



Interactive Patient Information Management System

Version 1.0

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1.0. Introduction

1.1. Purpose

The purpose of this document is to thoroughly detail on the terms, functionality, implementation and usage of the “Interactive Patient Information Management System” (I.P.I.M.S). This will overview the design and detail of each user, page, and item implemented within the web application. The rest of this document will provide sufficient detail for the reader to fully understand the IPIMS.

1.2. Scope of Project

The IPIMS is an interactive web-based system that will benefit healthcare providers with easy access to records, patients, appointments, lab records and hospital statistics. The system also allows patients of the healthcare provider to easily manage and access their healthcare needs such as appointments and prescriptions.

The IPIMS functionality enables maximum efficiency through the use of organized data and helps facilitate the access of those who are need of healthcare services. The implementation of online storage and accessibility rids of paper-based management to increase efficiency and allow for proper management.

1.3. Glossary

Term	Definition
User	General description for HSP or patient
HSP	Health care service staff member responsible for managing patient data, importing their information into the system and updating proper records for the doctor
Patient	Collection of healthcare data for the individual that can be managed and monitored through the entire IPIMS

Nurse	HSP staff nurse who can view patient medical conditions and update the health resolution outcome for each patient
Lab Staff	HSP staff member who is responsible for uploading, viewing and changing lab records per patient
Doctor	HSP staff member who is responsible for acting upon emergency alert notifications, prescribing medication, resolving patient concerns and managing patient medical data.
Django	A free and open source web application framework.
Text Field	A form element that accepts keyboard input
Patient Control Panel	Allows users to view and update their information.
Scheduling	A function that helps patient schedules an appointment at a certain time with their doctor.
Severity	Measurement the doctor uses to determine the conditions of the patients.
SQLite	An in-Process library that implements a transactional SQL database engine.

1.4. References

IEEE. *IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications*. IEEE Computer Society, 1998.

1.5. Overview of Document

The following section details on the overall implementation and usage of the web-based application. Here, it is described in an informal way so that one does not need prior knowledge in the field to understand it. These descriptions will systematically explain each process involved with the functional as well as non-functional requirements.

In addition, the document will transition into the requirements specification portion. This section will thoroughly explain the functional usage the software was intended for as well as illustrate the technicalities of the software to make the implementation easier to understand.

The combination of these sections within the documentation along with the diagrams and briefings in the system will facilitate the reader's understanding of the software and the intended specifications.

2.0 Overall Description

Section 2.1: System Environment

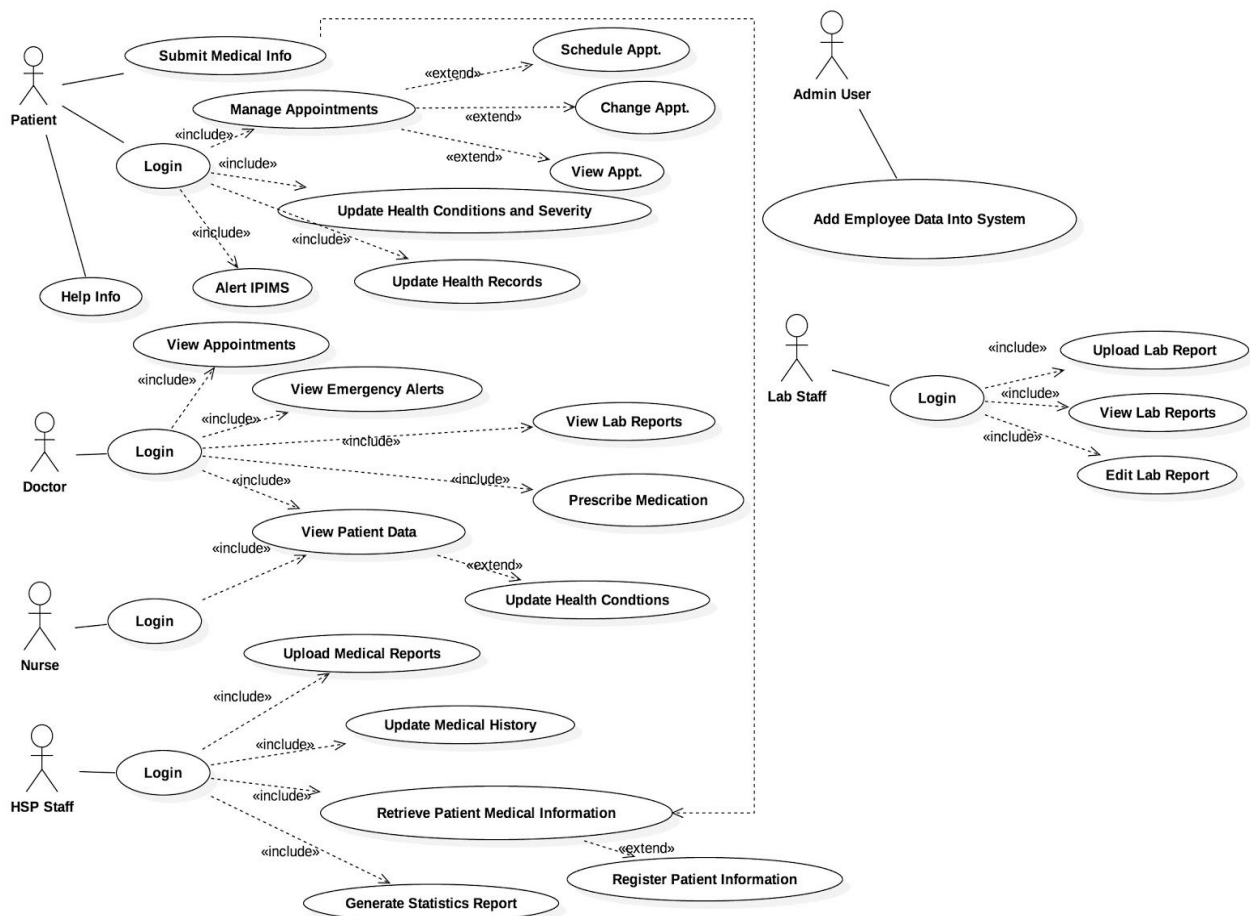


Figure 1 - System Environment

System Environment: The Interactive Patient Management System has six main actors consisting of patient, nurse, doctor, lab staff, HSP staff and admin user. Each user has separate permissions that allow them to access certain feature of the system.

Section 2.2: Functional Requirement Specifications

This section outlines the functional components (or use cases) of each of the actors. There are 6 main actors. The Healthcare Provider, the patient, the lab staff, the HSP staff, the nurse and the administrator.

Section 2.2.1: Patient Use Case:

Use Case: **Login**

Diagram:

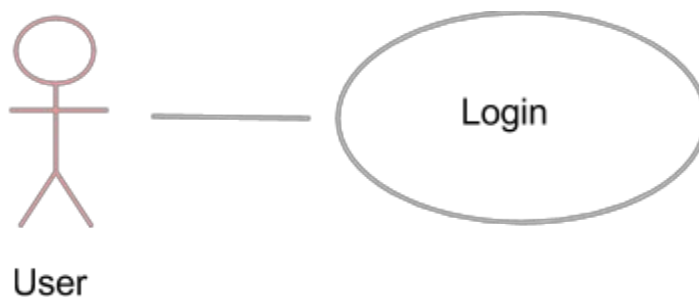


Figure 2

Summary: User registers and edits/provides medical information

Actors: patient, nurse, doctor, lab staff, HSP staff and admin user

Pre-conditions (Entry conditions):

- User is on the website

Post-conditions (Exit conditions):

- Information is sent to HSP staff to be reviewed and approved or denied.

Scenario:

1. Show option to register
2. Display categories for registration
 - a. Name
 - b. Date of Birth
 - c. Address
 - d. Social Security Number

- e. Gender
 - f. Phone Number
 - g. EID
 - h. Insurance Information
 - i. Medical History
 - j. Enter all information for required categories
3. Register

Special Requirements (exceptions):

- User can cancel and close webpage at any time
- User can choose not to validate information

XRef: Section 3.2.2: Login

Use Case: **Submit Medical Information**

Diagram:



Figure 3

Brief Description

In the initial stage, the patient will submit their medical information as well as personal information to the healthcare provider. This data will be sent to the HSP staff so they can be reviewed and registered into the system.

Initial Step-By-Step Description

1. The system presents various text fields labeled with their corresponding information.
2. The user must enter his or her Name, Date of Birth, Address, Social Security Number, Gender, Phone Number, Medical History, and Insurance Information to complete their admission application.
3. The user will hit submit to send the information to the staff for review.

XRef: Section 3.2.1: Submit Medical Information/Registration

Use case: **Schedule Appointment**

Diagram:



Figure 4

Brief Description

The Patient schedules an appointment at a certain time with the selected doctor and provides relevant pain and discomfort levels to properly notify the doctor and certain levels of precaution should be taken.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel and entered the correct health records into the account. The role of the user must be a Patient.

1. The Patient selects to *Schedule Appointment*.
2. The system presents a list of doctors to select from.
3. The Patient selects a doctor.
4. The system confirms the appointment and sends a notification to the doctor.
5. The system notifies the Patient that the appointment has been successfully scheduled and returns the Patient to the Patient main page.

Xref: Section 3.2.6: Schedule Appointment

Use case: **View Appointments**

Diagram:

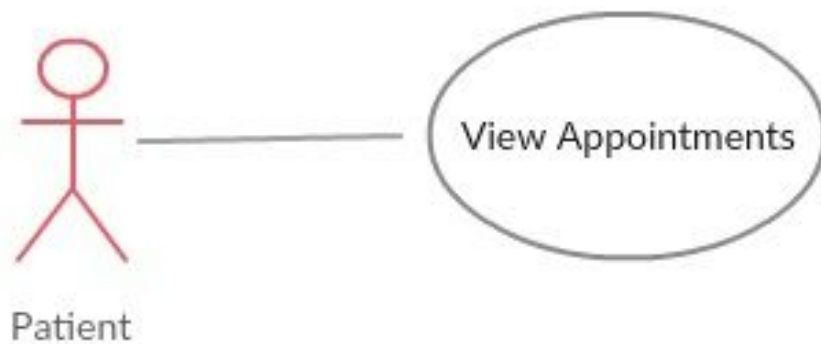


Figure 5

Brief Description

The Patient views their scheduled appointments and can make changes or cancel them.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel. The role of the user must be Patient.

1. The Patient selects to *View Appointments*.
2. The system displays all of the patient's currently scheduled appointments.
3. From here, the Patient can additionally choose to *change appointment* or *cancel appointment*.

XRef: Section 3.2.7: View Appointment

Use case: **Change Appointments**

Diagram:

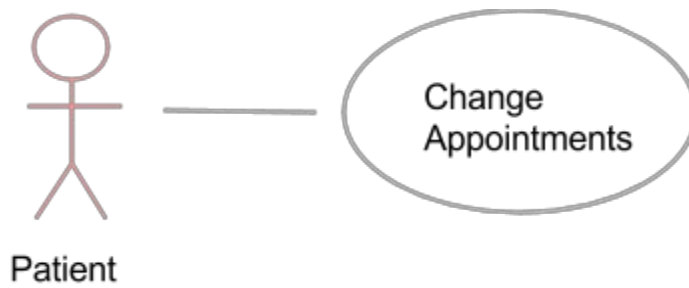


Figure 6

Brief Description

The Patient views their scheduled appointments and can make changes to the appointment. This could include pain level and severity status as well as cancelling the appointment.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel. The role of the user must be Patient. The patient must also have an appointment scheduled so they can change it.

1. The Patient selects to *View Appointments*.
2. The system displays all of the patient's currently scheduled appointments.
3. From here, the Patient can additionally choose to *change appointment* or *cancel appointment*.

XRef: 3.2.8: Change Appointments

Use case: **Update Health Record**

Diagram:

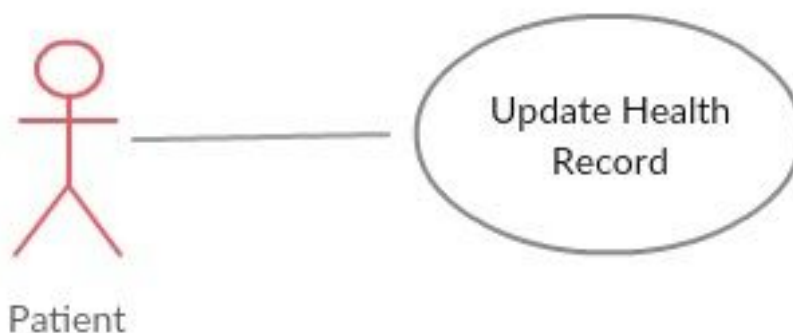


Figure 7

Brief Description

The Patient will be able to edit the initially submitted medical documents that are stored into the system.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel.

1. The Patient selects to *Update Health Records*.
2. The system brings the Patient to a Health Record Update form.
3. The Patient updates any relevant information into the text fields and submits the form.
4. The system confirms the information and returns the Patient to the Patient main page.

XRef: Section 3.2.3: Update Health Record

Use case: **Update Health Conditions/Severity Status**

Diagram:

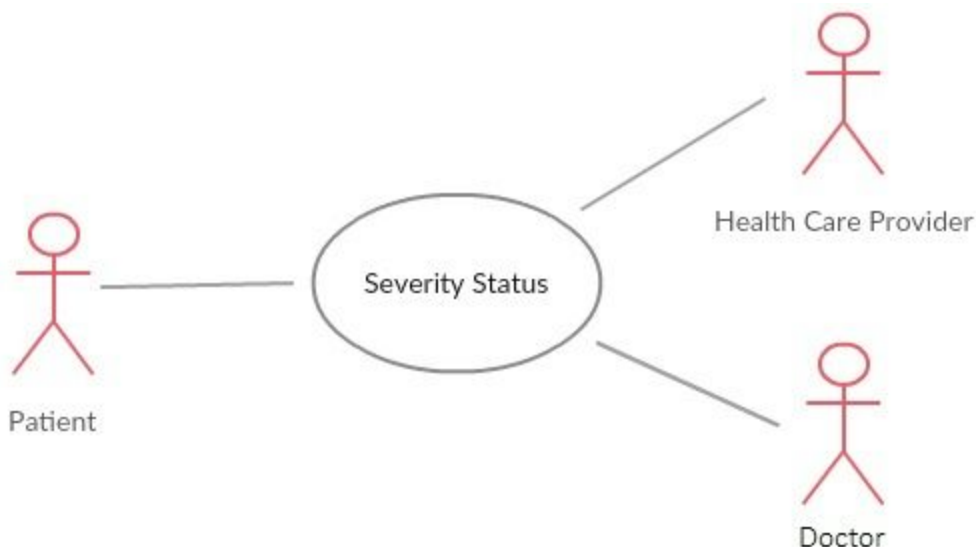


Figure 8

Brief Description

The Patient selects their conditions/types of pain and ranks their severity. Under certain conditions, the Health Care Provider may be prompted to take additional actions or the Emergency Ward may be alerted based on the status level.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel and inserted healthcare records. The role of the user must be Patient.

1. The Patient selects *Severity Status* under the currently accessed appointment schedule.
2. The Patient is prompted to enter any conditions or types of pain they are experiencing, as well as its corresponding pain level.
3. The system is updated with the Patient's condition and the Health Care Provider is notified.
4. If the Patient's condition is severe, the Health Care Provider can choose to perform additional actions.
5. In case of an emergency, an alert will be sent to Doctors within the Emergency Ward.
6. If the Health Care Provider performed additional actions, or if the ER was alerted, the Patient will be notified and given instructions.

XRef: Section 3.2.24: Update Health Conditions/Severity Status

Use case: **Help/Information**

Diagram:

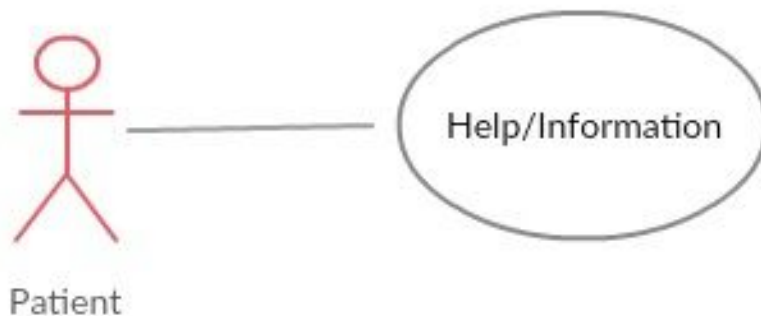


Figure 9

Brief Description

The system displays to the user a page that contains help and information concerning the Patient Control Panel.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel. The role of the user must be Patient.

1. The Patient selects *Help\Information*.
2. The system displays a page containing commonly asked questions and guides on navigating the Patient Control Panel.
3. When they are finished, the Patient selects *Return*.
4. The system returns the Patient to the Patient main page.

XRef: Section 3.2.10: Help/Information

Use case: **Alert IPIMS**

Diagram:



Figure 10

Brief Description

The user may choose to alert the IPIMS if their health condition is severe and they seek immediate medical attention.

Initial Step-By-Step Description

Before this use case can be initiated, the Patient has already accessed the Patient Control Panel. The role of the user must be Patient.

1. The Patient selects *Alert IPIMS* from the Patient Control Panel.
2. The system displays a page requesting health conditions and patient status fields to notify the Doctor.
3. When they click the button, the alert is sent and the doctor is notified.
4. The system returns the Patient to the Patient main page.

XRef: Section 3.2.4: Alert IPIMS

Section 2.2.2: Doctor Use Case:

Use Case: **View Emergency Alerts**

Diagram:

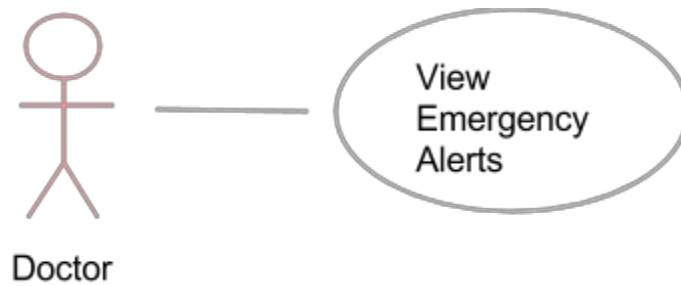


Figure 11

Brief Description

The system retrieves the emergency alerts associated with each doctor. The doctors will be able to review emergency alerts from their control panel for their patients.

Initial Step-by-Step Description

1. The Doctor will select to *View Emergency Alerts* from the User's portal page.
2. The database will then retrieve the information and display each patient that has an emergency case.
3. From here, the Doctor can choose to resolve the case and move the emergency out of the alerts panel.

XRef: Section 3.2.11: View Emergency Alerts

Use Case: View Appointments

Diagram:

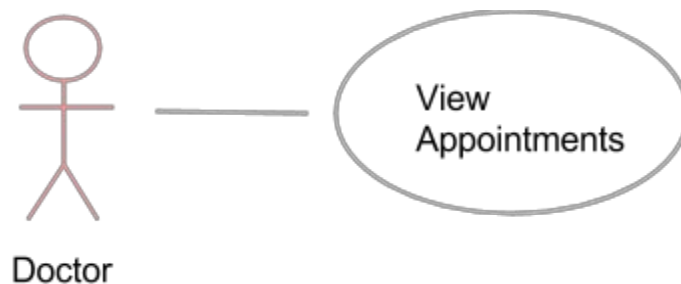


Figure 12

Brief Description

The system retrieves appointment information from the database and displays all available appointments in a list to the user. The role of the user must be Patient.

Initial Step-by-Step Description

1. The Doctor will select to *View Appointments* from the User's portal page.
2. The database will then retrieve the information (appointment data) and display all available appointments.
3. From here, the Doctor can choose to *Change An Open Appointment*, *Cancel Appointment*, or *Create a New Appointment*.

XRef: Section 3.2.25: View Appointments

Use Case: **View Patient Data**

Diagram:

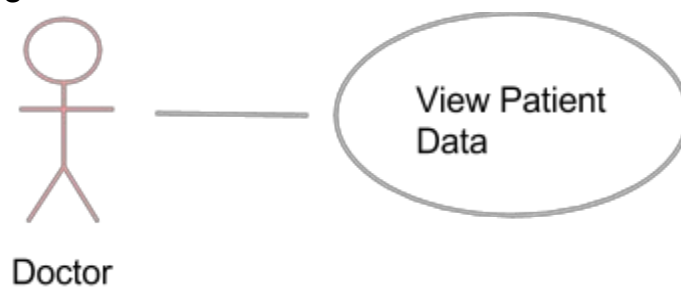


Figure 13

Brief Description

The system will return the patient data of selected patient to the user. This data will include contact information, physical description (height, weight, etc), health history, current medical condition, etc.

Initial Step-by-Step Description

1. The Doctor will select *View Patient Data*.
2. The Doctor will then be redirected to the "Search" page.
3. The Doctor will then be prompted to enter either the patient ID or patient first and last name.
4. The database will then search for the patient data and return the applicable patient data to the Doctor. If the patient data is not found from the search, the system will display that the patient does not exist in the current database.
5. The Doctor can, additionally, *Edit Patient Data* or *Exit*.

XRef: Section 3.2.14: View Patient Data

Use Case: **Prescribe Medicine**

Diagram:

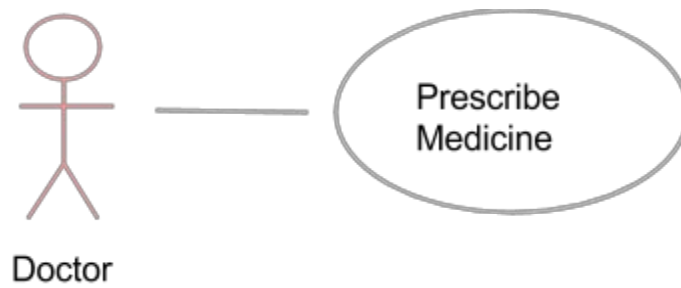


Figure 14

Brief Description

After option to "*Prescribe Medicine*" and specific patient is selected, the system will display a form which will have input fields for patient name, prescribed medicine name(s), medicine ID, and doctor signature field.

Initial Step-by-Step Description

1. The Doctor will select *Prescribe Medicine*.
2. The Doctor will then be redirected to the "*Search*" page.
3. The Doctor will then be prompted to enter either the patient ID or patient first and last name.
4. The database will be searched for the inputted patient name or patient ID.
5. If the patient is found, The Doctor will then enter this information and be taken to the prescription form page. This page will include four input fields (patient name, medicine name(s), medicine ID, and a doctor signature field).
6. The Doctor must enter in applicable information and will click the "Confirm Prescription" button, which will store the prescription information in the database.

XRef: Section 3.2.13: Prescribe Medicine

Use Case: **Lab Reports**

Diagram:

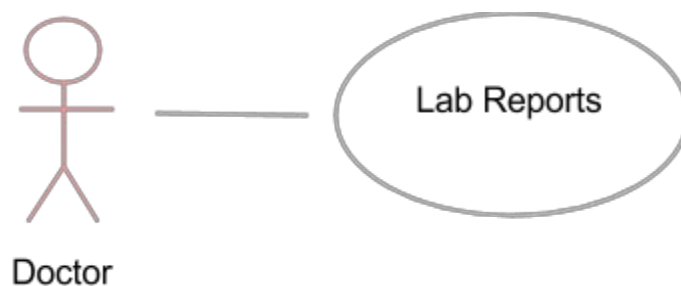


Figure 15

Brief Description:

When selecting the user will be taken to “Lab” portal page, where the user can then choose to “View Lab Reports”.

Initial Step-by-Step Description:

1. The Doctor will select the *Lab Reports* link and will be redirected to the “Lab” portal page.
2. The Doctor can then select to *View Lab Report* of a selected patient.
3. The Doctor can exit back to the main “Lab” portal page by hitting the “Exit” Button.

XRef: Section 3.2.12: View Lab Report

Use Case: **Update Health Conditions**

Diagram:

Figure 16

Brief Description

Once the doctor has met with the patient, they will be able to resolve the appointment and update the status of the patient from “Needs Attention” to “Complete”.

Initial Step-by-Step Description

1. The Doctor will select to *View Appointments* from the User’s portal page.
2. The database will then retrieve the information (appointment data) and display all available appointments.
3. From here, the Doctor can choose to resolve the case by selecting “Appointment Completed” to remove it from their task list.

XRef: Section 3.2.9: Update Health Conditions

Section 2.2.3: Nurse Use Case:

Use Case: **Update Health Conditions**

Diagram:

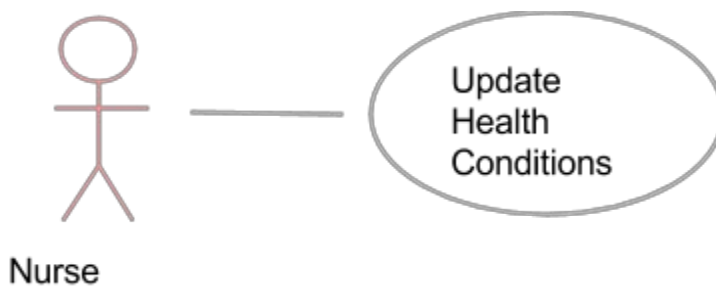


Figure 17

Brief Description

Once the nurse has met with the patient, they will be able to resolve the appointment and update the status of the patient from “Needs Attention” to “Complete”.

Initial Step-by-Step Description

1. The Nurse will select to “*View Appointments*” from the User’s portal page.
2. The database will then retrieve the information (appointment data) and display all available appointments
3. From here, the Nurse can choose to resolve the case by selecting “Appointment Completed” to remove it from their task list.
4. This will simultaneously remove the notification that is associated with the doctor as well.

XRef: Section 3.2.9: Update Health Conditions

Section 2.2.4: HSP Staff Use Case:

Use Case: **Upload Medical Reports**

Diagram:



Figure 18

Brief Description:

The HSP staff will receive the medical reports from the patient. They will then be able to upload this information into the system for future reference.

Initial Step-by-Step Description

1. The HSP staff member will receive a list of new medical reports to enter into the system from their control panel.
2. From here, they can view the list and choose to accept the submission or deny the submission into the database of the newly entered medical records.
3. The medical records will be added into the database and accessible by the appropriate staff members.

XRef: Section 3.2.15: Upload Medical Reports

Use Case: **Update Medical History**

Diagram:



Figure 19

Brief Description

The HSP staff will view data of the patient and choose to add fields to that patient's medical history.

Initial Step-by-Step Description

1. The HSP staff member will view the list of available patients to edit.
2. From here, they can access the medical history of each individual patient and append new items to the history.
3. The HSP staff member will save the changes so they can be viewed by the appropriate members in the system.

XRef: Section 3.2.16: Update Medical History

Use Case: **Retrieve Patient Medical Information**

Diagram:

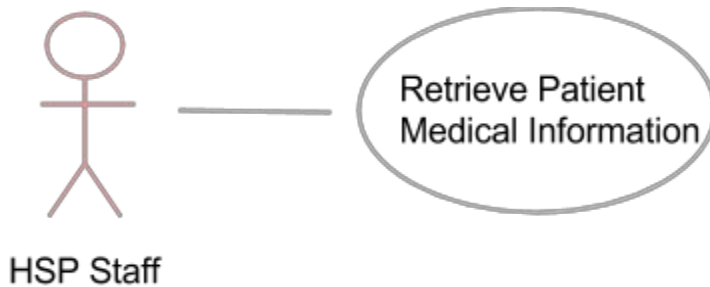


Figure 20

Brief Description

The HSP staff will be able to view the medical information for each patient in question by searching via their patient ID.

Initial Step-by-Step Description

1. The HSP staff member will enter their main control panel and select search for patient by ID.
2. From here, they can search for the patient by ID and will yield the associated medical data for the patient.
3. The HSP staff member will choose to view the data or return back to the control panel.

XRef: Section 3.2.17: Retrieve Patient Medical Information

Use Case: **Register Patient Into System**

Diagram:



Figure 21

Brief Description

The HSP staff will receive new patient applications to be submitted into the system. They can review the submitted data and choose to add or deny them from the system.

Initial Step-by-Step Description

1. The HSP staff member will enter their main control panel and select “View open applications”
2. From here, they can see the open applications for new patients and choose to submit or deny them.
3. Once they accept the patient, their data will be stored into the system and a username and password will be sent to them via email.

XRef: Section 3.2.18: Register Patient Information

Use Case: **Generate Statistical Report Analysis**

Diagram:



Figure 22

Brief Description

The HSP staff can choose to generate a statistical report analysis that combines a summary of population data, patient type data, admission rate data and health outcomes.

Initial Step-by-Step Description

1. The HSP staff member will enter their main control panel and select “Generate Statistical Report Analysis”
2. From here, the system will generate each individual report and prepare the data to be presented to the HSP staff member.
3. The report data will display infographics and relevant report data back to the user relating to population data, patient type data, admission rate data and health outcomes.

XRef: Section 3.2.19 : Generate Statistical Report

Section 2.2.5: Lab Staff Use Case:

Use Case: **Upload Lab Report**

Diagram:



Figure 23

Brief Description

The lab staff member will be able to upload relevant lab report data for the patient into the system to be accessed by the lab staff as well as the doctor.

Initial Step-by-Step Description

1. The lab staff member will select "Upload Lab Report" from the control panel.
2. From here, the lab staff will be able to enter proper lab data from the tests into the fields into the site.
3. Once the lab data is submitted, it will store into the database and be accessible by the doctor and patient for future use.

XRef: Section 3.2.20 : Update Lab Report

Use Case: **View Lab Report**

Diagram:

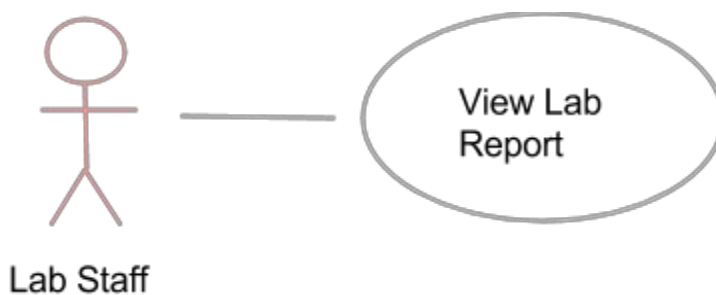


Figure 24

Brief Description

The lab staff member will be able to view relevant lab report data for the patient into the system to be accessed by the lab staff as well as the doctor.

Initial Step-by-Step Description

1. The lab staff member will select “View Lab Report” from the control panel.
2. From here, the lab staff will be able to view proper lab data from the tests that relate to the patient once they enter and search for the report by ID.
3. Once the ID is submitted, the report will display and be accessible to the lab staff.

XRef: Section 3.2.22 : View Lab Report

Use Case: **Edit Lab Report**

Diagram:

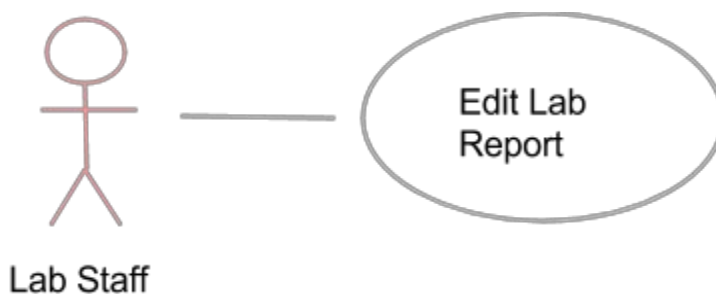


Figure 25

Brief Description

The lab staff member will be able to edit relevant lab report data for the patient into the system to be accessed by the lab staff as well as the doctor.

Initial Step-by-Step Description

1. The lab staff member will select “Edit Lab Report” from the control panel.
2. From here, the lab staff will be able to edit proper lab data from the tests that relate to the patient once they enter and search for the report by ID.
3. Once the ID is submitted, the report will display and be editable by the lab staff.
4. Once they select save, the data will be updated and inputted into the system.

XRef: Section 3.2.21 : Edit Lab Report

Section 2.2.6: Admin Staff Use Case:

Use Case: **Register HSP Member Into System**

Diagram:



Figure 26

Brief Description

The admin user will be able to add a new employee from the HSP into the system. The requirements must include a role (doctor, nurse, HSP), employee ID and name.

Initial Step-by-Step Description

1. The admin user will select “Register New Employee” from the control panel.
2. From here, the form will populate asking for role, employee ID and name.
3. Once this data is submitted, it will be saved so the employee can login with their information.

XRef: Section 3.2.23: Add Employee Data into System.

Section 2.3: User Characteristics

The user is expected to have a basic literacy in computers, smart phones. and the internet.

The user is expected to possess a smartphone or computer with internet access. Their internet literacy should be sufficient enough to be able to navigate a web page, register, and use the options panel that is presented to each user after he or she logs in.

Furthermore, the user must have an email account, and sufficient personal information for registration.

Section 2.4: Non-Functional Requirements

The system will utilize Django's database api functionality. More specifically, SQLite will be used. The roles of the users will determine how much of the database information they may view/change. The system will be hosted at an offsite datacenter

with a highspeed connection. The load time of the user will depend on their internet speed, computer and other factors outside the scope of the system itself.

3.0 Requirements Specification

3.1 External Interface Requirements

The only external interface requirement is that of an active internet connection. The functionality of the system will directly interact with the database that is stored in a separate storage management system that the web-application will be able to directly communicate with over the internet. This database includes items such as user information, records, reports and more.

3.2.1 Submit Medical Information/Registration

Use Case Name	Submit Medical Information/Registration
XRef	Section 2.2.1: Patient Submit Medical Information/Registration
Trigger	Click the Register button
Precondition	User is on the website
Basic Path	<ol style="list-style-type: none">1. Show option to register2. Display categories for registration<ol style="list-style-type: none">a. Nameb. Date of Birthc. Addressd. Social Security Numbere. Genderf. Phone Numberg. EIDh. Insurance Informationi. Medical History3. Enter all information for required categories4. Register
Alternative Paths	N/A
Postcondition	Information is sent to HSP staff to be reviewed and approved or denied.

Exception Paths	<ol style="list-style-type: none"> 1. User can cancel and close webpage at any time 2. User can choose not to validate information
Other	

3.2.2 Login

Use Case Name	Login
XRef	Section 2.2.1: Patient Login Section 2.2.2: Doctor Login Section 2.2.3: Nurse Login Section 2.2.4: HSP Login Section 2.2.5: Lab Staff Login Section 2.2.6: Admin Login
Trigger	User(patient, doctor, nurse, lab staff or HSP staff) enters login information and presses login button.
Precondition	Patient has already registered and doctor, nurse, lab staff, and HSP staff already have login information within the database.
Basic Path	<ol style="list-style-type: none"> 1. The user will go to the website. 2. The user will then click on the <i>login</i> button at the top right corner of the page. 3. The user will enter his or her email and password. 4. The login information will be verified by the database. 5. If information is verified, the user will be presented with their control panel.
Alternative Paths	N/A
Postcondition	User will return to his/her control panel.
Exception Paths	User doesn't login.
Other	N/A

3.2.3 Update Health Record

Use Case Name	Update Health Record
XRef	Section 2.2.1: Patient Update Health Record

Trigger	Patient selects 'Update Health Record' on side panel.
Precondition	User must be a patient, and they must be registered in the database.
Basic Path	<ol style="list-style-type: none"> 1. The user will go to the website 2. The user will click "login" at the top right corner of the page. 3. The user can then click on "Access Medical Info" 4. The user can then click on "Edit Medical Info" 5. The user can then freely edit the corresponding fields.
Alternative Paths	N/A.
Postcondition	The changes will be saved and the user will be returned to their control panel
Exception Paths	<ol style="list-style-type: none"> 1. User can exit the web page 2. User does not save changes to medical record
Other	N/A.

3.2.4 Alert IPIMS

Use Case Name	Alert IPMS
XRef	Section 2.2.1: Patient Send Emergency Alert
Trigger	Automatically triggers when the users (patient severity levels) are above a certain threshold.
Precondition	<ol style="list-style-type: none"> 1. The user must be registered into the database. 2. The user's current severity levels must be in the system and be currently monitored.
Basic Path	<ol style="list-style-type: none"> 1. The Patient selects <i>Send Emergency Alert</i> from the Patient Control Panel. 2. The system displays a page requesting health conditions and patient status fields to notify the Doctor.

	<p>3. When they click the button, the alert is sent and the doctor is notified.</p> <p>4. The system returns the Patient to the Patient main page.</p>
Alternative Paths	N/A
Postcondition	The alert is sent to the IPIMS, and doctor is notified.
Exception Paths	The user may abandon the operation at any given time.
Other	N/A

3.2.5 Manage Appointments

Use Case Name	Manage Appointments
XRef	<p>Section 2.2.1: Patient Edit Appointment</p> <p>Section 2.2.2: Doctor View Appointment</p> <p>Section 2.2.1: Patient View Appointment</p> <p>Section 2.2.1: Patient Schedule Appointment</p>
Trigger	Patient selects the 'Appointment' button from side panel
Precondition	Patient should have logged in
Basic Path	<p>1. Patient can have three different buttons to manage their own Appointments</p> <p>a. view appointments</p> <p>b. schedule appointments</p> <p>c. view appointments</p>
Alternative Paths	N/A.
Postcondition	Press different buttons and access different page
Exception Paths	Patients don't login in
Other	N/A.

3.2.6 Schedule Appointment

Use Case Name	Schedule Appointment
XRef	Section 2.2.1: Patient Schedule Appointment

Trigger	Patient selects the 'Schedule Appointment' button on side panel.
Precondition	Patient has logged in the system and accessed patient control panel.
Basic Path	<ol style="list-style-type: none"> 1. Patient logs into website 2. Patient selects to Schedule Appointment. 3. The system presents a list of doctors to select from. 4. Patient selects a doctor. 5. The system confirms the appointment and sends a notification to the doctor. 6. The system notifies the Patient that the appointment has been successfully scheduled and returns the user to the Patient main page.
Alternative Paths	N/A
Postcondition	System confirms the appointment, doctor is notified, patient is notified of scheduled appointment.
Exception Paths	Patients can abandon the act of scheduling appointment at anytime.
Other	N/A

3.2.7 View Appointment (Patient)

Use Case Name	View Appointments
XRef	Section 2.2.1: View Appointments
Trigger	Patient selects the 'View Appointment' button from side panel.
Precondition	Patient has logged in and accessed the proper control panel.
Basic Path	<ol style="list-style-type: none"> 1. The Patient selects to <i>View Appointments</i>. 1. The system displays all of the patient's currently scheduled appointments. 2. From here, the Patient can additionally choose to <i>change appointment or cancel appointment</i>.
Alternative Paths	N/A

Postcondition	The patient's appointments display onto the control panel with options to edit each associated appointment.
Exception Paths	The doctor or patient may abandon the operation at any time.
Other	If there are no appointments, no appointment will display in the screen.

3.2.8 Change Appointment

Use Case Name	Change Appointment
XRef	Section 2.2.1: Patient Change Appointment
Trigger	Patient has selected the 'Change Appointment' button from side panel.
Precondition	The patient must have a previous scheduled appointment.
Basic Path	<ol style="list-style-type: none"> 1. The Patient selects to <i>View Appointments</i>. 2. The system displays all of the patient's currently scheduled appointments. 3. From here, the Patient can additionally choose to <i>change appointment or cancel appointment</i>.
Alternative Paths	N/A.
Postcondition	An appointment has been changed/canceled and a notice has been sent.
Exception Paths	The patient may abandon the operation at any time.
Other	N/A

3.2.9 Update Health Conditions (Nurse & Doctor)

Use Case Name	Update Health Conditions
XRef	Sec 2.2.2: Update Health Conditions (Doctor); Sec 2.2.3: Update Health Conditions (Nurse)
Trigger	The user (Doctor or Nurse) clicks on "Update Health Conditions" after accessing patient medical information
Precondition	<ol style="list-style-type: none"> 1. The user must be logged in

	2. The specified patient must be registered into the database.
Basic Path	<ol style="list-style-type: none"> 1. The user (Doctor or Nurse) will click “Login” at the top right of the screen and enter appropriate credentials 2. The user will click on “Search Directory” 3. The user will search for the patient 4. The user will click on the patient's profile and from there can access medical records 5. The user will click on “Update Health Conditions”
Alternative Paths	N/A
Postcondition	The changes will be saved and submitted into the database.
Exception Paths	<ol style="list-style-type: none"> 1. The user prematurely exits the web page without saving information 2. The user chooses not to submit changes
Other	N/A

3.2.10 Help\Information

Use Case Name	Help\Information
XRef	Section 2.2.1: Help\Information
Trigger	Patient clicks on ‘Help\Information’ button at top or bottom of page.
Precondition	The patient has accessed patient control panel or home page, and the user must be a patient.
Basic Path	<ol style="list-style-type: none"> 1. The Patient selects <i>Help\Information</i> 2. The system displays a page containing commonly asked questions and guides on navigating the Patient Control Panel. 3. When they are finished, the Patient selects <i>Return</i>. 4. The system returns the Patient to the Patient main page.
Alternative Paths	User can select help from main page.
Postcondition	Selected help/information is available to patient
Exception Paths	The attempt may be abandoned at any time.
Other	N/A

3.2.11 View Emergency Alerts

Use Case Name	View Emergency Alerts
XRef	Section 2.2.2: Doctor View Emergency Alerts
Trigger	Doctor will select 'View Emergency Alerts' from side panel.
Precondition	The user must be a doctor, and be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The user will select to "<i>View Emergency Alerts</i>" from the User's portal page. 2. The database will then retrieve the information and display each patient that has an emergency case. 3. From here, The user (health care personnel), additionally, can choose to resolve the case and move the emergency out of the alerts panel.
Alternative Paths	N/A.
Postcondition	Emergency alert information is displayed and resolved.
Exception Paths	The doctor may abandon at any time.
Other	N/A.

3.2.12 View Lab Reports (Doctor)

Use Case Name	View Lab Reports
XRef	Section 2.2.2: Doctor View Lab Reports
Trigger	Doctor is on the lab report page and selects view lab reports.
Precondition	User is a doctor and must be logged in.
Basic Path	<ol style="list-style-type: none"> 1. User will select the "Lab Reports" link and will be redirected to the "Lab" portal page. 2. The user can then select to: <ol style="list-style-type: none"> i)"View Lab Report" of a selected patient 3. The user can exit back to the main "Lab" portal page by hitting the "Exit" Button
Alternative Paths	N/A.
Postcondition	Lab reports information had been display on screen.

Exception Paths	The doctor may abandon the operation at any time.
Other	If there isn't any lab reports for view, a message will be display and said that no lab reports currently.

3.2.13 Prescribe Medicine

Use Case Name	Prescribe Medicine
XRef	Section 2.2.2: Prescribe Medicine
Trigger	Doctor selects a patient and accessed Prescribe Medicine.
Precondition	The user is a doctor.
Basic Path	<ol style="list-style-type: none"> 1. The user will select "<i>Prescribe Medicine</i>" 2. The user will then be redirected to the "<i>Search</i>" page. 3. The user will then be prompted to enter either the patient ID or patient first and last name. 4. The database will be searched for the inputted patient name or patient ID. 5. If the patient is found, The user will then enter this information and be taken to the prescription form page. This page will include four input fields (patient name, medicine name(s), medicine ID, and a doctor signature field. 6. The user must enter in applicable information and will click the "Confirm Prescription" button, which will store the prescription information in the database.
Alternative Paths	In step 3, doctor can either enter medicine's name or ID.
Postcondition	Prescription is confirmed and saved.
Exception Paths	The doctor may abandon the operation at any time.
Other	If the prescription is not saved, user must start from the beginning.

3.2.14 View Patient Data

Use Case Name	View Patient Data
XRef	Section 2.2.2: Access Patient Data
Trigger	Doctor selects a patient and accesses the patient data.

Precondition	The user is a doctor, and must be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The user will select “<i>View Patient Data</i>” 2. The user will then be redirected to the “<i>Search</i>” page. 3. The user will then be prompted to enter either the patient ID or patient first and last name. 4. The database will then search for the patient data and return the applicable patient data to the user. If the patient data is not found from the search, the system will display to the user, that the patient does not exist in the current database. 5. The user (doctor) can, additionally, “<i>Edit Patient Data</i>” or “<i>Exit</i>”.
Alternative Paths	N/A.
Postcondition	Patient data is displayed on the screen.
Exception Paths	The doctor may abandon the operation at any time.
Other	N/A.

3.2.15 Upload Medical Reports

Use Case Name	Upload Medical Reports
XRef	2.2.4: HSP Upload Medical Reports
Trigger	HSP staff selects ‘Upload Medical Reports ‘button on side panel.
Precondition	The user must be a HSP staff, and logged in.
Basic Path	<ol style="list-style-type: none"> 1. The HSP staff member will receive a list of new medical reports to enter into the system from their control panel. 2. From here, they can view the list and choose to accept the submission or deny the submission into the database of the newly entered medical records. 3. The medical records will be added into the database and accessible by the appropriate staff members.
Alternative Paths	N/A.
Postcondition	Medical reports will be uploaded to the database.

Exception Paths	The HSP staff may abandon at any time.
Other	N/A.

3.2.16 Update Medical History

Use Case Name	Update Medical History
XRef	2.2.4: Update Medical History
Trigger	HSP staff selects a patient's data and accesses the patient history button.
Precondition	The user is an HSP staff, and the patient's history is in the database.
Basic Path	<ol style="list-style-type: none"> 1. The HSP staff member will view the list of available patients to edit. 2. From here, they can access the medical history of each individual patient and append new items to the history. 3. The HSP staff member will save the changes so they can be viewed by the appropriate members in the system.
Alternative Paths	N/A.
Postcondition	Patient's Medical History had been updated in the database.
Exception Paths	The HSP staff may abandon the operation at any time.
Other	If patient's Medical History is not in the database, this function will create the Medical History file for that patient.

3.2.17 Retrieve Patient Medical Information

Use Case Name	Retrieve Patient Medical Information
XRef	Section 2.2.4: HSP Retrieve Patient Medical Information
Trigger	HSP staff selects a patient's data and accesses the patient information button on side panel
Precondition	User must be HSP staff, and be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The HSP staff member will enter their main control panel and select search for patient by ID.

	<ol style="list-style-type: none"> From here, they can search for the patient by ID and will yield the associated medical data for the patient. The HSP staff member will choose to view the data or return back to the control panel.
Alternative Paths	N/A.
Postcondition	HSP staff can use patient medical information to register his/her information.
Exception Paths	HSP staff can abandon at any time, or not log in.
Other	N/A.

3.2.18 Register Patient Information

Use Case Name	Register Patient Information
XRef	Section 2.2.4: Register Patient Information
Trigger	HSP staff select 'View open applications' on side panel.
Precondition	User is a HSP staff and is logged in.
Basic Path	<ol style="list-style-type: none"> The HSP staff member will enter their main control panel and select "View open applications" From here, they can see the open applications for new patients and choose to submit or deny them. Once they accept the patient, their data will be stored into the system and a username and password will be sent to them via email.
Alternative Paths	N/A.
Postcondition	Patient's data stored into the system, username and password will be create and sent to the patient via email.
Exception Paths	The HSP staff may abandon the operation at any time.
Other	If Patient's register information has not been complete (missing some information), this patient will not be register and an email will sent to the patient to ask patient for the missing information.

3.2.19 Generate Statistics Report

Use Case Name	Generate Statistics Report
XRef	Section 2.2.4: HSP Generate Statistics Report
Trigger	HSP staff selects 'Generate Statistics Report' on side panel.
Precondition	User must be HSP staff, and be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The HSP staff member will enter their main control panel and select "Generate Statistical Report Analysis" 2. From here, the system will generate each individual report and prepare the data to be presented to the HSP staff member. 3. The report data will display infographics and relevant report data back to the user relating to population data, patient type data, admission rate data and health outcomes.
Alternative Paths	N/A.
Postcondition	Statistical reports generated and displayed.
Exception Paths	HSP staff can choose not to generate statistical reports
Other	N/A.

3.2.20 Upload Lab Report

Use Case Name	Upload Lab Report
XRef	Section 2.2.5: Lab Staff Upload Lab Report
Trigger	Lab Staff will select 'Upload Lab Report' from side panel.
Precondition	The user must be lab staff, and be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The lab staff member will select "Upload Lab Report" from the control panel. 2. From here, the lab staff will be able to enter proper lab data from the tests into the fields into the site. 3. Once the lab data is submitted, it will store into the database and be accessible by the doctor and patient for future use.

Alternative Paths	N/A.
Postcondition	Lab report uploaded into database.
Exception Paths	Lab staff doesn't upload lab report.
Other	N/A.

3.2.21 Edit Lab Report

Use Case Name	Edit Lab Report
XRef	Section 2.2.5: Lab Staff, Edit Lab Report
Trigger	The user clicks on “Edit Lab Report” after the applicable lab report is selected
Precondition	User must be Lab Staff, and be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The lab staff member will select “Edit Lab Report” from the control panel. 2. From here, the lab staff will be able to edit proper lab data from the tests that relate to the patient once they enter and search for the report by ID. 3. Once the ID is submitted, the report will display and be editable by the lab staff. 4. Once they select save, the data will be updated and inputted into the system
Alternative Paths	N/A
Postcondition	Revised lab report uploaded to database.
Exception Paths	Lab staff can decide not to edit lab report.
Other	N/A.

3.2.22 View Lab Report (Lab Staff)

Use Case Name	View Lab Report
XRef	Section 2.2.5: Lab Staff, View Lab Report
Trigger	After The user finds the specified lab report and clicks “View Lab Report”

Precondition	User must be Lab Staff, and be logged in.
Basic Path	<ol style="list-style-type: none"> 1. The lab staff member will select “View Lab Report” from the control panel. 2. From here, the lab staff will be able to view proper lab data from the tests that relate to the patient once they enter and search for the report by ID. 3. Once the ID is submitted, the report will display and be accessible to the lab staff.
Alternative Paths	N/A
Postcondition	Lab report will be displayed.
Exception Paths	Lab staff can decide not to view lab reports.
Other	N/A.

3.2.23 Add Employee Data Into System

Use Case Name	Add Employee Data Into System
XRef	Section 2.2.6: Register HSP Member
Trigger	User (Admin) clicks on “Add Employee Data”
Precondition	Admin has to be logged in and has appropriate permissions
Basic Path	<ol style="list-style-type: none"> 1. The admin user will select “Register New Employee” from the control panel. 2. From here, the form will populate asking for role, employee ID and name. 3. Once this data is submitted, it will be saved so the employee can login with their information.
Alternative Paths	N/A.
Postcondition	Employee data is saved into the database and User is returned to the control panel
Exception Paths	<ol style="list-style-type: none"> 1. The user chooses not to submit data 2. The user exits webpage prematurely before submitting data

Other	N/A.
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3.2.24 Update Health Conditions/Severity Status

Use Case Name	Update Health Conditions/Severity Status
XRef	Section 2.2.1: Patient, Update Health Conditions/Severity Status
Trigger	Patient selects Severity Status selection box
Precondition	The patient has accessed patient control panel, and the user must be a patient.
Basic Path	<ol style="list-style-type: none"> 1. The Patient selects <i>Severity Status</i> under the currently accessed appointment schedule. 2. The Patient is prompted to enter any conditions or types of pain they are experiencing, as well as it corresponding pain level. 3. The system is updated with the Patient's condition and the Health Care Provider is notified. 4. If the Patient's condition is severe, the Health Care Provider can choose to perform additional actions. 5. In case of an emergency, an alert will be sent to Doctors within the Emergency Ward. 6. If the Health Care Provider performed additional actions, or if the ER was alerted, the Patient will be notified and given instructions.
Alternative Paths	N/A.
Postcondition	Severity Status has been saved and the appropriate actions will be applied through the system.
Exception Paths	The patient may abandon at any time.
Other	N/A

3.2.25 View Appointment (Doctor)

Use Case Name	View Appointment
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XRef	Section 2.2.2: Doctor View Appointment
Trigger	Press the 'View Appointment' Button' On the page of 'appointment 'or on side panel.
Precondition	None
Basic Path	<ol style="list-style-type: none"> 1. Show a list of appointment that patients made already 2. Doctors can view different appointments that are scheduled. <ol style="list-style-type: none"> a. Each appointment will be listed with a name and appointment ID and date/time.
Alternative Paths	N/A.
Postcondition	The doctor will have access to a list to see all of the appointments.
Exception Paths	Doctors can abandon the operation at anytime
Other	N/A.

Section 3.3 Detailed Non-Functional Requirements

Section 3.3.1 Logical Structure of the Data

The logical structure of the data that will be used for the IPIMS can be found below. This details on the individual entities we are using for the associated data classes.

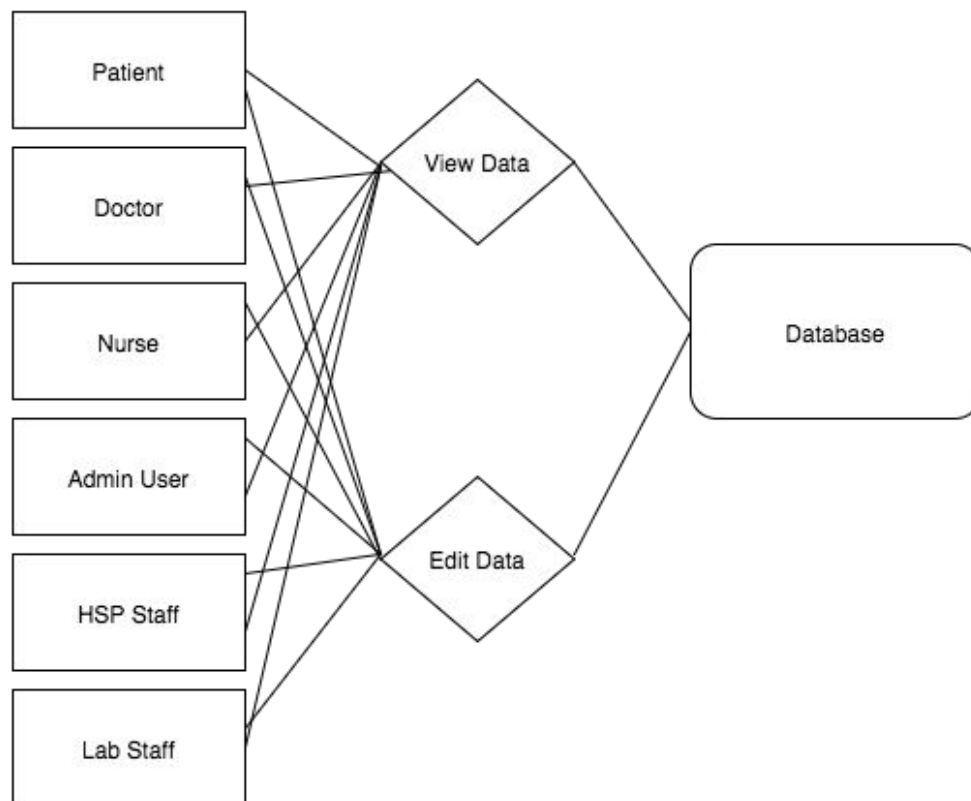


Figure 27

The descriptions for each of these entities are found below.

Patient Entity

Data Item	Type	Description	Comment
name	string	patient name	
date of birth	date	patient birth date	
current address	string	patient location	

social security num	float	patient ssn	
phone number	float	patient phone #	
insurance company	string	insurance comp name	
insurance #	float	associated insurance ID	
allergies	string	allergy information	
medical history	string	data relating to previous medical data	
chest pain level	int	level for each current issue	
nausea level	int	level for each current issue	
hunger level	int	level for each current issue	
anxiety level	int	patient issue lvl	
stomach pain level	int	level for each current issue	
body pain level	int	level for each current issue	
patient id	float	ID used as the primary key to distinguish different patients	
password	string	patient access string	

Doctor Entity

Data Item	Type	Description	Comment
name	string	doctors name	
type of doctor	string	type of doctor such as cardiologist,	

		neuro, etc.	
employee id	int	int used to distinguish different employees	
password	string	string to access the system	

Lab Staff Entity

Data Item	Type	Description	Comment
name	string	lab staff name	
employee id	int	int used to distinguish different employees	
password	string	string to access the system	

Nurse Entity

Data Item	Type	Description	Comment
name	string	nurse name	
employee id	int	int used to distinguish different employees	
password	string	string to access the system	

Admin User Entity

Data Item	Type	Description	Comment
name	string	doctors name	

employee id	int	int used to distinguish different employees	
password	string	string to access the system	

HSP Staff Entity

Data Item	Type	Description	Comment
name	string	hsp staff name	
employee id	int	int used to distinguish different employees	
password	string	string to access the system	

Section 3.3.2 Security

The server in which our server and associated data lives will be protected by user ID as well as password. The permissions once granted access will enable write and read permissions on a per-user basis. The data accessibility password access will be a hashed data string stored into the SQLite database to ensure maximum protection for each user.

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