

# **Software Requirement Specification**

**For**

**Vaccine Management System**

**(7GUARD)**

**Version 2.0**

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# **1 Introduction**

## **1.1 Purpose**

Currently Sri Lanka does not have a web-based system for the vaccine registration process of children from newborn to age of twelve years old. There are no digitalized records of the vaccination of children through this manual process. The channeling for the vaccinations is done through a hospital receptionist through a phone call or by person.

7GUARD is introduced as a potential solution for this with various services and features. It provides a user-friendly interface that manages the vaccine registration and offers an online accessible CHDR of the children. The system is designed to allow the users to engage with vaccine channeling online and save their time and effort. It also provides real-time updates of vaccination details in CHDR cards. The main goal of the system is to implement a strong database with continuous health records of children regarding their vaccination history. This way, if any need of these details is to be needed in the future, the relevant parties will know the injected vaccine history of the child. 7GUARD aims to expand the knowledge of the parents by displaying advises regarding the vaccines the children receive under the supervision of the health care providers. Along with that, efficiency and accuracy of the channeling will enhance through the system. By interacting with these services, the parents or the guardians of the children along with their children, the hospital staff that includes the receptionists, doctors, nurses, pharmacists, top level management and ICT technicians, and the system developers will be benefited based on their working areas.

Mainly, the system aims to make the whole process of vaccination easier for the parents or the guardians and the children, assuring the quality and security of the services.

## **1.2 Intended Audience and reading and suggestions**

The purpose of this document is to give a detailed description of the requirements for the 7GUARD vaccination system. This will illustrate the purpose, scope, tasks and complete description for the development of the system. It will also explain external interface requirements, system requirements and non-functional requirements.

## **1.3 Product Scope**

7GUARD vaccine registration system is developed with the functions for all users (parents, guardians and the children) and the client (hospital). These functions are listed based on their User and admin registration

1. User and Admin Registration
2. Appointment dates for channeling
3. Displaying vaccine list
4. Channeling
5. Calculating BMI
6. Recording injected vaccine details
7. Real-time updated CHDR card
8. Issuing prescriptions
9. Allowing suggestions and complaints
10. Displaying advises based on BMI value
11. Displaying advises of possible side effects after vaccinations
12. Displaying important of vaccines
13. Display Vaccine stock

The main objective is to improve the performance of the hospital by providing the ability to easily keep records of the vaccine histories of the children without having the risk of human errors such as data loss, data misplacement or damages. There will be an online accessible CHDR card with

renewed vaccinations and BMI chart of the child. The parents or the guardians and the hospital will be able to access this to examine any detail when needed.

As for the sub objectives, the system will display advises about the vaccines and their side effects along with the details of the medications the children need accordingly. All of this will be done under the supervision of the relevant healthcare providers.

These facilities can potentially result in creating an effective and timely system and enhance the quality of the hospital.

## 1.4 References

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## **2 Overall Description**

### **2.1 Product Perspective**

7GUARD is a new self-contained software product that is produced to overcome problems the current manual process of vaccine registration and storing child vaccination records. As for the moment, such a product does not exist with the features, such as, user registration for online vaccine channeling, check doctor availability beforehand, an online accessible CHDR card that has real-time updates, view advises and medications for side effect details and submit suggestion or complaints as feedback of the services.

### **2.2 Product Function**

- Nurse can add parent and child details and register them to the system
- Nurse can view parent and child details
- Nurse can send OTP
- Nurse can add scanned injected vaccine codes to CHDR
- Nurse can view CHDR
- Nurse can add BMI calculation
- Nurse can add importance of vaccines
- Nurse can view scanned barcodes of injected vaccines
- Nurse can view important of vaccines
- Nurse can view reminders
- Nurse can update parent and child details
- Nurse can update importance of vaccine
- Nurse can delete importance of vaccine
- Nurse can delete reminders
- Nurse can add vaccine list into the CHDR
- Nurse can delete vaccine list in CHDR
- Nurse can view vaccine list in the CHDR
- Hospital receptionist can add doctor appointments

- Hospital receptionist can view the doctor appointments and channelings
- Hospital receptionist can update the channelings
- Hospital receptionist can delete doctor appointments
- Hospital receptionist can confirm the channeling
- Pharmacist can add vaccines stock
- Pharmacist can view vaccine stock
- Doctor can add prescription
- Doctor can add BMI advises
- Doctor can add injected vaccine advises and side effects
- Doctor can view CHDR
- Doctor can view BMI advises
- Doctor can view injected vaccine advises and side effects
- Doctor can view prescription
- Doctor can update prescription
- Doctor can update BMI advises
- Doctor can update injected vaccine advises and side effects
- Parent can add channelings
- Parent can receive email from hospital
- Parent can view profile with CHDR and medical records
- Parent can view advises for after vaccinations
- Parent can view BMI chart
- Parent can add suggestions and complaints
- Parent can view suggestions and complaints
- Parent can update suggestions and complaints
- Parent can delete suggestions and complaints
- Top level management can reply to suggestions and complaints
- Top level management can view suggestions and complaints
- Hospital ICT technician can add staff details
- Hospital ICT technician can view staff details
- Hospital ICT technician can update staff details

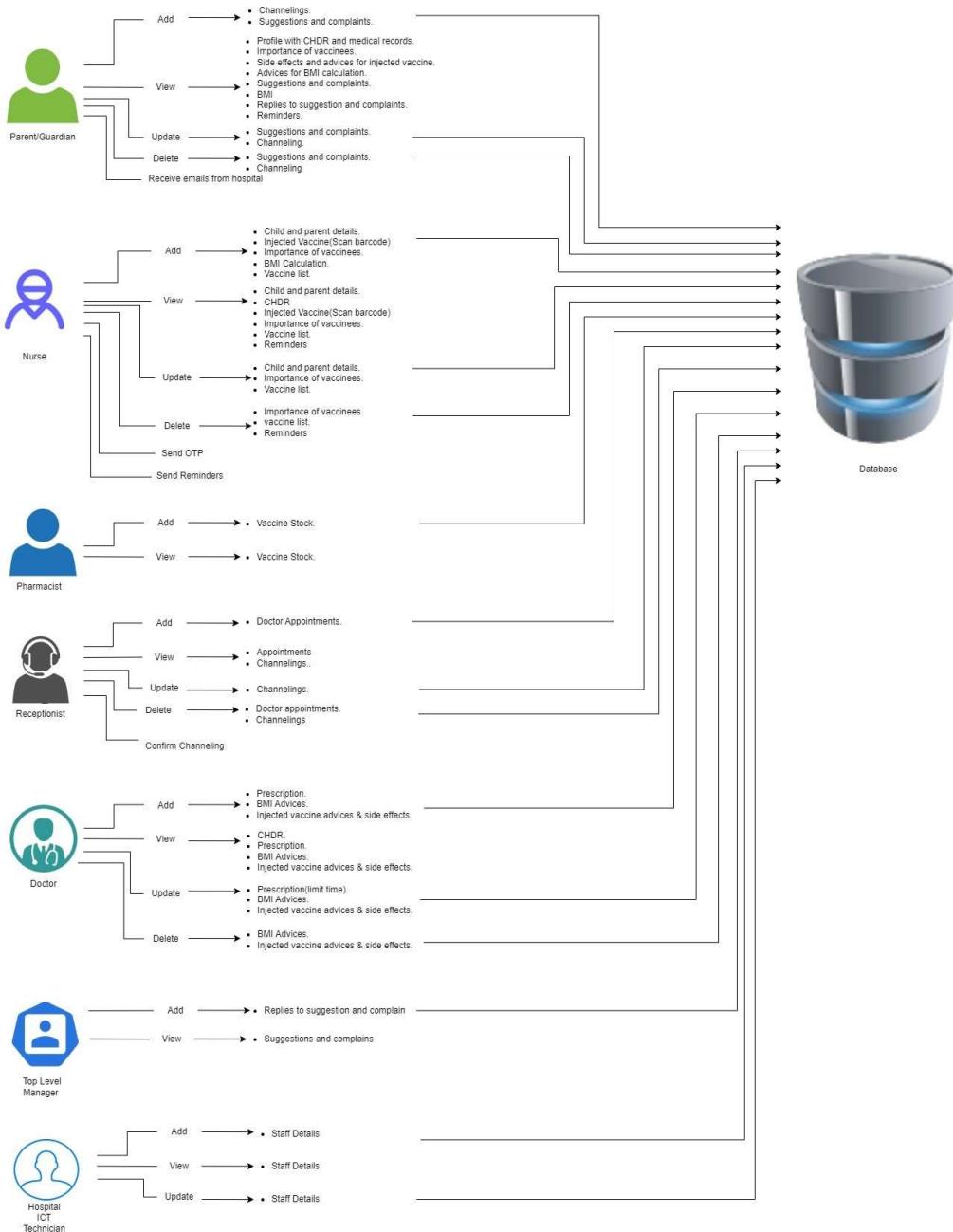


Figure 1: High-Level Architecture

## **2.3 User Classes and Characteristics**

### **User Classes:**

There are seven user levels in 7GUARD

1. Hospital Receptionist
2. Nurse
3. Doctor
4. Pharmacist
5. Parent/Guardian
6. Top level management
7. Hospital ICT technician

### **Characteristics of User Classes**

- **Hospital Receptionist**

Hospital receptionist oversees managing the channeling. The receptionist can view and update appointment dates and time the doctor is available. They can also delete the appointment dates if the doctor is unable to attend. The receptionist can view the channelings done by the parent and guardian and update the details if there are reasonable changes to be done. They can also confirm the channeling after the parent or guardian make the relevant payments. Hospital receptionist also can check whether the payment has been made or not and considering that deleting the channeling.

- **Nurse**

A nurse assigned by the hospital can register the parent or guardian first and allow the parent or guardian to add their children's details and register them as well. The nurse can view and update those registering details if needed. The barcode scanning of the injected vaccines is also done by the nurse. After that the scanned code is entered to the CHDR. The nurse is also assigned to calculate the child's BMI after entering the weight and height of the child. He or She should complete this before the vaccine is injected to the child. Then the nurse can view the CHDR if any detail is needed. If new details are to be added,

or these details are to be changed, or removed due to the evolving medical filed, the nurse can perform those tasks accordingly.

- **Doctor**

The doctors who are assigned to inject the vaccines to the children have their available dates and times displayed on the system. If the child has any kind of negative reaction to the vaccine, those doctors can add a prescription after examining the child. The doctor can also view that prescription through the CHDR. If the prescription needs to be changed under unavoidable circumstances, the doctor has a time limit of fifteen minutes to make the changes and edit the prescription. The system displays sections that include the importance of vaccines, advises for side effects that can occur after the vaccination and medications the children need for the side effects. These works also assigned to the doctor and doctor must be authenticated about these medications.

- **Pharmacist**

The pharmacist handles the stock of the vaccines. Pharmacist can add new vaccines to the system. Also, pharmacist fetch quantity details from the pharmacy management system and display vaccine stock

- **Parent/ Guardian**

Parent or the guardian is the legal guardian of the children who are been injected. They can make the channelings through the system after logging into the system. They can view their profiles, CHDR, and medical records of their children. They can also view the importance of vaccines, advises and vitamins through the system if they are interested in having a basic idea of what is good for their children. Other than that, they can also give feedback about the services they receive, may it be a suggestion, experience or a complaint.

- **Top level management**

Top level management refers to the management of the hospital that is in charge of the system. They can view the suggestions and complaints submitted by the users and reply to them, take relevant actions to improve the services of the hospital.

- **Hospital ICT technician**

The hospital ICT technician refers to ICT technicians of the hospital. They can add, view and update the staff details. Overall, they can manage the system.

## 2.4 Operating Environment

### 2.4.1 Hardware and Software Requirements

#### Hardware:

- **Operating System-** Compatible with major operating systems (Windows, macOS, Android, iOS)
- **Computers-** Minimum 8GB RAM
- **Network-** High-speed internet connectivity
- **Storage-** 500 GB SSD
- **Printer-** To print prescriptions
- **Barcode Scanner-** For scanning the vaccine codes

#### Software:

- **Operating System-** Windows Server
- **Programming Languages-** Spring Boot for backend
- **Frameworks-** React.js in Visual Studio Code for frontend, Figma for wireframe
- **Database-** MYSQL
- **Web Browser-** Supportive for all web browsers
- **Version Control-** Git for managing source code changes

- **Backup Software-** Regular database backup tools to ensure data recovery in case of failures

## 2.5 Design and Implementation Constraints

The development and deployment of the 7GUARD system face several design and implementation constraints that should be considered to ensure its successful implementation.

- **System Performance:**

Since the system handles large number of users including parents, guardians, healthcare providers, hospital staff, and has a huge database of user details and vaccine records, the system should have scalability to support these.

- **Internet Access:**

Not all users have high-speed internet connection to access the system. Therefore, the system should be designed to function with low bandwidth and connection, which might limit the use of the features.

- **Language:**

The developers might need to use the programming languages and frameworks that are already used in the hospital. This could limit the use of other modern and efficient technologies.

- **Mobile Compatibility:**

As most of the users access the via smartphones or tablets, the system must be optimized for mobile devices as well. This may limit the complexity of user interface and set constraints on the design. Yet the system ensures the responsiveness on these devices.

- **Data Encryption:**

Given that the children's vaccination and health records are personal and sensitive, their details will be encrypted to protect against unauthorized access or breaches.

## **2.6 Project Documentation**

A brief introduction of the system will be given with the overview, purpose and the scope of the project so that the client can understand the context of the project. Two user manuals will be given to the users and hospital staff with instructions to access the system.

Technical documentations will be provided as well.

- High-level Architecture Diagram
- System Design
- Entity Diagram
- Data Flow Diagram

## **2.7 User Documentation**

Two manuals will be provided to the parents or guardians and the hospital staff. A hard copy of the user manual written in a simple language will be given to the parent or guardian with clear instructions on how to interact with the system. Another manual will be given to the hospital staff with instructions on how to use the system from their side as well.

## **2.8 Assumptions and Dependencies**

- Language literacy: Assumes that the users are capable of reading, writing and understanding simple English language to access the system.
- User access to internet: Assumes that the parents or guardians and the hospital will have regular access to internet and can use web-based applications.
- Vaccine regulations: Assumes that government vaccine schedules and regulations related to child vaccinations will remain unchanged throughout the development and deployment phases.
- Technical skills of hospital staff: Assumes the hospital's IT staff and administrators have necessary technical skills to manage and maintain the system after deployment
- Vaccine stock list: Assume In vaccine stock list, quantity details will fetch from the main pharmacy management system.

### 3 External Interface Requirements

#### 3.1 User Interface

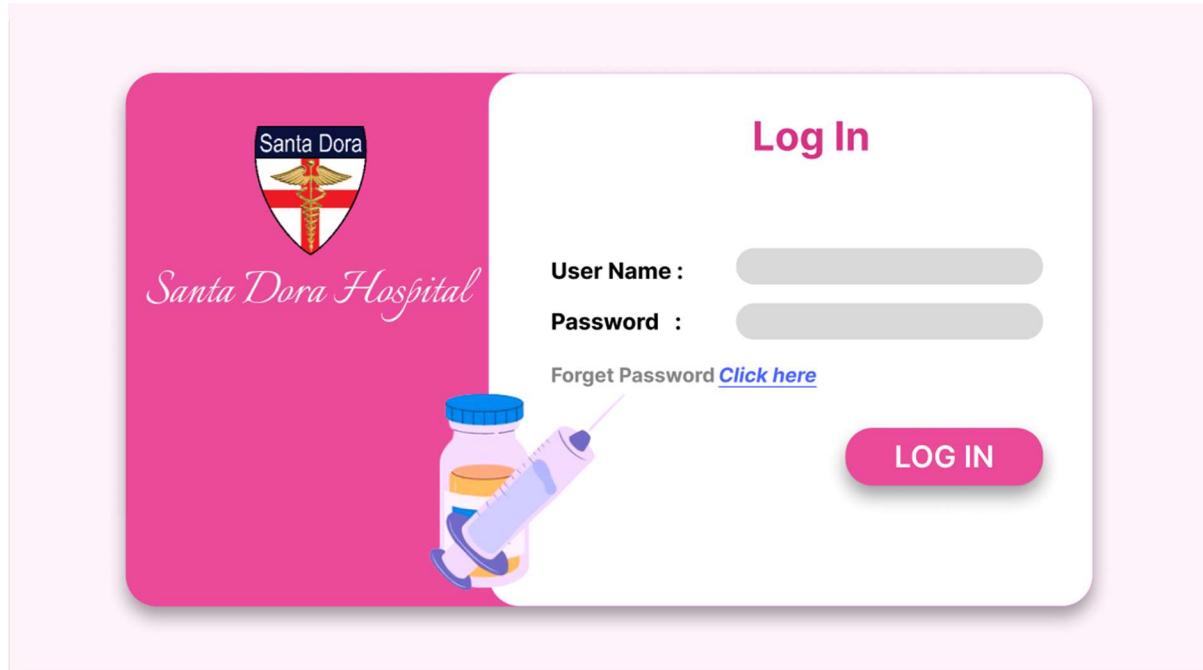


Figure 2: Log-In Interface

### 3.2 About Us interface

The screenshot shows the 'About us' page of the 7GUARD website. At the top, there's a navigation bar with links for HOME, ABOUT US, VACCINE, VITAMIN, APPOINTMENT, FEEDBACK, and a user profile icon. The main heading 'About us' is displayed in large pink text over a background image of a baby being vaccinated. Below this, a section titled 'Why You Should Trust Us?' contains two smaller images of babies receiving vaccinations. To the right, a paragraph explains their commitment to evidence-based practices and follows guidelines from trusted health organizations. Another section, 'Get to Know About Us!', describes their specialization in pediatric care, focusing on vaccinations to protect against serious diseases and build immunity. At the bottom, a 'Contact Us...' section provides three phone numbers and links to social media platforms like X, Instagram, and Facebook. It also features the 24-hour service logo and the Sint Dora Hospital logo.

Address: Mon 8.00a.m- Fri 5.00p.m  
+94 112 074 074  
LOGOUT

**7GUARD**

**About us**

**Why You Should Trust Us?**

Our commitment to your child's health is unwavering. We prioritize evidence-based practices and follow the latest guidelines from trusted health organizations. Our experienced team is dedicated to providing accurate information and support throughout your child's vaccination journey

**Get to Know About Us!**

We specialize in pediatric care, focusing on the importance of vaccinations in safeguarding your baby's health. Vaccines protect against serious diseases and help build immunity, ensuring your little one has a healthy start. Our friendly staff is here provide personalized care to keep your child safe and healthy. Trust us to guide you through every step of the vaccination process!

**Contact Us...**

+94 # # # # #  
+94 # # # # #  
+94 # # # # #

**Saint Dora Hospital**  
Saint Dora, the first luxurious, multi-faceted healthcare provider in Sri Lanka.

**Contact**  
PO Box 173, Panampitiya Road,  
Batticaloa, Sri Lanka.  
+941 112 074 074  
info@sintdorahospital.com

**Social Media**  
X Instagram Facebook

**24hr SERVICE**

Figure 3: About Us Interface

### 3.3 Channeling Interface



The image shows a user interface for a 'Channeling' service. The title 'Channeling' is at the top center. Below it are several input fields and controls:

- Name :
- Telephone :
- Doctor :
- Appointment Date :  (calendar icon)
- Channeling Type :  Normal  Vaccine
- Email :
- Bill :
- Date :  (calendar icon)
- 

Figure 4: Channeling Interface

### 3.4 Admin interface

The screenshot shows the 7GUARD Channeling Admin Interface. At the top, there is a navigation bar with links for CHANNELING, APPOINTMENT, and LOGOUT. Below the navigation bar, the title "Channeling" is displayed, along with a date input field labeled "Date :".

Below the title, there are two search/filter fields: "Channel Date :" and "Doctor :", each with a "Search" button.

The main content area contains three tables:

- Date History:** A table with columns: Channel no, Name, Telephone, Email, Channel date, Doctor, Vaccine, Bill, Date. It includes edit, delete, and pending/bill buttons.
- Doctor History:** A table with columns: Channel no, Name, Telephone, Email, Channel date, Doctor, Vaccine, Bill, Date. It includes edit, delete, and bill buttons.
- Date & Doctor History:** A table with columns: Channel no, Name, Telephone, Email, Channel date, Doctor, Vaccine, Bill, Date. It includes edit, delete, and bill buttons.

At the bottom of the interface, there are two text fields: "Normal Count :" and "Hepatitis B :".

Figure 5: Channeling Admin Interface

### **3.5 Hardware Interfaces**

This section outlines the physical and logical interactions between the 7GUARD system and hardware components such as, supported devices, data exchange, communication protocols, and hardware requirements for deployment.

- Supported devices: the system is designed to work with standard desktop computers, laptops, smartphones, and tablets. Hospital staff will use printers for prescriptions and barcode reader for scanning vaccine codes.
- Data exchange: the data from hardware devices are captured through touchscreens, keyboard and mouse inputs. The data is output through digital screens and printed copies for the prescriptions.
- Communication protocols: the system will use https to communicate between the client devices and backend servers ensuring secure transmission of sensitive data of child health records.
- Hardware requirements: the system may require hospital computers to have at least 8GB of RAM, dual-core processors and stable internet connection for the users to access the system. For mobile users, the system may require higher android with at least 2GB of memory availability.

### **3.6 Software Interfaces**

This section provides an idea of how the system integrates with external software and the specific requirements for communication and data exchange.

- External software: the system uses MySQL version for storing child health records and vaccine details. It is also compatible with major operating systems like Windows, macOS, Android and iOS.
- Data exchange and communication: the system receives data such as vaccine information, parent and child information, doctor availability details. These inputs take part in giving outputs such as vaccine schedules, CHDR, health records and prescriptions. The purpose of this data exchange is to keep the vaccine records up-to-date and ensure the users have the latest information on their child's health.

- Data sharing: data will be shared securely via internal API calls that connect the frontend and backend components. All communications will be encrypted to ensure data privacy and security.

### **3.7 Communications Interfaces**

- Communication functions: the system is accessible through any kind of web browser on both desktop and mobile devices. The system sends emails to provide OTP to the parent or guardian after registering to the system. Other than that, more emails will be sent regarding the channelings. Also, the reminders about the vaccine schedules and overdue schedules will be notified through emails as well.
- All web-based communications will be encrypted using SSL/TLS to ensure the confidentiality and integrity of the data. Only authorized parties can have the access to authentication. No two-hospital staff have the same authorization for each other's pages.

## 4 System Features

### 4.1 System Feature 1

#### 4.1.1 Use case diagram of User and Admin Registration:

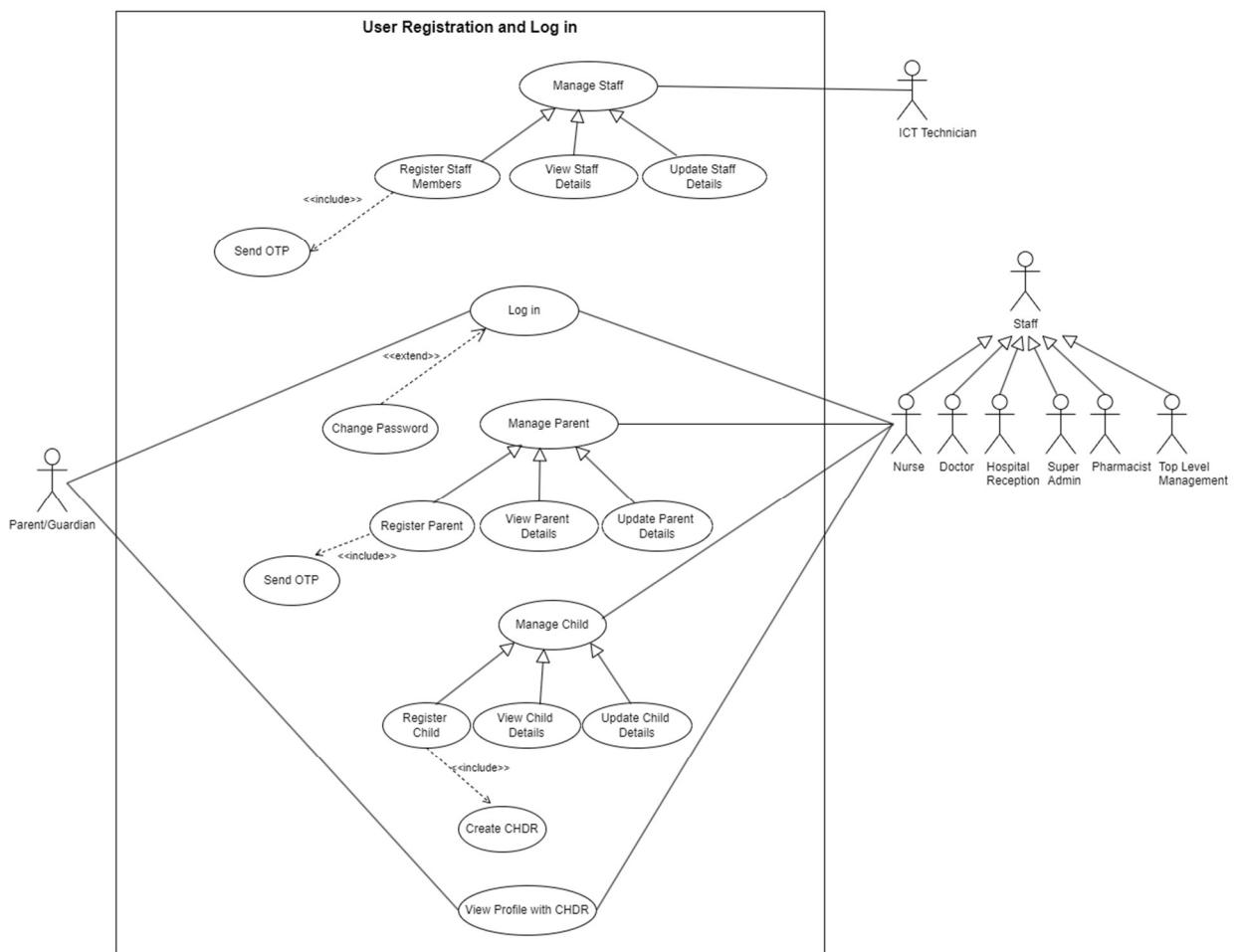


Figure 6: Use case diagram of user and admin registration

#### **4.1.2 Use case description of User and Admin Register:**

[1] Function Name: Managing Staff

Use Case Name	Manage Staff	
Goal	Register hospital staff and edit their details if needed	
Primary Actor	ICT Technician	
Secondary Actor	Hospital Staff	
Precondition	-	
Postcondition	The staff is registered to the system and has access to the system	
Main Flow	Step	Action
	1	ICT Technician fills staff register form with their details and submits the form
	2	Send an Email to the staff member with username and One Time Password (OTP)
	3	Newly registered staff member details are saved in the database
	4	Display and update registered staff member details if needed.

[2] Function Name: Managing Parents or Guardians

Use Case Name	Manage Parent	
Goal	Register parent/guardian and edit their details if needed	
Primary Actor	Nurse	
Secondary Actor	Parent/Guardian	
Precondition	-	
Postcondition	The parent/guardian is registered to the system and has access to the system	
Main Flow	Step	Action
	1	Nurse fills parent register form with their details and submits the form
	2	Send an Email to the parent/guardian with username and One Time Password (OTP)
	3	Newly registered parent details are saved in the database
	4	Display and update registered parent/guardian details if needed.

[3] Function Name: Managing Child

Use Case Name	Manage Child	
Goal	Register child and edit their details if needed	
Primary Actor	Nurse	
Secondary Actor	Parent/Guardian	
Precondition	The parent/guardian should be register first	
Postcondition	The child is registered to the system	
Main Flow	Step	Action
	1	Nurse fills child register form with their details and submits the form
	2	Newly registered child details are saved in the database
	3	Display and update registered parent/guardian details if needed.
	4	Create a CHDR for the registered child through the system

[4] Function Name: Log in

Use Case Name	Log in	
Goal	Grant security to the accounts allowed the users to engaging their own tasks based on their user type	
Primary Actor	Parent/Guardian and Staff Members	
Secondary Actor	-	
Precondition	Users must register first	
Postcondition	Has access to experience the services of the system based on their user type	
Main Flow	Step	Action
	1	User login to the system with their username and password
	2	When the user login into the system for the first time they should use the username and OTP provided by the hospital
	3	Update the OTP to the new password
	4	Log in again with their username and newly created password
	5	System pages are loaded according to the user type

#### 4.1.3 Sequence diagram of User and Admin Registration (Staff):

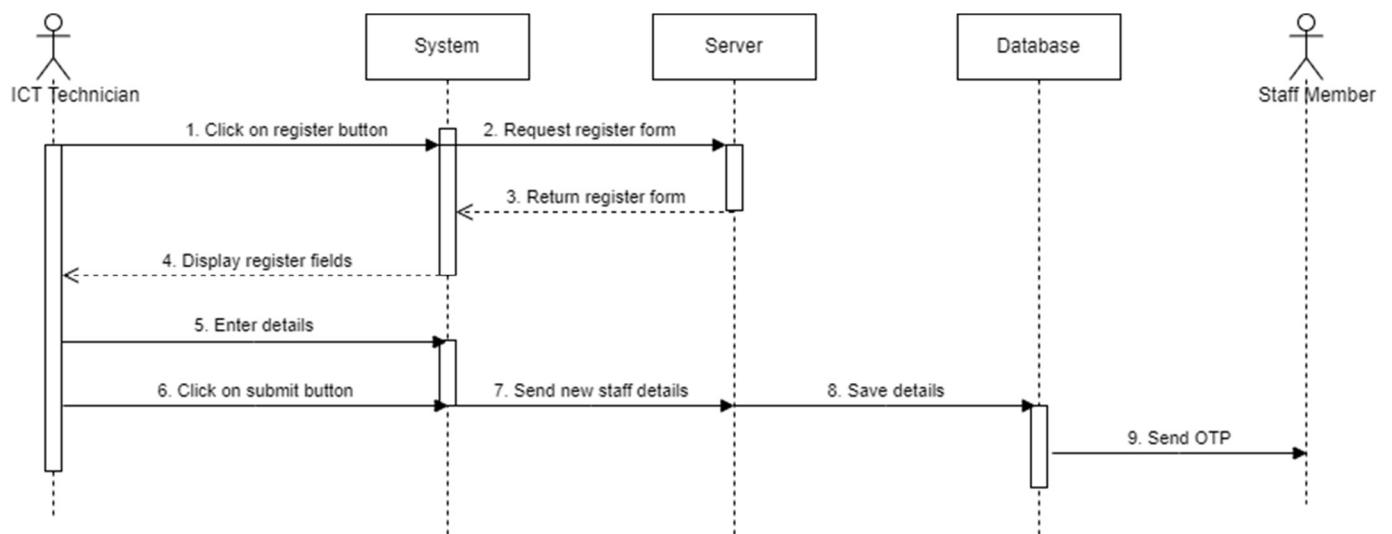


Figure 7: Sequence diagram of User and admin registration (Staff)

#### 4.1.4 Sequence diagram of User and Admin Registration (Parent and Child):

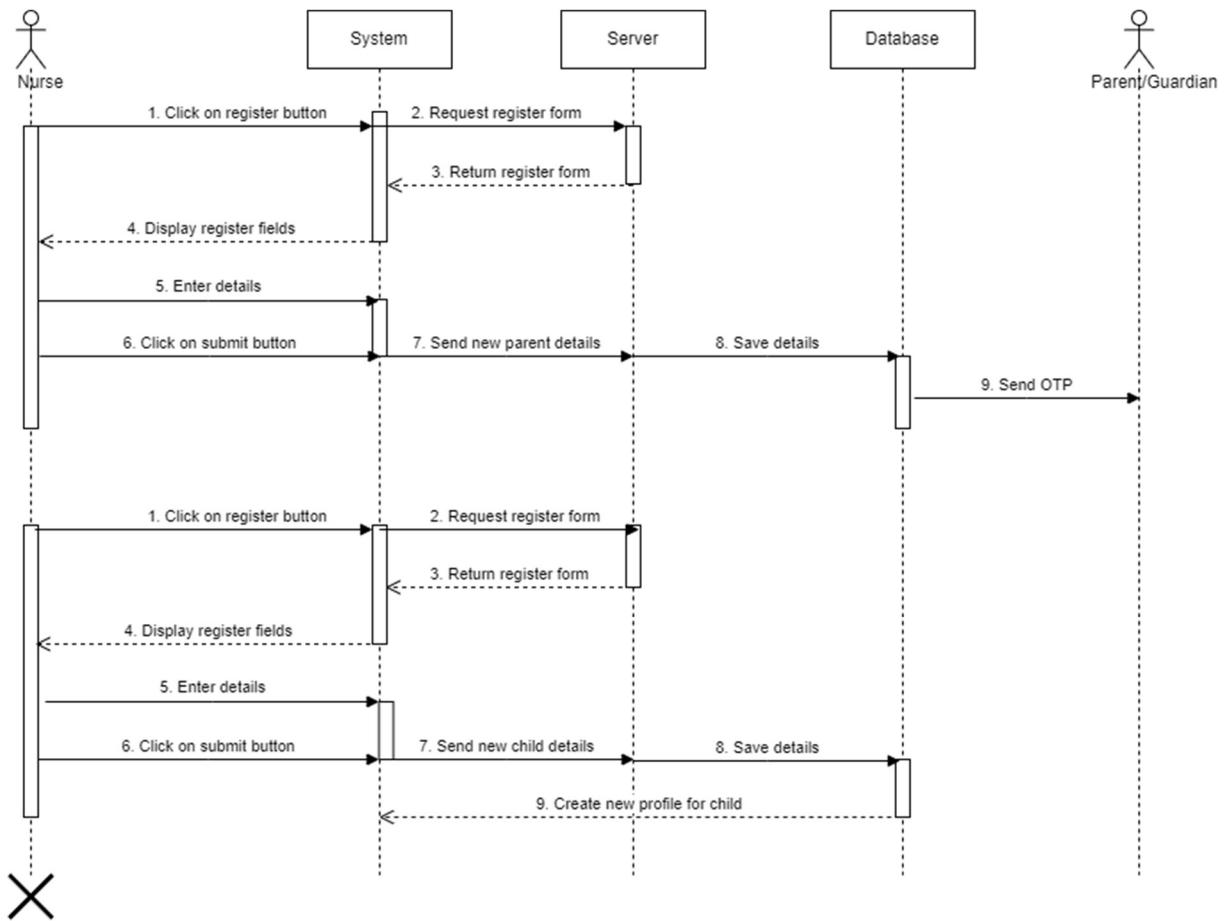


Figure 8: Sequence diagram of User and admin registration (Parent and Child)

#### 4.1.5 Sequence diagram of User and Admin Registration (Log in):

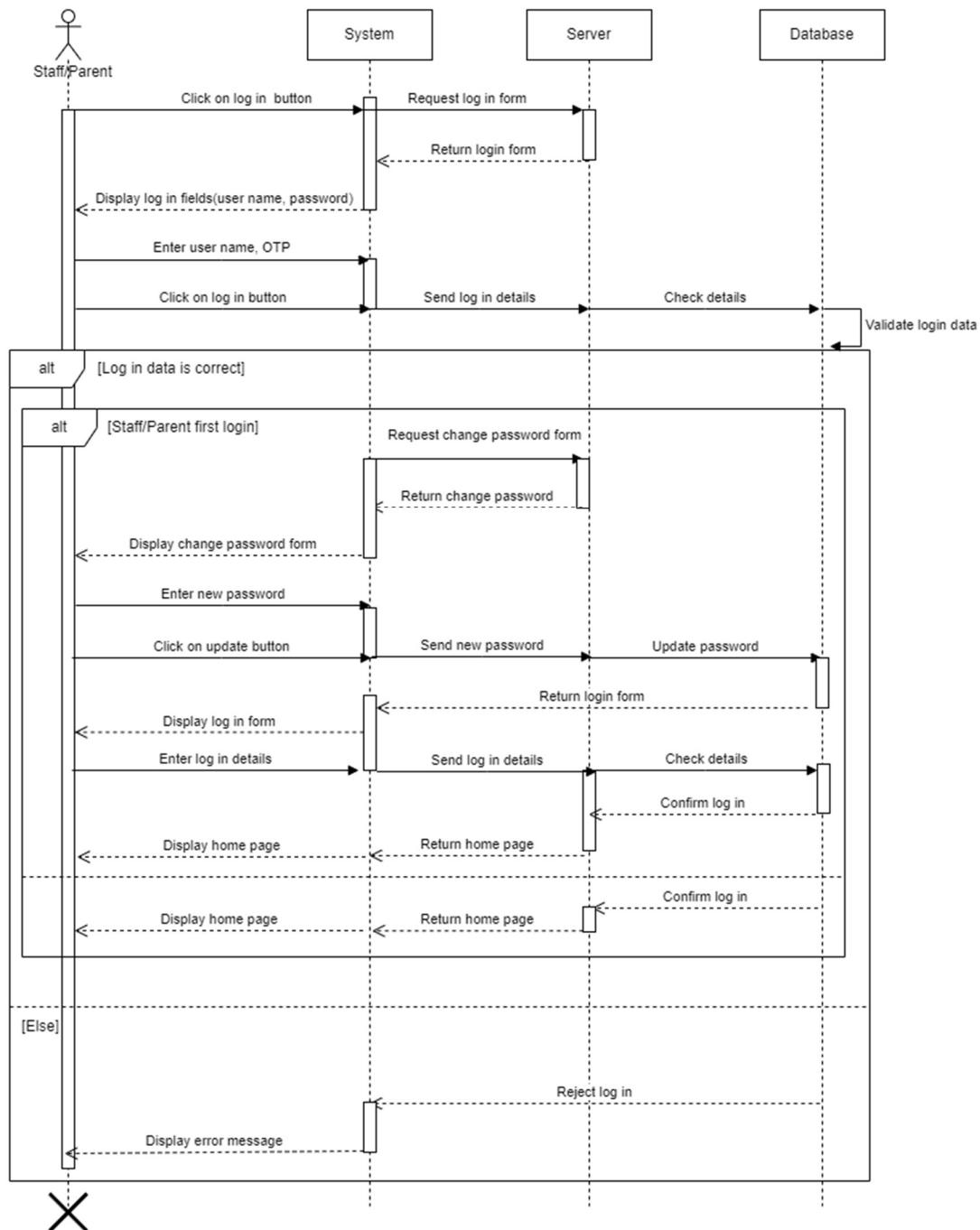


Figure 9: Sequence diagram of User and admin registration (Log in)

#### 4.1.6 Activity diagram of User and Admin Registration (Staff):

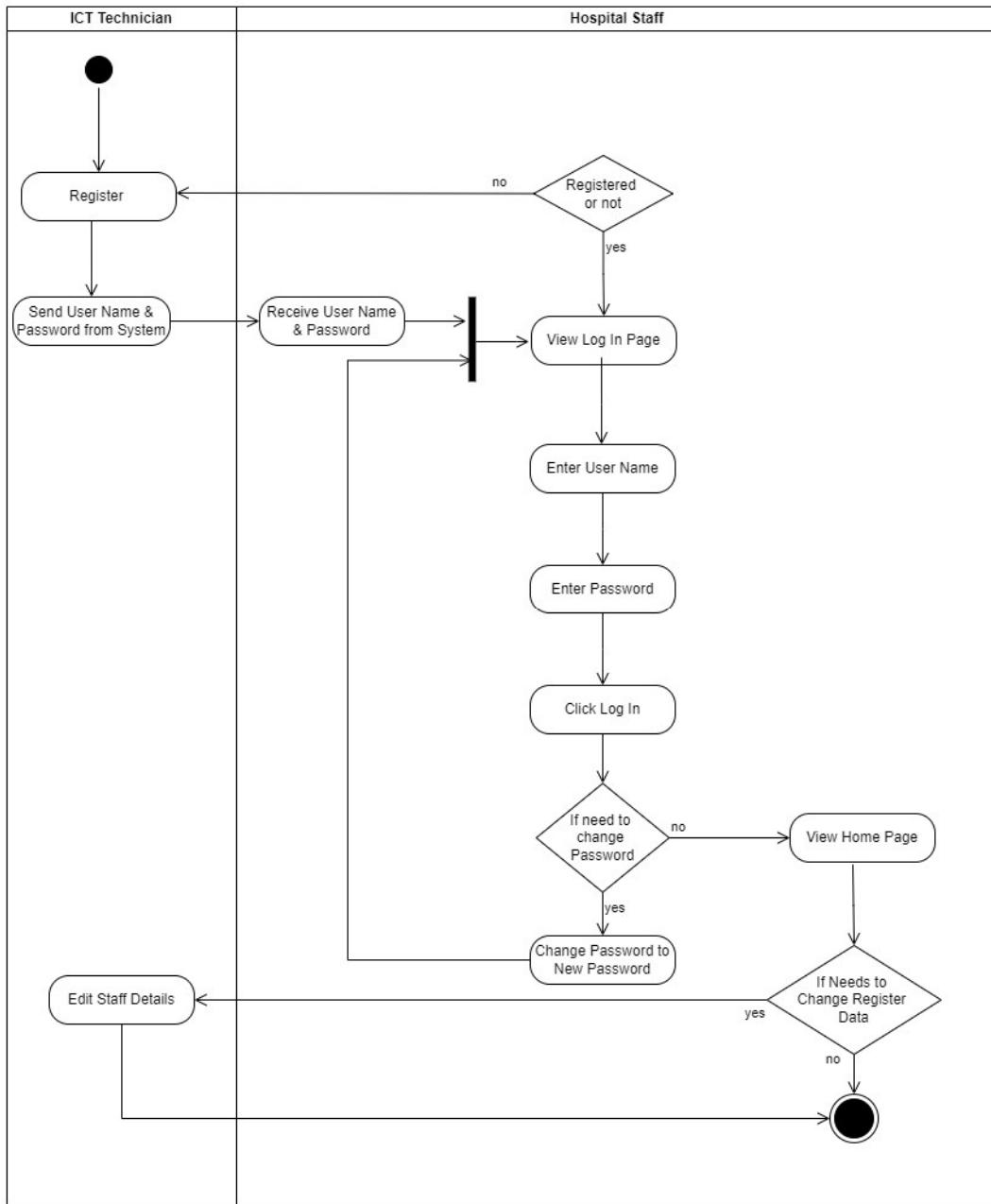


Figure 10: Activity diagram of User and admin registration (Staff)

#### 4.1.7 Activity diagram of User and Admin Registration (Parent):

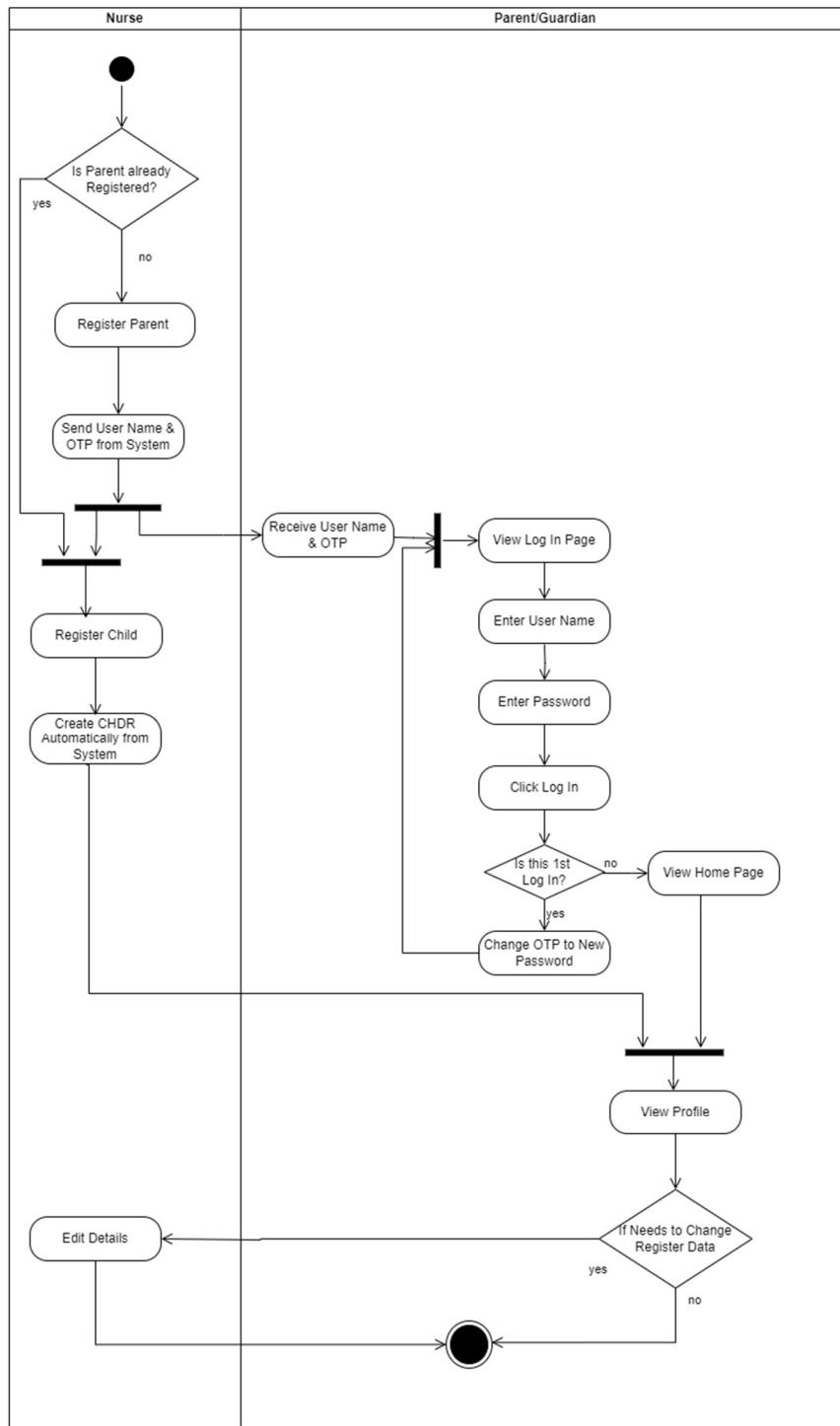


Figure 11: Activity diagram of User and admin registration (Parent)

## 4.2 System Feature 2

### 4.2.1 Use case diagram of Appointment Dates for Channeling:

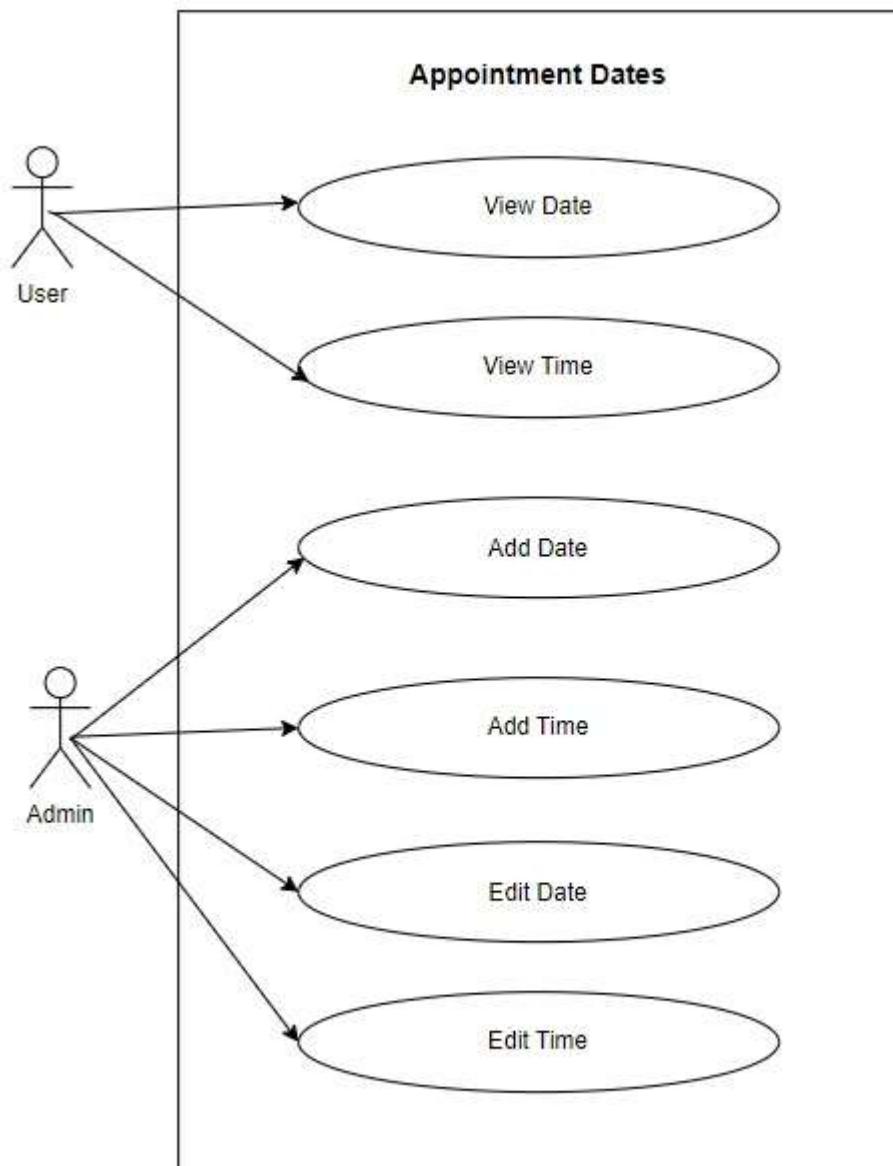


Figure 12: Use case diagram of Appointment dates for channeling.

#### 4.2.2 Use case description of Appointment Dates for Channeling:

[1] Function Name: Add Appointment

Use Case Name	Add Appointment	
Goal	Add doctor available date & time according to the relevant doctor's availability.	
Primary Actors	Nurse	
Secondary Actors	None	
Preconditions	Doctors should register to the system with their unique doctor ID and the name.	
Postconditions	None	
	Step	Action
Main Flow	1	When admin access to this page, it shows a filling form with doctor name (selection option), doctor id, date (selection option) and time (selection option).
	2	Admin should select the relevant doctor's name and after should fill the doctor id option.
	3	Admin should select the relevant date and time according to the relevant doctor's availability.
	4	After filling those data (doctor name and id, date & time), admin should press the submit button to add those data to the system as successfully
	5	System sends the successfully submitted or unsuccessfully submitted message.

[2] Function Name: Canceling Appointment

Use Case Name	Cancel Appointment	
Goal	Cancel /Edit the filled data (doctor name, doctor ID, date, time) before the submit.	
Primary Actors	Nurse	
Secondary Actors	None	
Preconditions	Doctors should register to the system with their unique doctor ID and the name.	
Postconditions	None	
Main Flow	Step	Action
	1	admin choose cancel option.
	2	System asks for cancel confirmation.
	3	Parent or guardian confirms the cancel.
	4	Page shows the filled data by admin doctor name, Doctor ID, date, time)

#### 4.2.3 Sequence diagram of Appointment Dates for Channeling:

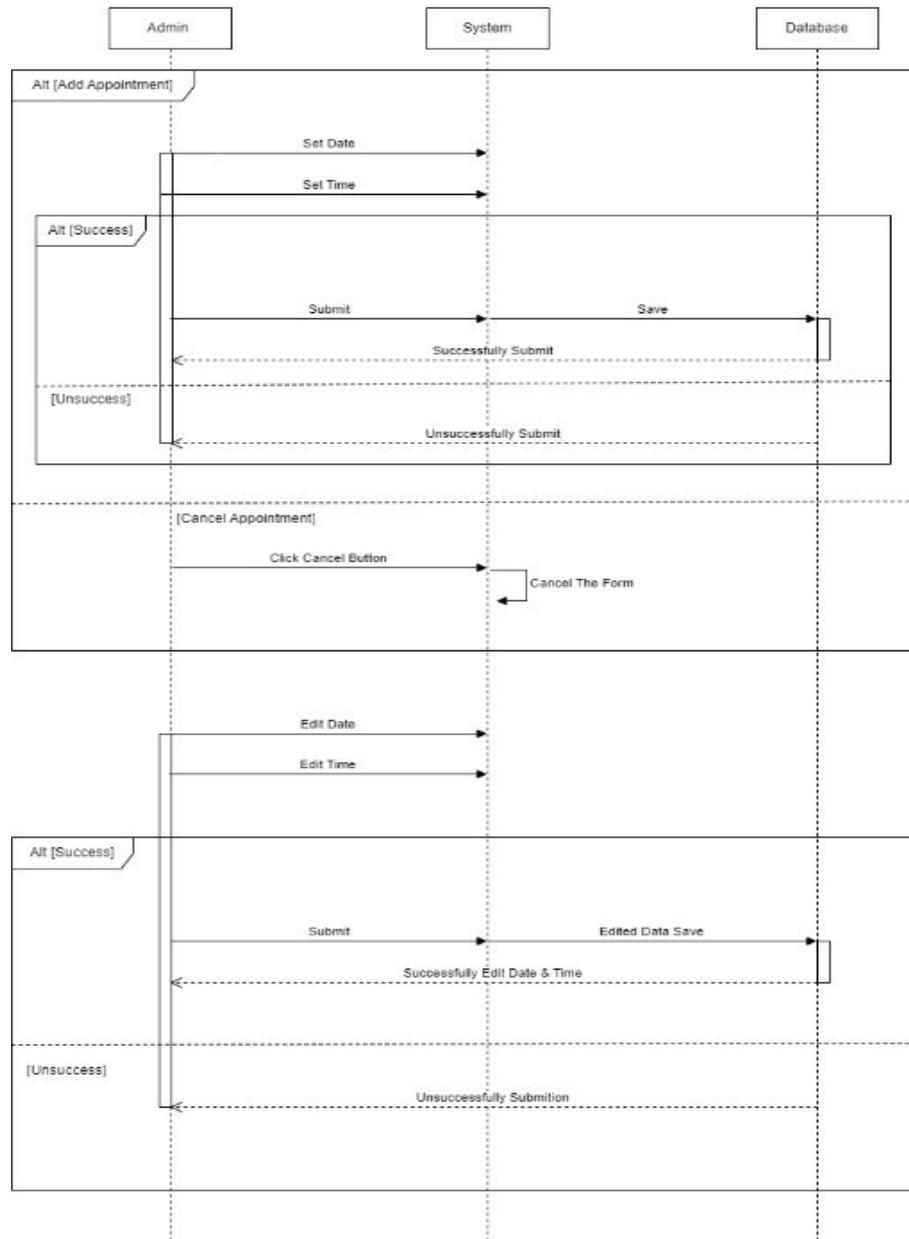


Figure 13: Sequence diagram of Appointment dates for channeling

#### 4.2.4 Activity diagram of Appointment Dates for Channeling:

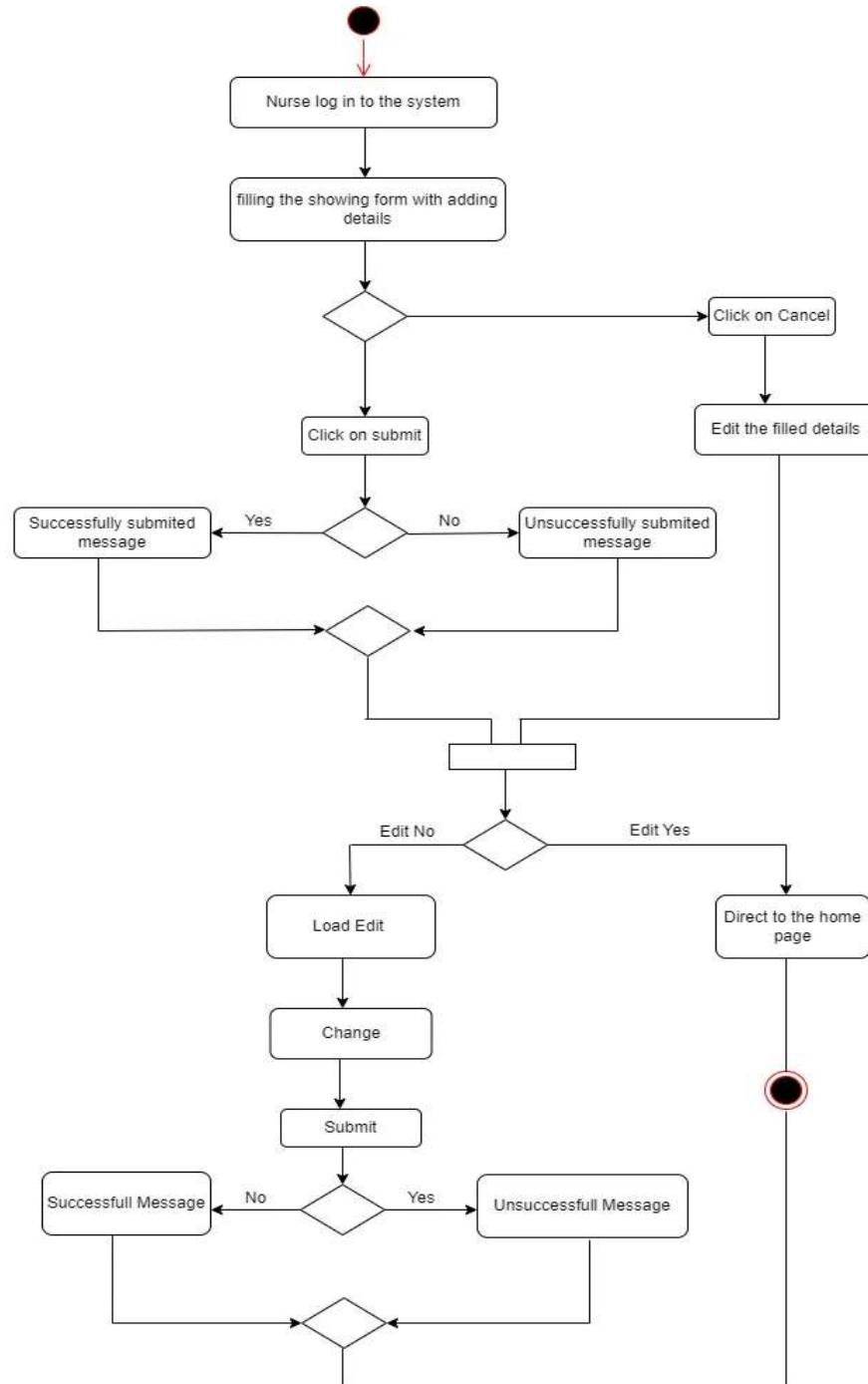


Figure 14: Activity diagram of Appointment dates for channeling

## 4.3 System Feature 3

### 4.3.1 Use case diagram of Injected Vaccine:

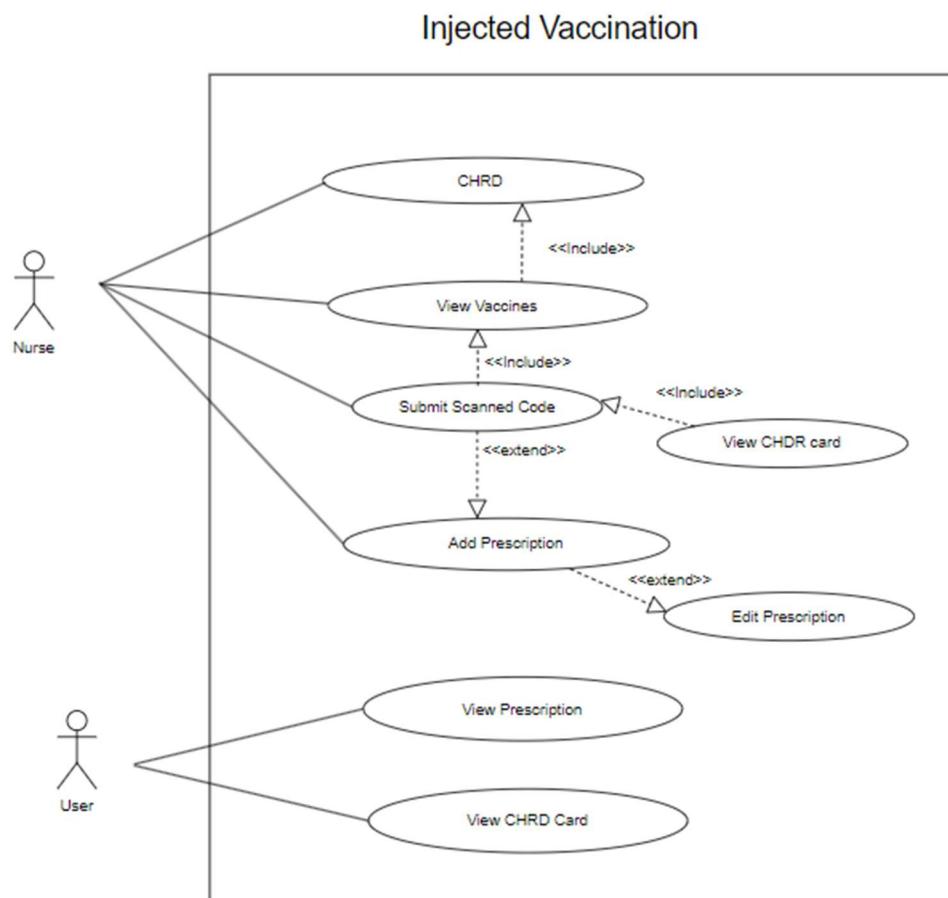


Figure 15: Use-case diagram of injected vaccine.

#### 4.3.2 Use case description of Injected Vaccination:

[1] Function name: View vaccines

Use Case Name	View Vaccination	
Goal	Selection of non-injected vaccinations	
Primary Actors	Nurse	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• nurse should login to the system with admin username and password.</li> <li>• Entering CHDR ID .</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	When Nurse access the form, enter CHDR ID.
	2	CHDR details automatically loads their details
	3	Next look at the injected vaccine to be added.

[2] Function name: Submit Scanned Code

Use Case Name	Submitted Scan Code	
Goal	Regarding the manual system, scan the next vaccine to be entered and enter it into the system.	
Primary Actors	Nurse	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Nurse should login to the system with Admin username and password.</li> <li>• Entering CHDR ID and get details at that patient.</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	When parent or guardian access the form, it automatically loads their registered details.
	2	Parent or guardian fills the channeling form.
	3	Parent or guardian chooses the vaccine options.
	4	Fill the vaccine information according to chosen vaccine option.

[3] Function name: Add Prescription

Use Case Name	Add Prescription	
Goal	Mentioning the medicine to be taken in case of emergency allergy.	
Primary Actors	Doctor & Nurse	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Nurse should login to the system with Admin username and password.</li> <li>• Entering CHDR ID and get details at that patient.</li> <li>• After scan the injected vaccinations and update CHDR card.</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	Nurse should login to the system with Admin username and password.
	2	Entering CHDR ID and get details at that patient.
	3	After scan the injected vaccinations and submit
	4	Nurse adds the prescription.
	5	Click save & print button , then Update CHDR card.

[4] Function name: Edit Prescription

Use Case Name	Edit Prescription	
Goal	Mentioning the medicine can be edited.	
Primary Actors	Nurse	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Nurse should login to the system with Admin username and password.</li> <li>• Entering CHDR ID and get details at that patient.</li> <li>• After scan, the injected vaccinations and update CHDR card.</li> <li>• Scan the injected vaccinations and submit.</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	Nurse choose the Edit option.
	2	System gave edit prescription form.
	3	Edit prescription and submit it.
	4	Update CHDR card and prescriptions.

[5] Function name: View CHDR

Use Case Name	View CHDR	
Goal	Ability to view currently injected vaccinations.	
Primary Actors	Parent or guardians.	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• Login their account.</li> </ul>	
Postconditions	Email will be generated.	
Main Flow	Step	Action
	1	Parent or guardian login the system and view account.
	2	System will show the injected vaccinations.
	3	System will show the prescriptions.

#### 4.3.3 Sequence diagram of Injected Vaccination:

## Injected Vaccination

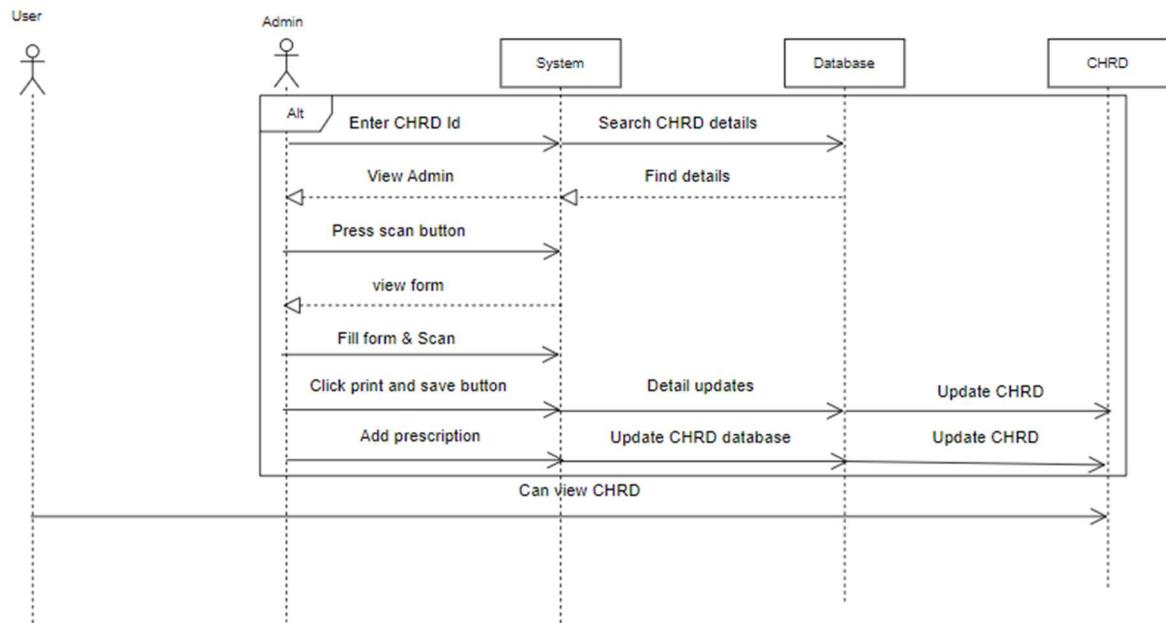


Figure 16: Sequence diagram of injected vaccination.

#### 4.3.4 Activity diagram of Injected Vaccination:

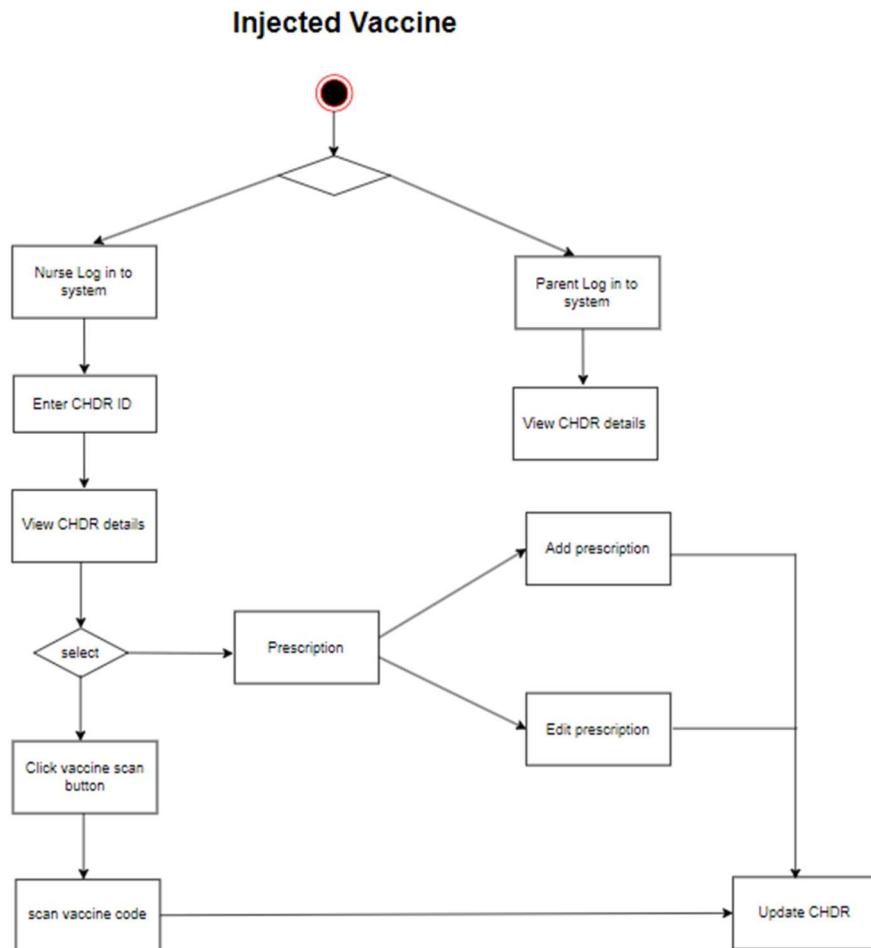


Figure 17: Activity diagram of injected vaccination

## 4.4 System Feature 4

### 4.4.1 Use case diagram of Vaccine Stock:

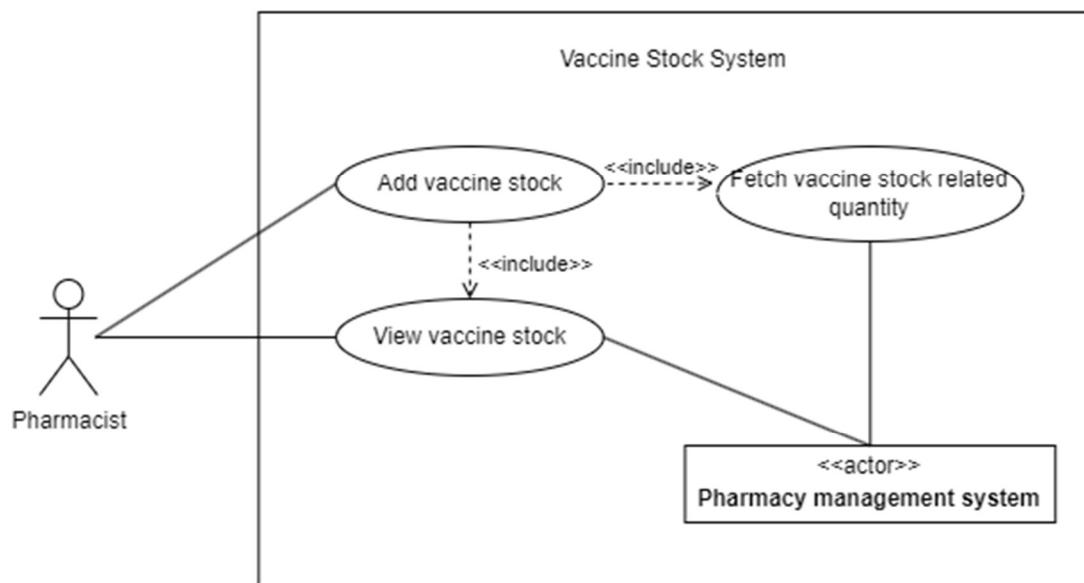


Figure 18: Use case diagram of Vaccine stock

#### 4.4.2 Use case description of Vaccine Stock:

Use case name	Vaccine stock details	
Goal	Adding new vaccines to the vaccine list	
Secondary actors	Pharmacist	
Pre-condition	<p>Pharmacist must log in to the system.</p> <p>The pharmacist must be authenticated and authorized to add stock.</p>	
Post-condition	The new stock is successfully added, and the system reflects the updated vaccine stock.	
Main flow	Step	Action
	1	Pharmacist can view vaccine stock page
	2	Using add button pharmacist can add new vaccine details
	3	Vaccine stock get the vaccine quantity in the pharmacist management system.

#### 4.4.3 Sequence diagram of Vaccine Stock:

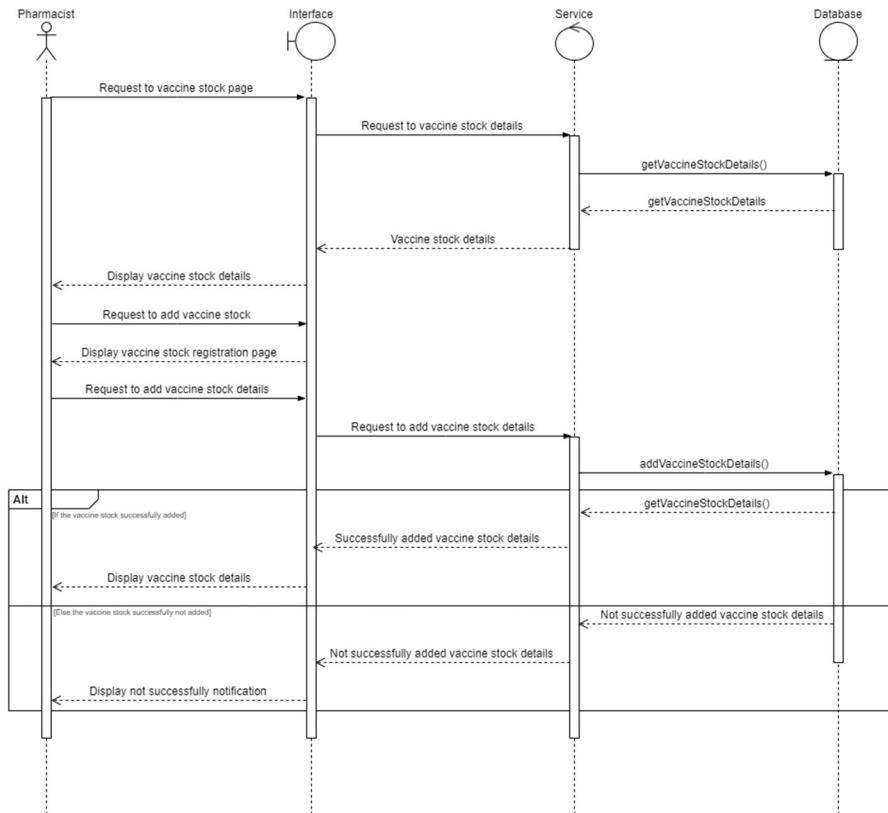


Figure 19: Sequence diagram of Vaccine stock

#### 4.4.4 Activity diagram of Vaccine Stock:

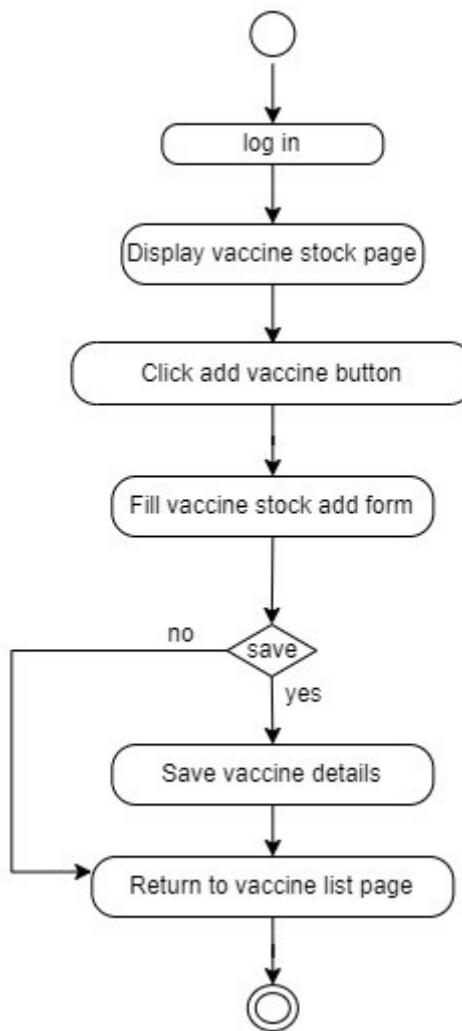


Figure 20: Activity diagram of Vaccine stock

## 4.5 System Feature 5

### 4.5.1 Use case diagram of Important of Vaccine:

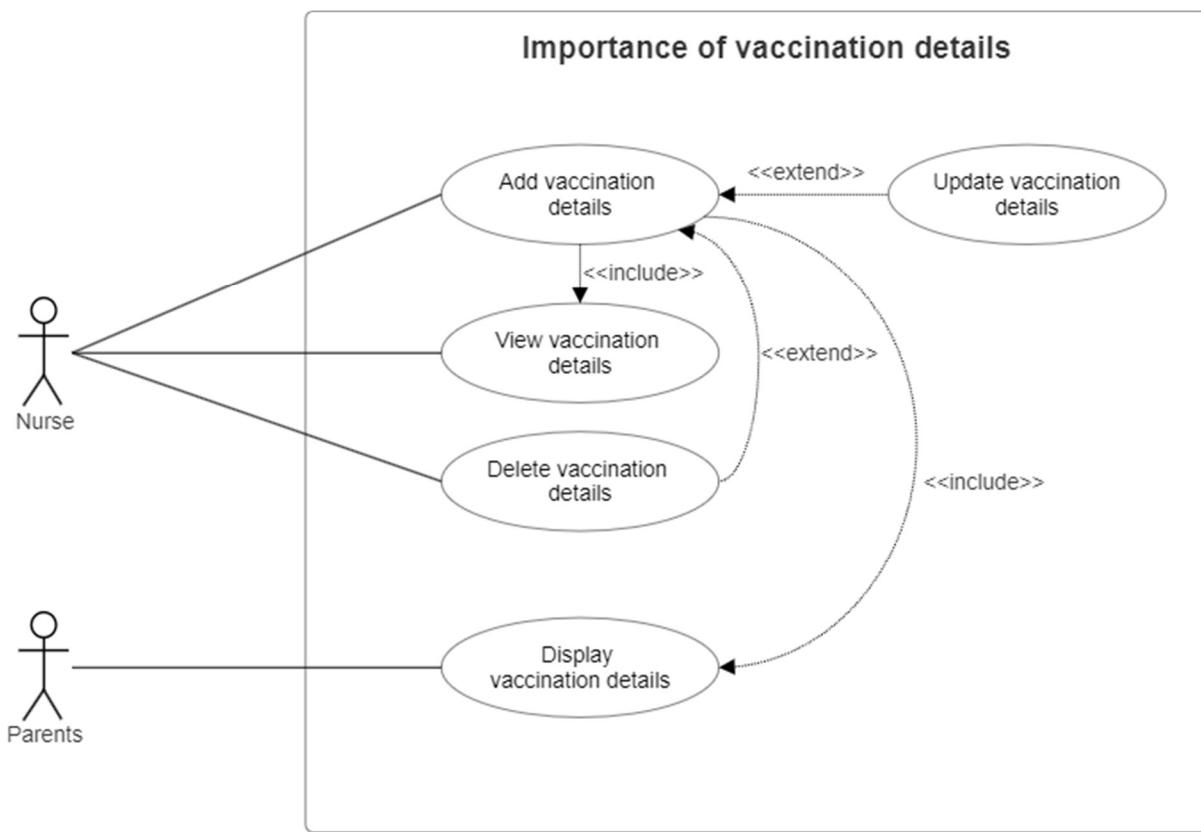


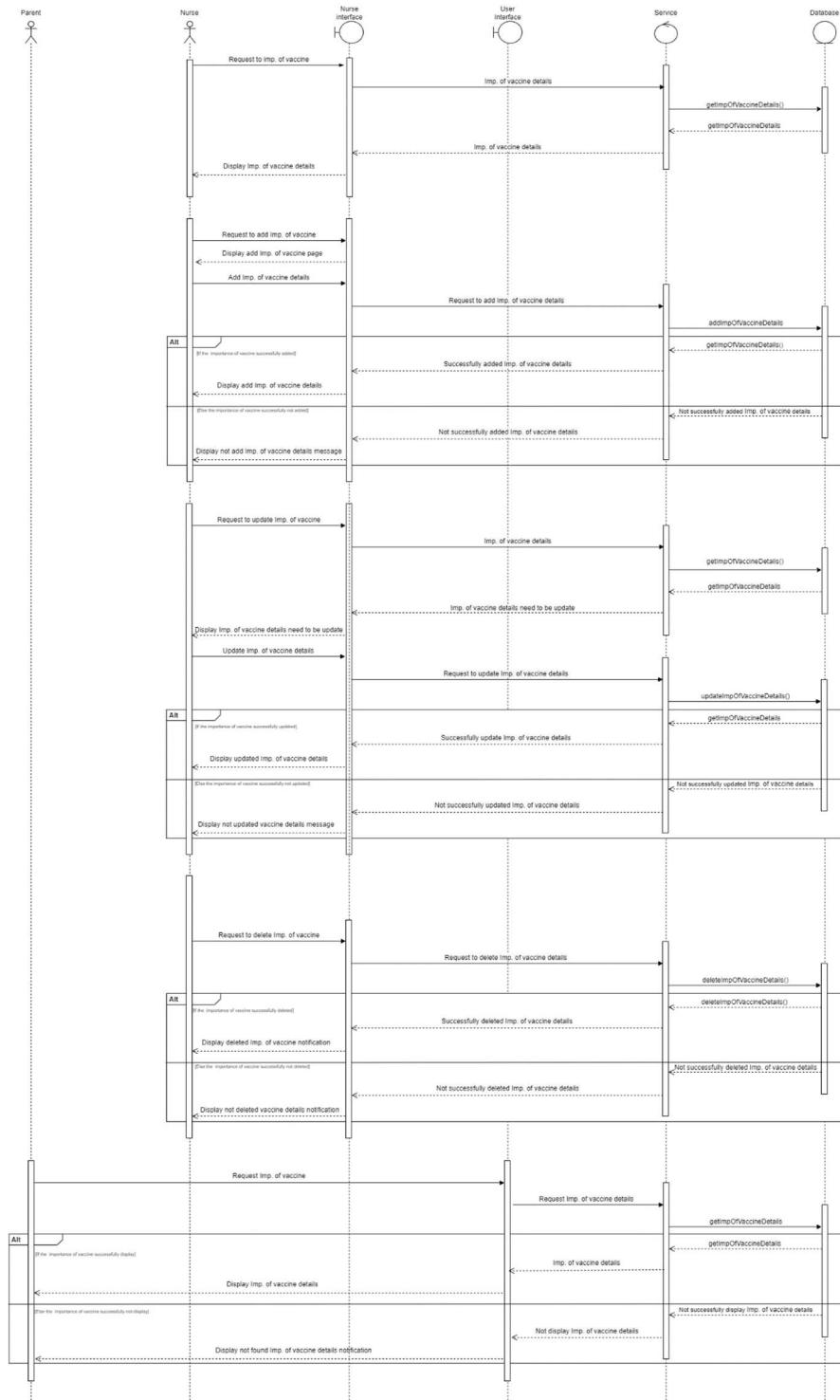
Figure 21: Use case diagram of important of vaccine

#### **4.5.2 Use case description of Important of Vaccine:**

Function name: Importance of vaccines

Use case name	Importance of vaccination details	
Goal	Nurse will use this use case to handle details about importance of vaccination details	
Primary actor	Nurse	
Secondary actors	Parents	
Pre-condition	Nurse already logged in to the system	
Post-condition	Database updated	
Main flow	Step	Action
	1	Nurse can view vaccination details page.
	2	Using add button nurse can add details about importance of vaccination.
	3	Nurse can update the details using update button.
	4	The nurse can delete the details using delete button.
	5	Parents can view importance of vaccination details.

#### **4.5.3 Sequence diagram of Important of Vaccine:**



*Figure 22: Sequence diagram of Important of vaccine*

#### 4.5.4 Activity diagram of Important of Vaccine:

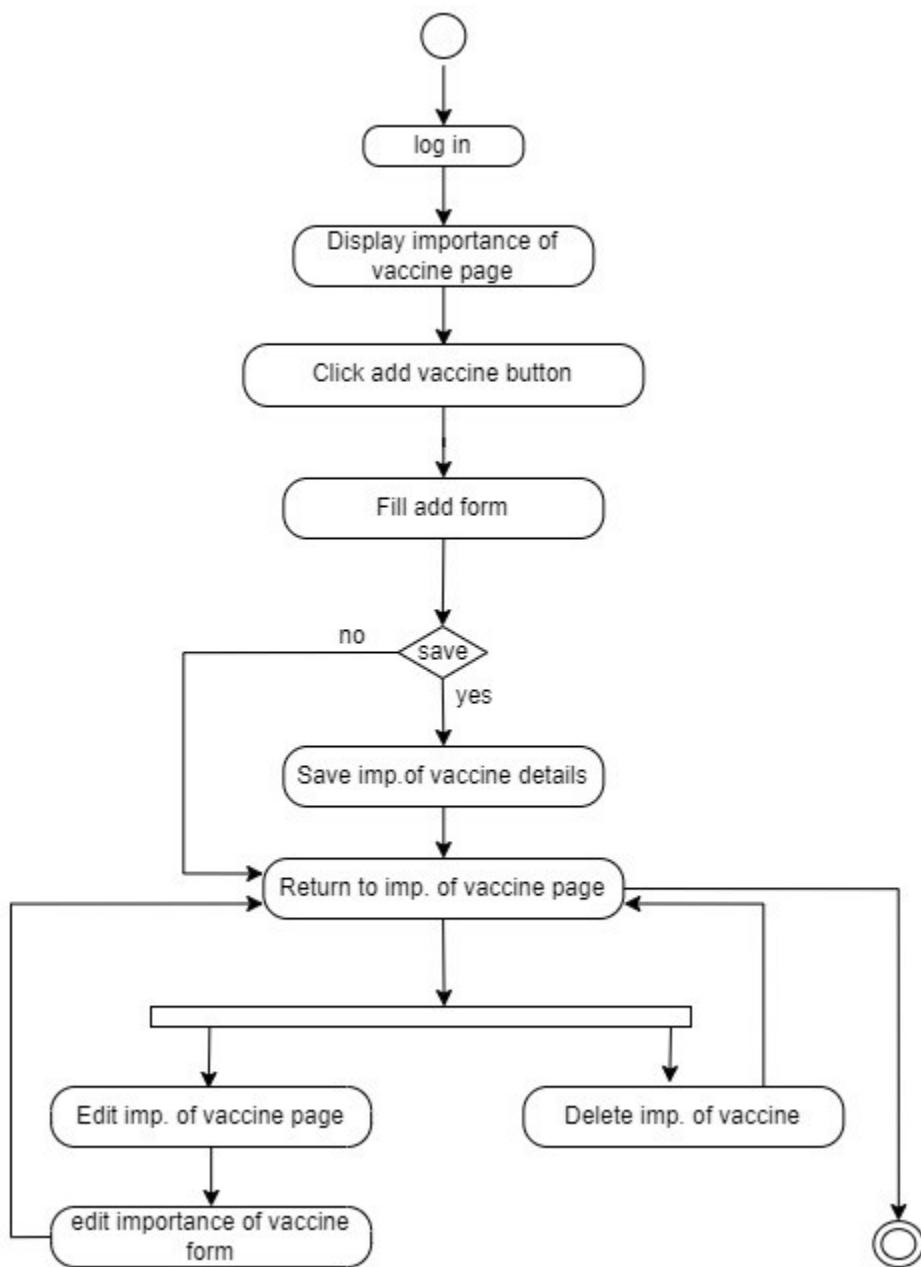


Figure 23: Activity diagram of important of vaccine

## 4.6 System Feature 6

### 4.6.1 Use case diagram of Channeling:

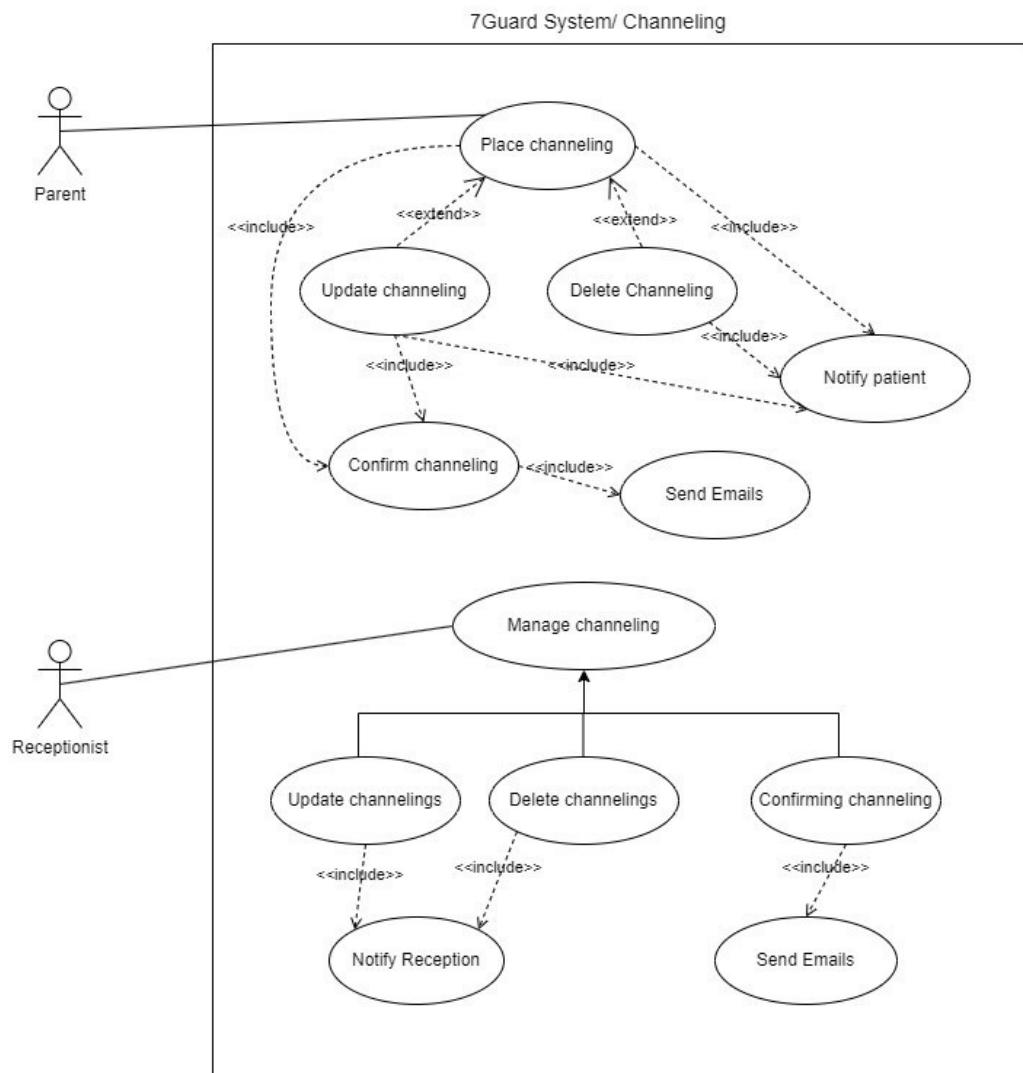


Figure 24: Use case diagram of Channeling

#### 4.6.2 Use case description of Channeling:

[1] Function name: Make Normal

Use Case Name	Make Normal Channeling	
Goal	Make a new appointment to the doctor.	
Primary Actors	Parent or guardian	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• For every child they have to put new channeling (for one channeling cannot have two or more patients).</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	When parent or guardian access the form, it automatically loads their registered details.
	2	Parent or Gurdian fills the channeling form.
	3	Submit the channeling form.
	4	System checks allocated channelings availability.
	5	System generates success message.

[2] Function name: Make Vaccine

Use Case Name	Make Vaccine Channeling	
Goal	Make a new appointment to vaccinate their children.	
Primary Actors	Parent or guardians	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• For every child they have to put new channeling (for one channeling cannot have two or more patients).</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	When parent or guardian access the form, it automatically loads their registered details.
	2	Parent or guardian fills the channeling form.
	3	Parent or guardian chooses the vaccine options.
	4	Check previous vaccination and alerting.
	5	Fill the vaccine information according to chosen vaccine option.
	6	Submit the channeling form.
	7	System checks allocated channelings availability.
	8	System checks vaccine availability.
	9	System generates a success message (if both are available).

[3] Function name: Update Channeling

Use Case Name	Update Channeling	
Goal	Change already made channeling details.	
Primary Actors	Parent or guardians	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• They should have already made channeling to be edited.</li> <li>• They cannot change vaccine after they put the vaccine, if they want to change vaccine in any case, they have to manually contact reception of the hospital.</li> <li>• There is a limited time to access update and delete channeling options (2 min).</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	When parent or guardian access the form, it automatically loads their already made channeling details.
	2	Parent or guardian change the channeling form.
	3	Submit the channeling form.
	4	System checks allocated channelings availability.
	5	System generates a success message (if it is available).

[4] Function name: Delete Channeling

Use Case Name	Delete Channeling	
Goal	Cancel already made channeling.	
Primary Actors	Parent or guardians	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• They should have already made channeling to be deleted.</li> <li>• There is a limited time to access update and delete channeling options (2 min).</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	Parent or guardian choose delete option.
	2	System asks for delete confirmation.
	3	Parent or guardian confirms the delete.
	4	Channeling will be deleted by the system.

[5] Function name: Done Channeling

Use Case Name	Done Channeling	
Goal	Deliver channeling token to the Parent or guardian.	
Primary Actors	Parent or guardians.	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• They should have already made channeling to be done.</li> <li>• Done option is not depend on update or delete functionalities.</li> </ul>	
Postconditions	Email will be generated.	
Main Flow	Step	Action
	1	Parent or guardian click on done option.
	2	System will show the channeling token(number) and other details to parent to review.
	3	Then click on the submit button.
	4	Parent or guardian will be direct to the home page.
	5	System sends channeling token to the parent or guardians registered email.

[6] Function name: Update Channeling

Use Case Name	Update Channeling.	
Goal	Change already made channeling for customer request.	
Primary Actors	Receptionist	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent or guardian should have already made channeling to be edited.</li> <li>• Parent or guardian should manually contact receptionist to change their vaccine channeling details.</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	Reception will ask for channel no and date then filter and find channel record.
	2	When reception access the record, it automatically loads parent or guardian already made channeling details.
	3	Reception changes the channeling form.
	4	Submit the channeling form.
	5	System checks allocated channelings availability.
	6	System checks allocated vaccine availability.
	7	Generate a success message (if both of conditions are available).

[7] Function name: Delete Channelings

Use Case Name	Delete Channeling	
Goal	Cancel already made channeling after checking their payments to the hospital.	
Primary Actors	Receptionist	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• They should have already made channeling to be deleted.</li> <li>• Reception check whether they are paid the channeling fees or not.</li> </ul>	
Postconditions	None	
Main Flow	Step	Action
	1	Reception check record status is confirmed or not.
	2	Receptionist choose delete option.
	3	System asks for delete confirmation.
	4	Receptionists confirm the delete.
	5	Channeling will be deleted by the system.
	6	If there are any prepared vaccines, they are release to the stock again.

[8] Function name: Confirm

Use Case Name	Confirm Channeling.	
Goal	Confirm their payment and channeling.	
Primary Actors	Receptionist	
Secondary Actors	None	
Preconditions	<ul style="list-style-type: none"> <li>• Parent should register to the system with their children.</li> <li>• To make a channeling parent should log in to the 7Guard system beforehand.</li> <li>• They should have already made channeling to be confirmed.</li> <li>• Confirm option is not depend on update or delete functionalities.</li> <li>• To confirm a channeling, first payment should pay to the reception.</li> </ul>	
Postconditions	Email will be generated.	
Main Flow	Step	Action
	1	When receptionist receive allocated amount, they click on confirm button.
	2	System will update the status of the channeling.
	3	System will send an email to the parent or guardian mentioning their channeling and payments.

### 4.6.3 Sequence diagram of Channeling (Admin):

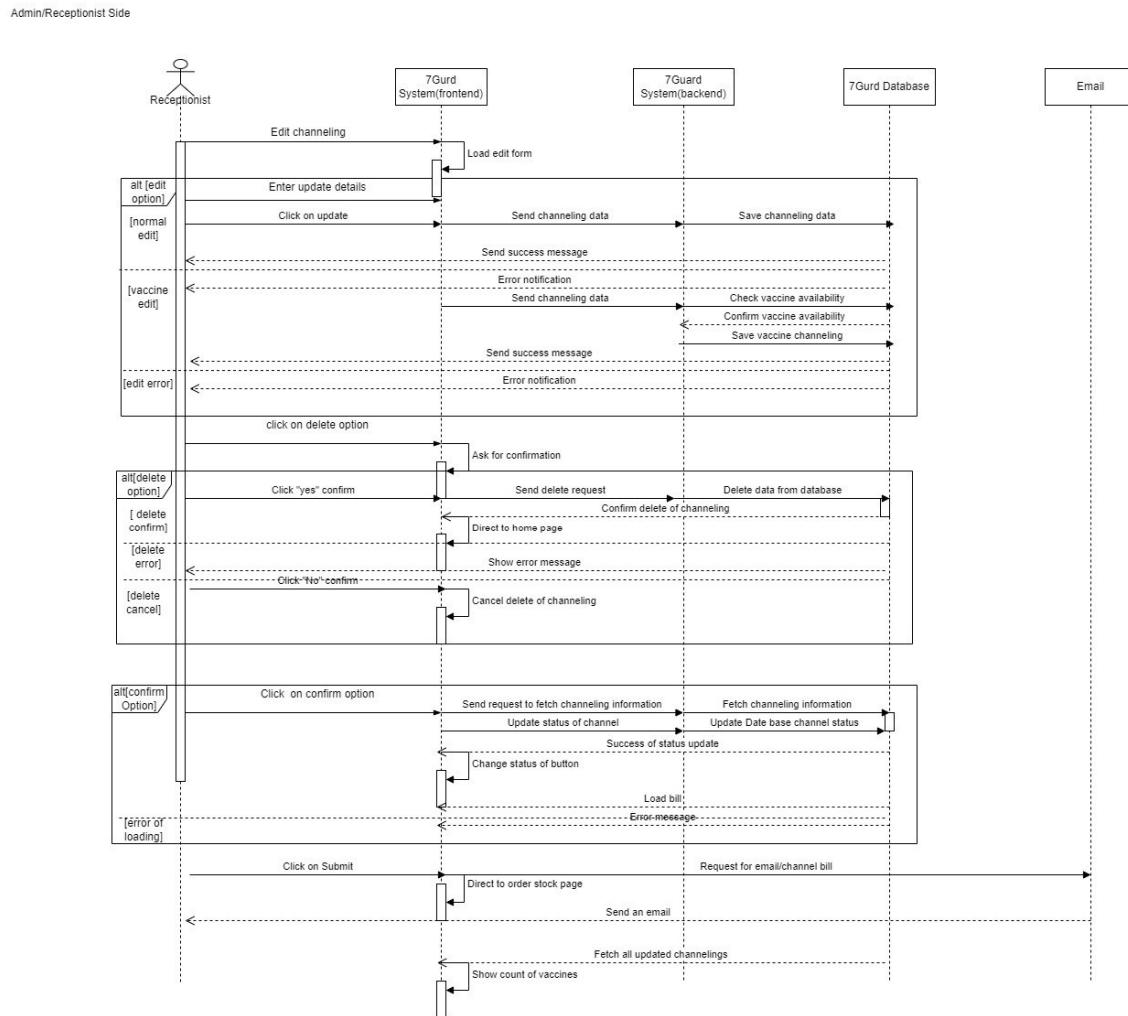


Figure 25: Sequence diagram of Channeling (Admin)

#### 4.6.4 Sequence diagram of Channeling (Parent):

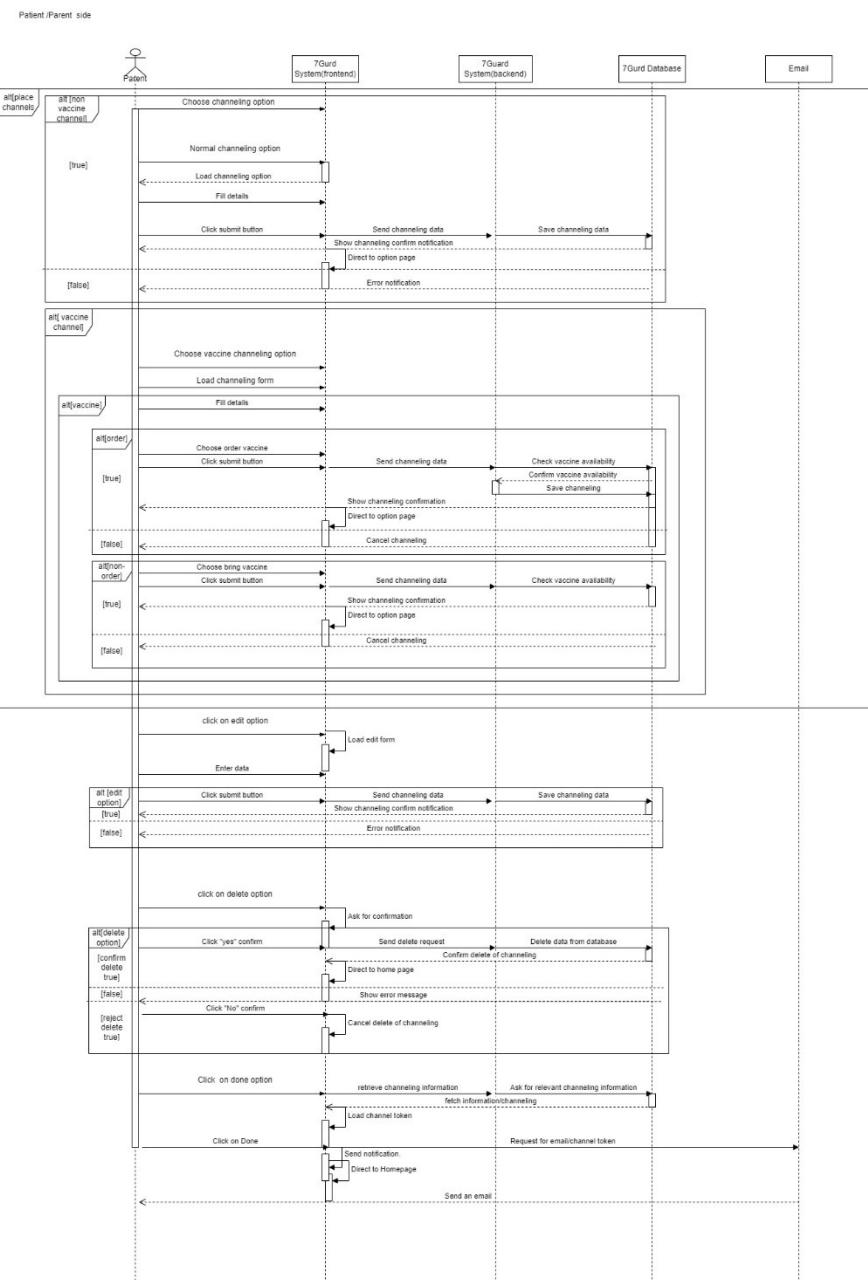


Figure 26: Sequence diagram of Channeling (Parent):

#### 4.6.5 Activity diagram of Channeling (Admin):

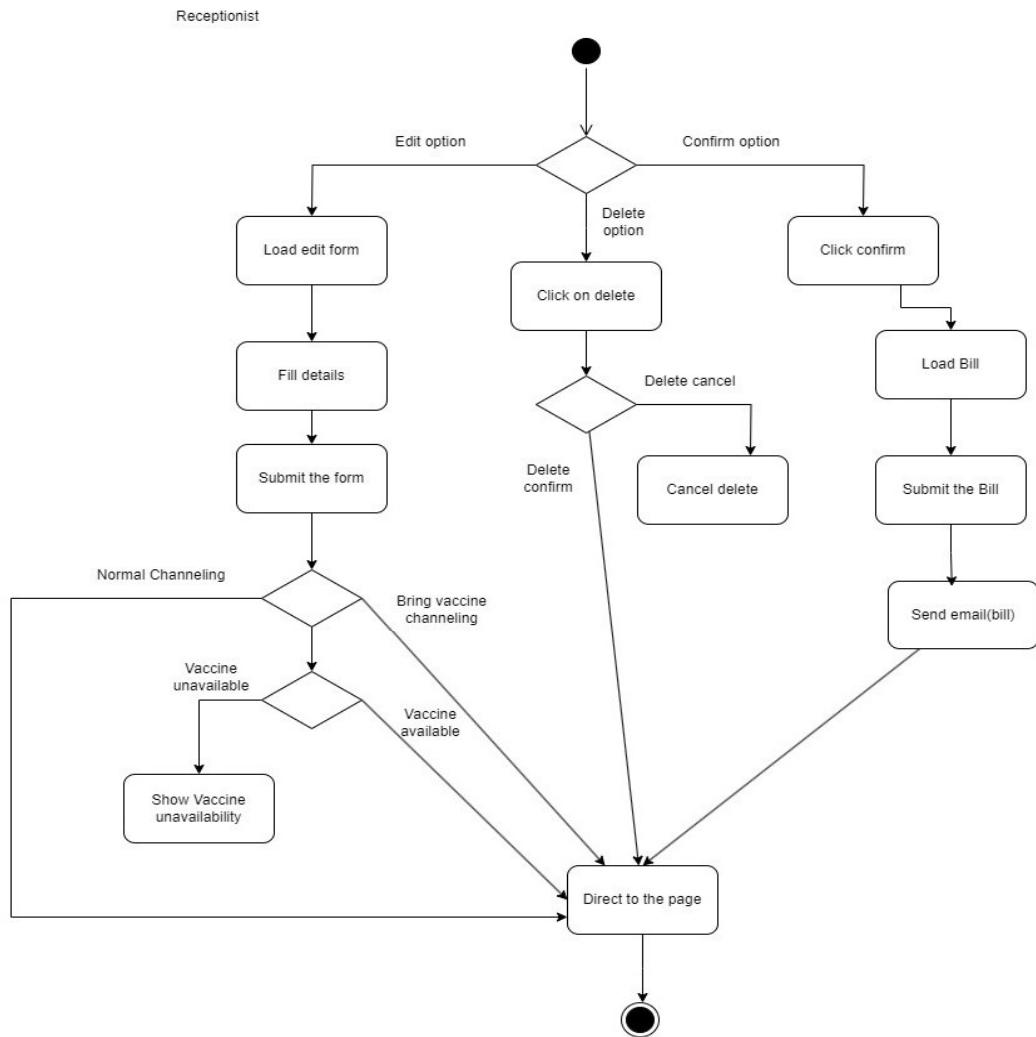


Figure 27: Activity diagram of Channeling (Admin):

#### 4.6.6 Activity diagram of Channeling (Parent):

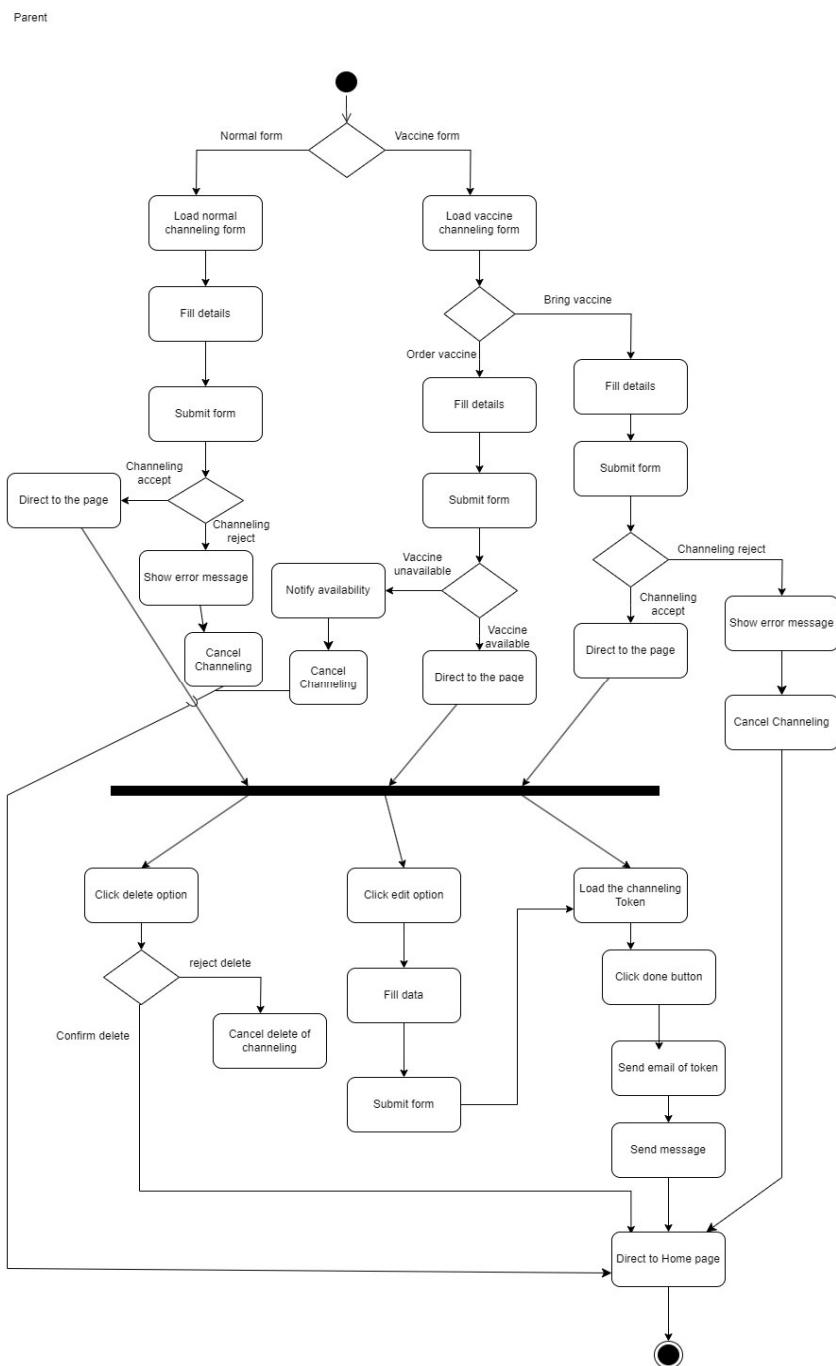


Figure 28: Activity diagram of Channeling (Parent):

## 4.7 System Feature 7

### 4.7.1 Use case diagram for BMI Calculation:

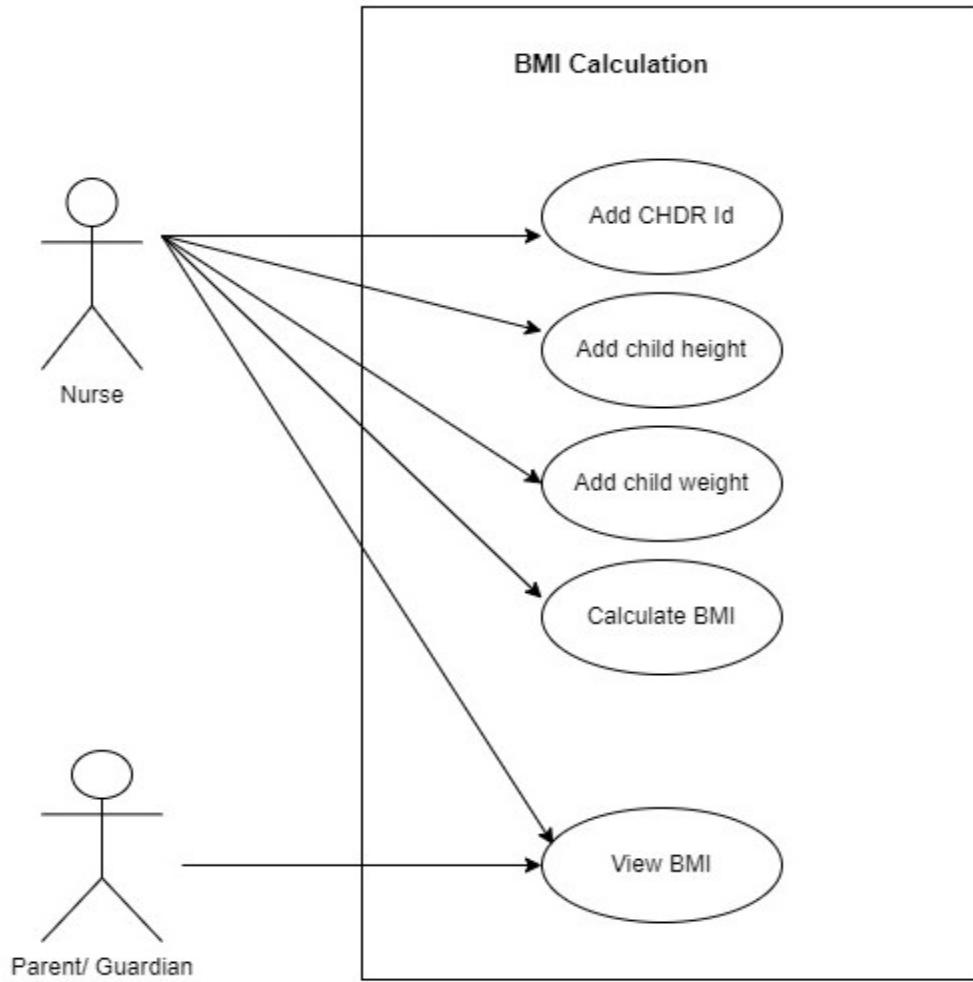


Figure 29: Use case diagram for BMI calculation:

#### **4.7.2 Use case description of BMI Calculation:**

Function name: Calculating BMI

Use Case Name	Adding details to find BMI	
Goal	Calculating BMI	
Primary Actor	Nurse	
Secondary Actor	Parent/Guardian	
Precondition	The parent/Guardian should already be registered along with their children	
Postcondition	The BMI chart is updated in CHDR	
Main Flow	Step	Action
	1	Nurse enters CHDR ID, child weight and child height
	2	BMI is calculated
	3	The BMI value is stored in the database
	4	BMI chart with new values is updated in the CHDR

#### 4.7.3 Sequence diagram of BMI Calculation:

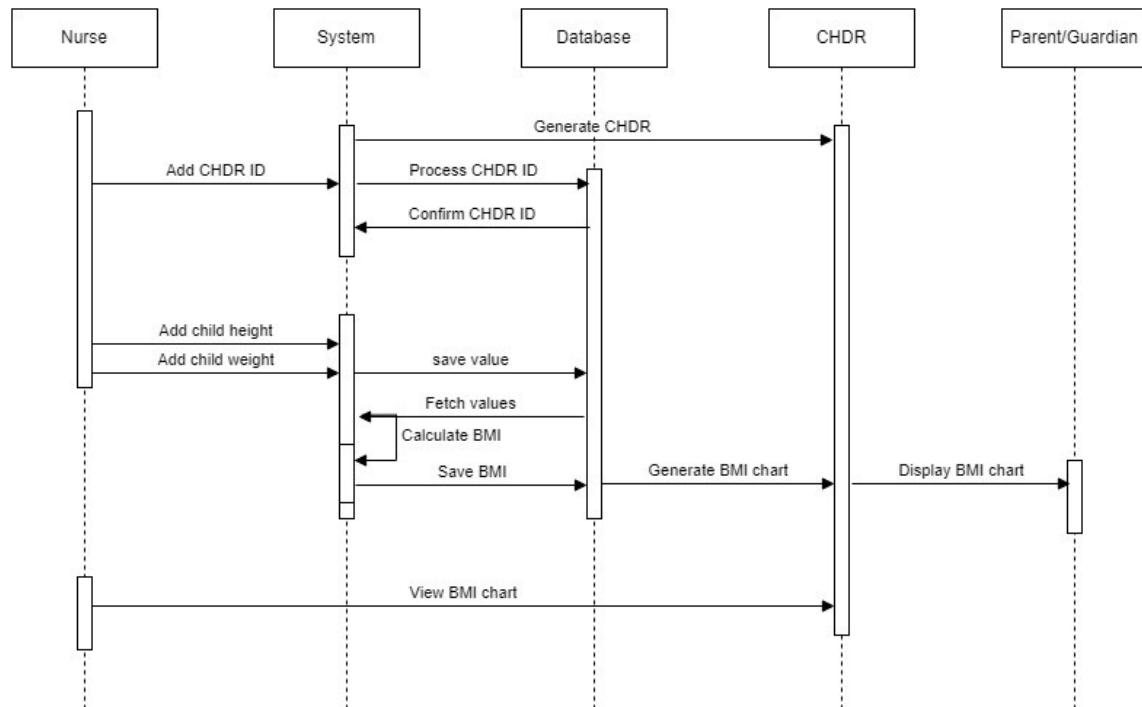


Figure 30: Sequence diagram of BMI calculation:

#### 4.7.4 Activity diagram of BMI Calculation:

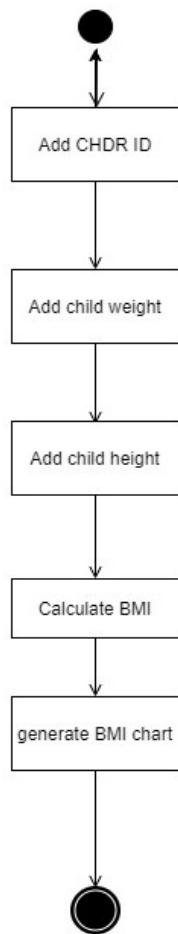


Figure 31: Activity diagram of BMI calculation.

## 4.8 System Feature 8

### 4.8.1 Use case diagram of Reminder:

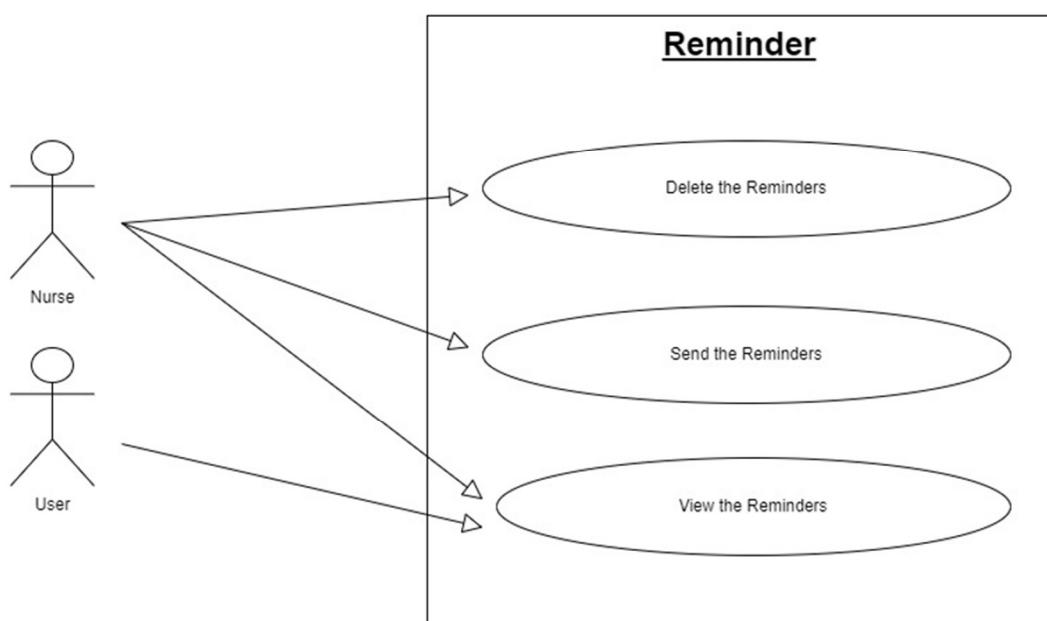


Figure 32: Use case diagram of Reminder

#### 4.8.2 Use case description of Reminder:

Function name: Sending reminders

Use case name	Reminders	
Goal	Send reminders for users regarding vaccination schedules.	
Primary Actor	Nurse/User	
Secondary Actor	System	
Precondition	The nurse must be authenticated and authorized to create reminders. Nurse must be logged in.	
Postcondition	The reminder is created and stored in the system for further processing. And reminder is sent successfully to the target users.	
Main Flow	Step	Action
	1	Delete the reminder if needed
	2	Send the reminder to targeted user.
	3	User and nurse also can view the reminder

#### 4.8.3 Sequence diagram of Reminder:

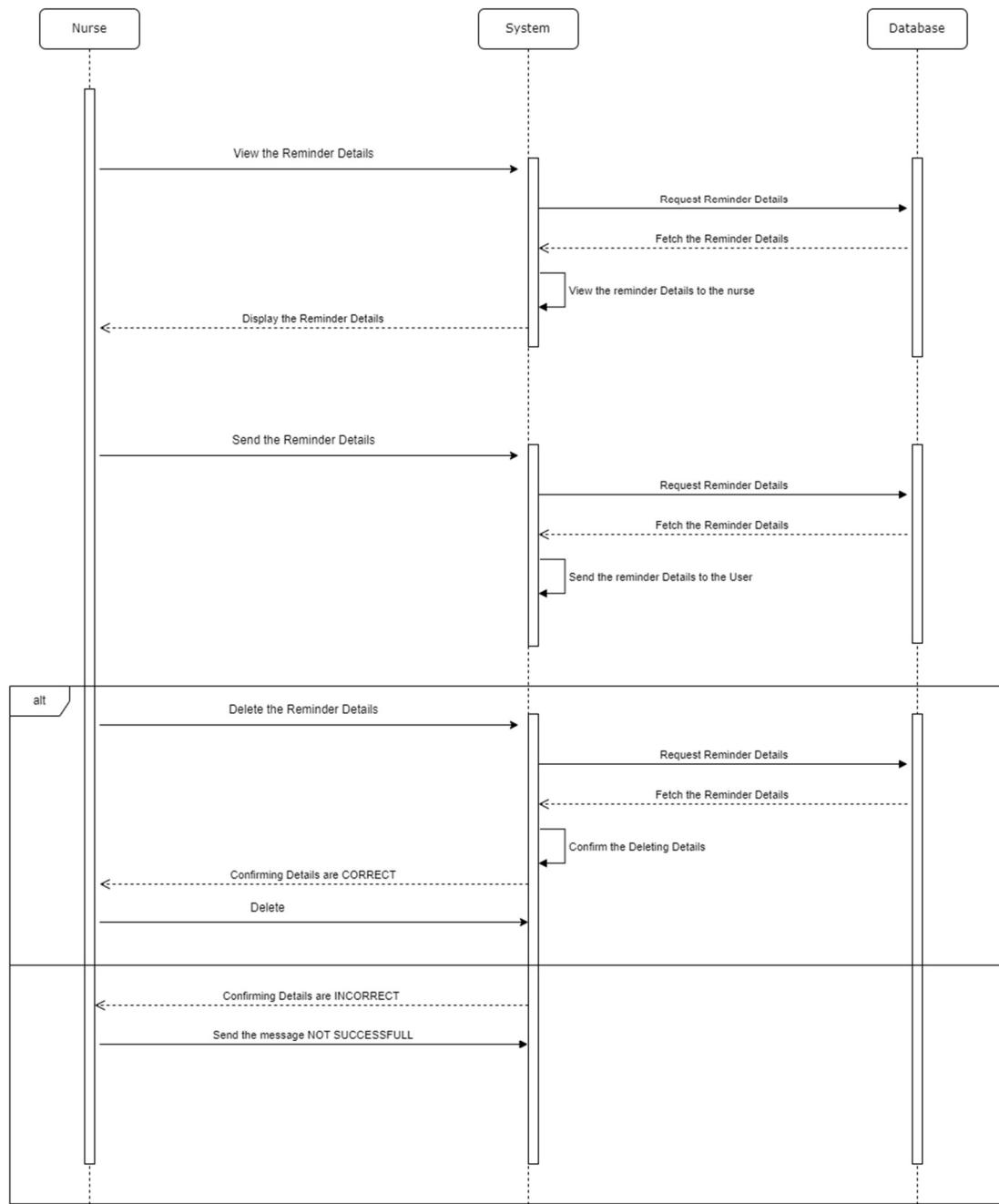


Figure 33: Sequence diagram of Reminder

#### 4.8.4 Activity diagram of Reminder:

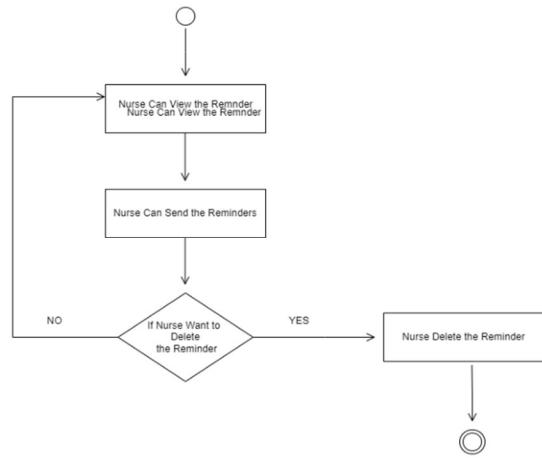


Figure 34: Activity diagram of Reminder

## 4.9 System Feature 9

### 4.9.1 Use case diagram of Advice Based on BMI:

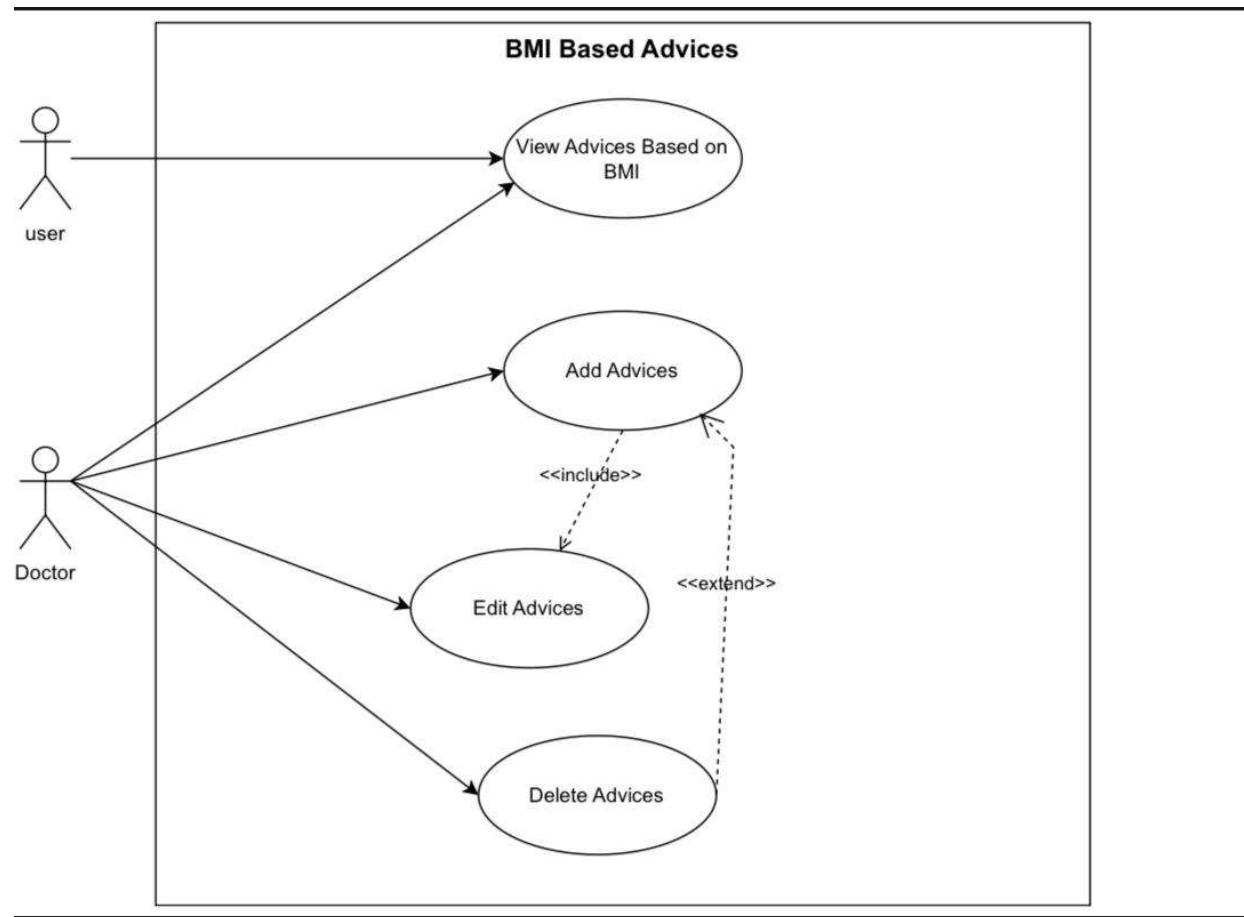


Figure 35: Use case diagram of Advice based on BMI

#### **4.9.2 Use case description of Advice Based on BMI:**

Function Name: Give Advises Based on BMI

Use Case Name	Manage BMI Based Advice	
Goal	Administer growth (weight/height) advice for the baby.	
Primary Actors	Doctor (Admin)	
Secondary Actors	None	
Preconditions	The doctor must be logged in with an admin username and password.	
Postconditions	None	
Main flow	Step	Action
	1	The Doctor accesses the advice Stored table
	2	The system loads the Advice based on BMI ranges and Specified Age
	3	The Doctor can add, edit, or delete advice on growth progress.

#### 4.9.3 Sequence diagram of Advice Based on BMI:

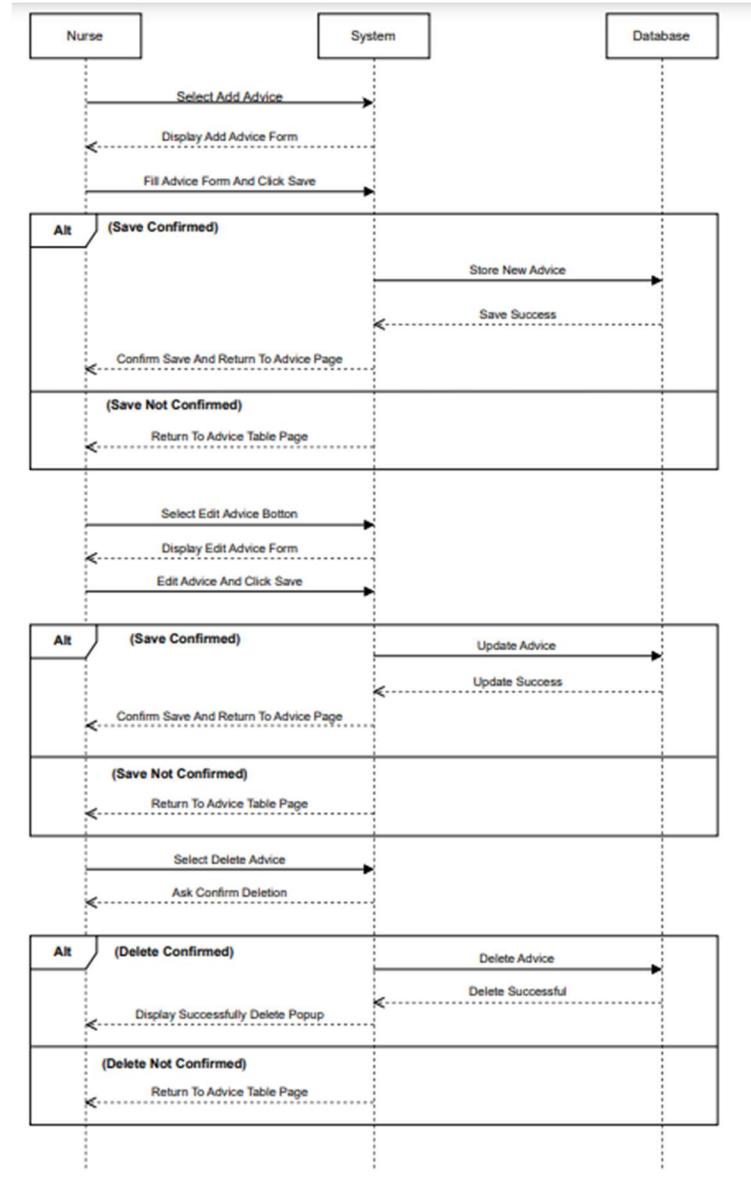


Figure 36: Sequence diagram of Advice based on BMI

#### 4.9.4 Activity diagram of Advice Based on BMI:

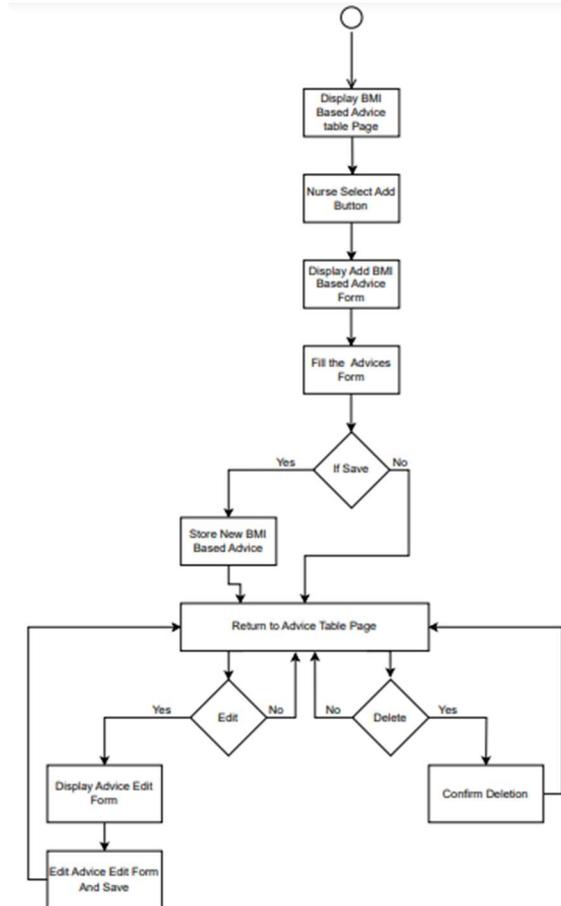


Figure 37: Activity diagram of Advice based on BMI

## 4.10 System Feature 10

### 4.10.1 Use case diagram of Vaccination Side Effects:

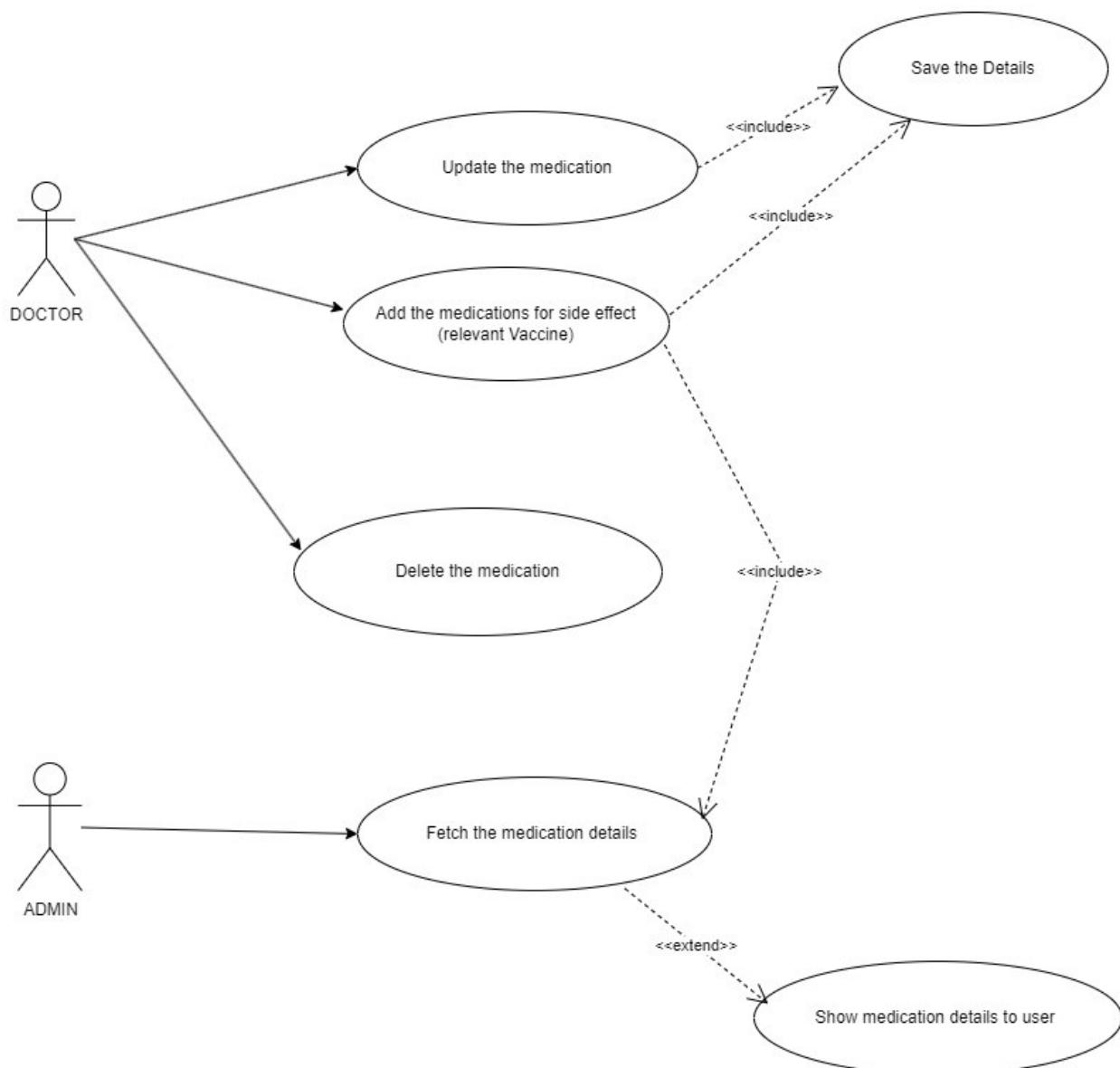


Figure 38: Use case diagram of Vaccination Side effects

#### 4.10.2 Use case description of Vaccination Side Effects:

Function name: Medications for side effects

Use case name	Medications for the side effects	
Goal	Inform users about medication if side effect occurs after the vaccine	
Primary Actor	Doctor/Admin	
Secondary Actor	System	
Precondition	Doctor must be logged in. The doctor must be authenticated.	
Postcondition	The medication for the relevant vaccine's side effects display to the user.	
Main Flow	Step	Action
	1	Add the medications for side effects and save details in system.
	2	Update the medications and save the new details.
	3	Delete the medications from the system.
	4	Admin fetch the data from system and display the details to the users.

#### 4.10.3 Sequence diagram of Vaccination Side Effects:

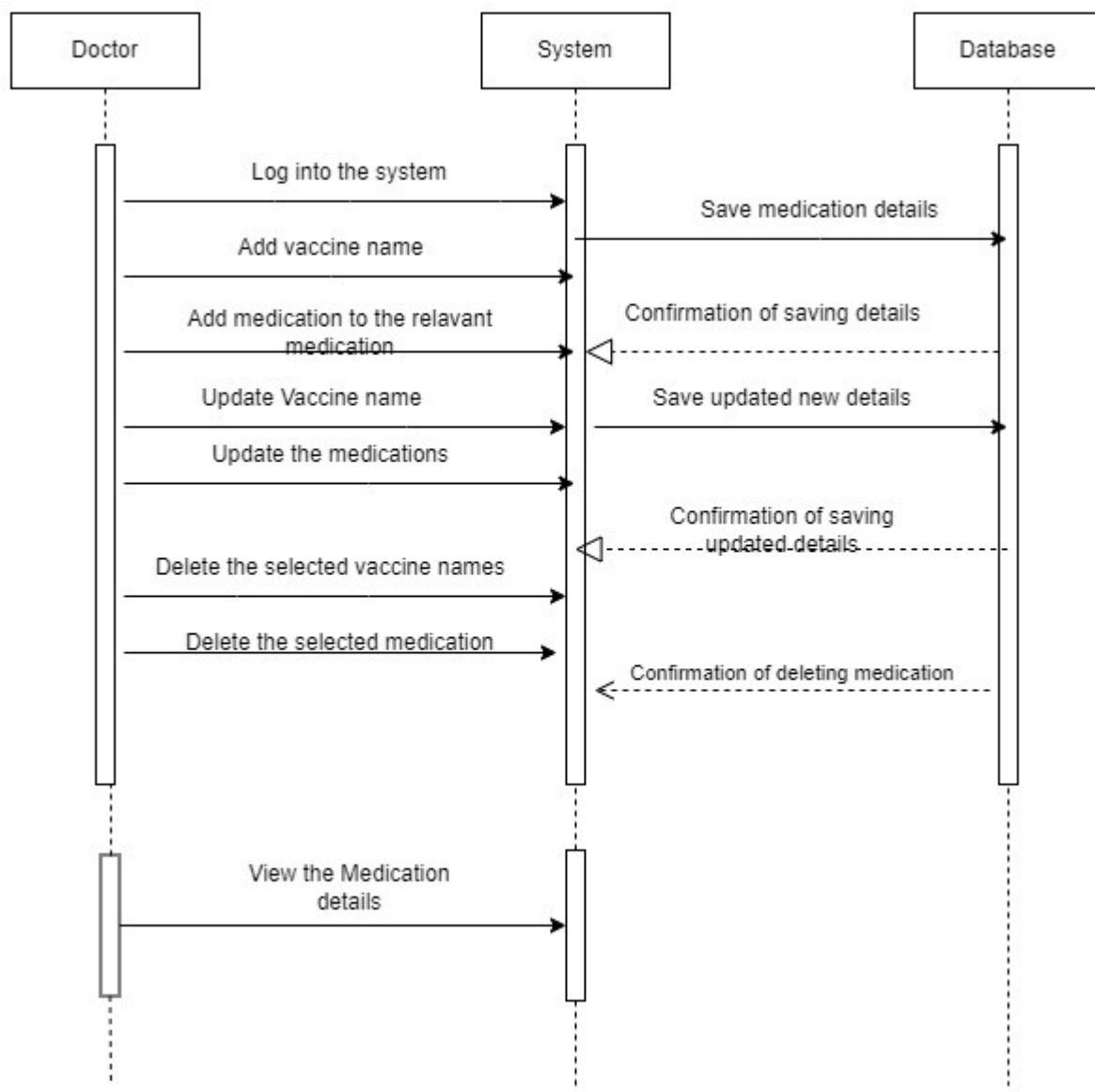


Figure 39: Sequence diagram of Vaccination Side effects.

#### 4.10.4 Activity diagram of Vaccination Side Effects:

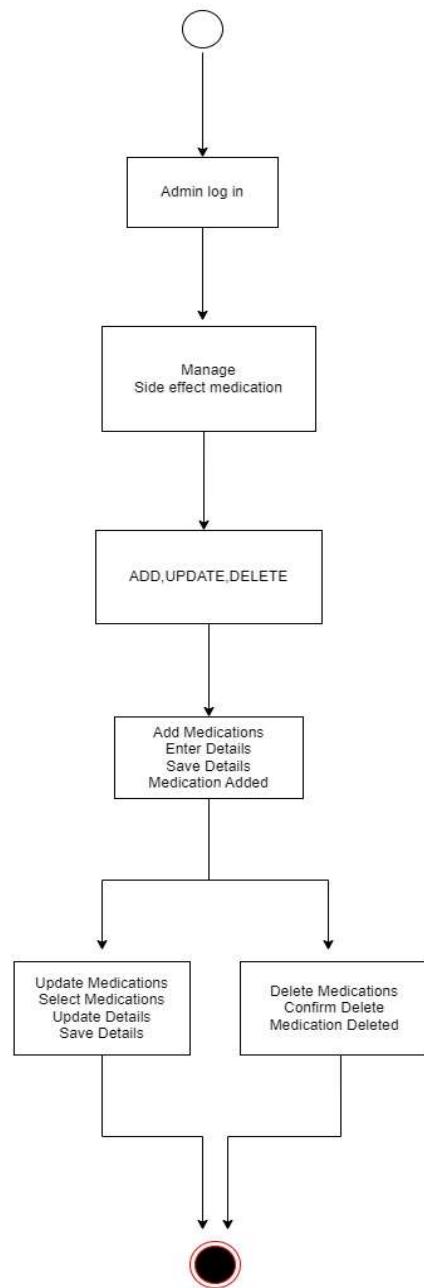


Figure 40: Activity diagram of Vaccination Side effects

## 4.11 System Feature 11

### 4.11.1 Use case diagram of Feedback.



Figure 41: Use case diagram of Feedback

#### 4.11.2 Use case description of Feedback.

Function name: managing feedback

Use Case Name	Manage Feedback Submission and Review	
Goal	Feedback submission by users is enabled for their experiences, while the administrator can manage, examine and respond to it.	
Primary Actors	User, Admin, Top management	
Secondary Actors	System	
Preconditions	<ul style="list-style-type: none"> <li>• Feedback system should be accessible for the user (either via webpage or platform).</li> <li>• The feedback form should be available and functioning.</li> <li>• Admin should have access to the feedback management tools of the system.</li> </ul>	
Postconditions	<ul style="list-style-type: none"> <li>• This user has submitted his feedback successfully and it has been saved in the database. He can view filter respond generate reports or even delete any feedback.</li> <li>• In case the user cancels or simply does not send the feedback, everything is erased. Additionally, no modifications are executed at all</li> </ul>	
Main Flow	Step	Action
	1	The user initiates the feedback process by selecting the option to open the feedback form. The system displays the feedback form.
	2	The user enters their channel no and name to identify themselves while submitting feedback.
	3	The user provides feedback by entering comments or suggestions in the designated text field.
	4	The user submits the feedback. The system processes and saves the feedback into the database.

#### 4.11.3 Sequence diagram of Feedback

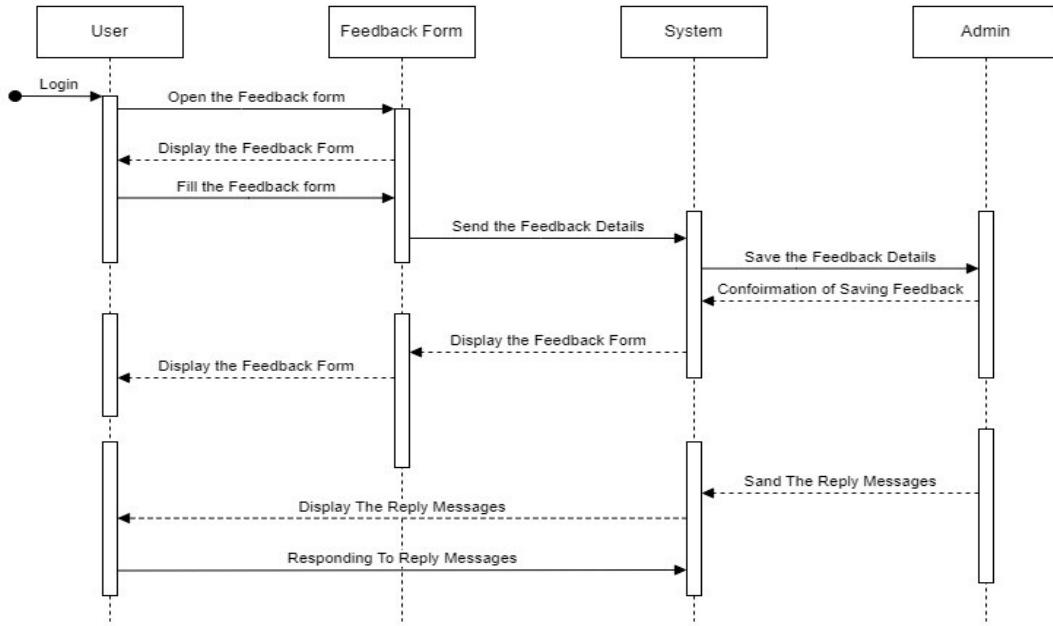


Figure 42: Sequence diagram of Feedback

#### 4.11.4 Activity diagram of Feedback (Admin):

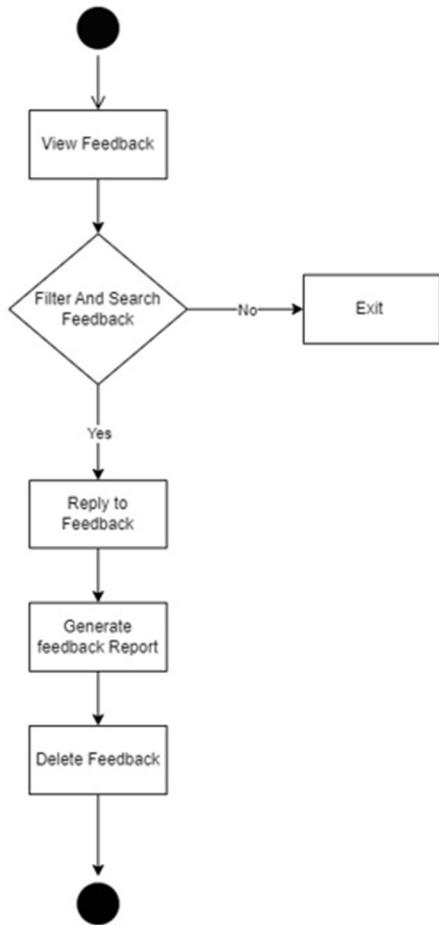


Figure 43: Activity diagram of Feedback (Admin)

#### 4.11.5 Activity diagram of Feedback (User):

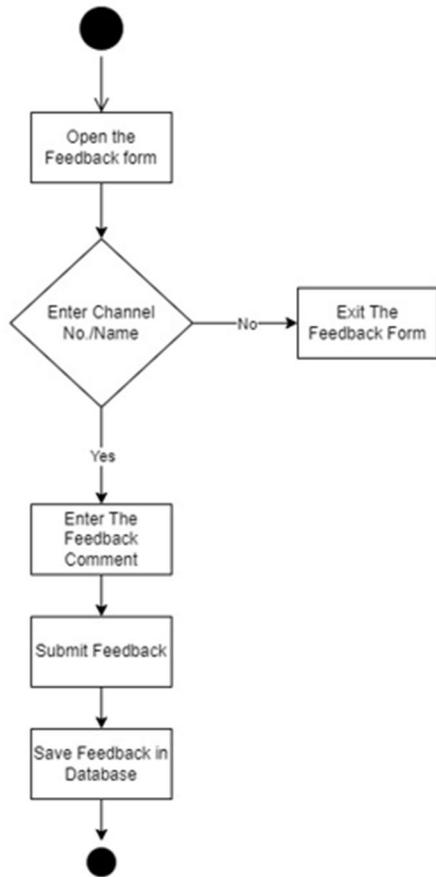


Figure 44: Activity diagram of Feedback (user):

## 4.12 System Feature 12

### 4.12.1 Use case diagram of Vaccine List:

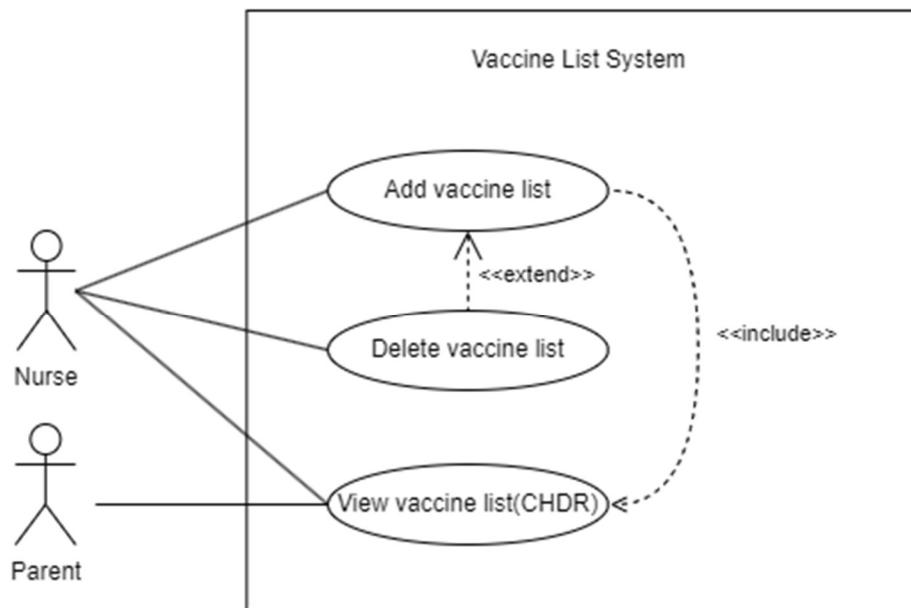


Figure 45: Use case diagram of Vaccine list.

#### **4.12.2 Use case description of Vaccine List:**

Function name: displaying vaccine details

Use case name	Vaccine list details	
Goal	display the vaccine list for a better understanding	
Primary actor	Nurse	
Secondary actors	Parent	
Precondition	Nurse already logged in to the system.	
Postcondition	Database update CHDR card update	
Main flow	Step	Action
	1	Using add button Nurse can add new vaccine details.
	2	Using delete button nurse can delete added vaccine.
	3	Nurse can view vaccine list page.
	4	Parent can view vaccine list in CHDR card.

#### 4.12.3 Sequence diagram of Vaccine List:

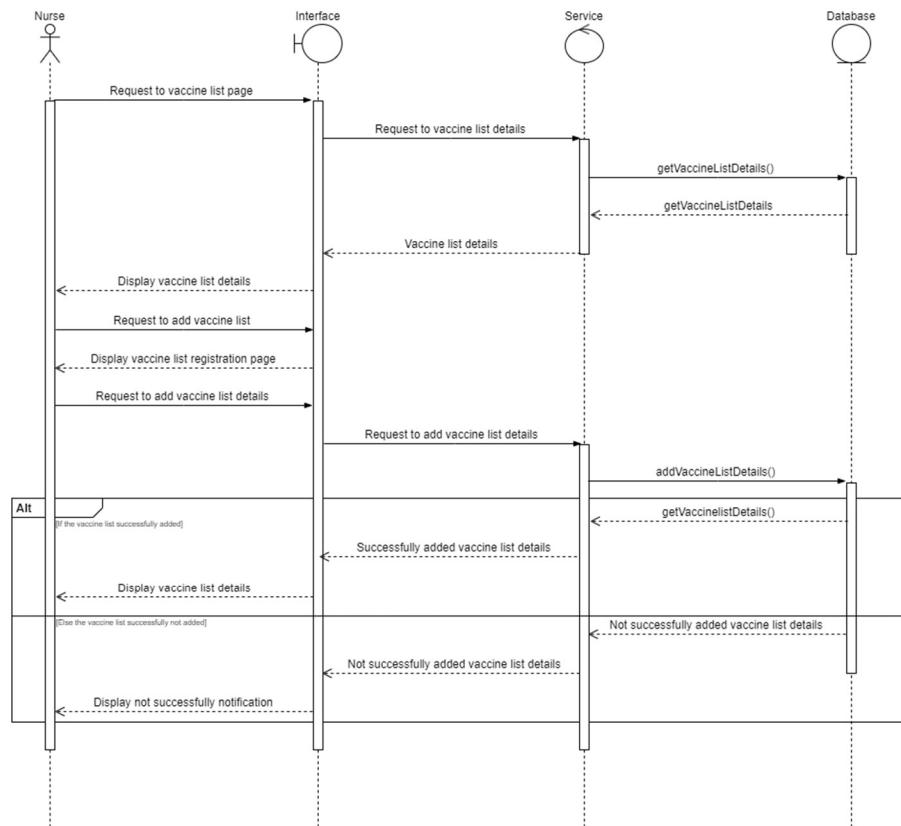


Figure 46: Sequence diagram of Vaccine list:

#### 4.12.4 Activity Diagram of Vaccine List:

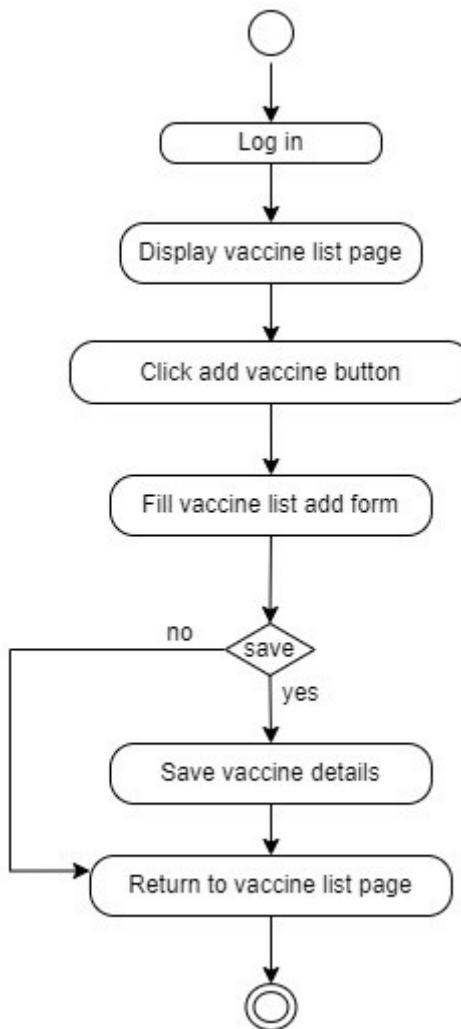


Figure 47: Activity Diagram of Vaccine list:

## **5 Other Nonfunctional Requirements**

### **5.1 Performance Requirements (Assumptions as for now)**

- The system loads CHDR card within maximum of 5 seconds under normal network conditions. API calls take maximum of 500 milliseconds to retrieve vaccine information from the database. User authentication and log in is processed within 1 second.
- The system supports 50 concurrent vaccine channels per second within the performance range and it also can handle 500 concurrent active users at the same time. The system is capable of handling 1000 child vaccination records with no more than a 5% performance drop in query speeds.
- Vaccination records are updated with changes within 1 second after the record is saved. Appointment reminder emails and notifications are sent 24 hours before the vaccine channelings.
- The updates on CHDR and generating BMI chart is completed within 30 seconds, regardless the number of records processed. To hand over the prescription bill to the user, it will take maximum of 10 seconds.

### **5.2 Safety Requirements**

- All vaccination records will be validated for accuracy when entering details to prevent incorrect or incomplete information. Clear error messages will be displayed when invalid data is detected. It will prevent health risks due to invalid data entry.
- The system will maintain regular backups of all vaccine records to prevent data loss in case of any technical failures.
- Role Based Access Control will ensure that only authorized hospital staff can modify vaccine records under unavoidable circumstances. Unauthorized personnel will be restricted from altering data.
- The system will ensure that all health reminder notifications are sent accurately and on time to prevent missed vaccinations or improper administration.

## **5.3 Security Requirements**

- All personal details and medical records will be encrypted and transmitted using SSL/TLS. Access to sensitive data is restricted to authorized personnel only.
- The system requires MFA for users accessing sensitive data and information, such as vaccine records and health records. Use of strong passwords will assure the security as well.
- User will have access only to the data and functions they need to perform their tasks. No two users can access each other's functions.
- The system will have regular backups in case of an emergency.

## **5.4 Software Quality Attributes**

- Adaptability: the system will easily adapt to future changes such as, changes in vaccines and vaccine schedules. It will be able to adapt new features without requiring a significant downtime.
- Availability: the system will be available for parents or guardians, doctors, nurse, pharmacist, top level management and ICT technicians at any time, particularly during the clinic working hours. The relevant hospital staff will be able to always access the child medical records, especially in emergencies.
- Accuracy: The system will be able to verify the correct dosage and vaccination dates and times, ensuring the child receives the correct treatment according to the medical standards.
- Flexibility: If the government introduces new vaccine programs or policies, the system will be able to adapt into the new changes with minimal disruption.
- Maintainability: Regular updates done to the vaccine database or adding new features will be straightforward.
- Reliability: The system will be able to handle large number of users accessing the system simultaneously.

## **Appendix A: Glossary**

<b>Terms</b>	<b>Definition</b>
<b>CHDR</b>	<b>Child Health Development Record</b>
<b>BMI</b>	<b>Body Mass Index</b>
<b>SRS</b>	<b>Software Requirement Specification</b>
<b>SQL</b>	<b>Structured Query Language</b>
<b>OTP</b>	<b>One Time Password</b>
<b>ICT</b>	<b>Information and Communication Technology</b>
<b>SSL</b>	<b>Secure Socket Layer</b>
<b>TLS</b>	<b>Transport Layer Security</b>
<b>MFA</b>	<b>Multi-Factor Authentication</b>
<b>API</b>	<b>Application Programming Interface</b>

**(As client requirements are still lacking, some of the parts are analyzed based on the team's assumptions)**