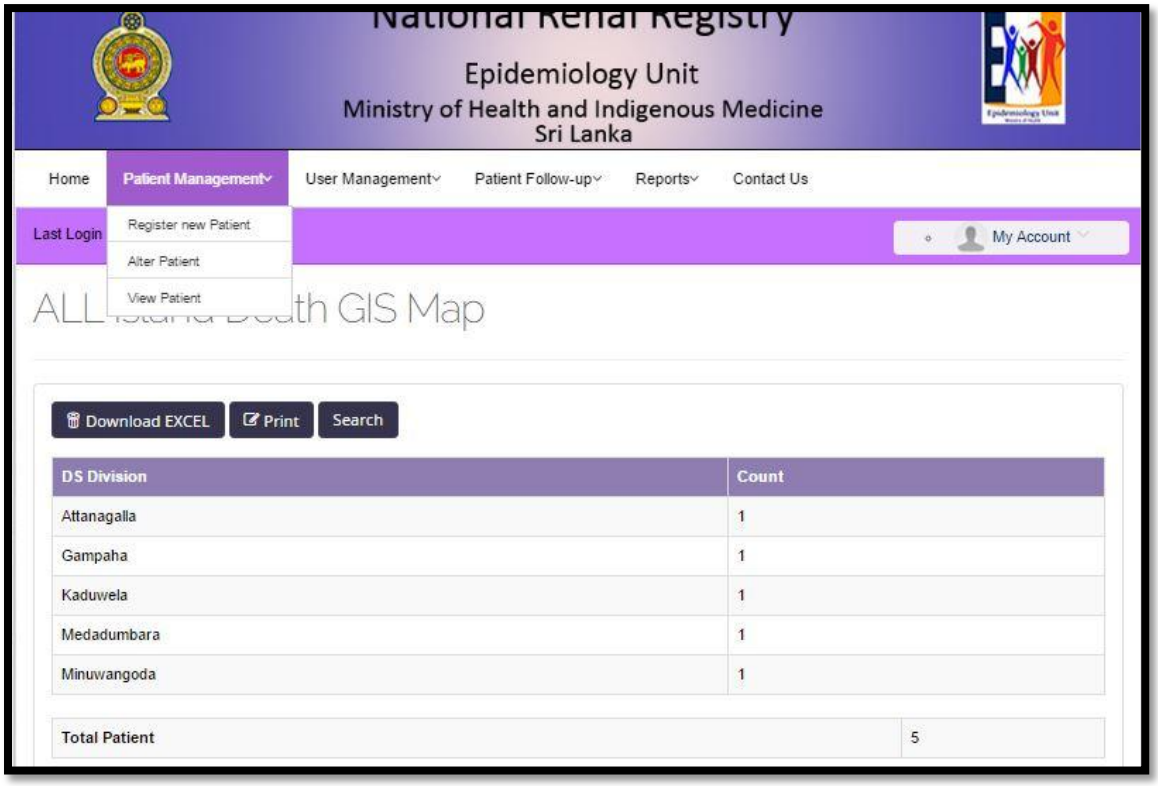
All Island GIS Map Report

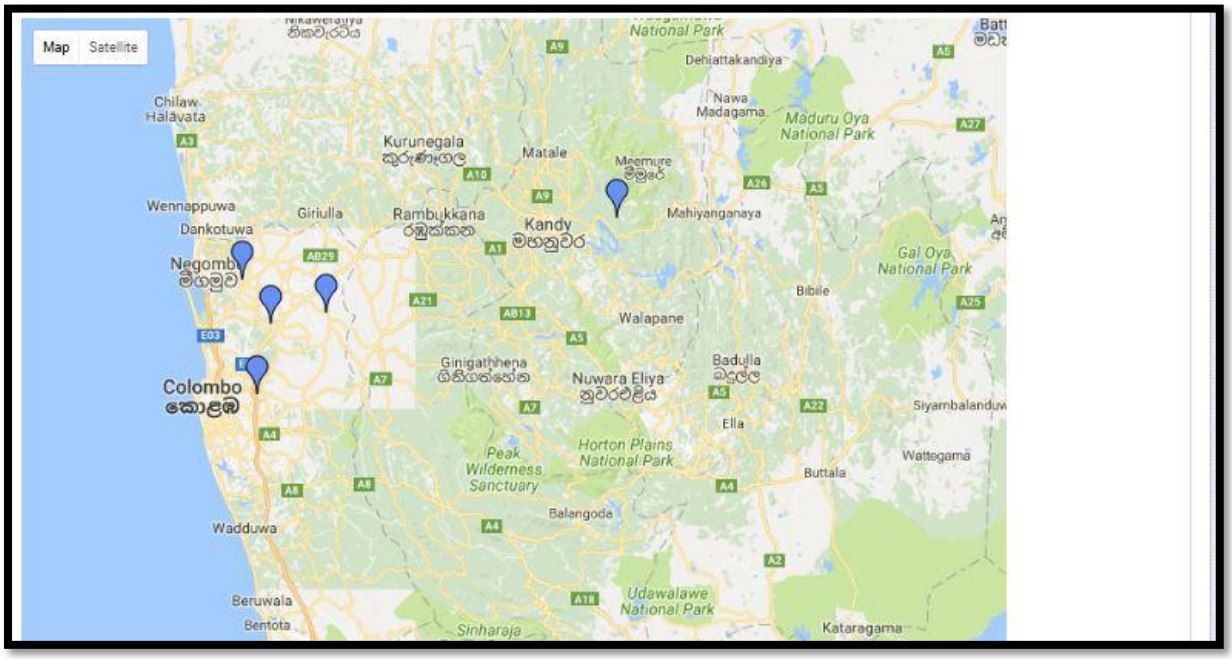


DS Division	Count
Addalaichenai	225
Agalawatta	1
Akmeemana	4
Akurana	1
Akuressa	16



All Island Death Report





Appendix C

Source Codes

C1. Login.php

This file (login.php) has following codes;

```
<?php
  session_start();
  $_SESSION['username'] = '';
  if(empty($_SESSION['username']))
  {
    session_unset();
    session_destroy();
  }
?>
<html lang="en" class="no-js"><!--<![endif]--><!-- start: HEAD --><head>
<title>CKD</title>
<!-- start: META -->
<meta charset="utf-8">
<!--[if IE]><meta http-equiv='X-UA-Compatible' content="IE=edge,IE=9,IE=8,chrome=1" /><![endif]-->
<meta name="viewport" content="width=device-width, initial-scale=1.0, user-scalable=0, minimum-scale=1.0, maximum-scale=1.0">
<meta name="apple-mobile-web-app-capable" content="yes">
<meta name="apple-mobile-web-app-status-bar-style" content="black">
<meta content="" name="description">
<meta content="" name="author">
<!-- end: META -->
<!-- start: MAIN CSS -->
<link rel="stylesheet" href="../assets/plugins/bootstrap/css/bootstrap.min.css">
<link rel="stylesheet" href="../assets/plugins/font-awesome/css/font-awesome.min.css">
<link rel="stylesheet" href="../assets/css/main.css">
<link rel="stylesheet" href="../assets/css/main-responsive.css">
<link rel="stylesheet" href="../assets/css/theme_light.css" type="text/css" id="skin_color">
<!--[if IE 7]>
<link rel="stylesheet" href="..//plugins/font-awesome/css/font-awesome-ie7.min.css">
<![endif]-->
<!-- end: MAIN CSS -->
<!-- start: CSS REQUIRED FOR THIS PAGE ONLY -->
<!-- end: CSS REQUIRED FOR THIS PAGE ONLY -->
</head>
<!-- end: HEAD -->
<!-- start: BODY -->
<body class="login example2">
<div class="row">
<!--<div class="col-lg-12">
<img class="img-responsive center-block" src="../assets/images/login1.png"/>
</div>-->
<br/>
<div class="col-sm-3"><img class="img-responsive center-block" src="../assets/images/national.png"/></div>
<div class="col-sm-6">
<div class="col-sm-12 row text-center"><h2>National Renal Registry</h2></div>
<div class="col-sm-12 row text-center"><h3>Epidemilogy Unit</h3></div>
<div class="col-sm-12 row text-center"><h3>Ministry of Health and Indigenous Medicine</h3></div>

</div>
<div class="col-sm-3"><img class="img-responsive center-block" src="../assets/images/epid.png"/></div>
<br/>
<!--<div style="width: 1000px; margin:10px auto"><img src="../assets/images/national.png" style="float:left;"/><img
src="../assets/images/epid.png" style="float:right;"/>Chronic Kidney Disease Surveillance System</br>
<span style="font-size: 22px">Epidemilogy Unit, Ministry of Health</span></div>-->
</div>
```

```
<div class="main-login col-sm-4 col-sm-offset-4">
<!-- start: LOGIN BOX -->
<div class="box-login" style="display: block;">
<h3>Sign in to your account</h3>
<p>
        Please enter your name and password to log in.
</p>
<form id="loginForm">
<div class="alert alert-danger" id="error" style="display: none;"></div>
<fieldset>
<div class="form-group">
                                                                <span class="input-icon">
                        <input type="text" class="form-control"
name="username" placeholder="Username">
                        <i class="fa fa-user"></i></span>
</div>
<div class="form-group form-actions">
                                                                <span class="input-icon">
                        <input type="password" class="form-control
password" name="password" placeholder="Password">
                        <i class="fa fa-lock"></i>
</div>
<div class="form-actions">
<button type="submit" id="loginBtn" class="btn btn-purple pull-right">
                Login <i class="fa fa-arrow-circle-right"></i>
</button>
</div>
</fieldset>
</form>
</div>
<!-- end: LOGIN BOX -->

<!-- start: COPYRIGHT -->
<div class="copyright">
<?php echo date("Y")?> © Epidemiology Unit
</div>
<!-- end: COPYRIGHT -->
</div>
<script src="../assets/plugins/jQuery-lib/2.0.3/jquery.min.js"></script>
<!--<![endif]-->
<script src="../assets/plugins/jquery-ui/jquery-ui-1.10.2.custom.min.js"></script>
<script src="../assets/plugins/bootstrap/js/bootstrap.min.js"></script>
<script src="../assets/plugins/blockUI/jquery.blockUI.js"></script>
<script src="../assets/plugins/perfect-scrollbar/src/jquery.mousewheel.js"></script>
<script src="../assets/plugins/perfect-scrollbar/src/perfect-scrollbar.js"></script>
<script src="../assets/plugins/less/less-1.5.0.min.js"></script>
<script src="../assets/plugins/jquery-cookie/jquery.cookie.js"></script>

<script src="../assets/js/main.js"></script>
<!-- end: MAIN JAVASCRIPTS -->
```

```
<script>
  jQuery(document).ready(function() {
    Main.init();
    $('#error').hide();
    $('#loginForm').submit(function(e){
      e.preventDefault();
      $.ajax({
        url : "../BLL/login_BL.php",
        type : "POST",
        data : $("#loginForm").serialize(),
        cache : false,

        success:function(data){
          if(data != 0){
            $('#error').hide();
            window.location.href = "home.php";
          }
          else{
            $('#error').show().html("Username or Password is invalid");
          }
        }
      })
    })

    $('#username').keypress(function(e){
      if(e.keyCode==13)
        $('#loginBtn').click();
    });

    $('#password').keypress(function(e){
      if(e.keyCode==13)
        $('#loginBtn').click();
    });

  });
</script>

<!-- end: BODY -->
</body></html>
```

C2. Home.php

```
<?php
session_start();
if(empty($_SESSION['username']))
{
   header('Location: ../PL/Login.php');
}

require_once("../includes/layout/header.php");
require_once("../BLL/patient_BL.php");
require_once("../DL/dbConnection.php");
require_once("../BLL/userGroup_BL.php");
require_once("../DL/select1.php");
?>

<!-- start: CSS REQUIRED FOR THIS PAGE ONLY -->
<link href="../assets/plugins/bootstrap-modal/css/bootstrap-modal-bs3patch.css" rel="stylesheet" type="text/css"/>
<link href="../assets/plugins/bootstrap-modal/css/bootstrap-modal.css" rel="stylesheet" type="text/css"/>
<!-- end: CSS REQUIRED FOR THIS PAGE ONLY -->

<link rel="shortcut icon" href="favicon.ico" />
</head>
<!-- end: HEAD -->

<!-- start: BODY -->
<body class="page-full-width layout-boxed bg_style_2 header-default">
<!-- start: HEADER -->
<div class="navbar navbar-inverse navbar-fixed-top">

<div class="navbar-header">

<!-- start: LOGO -->
<img src="../assets/images/ckd_cover_photo.png" class="img-responsive">
<!-- end: LOGO -->
<!-- start: RESPONSIVE MENU TOGGLER -->
<button data-target=".navbar-collapse" data-toggle="collapse" class="navbar-toggle" type="button">
<span class="clip-list-2"></span>
</button>
<!-- end: RESPONSIVE MENU TOGGLER -->
</div>
<!-- start: TOP NAVIGATION CONTAINER -->
<div class="container">
<div class="navbar-tools">

<!-- start: HORIZONTAL MENU -->
<?php
        include("../includes/layout/navigation.php");
        ?>
<!-- end: HORIZONTAL MENU -->

<!--.....-->
</div>

</div>
<!-- end: TOP NAVIGATION CONTAINER -->
</div>
<!-- end: HEADER -->
<!-- start: MAIN CONTAINER -->
<div class="main-container">
<!-- start: PAGE -->
```

```
<div class="main-content">

<div class="container" style="min-height: 760px;">
<!-- start: PAGE HEADER -->
<div class="row">
<div class="col-sm-12">
<!-- start: STYLE SELECTOR BOX -->

<!-- end: STYLE SELECTOR BOX -->
<!-- start: PAGE TITLE & BREADCRUMB -->
<ul class="breadcrumb">
<li>
            User : <?PHP echo $_SESSION['username']; ?>
</li>

<li class="search-box">
<form class="sidebar-search">
<div class="form-group">
<!-- start: TOP NAVIGATION MENU -->
<ul>
<!-- start: USER DROPDOWN -->
<li class="dropdown current-user">
<a data-toggle="dropdown" data-hover="dropdown" class="dropdown-toggle" data-close-others="true" href="#">
<img src="../assets/images/user.jpg" class="circle-img" alt="">
<span class="username">My Account</span>
<i class="clip-chevron-down"></i>
</a>
<ul class="dropdown-menu">
<li>
<a href="">
<i class="clip-user-2"></i>
 View My Profile
</a>
</li>
<li>
<a href="">
<i class="clip-pencil-3"></i>
 Edit My Profile
</a>
</li>
<li>
<a href="../BLL/logout_BL.php">
<i class="clip-exit"></i>
 Log Out
</a>
</li>
</ul>
</li>
<!-- end: USER DROPDOWN -->
</ul>
<!-- end: TOP NAVIGATION MENU -->
</div>
</form>
</li>
</ul>
<div class="page-header">
<h1>Home</h1>
</div>
<!-- end: PAGE TITLE & BREADCRUMB -->
</div>
</div>
<!-- end: PAGE HEADER -->
```

```
<!-- start: PAGE CONTENT -->
<a href="#top" ></a>
<div class="row">
<div class="col-sm-12">
<div class="panel panel-default">
<div class="panel-body">
<form role="form" class="form-horizontal" id="" method="post">

<div class="row">
<div class="col-sm-9">
<div class="panel panel-default">
<div class="panel-heading">
<i class="fa fa-external-link-square"></i>
<b>Surveillance on Chronic Kidney Disease in Sri Lanka</b>
</div>
<div class="panel-body">
<div style="float: left"><img width="500px" src="../assets/images/institutions.png" class="img-responsive"/></div>
<p><p style="text-align: justify">The Epidemiology Unit of the Ministry of Health, Sri Lanka has established surveillance on chronic kidney disease since October 2013. Thirty hospitals were declared as sentinel sites. The rationale of selecting the hospitals as sentinel sites was the available statistics on the disease burden and the media reports and public concerns of the presence of the disease in geographic locations. Based on the hospital statistics and the statistics at the renal research unit, the Polonnaruwa and Anuradhapura districts and geographically adjacent areas namely, Dehiattakandiya, Girandurukotte, Welioya, Polpithigama, Padavi Sripura, Wilgamuwa and Vavuniya South Divisional Secretariat divisions were proclaimed as high risk areas. The hospitals catering to the populations in the proclaimed areas were selected as sentinel sites, namely</p>
<p> </p>

<table border="0" cellpadding="0" cellspacing="0">
<tbody>
<tr>
<td style="width:220px">
<ol>
<li>DH Padaviya</li>
<li>DH Madawachchiya</li>
<li>BH Kebithigollawa</li>
<li>BH Thambuttegama</li>
<li>DH Kekirawa</li>
<li>BH Medirigiriya</li>
<li>DH Hingurakgoda</li>
<li>DH Bakamuna</li>
<li>DH Welikanda</li>
<li>DH Aralaganwila</li>
<li>DH Nikawewa</li>
<li>DH Padawi Sripura</li>
<li>DH Girandurukotte</li>
<li>DH Galenbindunuwewa</li>
<li>TH Anuradhapura</li>
<li>GH Polonnaruwa</li>
<li>GH Vavuniya</li>
<li>BH Dehiattakandiya</li>
<li>DH Hettipola</li>
<li>DH Kahatagasdigiliya</li>
<li>DH Sampathnuwara</li>
</ol>
</td>

<td style="width:220px">
<p> </p>
</td>
</tr>
</tbody>
</table>
```

```
<p style="text-align: justify">Another set of hospitals were selected on the basis of patients referral mechanisms, resource availability including availability of specialists&amp;#39; services, having renal clinics, which are as follows,</p>

<ol>
<li>BH Mahiyangana</li>
<li>GH Mullaitivu</li>
<li>TH Kurunegala</li>
<li>TH Kandy</li>
</ol>

<p style="text-align: justify">Further, the following institutions were selected considering the potentials of having the disease, anecdotal reports on the presence of disease and public concerns on the presence of the disease.</p>

<ol>
<li>TH Jaffna</li>
<li>DH Tanamalwila</li>
<li>DH Buttala</li>
<li>GH Killinochchi</li>
<li>GH Mannar</li>
</ol>

<p style="text-align: justify">As the surveillance continues, the list of sentinel sites could be evolved based on the evidence generated.&amp;nbsp;&amp;nbsp;</p>
</p>
</div>
</div>
</div>

<div class="col-sm-3">
<div class="panel panel-default" id="cvClinicVisitPnl">
<div class="panel-body">
<div class="col-sm-12">
<img class="img-responsive" src="../assets/images/Screening_Guidelines_CKD_Cover.jpg"/><br>
</div>
<div class="col-sm-12 text-center">
<a class="btn btn-purple" href="../assets/pdf/Screening_Guidelines_CKD.php">Download
<i class="fa fa-arrow-circle-o-down"></i>
</a>
</div>
</div>
</div>

<div class="panel panel-default" id="cvClinicVisitPnl">
<div class="panel-body">
<div class="col-sm-12">
<img class="img-responsive" src="../assets/images/clinical_management_guidline.JPG"/><br>
</div>
<div class="col-sm-12 text-center">
<a class="btn btn-purple" href="../assets/pdf/Clinical%20Management%20GuidelinesPDF.php">Download
<i class="fa fa-arrow-circle-o-down"></i>
</a>
</div>
</div>
</div>

</div>
</div>
</form>
</div>
</div>
</div>
</div>
```

```
</div>
</div>
</div>

<?php
  include("../includes/layout/footer.php");
?>

<!-- start: JAVASCRIPTS REQUIRED FOR THIS PAGE ONLY -->
<script src="../assets/plugins/jquery-inputlimiter/jquery.inputlimiter.1.3.1.min.js"></script>
<script src="../assets/plugins/autosize/jquery.autosize.min.js"></script>
<script src="../assets/plugins/select2/select2.min.js"></script>
<script src="../assets/plugins/jquery.maskedinput/src/jquery.maskedinput.js"></script>
<script src="../assets/plugins/jquery-maskmoney/jquery.maskMoney.js"></script>
<script src="../assets/plugins/bootstrap-datepicker/js/bootstrap-datepicker.js"></script>
<script src="../assets/plugins/bootstrap-timepicker/js/bootstrap-timepicker.min.js"></script>
<script src="../assets/plugins/bootstrap-daterangepicker/moment.min.js"></script>
<script src="../assets/plugins/bootstrap-daterangepicker/daterangepicker.js"></script>
<script src="../assets/plugins/bootstrap-colorpicker/js/bootstrap-colorpicker.js"></script>
<script src="../assets/plugins/bootstrap-colorpicker/js/commits.js"></script>
<script src="../assets/plugins/jQuery-Tags-Input/jquery.tagsinput.js"></script>
<script src="../assets/plugins/bootstrap-fileupload/bootstrap-fileupload.min.js"></script>
<script src="../assets/plugins/summernote/build/summernote.min.js"></script>
<script src="../assets/plugins/ckeditor/ckeditor.js"></script>
<script src="../assets/plugins/ckeditor/adapters/jquery.js"></script>
<script src="../assets/js/form-elements.js"></script>

<script src="../assets/js/accessPriviladgesJs.js"></script>
<script src="../assets/plugins/bootstrap-modal/js/bootstrap-modal.js"></script>
<script src="../assets/plugins/bootstrap-modal/js/bootstrap-modalmanager.js"></script>
<script src="../assets/js/ui-modals.js"></script>
<script src="../assets/js/dropdownPopulation.js"></script>
<script src="../assets/plugins/bootstrap-paginator/src/bootstrap-paginator.js"></script>
<script src="../assets/plugins/jquery.pulsate/jquery.pulsate.min.js"></script>
<script src="../assets/plugins/gritter/js/jquery.gritter.min.js"></script>
<script src="../assets/js/ui-elements.js"></script>
<!--<script src="../assets/plugins/bootbox/bootbox.min.js"></script>-->
<!-- end: JAVASCRIPTS REQUIRED FOR THIS PAGE ONLY -->
<script>
jQuery(document).ready(function() {
  Main.init();
  FormElements.init();

});
</script>
<!-- end: BODY -->
</body></html>
```