



COMSATS University, Islamabad Pakistan

Child Immunization and Growth Tracking System

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Bachelor of Science in Computer Science (2018-2022)

The candidate confirms that the work submitted is their own and appropriate credit has been given where reference has been made to the work of others.



COMSATS University, Islamabad Pakistan

Child Immunization and Growth Tracking System

**A project presented to
COMSATS University, Islamabad**

**In partial fulfillment
of the requirement for the degree of**

Bachelors of Science in Computer Science (2018-2022)

By

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DECLARATION

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Shariq Ahmed

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CERTIFICATE OF APPROVAL

It is to certify that the final year project of BS (CS) “Child Immunization and Growth Tracking” was developed by **Shariq Ahmed CIIT/SP18-BCS-151** and **Umar Khalid CIIT/ SP18-BCS-164** under the supervision of **Dr Ashfaq Hussain Farooqi** and that in his opinion; it is fully adequate, in scope and quality for the degree of Bachelors of Science in Computer Sciences.

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Supervisor

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(Department of Computer Science)

Executive Summary

Pakistan is one of the two countries that is not able to eradicate basis disease like polio. One of the main reasons of this is poor health facilities and not keeping record of immunization data or growth. We often see developed countries have very organized health care system and they ensure that each born child get these necessary vaccinations. Apart from this, another problem which our health care system face is undergrowth of children. Because of less facilities or hunger, child face malnutrition. Parents cannot get their children checked up from the doctor. There are also a number of parents who want to test their children growing abilities time to time. There exists no system from which they can check improvement about the mental, physical, emotional, socials abilities after a certain age.

Health care systems are available in Canada and other developed countries. They keep record from birth and if anyone miss their child vaccination, their system flag them and government fines the parents. Unfortunately, until now we don't have any system neither for government or parents. Manual tracking is done here, and if someone misses vaccination, no one can track them

Child immunization and Growth tracking is a web with Smart phone Application that provides these benefits to the officials and parents at the same time. Officials will be able to add data at the time of child birth and system will keep track of its vaccination. Stock levels can be easily maintained from higher to lower level with the future possible requirement stats too. Apart from that, different type of vaccine campaigns can be managed from this web application too.

Child immunization and growth tracking offers smart mobile application for polio workers and parents. Polio worker will perform the same work through mobile application. Parents can see their child track record, predict their child growth time to time by a machine learning model. Apart from that, information will be able in the application for parent's basic guidance too.

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All praise is to Almighty Allah who bestowed upon us a minute portion of His boundless knowledge by virtue of which we were able to accomplish this challenging task.

We are greatly indebted to our project supervisor “Dr. Ashfaq Hussain Farooqi”. Without their personal supervision, advice and valuable guidance, completion of this project would have been doubtful. We are deeply indebted to them for their encouragement and continual help during this work.

And we are also thankful to our parents and family who have been a constant source of encouragement for us and brought us the values of honesty & hard work.

Shariq Ahmed

Umar Khalid

Abbreviations

SRS	Software Requirement Specification
PC	Personal Computer
SDD	Software Design Description
ML	Machine Learning
MERN	Mongo DB, Express.js, React, Node.js
JS	JavaScript
SDLC	Software Development Lifecycle
OTP	One-time password
SMS	Short service message
APK	Android Application Package
API	Application programming interface

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1 Introduction

Pakistan is one of the two countries that is not able to eradicate basis disease like polio. One of the main reasons of this is poor health facilities and not keeping record of immunization data or growth. We often see developed countries have very organized health care system and they ensure that each born child get these necessary vaccinations. Apart from this, another problem which our health care system face is undergrowth of children

Child immunization and Growth tracking is a web with Smart phone Application that provides these benefits to the officials and parents at the same time. Officials will be able to add data at the time of child birth and system will keep track of its vaccination. Stock levels can be easily maintained from higher to lower level with the future possible requirement stats too. Apart from that, different type of vaccine campaigns can be managed from this web application too.

Child immunization and growth tracking offers smart mobile application for polio workers and parents. Polio worker will perform the same work through mobile application. Parents can see their child track record, predict their child growth time to time by a machine learning model. Apart from that, information will be able in the application for parent's basic guidance too.

1.1 Vision Statement

For government authorities and parents **who** want to track the immunization and growth of children/s respectively, **the** *Child Immunization and Growth Tracking System* is a web and smartphone-based application **that** will track the child immunization record from the birth time until completion of all the necessary vaccines helping authorities to control basic diseases. Apart from tracking, it will help to manage the extra vaccine campaigns. For parents, it has growth tracking system which can help them to monitor their child physical and mental health at different age of life. Apart from tracking, it will also help them to check polio symptoms in their child. **Unlike** current manual system of immunization of government authorities, **our product** (*Child Immunization and Growth Tracking System*) will be more automated, secure, more reliable, helping in reminding vaccination that will help the parents to immunize their children and authorities to reduce basic diseases. Also, helping parents to monitor children growth with respect to age.

1.2 Related System Analysis/Literature Review

Table 1: Related System Analysis with proposed project solution

Application Name	Weakness	Proposed Project Solution
Immunization information system [1]	<ul style="list-style-type: none"> Limited to only tracking of vaccines Not keeping track of individuals Cannot predict about future vaccine requirement Only US-based Only web-based application 	<ul style="list-style-type: none"> The system will be able to track individuals too It will keep all the record of vaccine and child too It will be able to predict the future requirement of the vaccine in a specific area The system will be able to generate all the reports which can help authorities The system will be web and mobile-based The system will also keep track of polio workers
Immunization exercise management system [2, 1]	<ul style="list-style-type: none"> Only web-based application Limited to only track the vaccine record Don't have prediction ability 	<ul style="list-style-type: none"> Track both child and vaccination record Track the child growth Mobile and web-based application Can generate reports and statistical graphs
Child vaccination schedule	<ul style="list-style-type: none"> User can only add a schedule and they will get the reminder Only mobile application 	<ul style="list-style-type: none"> As mentioned about the system will automatically give a reminder to parents Web and mobile applications will be made
Operability, Acceptability, and Usefulness of a Mobile App to Track Routine Immunization Performance in Rural Pakistan: Interview Study Among Vaccinators and Key Informants	<ul style="list-style-type: none"> Only track record of people in rural areas Not centralized Only mobile application Don't keep a record of children whose vaccination is not done 	<ul style="list-style-type: none"> The system will be centralizing so it can be used in any area It will keep a record of whether the child is vaccinated or not It will keep track of the vaccinator so it will be

	<ul style="list-style-type: none"> • Don't keep a record of vaccinator and vaccine • Don't have a good UI 	<p>easy if something wrong happens</p> <ul style="list-style-type: none"> • The system will have a user-friendly UI
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1.3 Project Deliverables

Following are the deliverables

- Scope Document
- Software Requirement Specifications
- Software Design Description
- Software Testing Report
- Final Report
- Mobile application APK
- Web Application Code

1.4 System Limitations/Constraints

Following are the limitations of our system right now

LI.1: For tracking, it is mandatory for hospitals and vaccine centers to be registered with our system.

LI.2: During time of vaccination, contact number provided should be there to confirm vaccination

LI.3: The system cannot track polio workers using GPS.

LI.4: The system cannot track those children who are born at home

LI.5: The system cannot track those children's vaccination record whose vaccination is done by a center which is not registered with us

1.5 Tools and Technologies

Following are the tools and technologies used in our system

Table 2 Tools and Technologies for Proposed Project

Tools And Technologies	Tools	Version	Rationale
	Visual Studio Code	2020	Text Editor
	MS Word	2015	Documentation
	MS PowerPoint	2015	Presentation
	Balsamic	4	Mockups Creation
	GitHub	2020	Collaboration
	Jupyter notebook	6.2.0	IDE
	Technology	Version	Rationale
	HTML	5.0	Web Development
	CSS	3.0	Web Development
	JavaScript	ES6	Web Development
	React JS	16	Frontend Development Framework
	Mongo DB	4	Database
	Node JS	14	Backend Development
	Express JS	4	Backend Development Framework
	React Native	0.62	Mobile Application Development
	Python	3.8	Programming Language
	Flask	1.1.2	Framework
	XGBOOST	1.3.6	Model
	Numpy	1.21.4	Library
	Panda	1.3.4	Library

1.6 Relevance to Course Modules

Below are the Concepts that we applied while implementing this project:

1.6.1 Machine Learning:

Machine learning is a type of artificial intelligence which uses the historical data to predict new results. It allows applications to become more accurate with the passage of time.

1.6.2 Databases

Collection of data in an organized structure from which data can be easily accessed and manipulated according to our own desire. We can store large amount of that with the minimal risk of losing the records. Apart from managing data, databases also provide privacy of the data too

1.6.3 Mobile Development

In this concept we learned how to make an application for mobile devices. As the technology is revolving and today's time requirement is to make an application that works on both famous operating system that is Android and IOS.

1.6.4 Website Development

A concept where we implement our all programming skills to make a program that is used by the end user comfortably. These are built on the requirements of the stakeholders. To make it easily interactive, front-end is made user friendly, while for optimize performance, its backend is coded in optimal way to avoid errors.

2 Problem Definition

This chapter discusses the precise problem to be solved. It should extend to include the outcome.

2.1 Problem Statement

All the developed countries have centralized health care system which helps them to track record of children and if someone is not getting his child vaccinated, he is penalized heavily. The reason being doing that is these are communicable diseases that can spread from one to others. These diseases include TB, Polio, Hepatitis, Flu, Measles, etc. To prevent these diseases to spread among others, immunization against them is done by the vaccine. As we know that Pakistan has poor health facilities and there is no proper infrastructure so no track of childbirth and their parent. And because of not having a centralized health care system it is difficult to track the children who are not getting the vaccination. Another thing is the manual system. People often forget the dates of vaccination of their children.

In many health care centers, there is a shortage of vaccines sometimes. One more problem is that sometimes children get expired vaccine which causes serious diseases and, in some cases, the child dies too. Apart from the vaccination-related problem, Pakistan is also facing a child undergrowth problem. Many children don't grow properly in the initial years which causes many deficiencies among them. Parents cannot monitor their child growth.

So, this system will cover all these problems and assist the parents and authorities in reducing these communicable diseases and monitor the growth of children so that no child gets undergrowth diseases.

2.2 Problem Solution

We have divided the system into two different parts. One is dealing with the vaccination system. It will add the infant and parents' detail and will give vaccination dates to the parents. Then before the vaccination date, parents will be notified. If the child gets vaccinated then that vaccination will get marked and if he is not vaccinated then the system will notify parents again. If the child doesn't get vaccinated then the report will be delivered to authorities after two weeks. Also, the system will track all the details related to the vaccine. Its manufacturing and expiring dates, who is injecting that vaccine, how much stock is left etc. system will also predict the possible cases according to previous data. Apart from this system will also predict the requirement of the vaccine in the upcoming months.

Through this system, it will be easier to centralize all the data information and keep track of the health of newborn children. This system will be made in such a way that in the future if we want to centralize our country's health care system then it will provide the root system for the new system.

The other part of the system is dealing with parent's benefits as parents can add the updated information of the child and mobile applications will tell them about their growth.

2.3 Objectives of the Proposed System

Example:

BO-1: Track child immunization record

BO-2: Management of vaccine stock and campaigns efficiently

BO-3: Maintain stock levels according to current and upcoming needs

BO-4: Predict Child growth with respect to age

BO-5: Check polio symptoms in child

2.4 Scope

Child immunization and growth tracking system is an immunization tracking system that is taking child and parent detail at the time of birth. Birth certificate is printed with vaccination dates. Before the vaccination date, a SMS reminder is sending to given contact number. At time of vaccination, when vaccination data is updated, a confirmation code is sent to given contact number. If parent don't come for vaccination of child, parent will get a reminder SMS. And if they still don't come for vaccination, report of children who didn't get vaccinated, will be sent to sub admin with their parent information for further action.

Vaccine center can manage the stock levels of the vaccine to make sure no sub center or hospital go out of stock for vaccines. They can also manage campaigns from this. Vaccine center can create specific campaign, a lot vaccination to it and notify public about it. Daily monitoring on the basis of vaccination completion can be viewed inside the campaign manager. Future stock requirement is also showing to them, which helps to maintain stocks for future need too.

Parents through the mobile application, see their children/s vaccination dates and necessary vaccination related information. They can also asses their child growth by rating their child skills and application will let them know their child mental and physical health status. On the basis of these results, diet will be suggested for the children to improve their health status. Parents can also check the polio symptoms in their child by providing necessary information

2.5 Modules

2.5.1 Module 1: Child Record Management and Tracking

FE-1: Signup through document upload and approval from sub admin

FE-2: Add, view, update, child and parent record

FE-3: Reminders for vaccination

FE-4: SMS confirmation for vaccine update

FE-5: Birth Certificate and vaccination schedule printable

FE-6: request, view vaccine stocks

FE-7: Check upcoming stock requirements

2.5.2 Module 2: Vaccine and Vaccine Center Management:

FE-1: Signup through document upload and approval from sub admin

FE-2: View, request vaccine stock

FE-3: Upcoming stock needs

FE-4: Stock allotment to registered polio workers

FE-5: Vaccine campaigns management
FE-6: Notify public regarding vaccine campaign
FE-7: Check requests of vaccine stocks from different registered polio workers
FE-8: Polio worker management

2.5.3 Module 3: User Management

FE-1: View to be vaccinated children data to polio workers
FE-2: Update vaccine record of child to Polio worker
FE-3: Maintain user profiles
FE-4: View information related to Vaccination and its benefits
FE-5: Check polio symptoms for parents
FE-6: Send reports to parent vaccine center for polio worker

2.5.4 Module 4: Predict Growth Tracking

FE-1: Rate children skills
FE-2: Add details of children
FE-3: Predict children growth based on machine learning trained model
FE-4: View suggested diet based on the results of growth prediction

2.5.5 Module 5: Admin and Sub admin Panel

FE-1: View children, vaccine stocks, hospitals and vaccine center data for whole country -> admin
FE-2: View data in statistical and graphical way
FE-3: Search information
FE-4: Filters
FE-5: View reports
FE-5: Assign vaccine stock to sub admins -> admin
FE-6: Assign vaccine stock to hospitals and vaccine centers -> sub admins
FE-7: View children, vaccine stocks, hospitals and vaccine center data for its own city -> sub admin

3 Requirement Analysis

This Chapter is about all the specification of requirements in detail for our project “Child immunization and growth tracker

3.1 Requirement Elicitation Techniques

By following ways, we gathered some requirements:

3.1.1 Observation

We got this project idea when I (Shariq Ahmed) spent some days in the backward area of KPK. I observed that people there don't want their children to be vaccinated as they have some wrong beliefs related to it. Then I started searching for this idea.

Apart from this, we observed in our close relatives that most parents forget the dates of vaccination too.

3.1.2 Research

After getting the idea we started to search for this and then we came to know about the figures for yearly children dying from these diseases. We made our research and decided to make such a system which can keep a record so that no one can escape from it

3.1.3 Brainstorming

After all this research, we brainstormed many ideas that how can we automate this immunization system. How can we make a system which can eradicate this problem from our country?

3.1.4 Interview

We interviewed our relatives who recently became a parent and some health workers too. We gathered all the information and the problems which the current system is having.

Also, we interviewed our foreigner friends and ask them about their country's immunization system and they told us how advanced and automated those systems are so that no one can escape from them.

3.2 User classes and characteristics

There are 6 different type of user's classes in our system. Following are the detailed characteristics mentioned:

Table 3: User Classes

User class	Description
Admin	Admin will be the main user of the application who will check data of whole country and specific cities in the form of numbers and graphs. He will also manage vaccine stocks and assign the stock to sub admins. He will be able to check reports of non-vaccinated children. He will also check future vaccine stock requirements.
Sub Admin	The characteristics of sub admin includes the management of vaccine stocks in his specific city. Check reports of non-vaccinated children of his city. Assign vaccine stock to hospitals and vaccine centers of his city.
Hospital	The hospitals will be able to manage child record. Send reminders before vaccination of children. Print birth certificates and child vaccination schedule. Request vaccine stock from sub admins.
Vaccine centers	Vaccine centers will update child vaccination record. They will manage campaign in their area, notify public about vaccine campaigns. They will also manage polio workers. Assign vaccine stock to polio workers is also the characteristics of vaccine center.
Polio worker	Polio workers will be able to update child record. Manage their profiles, Check polio symptoms of children.
Parents	Parents will be able to check their child data and his/her vaccination record, check their child growth, check polio symptoms, learn about different vaccines, check diet plans according to growth of their child

3.3 Requirement Identifying Technique

For child immunization and growth tracking, we used "Use Cases" as our requirement identifying technique. This include use case diagrams and descriptive tabular use cases. Following are the use case diagrams:

3.3.1 Admin

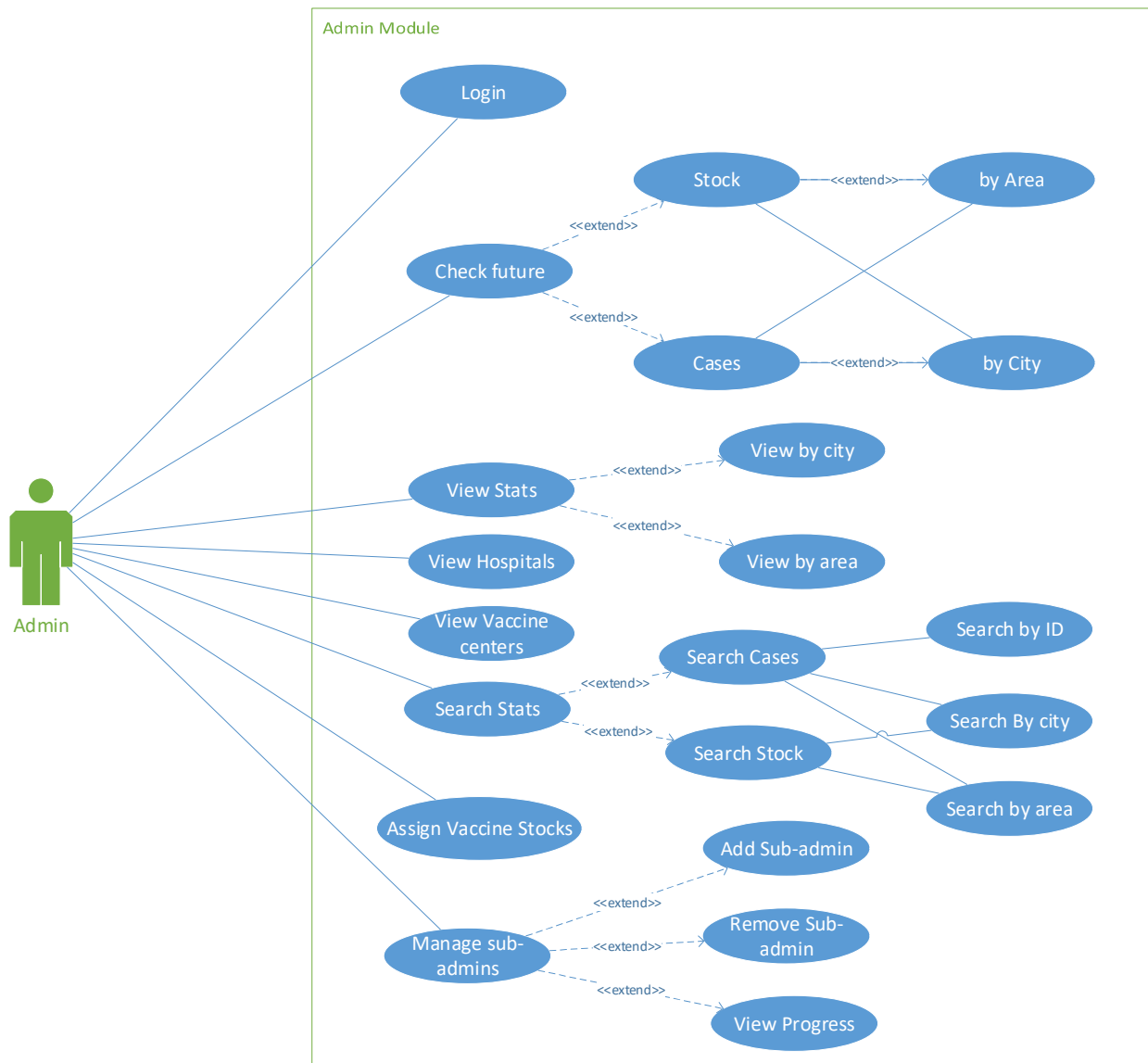


Figure 1: Admin Use Case diagram

3.3.2 Vaccine Center Employee

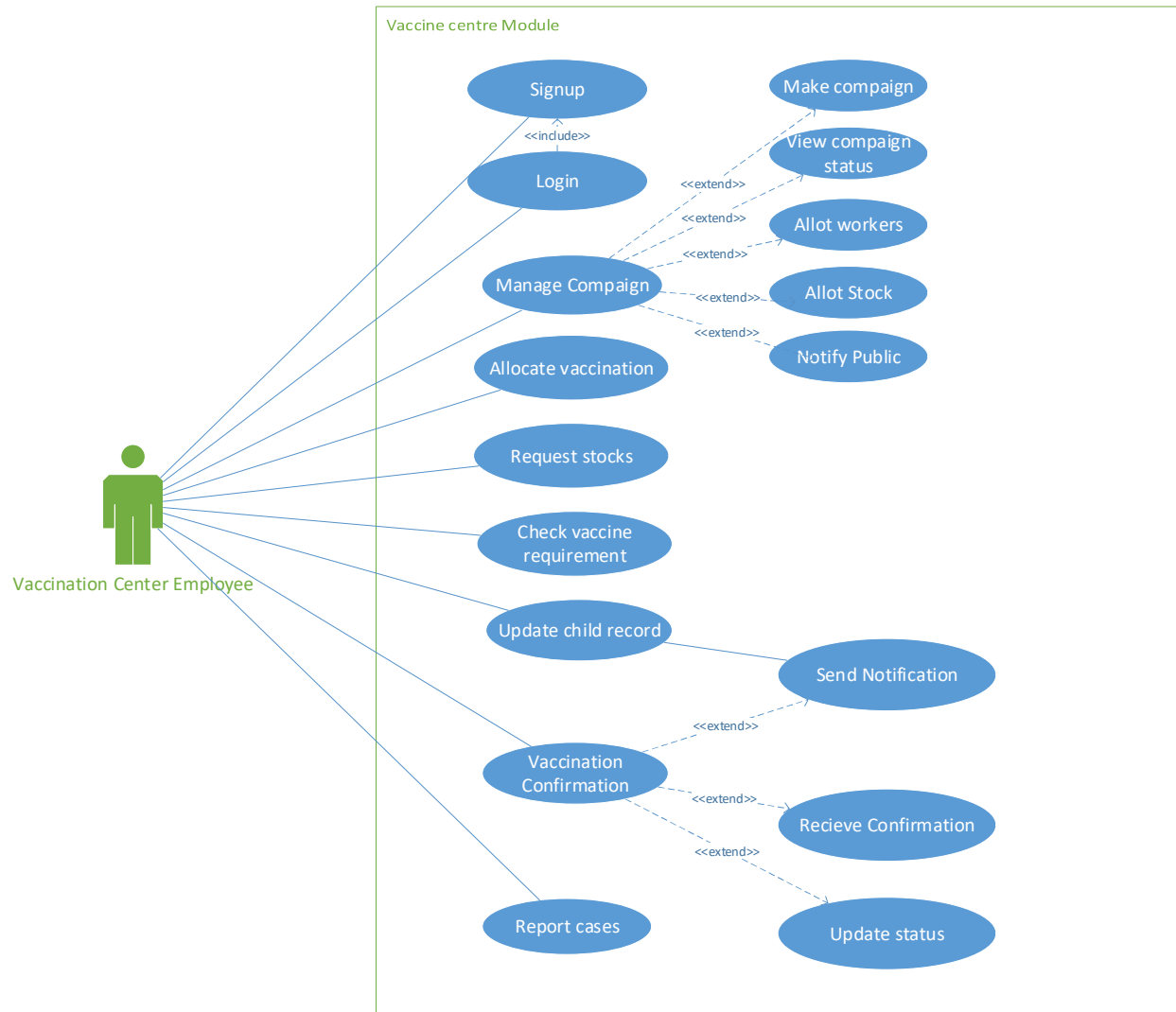


Figure 2: Vaccine Center Employee Use case diagram

3.3.3 Polio Worker

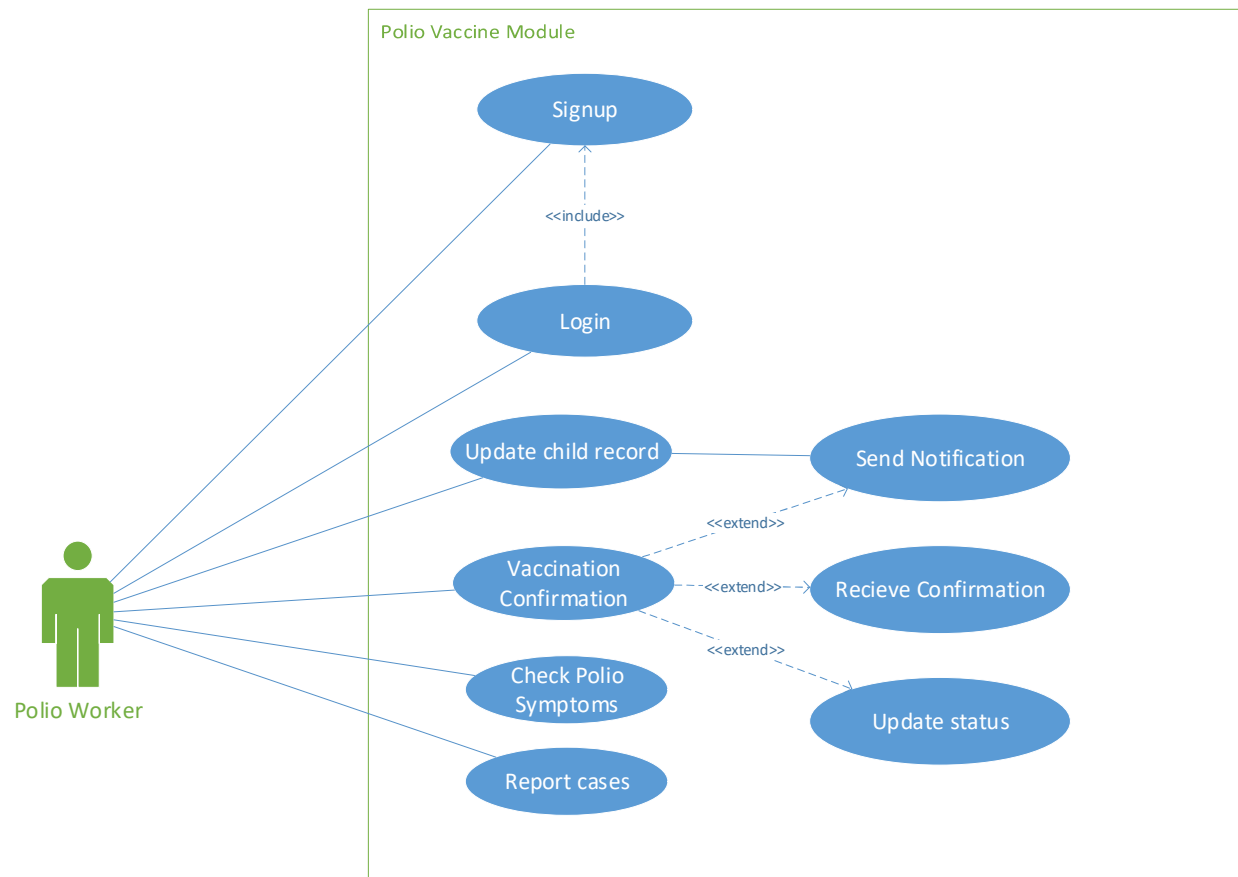


Figure 3: Polio Worker use case diagram

3.3.4 Hospital Employee

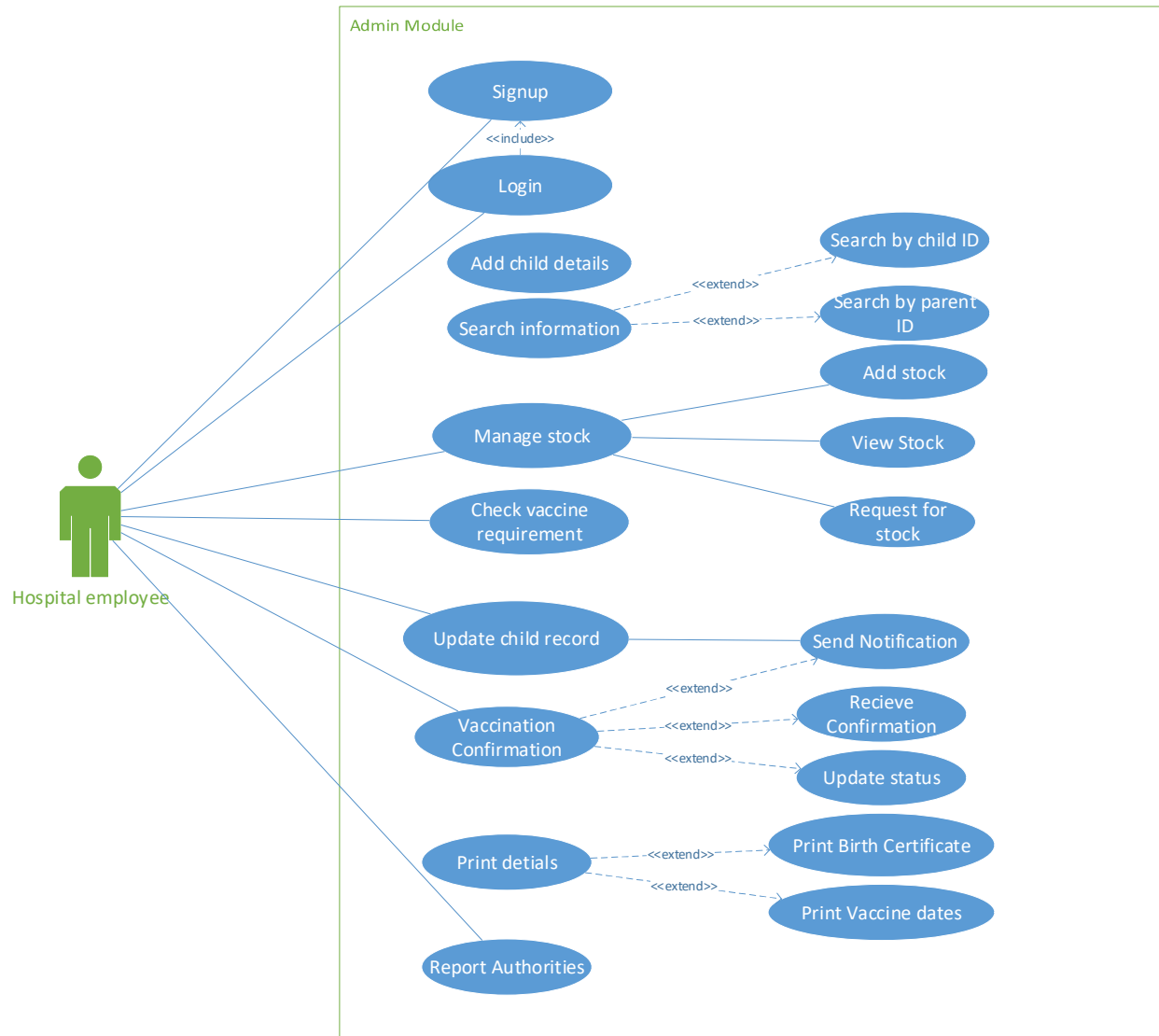


Figure 4: Hospital Employee diagram

3.3.5 Parent

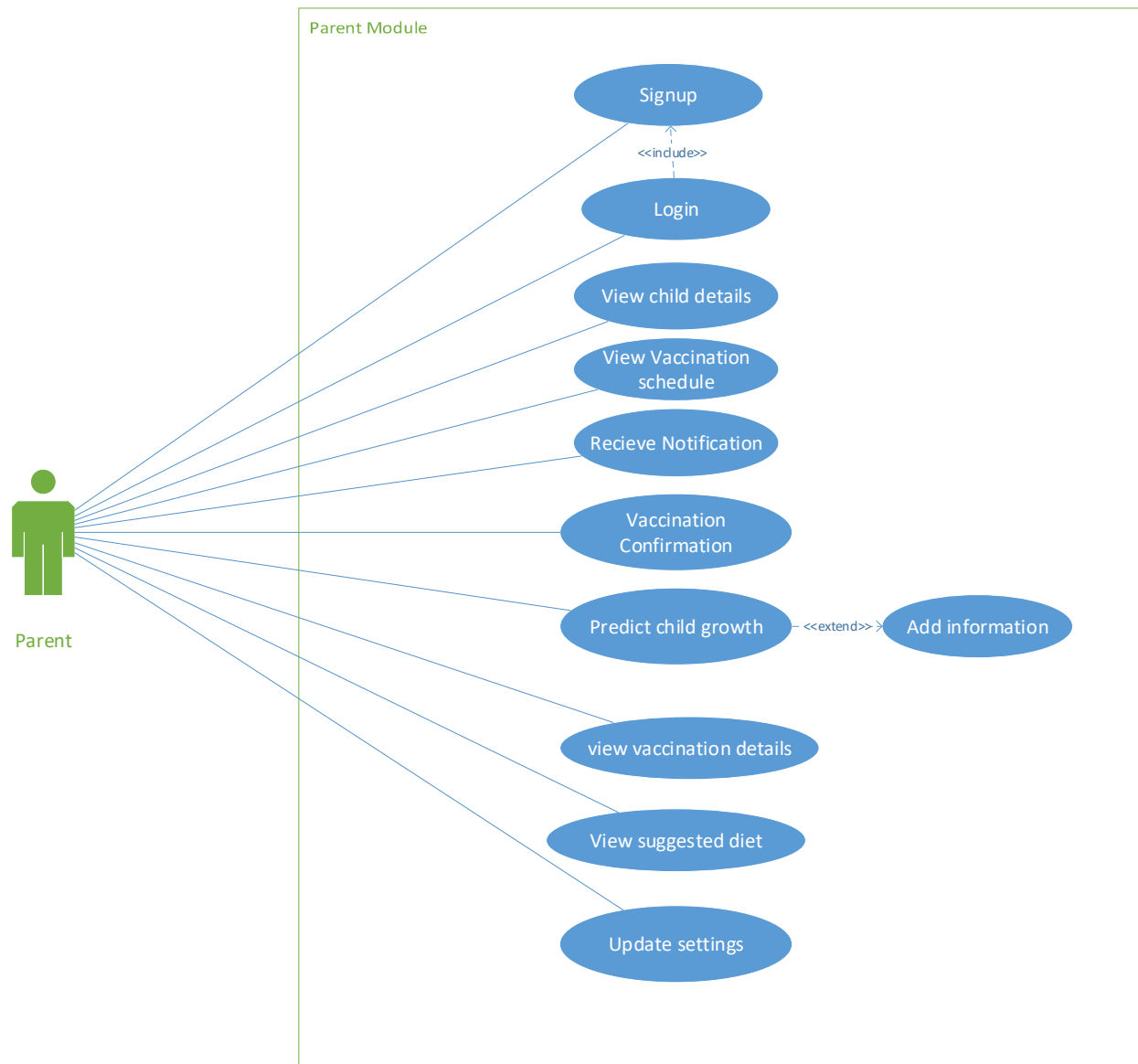


Figure 5: Parent use case diagram

3.3.6 Tabular Use Cases

Following are the descriptive tabular use cases

3.3.6.1 Module 1: Child record management and tracking

Table 4:Signup (Web application)

Use Case ID:	UC-1
Use Case Name:	Signup as hospital
Actors:	Hospital, Vaccine center
Description:	The user will be able to Register account and use the application.
Trigger:	A User will click on “Sign up” to start registering.
Level	High
Preconditions:	PRE-1. User has already accessed to the web page
Post conditions:	POST-1. User will be given access to fill from to register account.
Normal Flow:	<ol style="list-style-type: none">1. User will enter name, email, password, confirm password, address.2. User will click on signup.3. User account will be registered.
Alternative Flows:	<p>In step 1, If user enter an email that is already registered:</p> <ol style="list-style-type: none">1. He will be asked to add another email.2. He can resume from step 2. <p>In step 1, If password does not match with confirm password</p> <ol style="list-style-type: none">1. User will be asked to enter the password again.2. User can continue form step 2.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none">1. User shall be able to access website.2. User shall have and email account and phone no.

Table 5: Login as Hospital (Web)

Use Case ID:	UC-2
Use Case Name:	Login as hospital
Actors:	Hospital, Vaccine center
Description:	The user will be able to login and use the application.
Trigger:	A User will click on “Sign in” to go to the landing page.
Level	High
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be given access to fill from to register account.
Normal Flow:	<ol style="list-style-type: none">1. User will enter email and password.2. User will click on sign in.3. User will be directed to dashboard.
Alternative Flows:	<p>In step 1: If email is not registered, user will be asked to enter email that is registered or the user will be redirected to sign up page.</p> <p>In step 1: If password is wrong, user will be asked to enter the correct password.</p>
Exceptions:	<p>In step 1: If actor does not fill the required fields.</p> <p>Prompt message will be shown to user to fill in required fields.</p> <p>If at any step, internet connection is lost. User will be shown “internet connection lost”</p>

Business Rules	N/A
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Table 6: Add child record

Use Case ID:	UC-3
Use Case Name:	Add child record
Actors:	Hospital
Description:	User will add all basic information of parent and child
Trigger:	A user will click on the add child
Level	High
Preconditions:	PRE-1. User has already signed in to the application
Post conditions:	POST-1. User will be able to add a new born child information in the system
Normal Flow:	<ol style="list-style-type: none"> 1. User will add parent name, parent CNIC, address, phone number, date of birth etc. of the child. 2. User will click on add, the child will be added to the system.
Alternative Flows:	<p>In step 1: If user entered invalid contact number.</p> <ol style="list-style-type: none"> 1. User will be asked to enter contact number again. <p>User can resume from step 2.</p>
Exceptions:	<p>In step 1: If user does not fill the required fields.</p> <p>Prompt message will be shown to user to fill in required fields.</p> <p>If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.</p>
Business Rules	N/A

Table 7: Print Certificate and Schedule

Use Case ID:	UC-4
Use Case Name:	Print birth certificate and vaccination schedule.
Actors:	Hospital
Description:	Through this feature hospital can give birth certificate and vaccination dates to parents
Trigger:	A user will click on print details after child has been added.
Level	High
Preconditions:	PRE-1. All details of new born child are already entered in the system
Post conditions:	POST-1. User will be able to provide the birth certificate or vaccine details
Normal Flow:	<ol style="list-style-type: none"> 1. Birth certificate and vaccination schedule will be displayed on screen. 2. User will click on print. 3. Print box will be displayed. 4. User will adjust the print options. 5. User will click on print. <p>Both documents will be printed.</p>
Alternative Flows:	<p>After step 1, User can use control + p to print both things</p> <p>User will be directed to step 3.</p>
Exceptions:	<p>If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.</p>
Business Rules	N/A

Table 8: Search Child details by hospital

Use Case ID:	UC-5
Use Case Name:	Search child
Actors:	Hospital
Description:	User will type child name or id and his information will be shown. It will help user to see and update the child record of vaccine.
Trigger:	A user will click on the add child
Level	High
Preconditions:	PRE-1. User has already signed in to the application
Post conditions:	POST-1. User will be able to view and update the existing child information in the system
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on search button. 2. User will enter child ID 3. Child data will appear and user can see the child information User can select child to view and update its vaccine information
Alternative Flows:	In step 2: If user entered wrong ID <ol style="list-style-type: none"> 1. User will be prompted to enter correct ID User can resume from step 3.
Exceptions:	In step 1: If actor does not fill the required fields. Prompt message will be shown to user to fill in required fields. If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A

Table 9: Update Child Vaccination Record

Use Case ID:	UC-6
Use Case Name:	Update Child Vaccination Record
Actors:	Hospital
Description:	User will update the child record of vaccine.
Trigger:	A user will click on the update.
Level	High
Preconditions:	PRE-1. User has already signed in to the application
Post conditions:	POST-1. User will be able to view and update the existing child information in the system
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter update information of child i.e. updated vaccination 2. Notification with code will be sent to guardian’s phone number. 3. User will enter code. If the code is matched, child record will be updated.
Alternative Flows:	In step 3, if user entered the wrong code: <ol style="list-style-type: none"> 1. User will be given an option to resend code. User can resume from step 3.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.

Business Rules	N/A
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Table 10: Manage Stock

Use Case ID:	UC-7
Use Case Name:	Manage stock
Actors:	Hospital, Vaccine center
Description:	User will be able to add or request for vaccine stock to the admin
Trigger:	A user will click on the manage stock
Level	High
Preconditions:	PRE-1. User has already signed in to the application
Post conditions:	POST-1. User will be able to add a new born child information in the system
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on vaccine name to view. 2. User will also request vaccine stock from sub admin. 3. User will select vaccine and its required quantity. 4. User will click on request stock. Request will be sent to sub admin.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	Stock must be allotted by sub admin before.

Table 11: Check vaccine requirements

Use Case ID:	UC-8
Use Case Name:	Check vaccine requirements
Actors:	Hospital, Vaccine center
Description:	This will help the users to check the upcoming requirement of vaccine in a particular area or hospital
Trigger:	A user will click check vaccine requirement button
Level	High
Preconditions:	PRE-1. All details of vaccine are already entered in the system
Post conditions:	POST-1. User will be able to view the upcoming vaccine stock requirement
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on vaccine name to display its details. 2. Vaccine details along with future vaccine requirements information will be displayed there.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	This is only valid for the existing vaccines.

3.3.6.2 Vaccine center management

Table 12: Make campaign

Use Case ID:	UC-9
Use Case Name:	Make campaign
Actors:	Vaccine center
Description:	User will be able to make new vaccine campaigns time to time
Trigger:	A user will click on the manage campaigns
Level	High
Preconditions:	PRE-1. User has already signed in to the application PRE-2. User is authorized by admin to make these campaigns
Post conditions:	POST-1. User will be able to make a new campaign of vaccine for general public
Normal Flow:	1. User will click on manage campaign. 2. User will click on make new campaign. 3. User will add details like area, starting and ending dates etc. 4. User will click on make campaign
Alternative Flows:	In step 3: If user entered ending date that is less then starting date 1. User will be asked to enter correct date. 2. User can continue from step 4.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A

Table 13: View Campaign

Use Case ID:	UC-10
Use Case Name:	View Campaign
Actors:	Vaccine center
Description:	User will be able to view existing vaccine campaigns.
Trigger:	A user will click on the manage campaigns
Level	High
Preconditions:	PRE-1. User has already signed in to the application PRE-2. User is authorized by admin to make these campaigns
Post conditions:	POST-1. User will be able to see the status of existing vaccine campaigns
Normal Flow:	1. User will click on manage campaign. 2. User will click View campaigns 3. User will be able to see the status of campaigns running
Alternative Flows:	N/A

Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A

Table 14: Allot vaccine and worker for campaigns

Use Case ID:	UC-11
Use Case Name:	Allot vaccine and worker for campaigns
Actors:	Vaccine center
Description:	User will be able to Allot workers and vaccine stock to the campaigns
Trigger:	A user will click on the manage campaigns
Level	High
Preconditions:	PRE-1. User has already signed in to the application PRE-2. User is authorized by admin to manage these campaigns
Post conditions:	POST-1. Workers are allotted the area and stock of vaccines
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on the running campaigns 2. User will click on allotment and select workers and vaccines 3. User will allot workers and vaccine stock to the campaigns 4. User will click on the update.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A

Table 15: Notify public about vaccination campaign

Use Case ID:	UC-12
Use Case Name:	Notify public about vaccination campaign
Actors:	Vaccine center
Description:	This feature is to notify the public via SMS about the vaccine campaigns so that they can get their children vaccinated
Trigger:	A user will click on the notify public
Level	High
Preconditions:	PRE-1. User has already signed in to the application PRE-2. User is authorized by admin to manage campaigns
Post conditions:	POST-1. Parents will receive SMS notification about campaigns
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on the running campaigns 2. User will click on notify public. 3. System will send notification to the end users.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A

Table 16: Report cases

Use Case ID:	UC-13
Use Case Name:	Report cases
Actors:	Vaccine center, hospital
Description:	User will be able report the cases to admins which got unvaccinated
Trigger:	A user will click on the report to admin button
Level	High
Preconditions:	PRE-1. User has already signed in to the application Pre-2. Parents has been notified many times
Post conditions:	POST-1. Admin will get the data of such child who didn't get vaccinated
Normal Flow:	1. A system generated report will appear in front of user 2. User will click on send. 3. Report will be sent to admin
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown "internet connection lost" on the screen.
Business Rules	N/A

Table 17: Add polio Worker

Use Case ID:	UC-14
Use Case Name:	Add Polio worker
Actors:	Vaccine center
Description:	The user will select manage polio workers from the sidebar
Trigger:	A User will click on manage polio workers
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as vaccine center
Post conditions:	POST-1. User will be given access to the manage polio workers screen where all the polio workers will be shown
Normal Flow:	1. User will click on add polio worker 2. User will enter details of polio worker i.e. name, email, CNIC, address etc. 3. User will click on add. 4. Polio worker will be added.
Alternative Flows:	In step 2, if user entered email that is already registered or invalid email: 1. User will be prompted to enter email again. 2. User can continue from step 3.
Exceptions:	If at any step, internet connection is lost. User will be shown "internet connection lost" on the screen.
Business Rules	N/A
Assumptions:	1. User shall be able to access website. 2. User must be logged in as admin.

Table 18: Update polio worker

Use Case ID:	UC-15
Use Case Name:	Update polio worker
Actors:	Vaccine center
Description:	The admin will select manage polio workers from the sidebar
Trigger:	A User will click on manage polio workers
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as vaccine center
Post conditions:	POST-1. User will be given access to the manage polio workers screen where all the workers will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on update button displayed in the end of every row of polio worker 2. User will edit details of polio worker i.e. name, email, address etc. 3. User will click on update. 4. Polio worker will be updated.
Alternative Flows:	In step 2, if user entered email that is already registered or invalid email: <ol style="list-style-type: none"> 1. User will be prompted to enter email again. 2. User can continue from step 3.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 19: View/delete polio worker

Use Case ID:	UC-16
Use Case Name:	View/delete polio worker
Actors:	Admin
Description:	The admin will select manage polio workers from the sidebar
Trigger:	A User will click on manage polio workers
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as vaccine center
Post conditions:	POST-1. User will be given access to the manage polio workers screen where all the workers will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Sub admins will be displayed on screen. 2. User will click on delete button displayed in the end of every row of polio worker 3. Sub admin will be deleted.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 20: Assign Vaccine stock to polio worker

Use Case ID:	UC-17
Use Case Name:	Assign Vaccine stock to polio worker
Actors:	Vaccine center
Description:	The admin will select workers from the sidebar
Trigger:	User will click on polio workers
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as vaccine centers
Post conditions:	POST-1. User will be given access to the manage workers screen where all the workers are will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Workers will be displayed on screen. 2. User will click on assign button displayed in the end of every row of workers 3. User will select the vaccine and its quantity. 4. User will click on assign 5. Vaccine stock will be assigned to the worker.
Alternative Flows:	In step 3: if user added quantity that is greater than the available quantity: <ol style="list-style-type: none"> 1. User will be prompted to enter quantity again. 2. User can continue from step 4
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 21: Request vaccine stock from sub-admin

Use Case ID:	UC-18
Use Case Name:	Request vaccine stock from sub-admin
Actors:	Vaccine center, Hospital
Description:	The admin will request sub admin for allocation of vaccines
Trigger:	User will click on vaccine stock.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as vaccine centers / hospital
Post conditions:	POST-1. User will be given access to the vaccine stock screen where all the vaccines are will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Vaccines will be displayed on screen. 2. User will click on request vaccine stock. 3. User will select the vaccine and its quantity. 4. User will click on request 5. Request will be sent to sub admin.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website.

	2. User must be logged in as admin.
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3.3.6.3 Parent and Polio worker management:

Table 22: Sign up from mobile app

Use Case ID:	UC-19
Use Case Name:	Sign up from mobile app
Actors:	Parent
Description:	The user will be able to Register account and use the application.
Trigger:	A User will click on “Sign up” to start registering.
Preconditions:	PRE-1. User has already downloaded the application
Post conditions:	POST-1. User will be given access to fill from to register account.
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter details like name, email, password, CNIC, address etc. 2. User will click on sign up. 3. User account will be registered.
Alternative Flows:	In step 1, if user entered invalid email or email that is already registered: 1. User will be asked to enter another email. 2. User can continue from step 2.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	1. User shall be downloaded the application 2. User shall have and email account and phone no.

Table 23: Sign in from mobile app

Use Case ID:	UC-20
Use Case Name:	Sign in from mobile app
Actors:	Parent, Polio worker
Description:	The user will be able to login and use the application.
Trigger:	A User will click on “Sign in” to go to the landing page.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be given access to the landing page
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter email and password. 2. User will click on sign in. 3. User will be directed to dashboard.
Alternative Flows:	In step 1: If user entered email that is not registered, he will be asked to enter email that is registered, or create a new account. In step 1: If user entered wrong password, he will be asked to enter correct password.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.

Business Rules	N/A
Assumptions:	1. User must be registered.

Table 24: View child info

Use Case ID:	UC-21
Use Case Name:	View child info
Actors:	Parent
Description:	The user will be able to see his child info
Trigger:	A User will click on see child info from the landing page.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be given access to the child info screen where he will enter his ID
Normal Flow:	<ol style="list-style-type: none"> 1. User will view his child information if he is registered in the system 2. User will click on his child, displayed on the landing page. 3. Complete details i.e. date of birth, hospital name, vaccinations etc., of his child will be displayed on the screen.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User must be registered. 2. Child must also be registered in our system.

Table 25: Vaccination Confirmation

Use Case ID:	UC-22
Use Case Name:	Vaccination Confirmation
Actors:	Parent
Description:	The user will be able to confirm his child vaccination
Trigger:	A User will receive notification which he will confirm.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will confirm his child vaccination
Normal Flow:	<ol style="list-style-type: none"> 1. User will receive notification of his child vaccination with a code. 2. User will tell the code to worker and the worker will enter the code. 3. Worker will update the record.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	1. User must be registered.

	2. Child must also be registered in our system.
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Table 26:Update settings

Use Case ID:	UC-23
Use Case Name:	Update settings
Actors:	Parent, Polio worker
Description:	The user will be able to update his settings.
Trigger:	A User will click on settings.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be accessed to the settings screen
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on settings. 2. User will update his settings i.e. change email, change name, change password etc. 3. User will click on submit, His settings will be updated.
Alternative Flows:	In step 2: If user entered email that is already registered, he will be asked to enter another email.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User must be registered.

Table 27:Vaccination Schedule

Use Case ID:	UC-24
Use Case Name:	Vaccination Schedule
Actors:	Parent
Description:	The user will be able to view his child vaccination schedule.
Trigger:	A User will click on vaccination schedule from menu.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be accessed to the settings screen
Normal Flow:	<ol style="list-style-type: none"> 1. Vaccination schedule will be displayed on the screen. 2. Where all the dates of upcoming vaccination are written.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User must be registered.

Table 28:Learn about vaccinations

Use Case ID:	UC-25
Use Case Name:	Learn about vaccinations
Actors:	Parent, Polio worker
Description:	The user will be able to learn about different vaccinations.
Trigger:	A User will click on vaccines.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be accessed to the settings screen
Normal Flow:	<ol style="list-style-type: none"> 1. List of vaccination will be displayed on the screen. 2. User will click on any vaccination name. 3. Vaccination information of that vaccine will be displayed on the screen.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	2. User must be registered.

Table 29:Check polio symptoms

Use Case ID:	UC-26
Use Case Name:	Check polio symptoms
Actors:	Parent, Polio worker
Description:	The user will be able to check polio symptoms of child.
Trigger:	A User will click on check polio symptoms/
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be accessed to the settings screen
Normal Flow:	<ol style="list-style-type: none"> 1. User will be asked to enter his child symptoms like fever, headache, fatigue, pain in arms and legs etc. 2. System will show the results, if the child may have polio or not.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A

Assumptions:	3. User must be registered.
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Table 30: Update child record from mobile app

Use Case ID:	UC-27
Use Case Name:	Update child record from mobile app.
Actors:	Polio Worker
Description:	The user will be able to update child record whose vaccination is done.
Trigger:	A User will click on update child record.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be able to update child vaccination data
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter child ID. 2. User will update his vaccination record. 3. Notification will be sent to parent mobile with a code. 4. User will enter that code and click on submit. 5. Child record will be updated.
Alternative Flows:	<p>In step 1: If user entered invalid ID:</p> <ol style="list-style-type: none"> 1. User will be asked to enter valid ID 2. User can resume from step 2. <p>In step 4: If user entered wrong code:</p> <ol style="list-style-type: none"> 1. User will be given an option to resend code. 2. User can resume from step 4.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	1. User must be registered.

Table 31: Report cases

Use Case ID:	UC-28
Use Case Name:	Report cases
Actors:	Polio worker
Description:	The user will be able to report authorities about polio cases.
Trigger:	A User will click on report authorities.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be able to send data to authorities i.e. vaccination center
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on report authorities 2. User will click on send report 3. A report will be sent to parent vaccination center of worker.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	1. User must be registered.

3.3.6.4 Child Growth Prediction

Table 32: Predict child growth

Use Case ID:	UC-29
Use Case Name:	Predict child growth
Actors:	Parent
Description:	The user will be able to predict his child growth.
Trigger:	A User will click on child growth
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be accessed to the growth checking screen where he will enter his child details.
Normal Flow:	<ol style="list-style-type: none">1. User will enter his child details like height, weight, age etc.2. User will click on submit.3. User will see his child growth.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none">1. User must be registered.

Table 33: View diet plans

Use Case ID:	UC-30
Use Case Name:	View diet plans
Actors:	Parent
Description:	The user will be able to check his child growth and then view the diet plan according to the growth.
Trigger:	A User will click on see suggested diet.
Preconditions:	PRE-1. User has already signed up to the application
Post conditions:	POST-1. User will be accessed to the growth checking screen where he will enter his child details and then see diet plans.
Normal Flow:	<ol style="list-style-type: none">1. On child growth report screen.2. User will click on see suggested diet.3. Suggested diet will be displayed.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none">1. User must be registered.

Table 34:Sign out from mobile app

Use Case ID:	UC-31
Use Case Name:	Sign out from mobile app
Actors:	Parent, Polio worker
Description:	The user will sign out from the application.
Trigger:	A User will click on sign out button.
Preconditions:	PRE-1. User was already logged in.
Post conditions:	POST-1. User will be given access to the settings page.
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on sign out button. 2. User will be directed to login screen.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

3.3.6.5 Admin Panel

Table 35:View Stats

Use Case ID:	UC-32
Use Case Name:	View Stats
Actors:	Primary Actor: Admin
Description:	The admin will select view stats from the sidebar
Trigger:	A User will click on view stats from sidebar
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the statistics screen.
Normal Flow:	<ol style="list-style-type: none"> 1. Country stats will be displayed on the screen. 2. Admin can see stats in the form of graphs and numbers.
Alternative Flows:	N/A
Exceptions:	Stats will not be shown if there is no data available
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 36:View Stats by city/area

Use Case ID:	UC-33
Use Case Name:	View Stats by city/area
Actors:	Primary Actor: Admin
Description:	The admin will select view stats by city or by area from the statistics screen.
Trigger:	A User will click on view stats from sidebar.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the statistics screen where statistics will be shown.
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on statistics 2. User will select area/city. 3. Statistics of that city/area will be displayed.
Alternative Flows:	N/A
Exceptions:	In step 2, if user selected area/city that is not registered in our system. <ol style="list-style-type: none"> 1. User is prompt to select city/area that is registered in our system. 2. User will continue from step 3
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 37:Search Stats

Use Case ID:	UC-34
Use Case Name:	Search Stats
Actors:	Primary Actor: Admin
Description:	The admin will search stats from the statistics screen
Trigger:	A User will click on search input box
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the search statistics screen where you will search stats
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter the name of city in the search box 2. List will be displayed in front of user 3. User will click on the city and the stats of that city will be displayed.
Alternative Flows:	N/A
Exceptions:	In step 1, if entered city is not available <ol style="list-style-type: none"> 1. User is prompted that this city is not registered in our system. 2. User can enter another city. 3. User will continue from step 2.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 38:Add Sub admin

Use Case ID:	UC-35
Use Case Name:	Add Sub admin
Actors:	Admin
Description:	The admin will select manage sub admins from the sidebar
Trigger:	A User will click on manage sub admins
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the manage sub admins screen where all the admins will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on add sub admin 2. User will enter details of sub admin i.e. name, email, address, CNIC etc. 3. User will click on add. 4. Sub admin will be added.
Alternative Flows:	In step 2, if user entered email that is already registered or invalid: <ol style="list-style-type: none"> 1. User is prompted to enter email again. 2. User will continue from step 3.
Exceptions:	N/A
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 39:Update sub admin

Use Case ID:	UC-36
Use Case Name:	Update sub admin
Actors:	Admin
Description:	The admin will select manage sub admins from the sidebar
Trigger:	A User will click on manage sub admins
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the manage sub admins screen where all the admins will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on update button displayed in the end of every row of sub admin 2. User will edit details of sub admin i.e. name, email, address etc. 3. User will click on update. 4. Sub admin will be updated.
Alternative Flows:	In step 2, if user entered email that is already registered or invalid: <ol style="list-style-type: none"> 1. User is prompted to enter email again. 2. User will continue from step 3.
Exceptions:	N/A
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 40:View/delete sub admin

Use Case ID:	UC-37
Use Case Name:	View/delete sub admin
Actors:	Admin
Description:	The admin will select manage sub admins from the sidebar
Trigger:	A User will click on manage sub admins
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the manage sub admins screen where all the admins will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Sub admins will be displayed on screen. 2. User will click on delete button displayed in the end of every row of sub admin 3. Sub admin will be deleted.
Alternative Flows:	N/A
Exceptions:	N/A
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 41:Add Vaccine stock

Use Case ID:	UC-38
Use Case Name:	Add Vaccine stock
Actors:	Admin
Description:	The admin will select manage vaccine stock from the sidebar
Trigger:	A User will click on manage vaccine stock
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the manage vaccine stock screen where all the available vaccines will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on add vaccine 2. User will enter details of vaccine i.e. name, quantity, expiry date 3. User will click on add. 4. Vaccine will be added.
Alternative Flows:	<p>In step 2, if user entered expiry data, that is less than the current date:</p> <ol style="list-style-type: none"> 1. User will be prompted to enter expiry date again. 2. User can continue from step 3.
Exceptions:	N/A
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 42:Update Vaccine stock

Use Case ID:	UC-39
Use Case Name:	Update Vaccine stock
Actors:	Admin
Description:	The admin will select manage vaccine stock from the sidebar
Trigger:	A User will click on manage vaccine stock
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the manage vaccine stock screen where all the available vaccines will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Vaccines will be displayed on screen. 2. User will click on update button displayed in the end of every row of vaccine 3. User will enter updated vaccine record i.e. quantity, expiry date 4. User will click on update 5. Vaccine stock will be updated.
Alternative Flows:	In step 2, if user entered expiry data, that is less than the current date: <ol style="list-style-type: none"> 1. User will be prompted to enter expiry date again. 2. User can continue from step 3.
Exceptions:	N/A
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 43:Assign Vaccine stock

Use Case ID:	UC-40
Use Case Name:	Assign Vaccine stock
Actors:	Admin, Sub admin
Description:	The admin will select sub admins from the sidebar
Trigger:	User will click on sub admins
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the manage sub admins screen where all the sub admins are will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Sub admins will be displayed on screen. 2. User will click on assign button displayed in the end of every row of sub admin 3. User will select the vaccine and its quantity. 4. User will click on assign 5. Vaccine stock will be assigned to the sub admin.
Alternative Flows:	In step 2, if user entered quantity, that is greater than the available quantity: <ol style="list-style-type: none"> 1. User will be prompted to enter less quantity again. 2. User can continue from step 4.
Exceptions:	N/A
Business Rules	N/A

Assumptions:	1. User shall be able to access website. 2. User must be logged in as admin.
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Table 44:View child details

Use Case ID:	UC-41
Use Case Name:	View child details
Actors:	Admin
Description:	The admin will select Children from the sidebar
Trigger:	User will click on children.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the Children screen where all the children will be shown
Normal Flow:	1. Children will be displayed on screen. 2. User will click on view button displayed in the end of every row of child. 3. Complete detail of that child will be displayed.
Alternative Flows:	N/A
Exceptions:	N/A
Business Rules	N/A
Assumptions:	1. User shall be able to access website. 2. User must be logged in as admin.

Table 45:Search child details

Use Case ID:	UC-42
Use Case Name:	Search child details
Actors:	Admin
Description:	The admin will select Children from the sidebar
Trigger:	User will click on search bar displayed on the children page.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the Children screen where all the children will be shown
Normal Flow:	1. User will enter child ID in the search bar. 2. User will click search. 3. Complete detail of the searched child will be displayed.
Alternative Flows:	In step 1, if user entered incorrect ID: 1. User will be prompted to enter correct ID 2. User can continue from step 2
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	1. User shall be able to access website. 2. User must be logged in as admin.

Table 46:View Hospitals

Use Case ID:	UC-43
Use Case Name:	View Hospitals
Actors:	Admin
Description:	The admin will select Hospital from the sidebar
Trigger:	User will click on hospitals.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the Hospitals screen where all the Hospitals will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Hospitals will be displayed on screen. 2. User will click on view button displayed in the end of every row of hospital. 3. Complete detail of that hospital will be displayed.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 47:Search Hospitals

Use Case ID:	UC-44
Use Case Name:	Search Hospitals
Actors:	Admin
Description:	The admin will select Hospitals from the sidebar
Trigger:	User will click on search bar displayed on the hospitals page.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the Hospitals screen where all the children will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter hospital name in the search bar. 2. User will click search. 3. Complete detail of the searched hospital will be displayed.
Alternative Flows:	In step 1, if user entered hospital that is not registered in our system: <ol style="list-style-type: none"> 1. User will be asked to enter hospital name again. 2. User can continue from step 2.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 48:View vaccine center

Use Case ID:	UC-45
Use Case Name:	View vaccine center
Actors:	Admin
Description:	The admin will select Vaccine centers from the sidebar
Trigger:	User will click on Vaccine centers.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the Vaccine center screen where all the registered vaccine centers will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. Vaccine centers will be displayed on screen. 2. User will click on view button displayed in the end of every row of vaccine center. 3. Complete detail of that vaccine center will be displayed.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 49:Search vaccine centers

Use Case ID:	UC-46
Use Case Name:	Search vaccine centers
Actors:	Admin
Description:	The admin will select vaccine centers from the sidebar
Trigger:	User will click on search bar displayed on the vaccine centers page.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the Vaccine centers screen where all the vaccine centers will be shown
Normal Flow:	<ol style="list-style-type: none"> 1. User will enter vaccine center name in the search bar. 2. User will click search. 3. Complete detail of the searched vaccine center will be displayed.
Alternative Flows:	In step 1, if user entered vaccine center that is not registered: <ol style="list-style-type: none"> 1. He will be prompted to enter another vaccine center. 2. User can continue from step 2.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 50:Check vaccine requirements

Use Case ID:	UC-47
Use Case Name:	Check vaccine requirements
Actors:	Admin, Sub admin
Description:	The admin will select the future vaccine requirements option from side bar.
Trigger:	A User will click on vaccine Stock requirements.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the stock requirement screen.
Normal Flow:	<ol style="list-style-type: none"> 1. User will select area/city from requirements screens 2. Vaccine stock requirements of that city/area will be displayed.
Alternative Flows:	In step 1, if user selected area/city that is not registered: <ol style="list-style-type: none"> 1. User will be prompted to select area/city again. 2. User will continue from step 2.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 51:Check future possible cases

Use Case ID:	UC-48
Use Case Name:	Check future possible cases.
Actors:	Admin, Sub admin
Description:	The admin will select the future possible cases option from side bar.
Trigger:	A User will click on future possible cases.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the future possible cases.
Normal Flow:	<ol style="list-style-type: none"> 1. User will select area/city from future possible cases screen. 2. Information related to future possible cases of that city/area will be displayed.
Alternative Flows:	In step 1, if user selected area/city that is not registered: <ol style="list-style-type: none"> 1. User will be prompted to select area/city again. 2. User will continue from step 2.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 52:Check Reports

Use Case ID:	UC-49
Use Case Name:	Check Reports
Actors:	Admin, Sub admin
Description:	The admin will select the reports option from side bar.
Trigger:	A User will click on future possible cases.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the future possible cases.
Normal Flow:	<ol style="list-style-type: none"> 1. User will select either weekly, monthly or yearly reports. 2. Reports will be displayed on the screen. 3. User will click on specific report to check it.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 53:Update user settings

Use Case ID:	UC-50
Use Case Name:	Update user settings
Actors:	Admin, Sub admin, Hospital, Vaccine center
Description:	The admin will select the settings option from side bar.
Trigger:	A User will click on settings.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the settings page.
Normal Flow:	<ol style="list-style-type: none"> 1. User will update his profile from setting. 2. User will update his name, email, password etc. 3. User will click on submit to update his profile.
Alternative Flows:	In step 2, if user entered invalid email or email that is already registered: <ol style="list-style-type: none"> 1. He will be asked to enter email again 2. User can continue from step 3.
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

Table 54:Log out

Use Case ID:	UC-51
Use Case Name:	Log out
Actors:	Admin, Sub admin, Hospital, Vaccine center
Description:	The admin will sign out from the application.
Trigger:	A User will click on sign out button.
Preconditions:	PRE-1. User has already accessed to the web page PRE-2- User must be logged in as admin
Post conditions:	POST-1. User will be given access to the settings page.
Normal Flow:	<ol style="list-style-type: none"> 1. User will click on sign out button. 2. User will be directed to login screen.
Alternative Flows:	N/A
Exceptions:	If at any step, internet connection is lost. User will be shown “internet connection lost” on the screen.
Business Rules	N/A
Assumptions:	<ol style="list-style-type: none"> 1. User shall be able to access website. 2. User must be logged in as admin.

3.4 Functional Requirements

Following Are the functional requirements that we completed in our system.

3.4.1 FR Module 1: Child Record Management and tracking

3.4.1.1 Login

Table 55: Email

Identifier	FR-1.1.1
Title	Email for sign in
Requirement	User will enter email that has the valid value only
Source	Supervisor
Rationale	User will be able to enter the email address so basic validation of credentials can be done
Business Rule (if required)	Email is compulsory for login User cannot enter any special character other than @, -.
Dependencies	N/A
Priority	High

Table 56: Password

Identifier	FR-1.1.2
Title	Password for sign in
Requirement	The user will enter password and system will validate that
Source	Supervisor
Rationale	User will be able to enter the password so basic validation of credentials can be done
Business Rule (if required)	Password minimum length shall be 8 while maximum shall be 20. Lower and upper case shall be used with one numeric
Dependencies	N/A
Priority	High

Table 57: Notification for Invalid Password

Identifier	FR-1.1.3
Title	Notification for Invalid Password during sign in
Requirement	After validation if password provided is not correct, system will display “Invalid password” error.
Source	Supervisor
Rationale	To verify system is validating credentials while logging in
Business Rule (if required)	Password is compulsory for login User cannot enter any special character.
Dependencies	FR-2.1.2
Priority	Medium

Table 58: Notification for Invalid Email

Identifier	FR-1.1.4
Title	Notification for Invalid Email during sign in
Requirement	After validation if email provided is not correct, system will display “Invalid email” error.
Source	Supervisor
Rationale	To verify system is validating credentials while logging in
Business Rule (if required)	Email is compulsory for login
Dependencies	FR-1.1.1
Priority	Medium

Table 59: Remember me (Check)

Identifier	FR-1.1.5
Title	To check remember me while logging in to remain login for longer time
Requirement	Before clicking on Sign in, if user clicks on remember will user will be logged in for longer time
Source	Supervisor
Rationale	If user wants to be logged in for longer time
Business Rule (if required)	Credentials are compulsory for login Check box click is mandatory
Dependencies	FR-1.1.1, FR-1.1.2
Priority	Medium

3.4.1.2 Add children

Table 60: Father Name

Identifier	FR-1.2.1
Title	Enter Father name to Add child record in system
Requirement	User will enter father name of the child in the field
Source	Teammate
Rationale	User will be able to enter parent's data in child record
Business Rule (if required)	Name shall not have any numeric of special characters
Dependencies	N/A
Priority	High

Table 61: Father CNIC

Identifier	FR-1.2.2
Title	Enter Father CNIC to Add child record in system
Requirement	User will enter father CNIC of the child in the field
Source	Teammate
Rationale	User will be able to enter parent's data in child record
Business Rule (if required)	CNIC shall not have any alphabet or special characters CNIC shall not be less than or greater to 13 numeric
Dependencies	N/A
Priority	High

Table 62: Parent Address

Identifier	FR-1.2.3
Title	Enter parents address to Add child record in system
Requirement	User will enter parents address of the child in the field
Source	Teammate
Rationale	User will be able to enter parent's data in child record
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 63: Parent Contact

Identifier	FR-1.2.4
Title	Enter parents contact number to Add child record in system
Requirement	User will enter parents contact number of the child in the field
Source	Teammate
Rationale	User will be able to enter parent's data in child record
Business Rule (if required)	Contact number shall not have any alphabet
Dependencies	N/A
Priority	High

3.4.1.3 *Print*

Table 64: Print Birth Certificate

Identifier	FR-1.3.1
Title	Print birth certificate
Requirement	User will click on the print birth certificate and adjust the print option
Source	Teammate
Rationale	User will be able to print birth certificate of the child
Business Rule (if required)	Printer shall be available
Dependencies	N/A
Priority	High

Table 65: Print Vaccination Schedule

Identifier	FR-1.3.2
Title	Print vaccination schedule
Requirement	User will click on the print vaccination schedule and adjust the print option
Source	Teammate
Rationale	User will be able to print vaccination schedule of the child
Business Rule (if required)	Printer shall be available
Dependencies	N/A
Priority	High

3.4.1.4 Search child**Table 66: Search by Child ID**

Identifier	FR-1.4.1
Title	Search child details by child ID
Requirement	User will click on search field and enter specific child id to see its information
Source	Teammate
Rationale	User will be able to search specific child data
Business Rule (if required)	Child ID shall not be other than the current available IDs of system
Dependencies	N/A
Priority	Low

3.4.1.5 Update child record**Table 67: Select vaccine**

Identifier	FR-1.5.1
Title	Select vaccine to update child record
Requirement	User will select vaccine from the available vaccines
Source	Teammate
Rationale	User will be able to update child vaccination record
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 68: Vaccine Dose

Identifier	FR-1.5.2
Title	Enter vaccine dose number to update child record
Requirement	User will enter vaccine dose number in the required field
Source	Teammate
Rationale	User will be able to update child vaccination record
Business Rule (if required)	vaccine dose number shall not be other than numeric
Dependencies	N/A
Priority	High

Table 69: OTP

Identifier	FR-1.5.3
Title	Enter OTP and verify it
Requirement	User will enter the OTP received to parents and system will verify it
Source	Teammate
Rationale	User will be able to update child vaccination record
Business Rule (if required)	OTP shall match the system's generated code
Dependencies	N/A
Priority	High

Table 70: Resend OTP

Identifier	FR-1.5.4
Title	Resend OTP
Requirement	User will click on resend OTP
Source	Teammate
Rationale	User will be able to update child vaccination record
Business Rule (if required)	OTP shall match the system's generated code
Dependencies	N/A
Priority	High

3.4.1.6 Manage vaccine stock

Table 71: View Vaccine Stock

Identifier	FR-1.6.1
Title	View Vaccine stock details
Requirement	User will click on vaccine name to check its stocks
Source	Supervisor
Rationale	User will be able to manage stocks
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 72: Stock Quantity

Identifier	FR-1.6.2
Title	Enter stock quantity to request
Requirement	User will enter the required stock quantity in the field
Source	Supervisor
Rationale	User will be able to manage stocks
Business Rule (if required)	Quantity shall not be zero or negative
Dependencies	N/A
Priority	High

Table 73: Request Stock

Identifier	FR-1.6.3
Title	Request send to sub admin for the stock
Requirement	User will click on request stocks and system will send a request to sub admin for the stocks
Source	Supervisor
Rationale	User will be able to manage stocks
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.1.7 Check vaccine requirements

Table 74: Check Vaccine Requirement

Identifier	FR-1.7.1
Title	Check vaccine stock requirement
Requirement	User will click on check vaccine requirement
Source	Teammate
Rationale	User will be able to see upcoming requirements of the vaccine stock
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.2 FR Module 2: Vaccine Center Management

3.4.2.1 Make campaign

Table 75: View campaign

Identifier	FR-2.1.1
Title	View campaign management
Requirement	User will click on campaign management and dashboard will open for management
Source	Supervisor
Rationale	User will be able to manage campaigns
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 76: Name of campaign

Identifier	FR-2.1.2
Title	Enter name of new campaign
Requirement	User will enter the name of new campaign
Source	Supervisor
Rationale	User will be able to manage campaigns
Business Rule (if required)	Name shall be based on the diseases only
Dependencies	N/A
Priority	High

Table 77: Area Selection

Identifier	FR-2.1.3
Title	Select area for the new campaign
Requirement	User will select the area for new campaign
Source	Supervisor
Rationale	User will be able to manage campaigns
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 78: Date Selection

Identifier	FR-2.1.4
Title	Select starting and ending date for new campaign
Requirement	User will select the dates for starting and ending the new campaign
Source	Supervisor
Rationale	User will be able to manage campaigns
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.2.2 View campaign

Table 79: View Campaign Process

Identifier	FR-2.2.1
Title	View Campaign progress
Requirement	User will click on the campaign to see its progress
Source	Supervisor
Rationale	User will be able to view campaigns progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Allot vaccine and workers

Table 80: Vaccine Details

Identifier	FR-2.3.1
Title	Enter vaccine details to allot
Requirement	User will select the vaccine and add the quantity to allot it to the worker
Source	Supervisor
Rationale	User will be able to manage campaigns progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 81: Select Worker

Identifier	FR-2.3.2
Title	Select worker
Requirement	User will select worker to allot it to the vaccine campaign
Source	Supervisor
Rationale	User will be able to manage campaigns progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 82: Share Details

Identifier	FR-2.3.3
Title	Share details with worker
Requirement	User will share the unvaccinated children data in specific areas
Source	Supervisor
Rationale	User will be able to manage campaigns progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.2.3 *Notify public*

Table 83: Campaign Selection

Identifier	FR-2.4.1
Title	Select the campaign to notify
Requirement	User will click on the campaign which the end user needs to notify
Source	Supervisor
Rationale	User will be able to notify people about the campaigns
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 84: Campaign Description

Identifier	FR-2.4.2
Title	Enter the campaign notification description
Requirement	User will enter the campaign message to notify public about upcoming campaign
Source	Supervisor
Rationale	User will be able to notify people about the campaigns
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 85: Send Notification

Identifier	FR-2.4.3
Title	Send notifications
Requirement	User will click on the notify button and system will send notification on the application and provided contact numbers
Source	Supervisor
Rationale	User will be able to notify people about the campaigns
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.2.4 Report cases**Table 86: Report Cases**

Identifier	FR-2.5.1
Title	Report cases to sub-admin
Requirement	User will click on report cases button and last 7 days report about the unvaccinated children will appear
Source	Supervisor
Rationale	User will be able to report cases to sub-admin
Dependencies	N/A
Priority	High

Table 87: Send Report

Identifier	FR-2.5.2
Title	Send report
Requirement	User will click on send button and system will send a report to sub admin
Source	Supervisor
Rationale	User will be able to report cases to sub-admin
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.2.5 Add polio workers

Table 88: Polio Worker name

Identifier	FR-2.6.1
Title	Add polio worker name
Requirement	The user will click on add new polio worker and enter user name of the polio worker
Source	Supervisor
Rationale	To add new polio worker in the system.
Business Rule (if required)	Name shall not have any special characters or numeric
Dependencies	N/A
Priority	Low

Table 89: Polio worker name

Identifier	FR-2.6.2
Title	Add polio worker email
Requirement	The user will enter email of the polio worker and system will validate the email
Source	Supervisor
Rationale	To add new polio worker in the system.
Business Rule (if required)	Email shall validate the basic criteria
Dependencies	N/A
Priority	Low

Table 90: Polio worker CNIC

Identifier	FR-2.6.3
Title	Add polio worker CNIC
Requirement	The user will enter CNIC of the polio worker and system will validate that
Source	Supervisor
Rationale	To add new polio worker CNIC in the system.
Business Rule (if required)	CNIC shall not have any alphabets or its length shall not exceed 13 numeric
Dependencies	N/A
Priority	Low

Table 91: Polio worker preferred area

Identifier	FR-2.6.4
Title	Enter polio worker preferred area
Requirement	User will enter polio worker preferred area
Source	Teammate
Rationale	To add new polio worker CNIC in the system
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.2.6 Update polio workers

Table 92: Update Polio worker

Identifier	FR-2.7.1
Title	Update polio worker
Requirement	The user will click on update polio worker and enter updated information
Source	Supervisor
Rationale	To update polio worker from the system.
Business Rule (if required)	Admin must have all the details of the polio worker
Dependencies	N/A
Priority	Low

View/Delete polio worker

Table 93: View Polio Worker Progress

Identifier	FR-2.8.1
Title	View polio worker progress
Requirement	The user will click on polio worker to see progress.
Source	Supervisor
Rationale	To view the current progress of polio worker
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 94: Remove Polio Worker

Identifier	FR-2.8.2
Title	Remove polio worker
Requirement	The user will click on polio worker and then remove button
Source	Supervisor
Rationale	To remove polio worker from the system.
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Medium

3.4.2.7 Assign Stock

Table 95: Vaccine Details

Identifier	FR-2.9.1
Title	Enter vaccine details to allot
Requirement	User will select the vaccine and add the quantity to allot it to the polio worker
Source	Supervisor
Rationale	User will be able to manage campaigns progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.2.8 Request vaccine stock

Table 96: Stock Quantity

Identifier	FR-2.10.1
Title	Enter stock quantity to request to sub admin
Requirement	User will enter the required stock quantity in the field
Source	Supervisor
Rationale	User will be able to manage stocks
Business Rule (if required)	Quantity shall not be zero or negative
Dependencies	N/A
Priority	High

Table 97: Send request for stock

Identifier	FR-2.10.2
Title	Request send to sub admin for the stock
Requirement	User will click on request stocks and system will send a request to sub admin for the stocks
Source	Supervisor
Rationale	User will be able to manage stocks
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.3 FR Module 3: Sign in from mobile application

3.4.3.1 Sign in from mobile application

Table 98: Email

Identifier	FR-3.1.1
Title	Email for sign in to mobile application
Requirement	User will enter email that has the valid value only
Source	Supervisor
Rationale	User will be able to enter the email address so basic validation of credentials can be done
Business Rule (if required)	Email is compulsory for login User cannot enter any special character other than @, -.
Dependencies	N/A
Priority	High

Table 99: Password

Identifier	FR-3.1.2
Title	Password for sign in to mobile application
Requirement	The user will enter password and system will validate that
Source	Supervisor
Rationale	User will be able to enter the password so basic validation of credentials can be done
Business Rule (if required)	Password minimum length shall be 8 while maximum shall be 20. Lower and upper case shall be used with one numeric
Dependencies	N/A
Priority	High

3.4.3.2 View child information

Table 100: View Child Details

Identifier	FR-3.2.1
Title	View child information in mobile application
Requirement	The user will click on child name and screen will display information
Source	Supervisor
Rationale	User will be able to view the child information
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.3.3 Notifications / Vaccination confirmation

Table 101: Code Notification

Identifier	FR-3.3.1
Title	Receive code on notification
Requirement	The user will click on notifications
Source	Supervisor
Rationale	User will be able to receive code on notifications
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 102: Receive Notification

Identifier	FR-3.3.2
Title	Receive notification
Requirement	The user will click on notifications
Source	Supervisor
Rationale	User will be able to see the upcoming vaccine campaigns, code, additional information
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.3.4 Update settings

Table 103: Profile Settings

Identifier	FR-3.4.1
Title	Update profile settings on mobile
Requirement	The user will click on update settings
Source	Supervisor
Rationale	To update personal information in the system.
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 104: Profile Picture

Identifier	FR-3.4.2
Title	Update profile picture on mobile
Requirement	The user will click on change profile picture in the mobile settings
Source	Supervisor
Rationale	To update personal information in the system.
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 105: Picture Selection

Identifier	FR-3.4.3
Title	Select picture from mobile
Requirement	User will select his desired picture from mobile storage
Source	Supervisor
Rationale	To update personal information in the system.
Business Rule (if required)	Pictures shall be in specific format only
Dependencies	N/A
Priority	Low

Table 106: Picture Update

Identifier	FR-3.4.3
Title	update picture from mobile
Requirement	After selecting the picture user will click on update profile picture and system will update the picture at backend
Source	Supervisor
Rationale	To update personal information in the system.
Business Rule (if required)	Pictures shall be in specific format only
Dependencies	N/A
Priority	Low

3.4.3.5 Vaccine schedule

Table 107: Vaccine Schedule

Identifier	FR-3.5.1
Title	View vaccine schedule mobile application
Requirement	User will click on the child name to see the vaccine schedule
Source	Supervisor
Rationale	To view vaccine schedule in the mobile application
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.3.6 General guidance about vaccination

Table 108: Vaccine Guidelines

Identifier	FR-3.6.1
Title	View vaccination guidelines in the mobile application
Requirement	User will click on vaccination details
Source	Supervisor
Rationale	User will be able to read the guidelines for the vaccines
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.3.7 Check polio symptoms

Table 109: Genetic Details

Identifier	FR-3.7.1
Title	Enter genetic details
Requirement	User will answer the fields regarding genetics
Source	Supervisor
Rationale	User will be able to check symptoms of polio
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 110: Symptoms Detail

Identifier	FR-3.7.2
Title	Enter symptoms detail
Requirement	User will answer the fields regarding symptoms
Source	Supervisor
Rationale	User will be able to check symptoms of polio
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.3.8 Update child record from mobile app (Polio worker)

Table 111: Vaccine Dose Number

Identifier	FR-3.8.1
Title	Enter vaccine dose number to update child record on mobile application
Requirement	User will enter vaccine dose number in the required field
Source	Teammate
Rationale	User will be able to update child vaccination record on mobile application
Business Rule (if required)	vaccine dose number shall not be other than numeric
Dependencies	N/A
Priority	High

Table 112: OTP

Identifier	FR-3.8.3
Title	Enter OTP and verify it
Requirement	User will enter the OTP received to parents and system will verify it on mobile application
Source	Teammate
Rationale	User will be able to update child vaccination record on mobile application
Business Rule (if required)	OTP shall match the system's generated code
Dependencies	N/A
Priority	High

Table 113: Resend OTP

Identifier	FR-3.8.4
Title	Resend OTP on mobile application
Requirement	User will click on resend OTP
Source	Teammate
Rationale	User will be able to update child vaccination record on mobile application
Business Rule (if required)	OTP shall match the system's generated code
Dependencies	N/A
Priority	High

3.4.3.9 Update child record from mobile app (Polio worker)

Table 114: Report Cases

Identifier	FR-3.9.1
Title	Report cases to sub-admin from mobile application
Requirement	User will click on report cases button and last 7 days report about the unvaccinated children will appear
Source	Supervisor
Rationale	User will be able to report cases to sub-admin from mobile application
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.4 FR Module 4: Child Growth Prediction

3.4.4.1 Predict child growth

Table 115: Child Details

Identifier	FR-4.1.1
Title	Enter Child related details
Requirement	User will enter child data like weight and height
Source	Supervisor
Rationale	User will be able to predict child growth
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 116: Child Skills

Identifier	FR-4.1.2
Title	Select child skills
Requirement	User will select any one of 4 options for different skills or features of child
Source	Supervisor
Rationale	User will be able to predict child growth
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 117: Predict and result

Identifier	FR-4.1.3
Title	Predict and result
Requirement	User will click on the predict growth and system will display the results of that
Source	Supervisor
Rationale	User will be able to predict child growth
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.4.2 View diet plan

Table 118: Diet Plan

Identifier	FR-4.2.1
Title	View diet plan
Requirement	User will click on suggested diet plan and system will display the suggested diet according to prediction model results
Source	Supervisor
Rationale	User will be able see suggested diet
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 119: Save Diet plan

Identifier	FR-4.2.2
Title	Save diet plan
Requirement	User will click on suggested diet plan and system will display the suggested diet according to prediction model results. Then user can click on download and diet will be save in the mobile
Source	Supervisor
Rationale	User will be able see suggested diet
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.5 FR Module 5: Admin Panel

3.4.5.1 Login

Table 120: Email for sign in

Identifier	FR-5.1.1
Title	Email for sign in
Requirement	User will enter email that has the valid value only
Source	Supervisor
Rationale	User will be able to enter the email address so basic validation of credentials can be done
Business Rule (if required)	Email is compulsory for login User cannot enter any special character other than @, -.
Dependencies	N/A
Priority	High

Table 121: Password for sign in

Identifier	FR-5.1.2
Title	Password for sign in
Requirement	The user will enter password and system will validate that
Source	Supervisor
Rationale	User will be able to enter the password so basic validation of credentials can be done
Business Rule (if required)	Password minimum length shall be 8 while maximum shall be 20. Lower and upper case shall be used with one numeric
Dependencies	N/A
Priority	High

Table 122: Notification for invalid password

Identifier	FR- 5.1.3
Title	Notification for Invalid Password during sign in
Requirement	After validation if password provided is not correct, system will display “Invalid password” error.
Source	Supervisor
Rationale	To verify system is validating credentials while logging in
Business Rule (if required)	Password is compulsory for login User cannot enter any special character.
Dependencies	FR-5.1.2
Priority	Medium

Table 123: Notification for invalid Email

Identifier	FR-5.1.4
Title	Notification for Invalid Email during sign in
Requirement	After validation if email provided is not correct, system will display “Invalid email” error.
Source	Supervisor
Rationale	To verify system is validating credentials while logging in
Business Rule (if required)	Email is compulsory for login
Dependencies	FR-5.1.1
Priority	Medium

Table 124: Remember Check

Identifier	FR-5.1.5
Title	To check remember me while logging in to remain login for longer time
Requirement	Before clicking on Sign in, if user clicks on remember will user will be logged in for longer time
Source	Supervisor
Rationale	If user wants to be logged in for longer time
Business Rule (if required)	Credentials are compulsory for login Check box click is mandatory
Dependencies	FR-5.1.1, FR-5.1.2
Priority	Medium

3.4.5.2 View Stats

Table 125: Graphic Stats

Identifier	FR-5.2.1
Title	To be able to view stats graphically
Requirement	The user will click on view stats button to see stats for entire country through graphs
Source	Supervisor
Rationale	If user wants to view stats of entire country.
Business Rule (if required)	Data must be updated at the backend
Dependencies	N/A
Priority	Low

Table 126: Tabular view

Identifier	FR-5.2.2
Title	To be able to view stats in tables
Requirement	The user will click on view stats button to see stats for entire country in tables
Source	Supervisor
Rationale	If user wants to view stats of entire country.
Business Rule (if required)	Data must be updated at the backend
Dependencies	N/A
Priority	Low

3.4.5.3 View Stats by city/area

Table 127: Search specific city stats

Identifier	FR-5.3.1
Title	To View Stats for any specific city
Requirement	The user will select specific city name to view stats of vaccination/vaccinated children there
Source	Supervisor
Rationale	To view stats of vaccination for specific city
Business Rule (if required)	Data must be updated at the backend
Dependencies	N/A
Priority	N/A

Table 128: Specific Area stats

Identifier	FR-5.3.2
Title	To View Stats for any specific area
Requirement	The user will select specific area name to view stats of vaccination/vaccinated children there
Source	Supervisor
Rationale	To view stats of vaccination for specific area
Business Rule (if required)	Data must be updated at the backend
Dependencies	N/A
Priority	N/A

3.4.5.4 Search Stats

Table 129: Search stats by city

Identifier	FR-5.4.1
Title	Search Stats by city name
Requirement	The user will click on search stats and enter city name to search stats
Source	Teammate
Rationale	To search stats for a specific area to monitor the
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 130: Stats by area

Identifier	FR-5.4.2
Title	Search Stats by area name
Requirement	The user will click on search stats and enter area name to search stats
Source	Teammate
Rationale	To search stats for a specific area to monitor the
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 131: Search by child ID

Identifier	FR-5.4.3
Title	Search child info
Requirement	The user will click on search and then search child id. After entering child id, they will click on search
Source	Teammate
Rationale	To search child vaccination info by entering his ID to the search field.
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.5.5 Add sub admin

Table 132: Sub admin Name

Identifier	FR-5.5.1
Title	Add sub admin name
Requirement	The user will click on add new sub admin and enter user name of the sub admin
Source	Supervisor
Rationale	To add new sub admin name in the system.
Business Rule (if required)	Name shall not have any special characters or numeric
Dependencies	N/A
Priority	Low

Table 133: Sub Admin Email

Identifier	FR-5.5.2
Title	Add sub admin email
Requirement	The user will enter email of the sub admin and system will validate the email
Source	Supervisor
Rationale	To add new sub admin email in the system.
Business Rule (if required)	Email shall validate the basic criteria
Dependencies	N/A
Priority	Low

Table 134: Sub admin Password

Identifier	FR-5.5.3
Title	Add sub admin password
Requirement	The user will enter password for the sub admin and system will validate that
Source	Supervisor
Rationale	To add new sub admin password in the system.
Business Rule (if required)	Password minimum length shall be 8 while maximum shall be 20. Lower and upper case shall be used with one numeric
Dependencies	N/A
Priority	Low

Table 135: Sub Admin CNIC

Identifier	FR-5.5.4
Title	Add sub admin CNIC
Requirement	The user will enter CNIC of the sub admin and system will validate that
Source	Supervisor
Rationale	To add new sub admin CNIC in the system.
Business Rule (if required)	CNIC shall not have any alphabets or its length shall not exceed 13 numeric
Dependencies	N/A
Priority	Low

Table 136: Sub Admin City

Identifier	FR-5.5.5
Title	Select sub admin city
Requirement	The user will select city for the sub admin
Source	Supervisor
Rationale	To select new sub admin city
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.5.6 Update sub admin**Table 137: Update Sub Admin**

Identifier	FR-5.6.1
Title	Update sub admin
Requirement	The user will click on update sub admin and enter updated information
Source	Supervisor
Rationale	To update sub admin from the system.
Business Rule (if required)	Admin must have all the details of the sub-admin
Dependencies	N/A
Priority	Low

3.4.5.7 View/Delete sub admin**Table 138: Sub Admin Progress**

Identifier	FR-5.7.1
Title	View sub admin progress
Requirement	The user will click on sub admin to see progress.
Source	Supervisor
Rationale	To view the current progress of sub admin
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 139: Remove Sub Admin

Identifier	FR-5.7.2
Title	Remove sub admin
Requirement	The user will click on sub-admin and then remove button
Source	Team member 1
Rationale	To remove sub admins from the system.
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Medium

3.4.5.8 Add vaccine Stock

Table 140: Manage vaccine stocks

Identifier	FR-5.8.1
Title	Manage Vaccine Stock levels
Requirement	The user will click on manage stock levels to view or add stock levels
Source	Team member 1
Rationale	User will be able to manage stocks of vaccine
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 141: Vaccine Stock name

Identifier	FR-5.8.2
Title	Add Vaccine Stock Name
Requirement	The user will click on add stock levels and then enter Vaccine name
Source	Teammate
Rationale	User will be able to add vaccine name while adding stocks
Business Rule (if required)	Vaccine name shall be the one that doesn't exist in the system
Dependencies	N/A
Priority	High

Table 142: Vaccine Quantity

Identifier	FR-5.8.3
Title	Add Vaccine Quantity
Requirement	The user will enter vaccine quantity available
Source	Teammate
Rationale	User will be able to add vaccine quantity while adding stocks
Business Rule (if required)	Vaccine quantity shall not be negative or zero
Dependencies	N/A
Priority	High

Table 143: Vaccine Manufacturer

Identifier	FR-5.8.4
Title	Add Vaccine Manufacturer
Requirement	The user will enter manufacturer of the vaccine
Source	Teammate
Rationale	User will be able to add vaccine manufacturer while adding stocks
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 144: Vaccine Expiry Update

Identifier	FR-5.8.5
Title	Add Vaccine Expiry Date
Requirement	The user will select vaccine expiry date
Source	Teammate
Rationale	User will be able to select vaccine expiry date while adding stocks
Business Rule (if required)	Date shall not be from the past
Dependencies	N/A
Priority	High

3.4.5.9 Update Vaccine Stock

Table 145: Update Vaccine Stock

Identifier	FR-5.9.1
Title	Update Vaccine stock
Requirement	The user will click on the field which needs update and enter the information
Source	Teammate
Rationale	User will be able to update vaccine stock information
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

3.4.5.10 Assign Vaccine Stock

Table 146: Select Vaccine Name

Identifier	FR-5.10.1
Title	Select vaccine name
Requirement	User will select the vaccine name which needs to be assigned to sub admin
Source	Supervisor
Rationale	User will be able to select vaccine name to assign it to the sub admin
Business Rule (if required)	N/A
Dependencies	N/A
Priority	High

Table 147: Vaccine Quantity

Identifier	FR-5.10.2
Title	Add quantity of vaccine stock
Requirement	User will enter the vaccine stock quantity which needs to be assigned to sub admin
Source	Supervisor
Rationale	User will be able to assign vaccine stock quantity to sub admin
Business Rule (if required)	Quantity shall not be negative or zero
Dependencies	N/A
Priority	High

3.4.5.11 View Child details

Table 148: View Child Details

Identifier	FR-5.11.1
Title	View child details
Requirement	User will click on view vaccinated child stats detail to see the current progress of vaccination
Source	Teammate
Rationale	User will be able to see the vaccinated child stats
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Search Child details

Table 149: Search Child by ID

Identifier	FR-5.12.1
Title	Search child details by child ID
Requirement	User will click on search field and enter specific child id to see its information
Source	Teammate
Rationale	User will be able to search specific child data
Business Rule (if required)	Child ID shall not be other than the current available IDs of system
Dependencies	N/A
Priority	Low

3.4.5.12 View Hospital details

Table 150: View Hospital stats

Identifier	FR-5.12.1
Title	View hospitals stats
Requirement	User will click on the hospital name to view its current stats
Source	Teammate
Rationale	User will be able to see any hospital progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 151: Search Stats

Identifier	FR-5.14.1
Title	Search hospitals stats
Requirement	User will click on the search field and enter the hospital name
Source	Teammate
Rationale	User will be able to see specific hospital progress
Business Rule (if required)	Hospital name shall be available in system
Dependencies	N/A
Priority	Low

3.4.5.13 View Hospital details

Table 152: View Vaccine Center Stats

Identifier	FR-5.15.1
Title	View vaccine center stats
Requirement	User will click on the vaccine center name to view its current stats
Source	Teammate
Rationale	User will be able to see any vaccine center progress
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 153: Search Vaccine center Stats

Identifier	FR-5.16.1
Title	Search vaccine center stats
Requirement	User will click on the search field and enter the vaccine center name
Source	Teammate
Rationale	User will be able to see specific vaccine center progress
Business Rule (if required)	Vaccine center name shall be available in system
Priority	Low

3.4.5.14 Check vaccine requirement

Table 154: Check requirement for city

Identifier	FR-5.17.1
Title	Check vaccine stock requirement for a city
Requirement	User will select city and then check requirement
Source	Teammate
Rationale	User will be able to see upcoming requirements of the vaccine stock in a specific city
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 155: Check requirement for area

Identifier	FR-5.17.2
Title	Check vaccine stock requirement for an area
Requirement	User will select area and then check requirement
Source	Teammate
Rationale	User will be able to see upcoming requirements of the vaccine stock in a specific area
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.5.15 Check future possible cases

Table 156: Check future possible cases by city

Identifier	FR-5.18.1
Title	Check future possible cases for a city
Requirement	User will select city and then click on check possible cases
Source	Teammate
Rationale	User will be able to see future possible cases in a specific city
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 157: Check future possible cases by area

Identifier	FR-5.18.2
Title	Check future possible cases for an area
Requirement	User will select area and then click on check possible cases
Source	Teammate
Rationale	User will be able to see future possible cases in a specific area
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.5.16 View reports

Table 158: View Vaccinated Children Report

Identifier	FR-5.19.1
Title	View vaccinated children report
Requirement	User will click on vaccinated children report and report will appear
Source	Supervisor
Rationale	User will be able to see reports of vaccinated children of past
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 159: View Unvaccinated Children Report

Identifier	FR-5.19.2
Title	View unvaccinated children report
Requirement	User will click on unvaccinated children report and report will appear User can select weekly, monthly or yearly filter
Source	Supervisor
Rationale	User will be able to see reports of unvaccinated children of past
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

Table 160: Stocks report

Identifier	FR-5.19.3
Title	View stocks report
Requirement	User will click on stocks report and report will appear User can select weekly, monthly or yearly filter
Source	Supervisor
Rationale	User will be able to see reports of stocks of past
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.4.5.17 Update user settings**Table 161: Update user settings**

Identifier	FR-5.20.1
Title	Update user settings
Requirement	The user will click on the field which needs update and enter the information
Source	Supervisor
Rationale	User will be able update the settings
Business Rule (if required)	N/A
Dependencies	N/A
Priority	Low

3.5 Non-Functional Requirements

Following are the nonfunctional requirements for our system

3.5.1 Reliability

REA-1: Mean Time between Failures (MTBF): Software is designed in a way that it should be efficient enough so that MTBF remains minimum.

REA-2: Mean Time to Repair (MTTR): In case of any crash occur in the system, it is reloading itself quickly to minimize the MTTR time.

REA-3: Parent and child data should be added accurately as required

REA-4: Admin approval is important for all the work done

3.5.2 Usability

USE-1: System is designed in a user-friendly way so that all actors can understand the system in very short span

USE-2: System is optimized in a way that it gives response efficiently so that user is satisfy with performance

USE-3: System is allowing user to see his child vaccine data with only one click

USE-4: System is providing information for conforming notification over SMS efficiently

3.5.3 Performance

PER-1: 95% of webpages or application shall work completely within 1-6 seconds when user requests that page over at least 25 Mbps or faster Internet connection.

PER-2:

3.5.4 Security

SEC-1: System is designed in such a way that only admins can or authorized employees can access data. This makes the system secure and reducing loss risk to minimum.

3.5.5 Accessibility

ACC-1- System is accessible from remote areas too as it doesn't have any high graphics to it can work with slow internet access. It is accessible through mobile and web efficiently

3.5.6 Compatible

COM-1- The system is compatible with both Android and iOS. Web is easily compatible on all major browsers

3.6 External Interface Requirements

Following are the complete details for all of the external interface requirements identified for our system.

3.6.1 User Interfaces Requirements

Describe the logical characteristics of each user interface that the system needs. Some possible items to include are

- User friendly GUI.
- Standards for fonts, icons, button labels, images, color schemes, gradient, form inputs,
- In case of error message, Messages shown through Alert which are displayed on top right corner.

- Validation is applied on all inputs in forms. IN case of errors, error message will be displayed below the input.
- Primary color #e6f7fc and secondary color #001027 and color for buttons #0cb8b6 should maintain throughout the app

4 Design and Architecture

The following parts represents Software Design Description (SDD) report of our system.

4.1 Architectural Design

4.1.1.1 Tier-1

This is the front end of the system where user can access all the functionalities using the interface. It is usually called as Presentation Layer. This layer is implemented in React and React Native.

4.1.1.2 Tier-2:

This is the backend of the system where all the application logic is implemented. It is a server which make communication between tier 1 and tier 3. This layer is called as Business Layer. It is implemented in Node JS.

4.1.1.3 Tier-3:

This is the database of the system where all the application data will be stored. This layer is called as Data Layer. It is implemented Mongo DB.

This is our architectural diagram. We are using 3 Tier architecture where
First layer is user layer
Second layer is server layer
Third layer is database

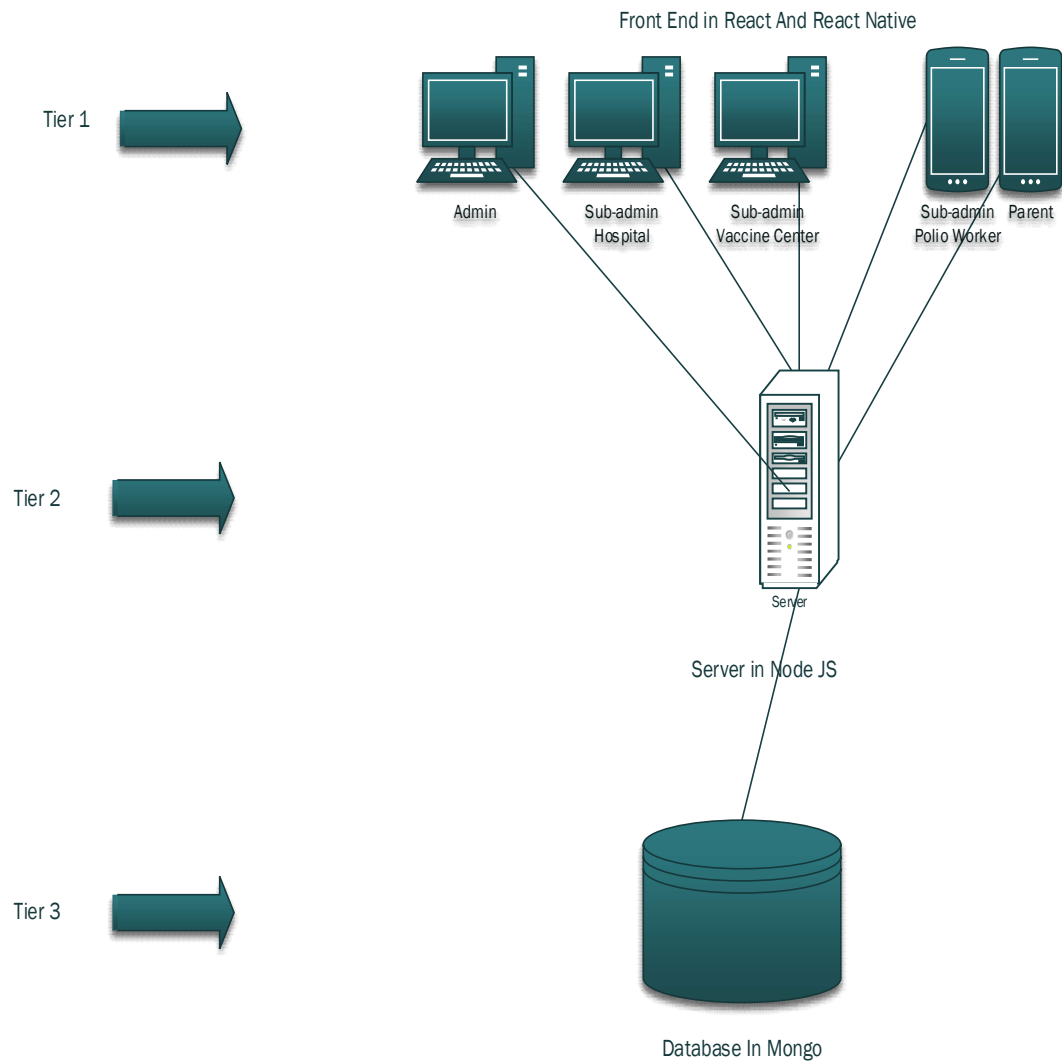


Figure 6: 3-Tier Architecture Diagram

4.2 JSON Schema

4.2.1 Vaccine Schema

```
const vaccineSchema = new schema({
  name: { type: String, default: "", required: true },
  manufacturer: { type: String, default: "", required: true },
  quantity: { type: Number, default: 50, required: true },
  expiryDate: { type: Date, default: Date.now, required: true },
});
```

4.2.2 Assign Vaccination Schema

```
const organizationVaccinesSchema = new schema({
  organization: { type: schema.Types.ObjectId, required: true, default: "", ref:
"userAccounts" },
  vaccines: {
    polio: { quantity: Number, default: 0 },
    diphtheria: { quantity: Number, default: 0 },
    homophiles: { quantity: Number, default: 0 },
    rotaVirus: { quantity: Number, default: 0 },
    measles: { quantity: Number, default: 0 },
    hepatitisA: { quantity: Number, default: 0 },
    hepatitisB: { quantity: Number, default: 0 },
    papillomaVirus: { quantity: Number, default: 0 },
    influenza: { quantity: Number, default: 0 },
  },
});
```

4.2.3 Daily Consumption Schema

```
const dailyConsumptionSchema = new schema({
  vaccineName: { type: schema.Types.ObjectId, required: true, ref: "Vaccine" },
  date: { type: Date, default: Date.now(), required: true },
  gender: { type: String, default: "", enum: ["male", "female"] },
  region: { type: String, default: "" },
  organization: { type: schema.Types.ObjectId, required: true, ref: "userAccounts" },
});
```

4.2.4 Child Follow up Schema

```
const childFollowUpSchema = new schema({
  child: { type: schema.Types.ObjectId, required: true, ref: "Child" },
  date: { type: Date, default: Date.now() },
  nextDate: { type: Date, default: Date.now() },
  vaccineName: { type: schema.Types.ObjectId, required: true, ref: "Vaccine" },
  organization: { type: schema.Types.ObjectId, required: true, ref: "userAccounts" },
  confirmationCode: { type: String, default: "" },
});
```

4.2.5 Child Schema

```
const childrenSchema = new schema({
```

```

childID: { type: String, required: true, default: "" },
parentName: { type: String, required: true, default: "" },
parentCNIC: { type: String, required: true, default: "" },
contactNo: { type: String, required: true, default: "" },
emergencyContact: { type: String, required: true, default: "" },
address: {
  addr: { type: String, default: "", required: true },
  area: { type: String, default: "", required: true },
  city: { type: String, default: "", required: true },
},
dateOfBirth: { type: Date, required: true, default: Date.now() },
gender: { type: String, required: true, default: "" },
birthPlace: { type: String, required: true, default: "" },
siblingNo: { type: Number, required: true, default: 1 },
hospitalName: { type: schema.Types.ObjectId, required: true, ref: "userAccounts" },
vaccination: [
  {
    polio: { noOfDoses: { type: Number, default: 0 } },
    diphtheria: { noOfDoses: { type: Number, default: 0 } },
    homophiles: { noOfDoses: { type: Number, default: 0 } },
    rotaVirus: { noOfDoses: { type: Number, default: 0 } },
    measles: { noOfDoses: { type: Number, default: 0 } },
    hepatitisA: { noOfDoses: { type: Number, default: 0 } },
    hepatitisB: { noOfDoses: { type: Number, default: 0 } },
    papillomaVirus: { noOfDoses: { type: Number, default: 0 } },
    influenza: { noOfDoses: { type: Number, default: 0 } },
  },
],));

```

4.2.6 Campaign Schema

```

const campaignSchema = new schema({
  campaignID: { type: String, default: "", required: true },
  vaccineCenter: { type: schema.Types.ObjectId, required: true, ref: "userAccounts" },
  status: { type: String, default: "active", required: true, enum: ["active", "inactive"] },
  area: { type: String, default: "", required: true },
  noOfWorkers: { type: String, default: "5", required: true },
  startDate: { type: Date, default: Date.now() },
  endDate: { type: Date, default: Date.now() },
});

```

4.2.7 Assign Vaccine Schema

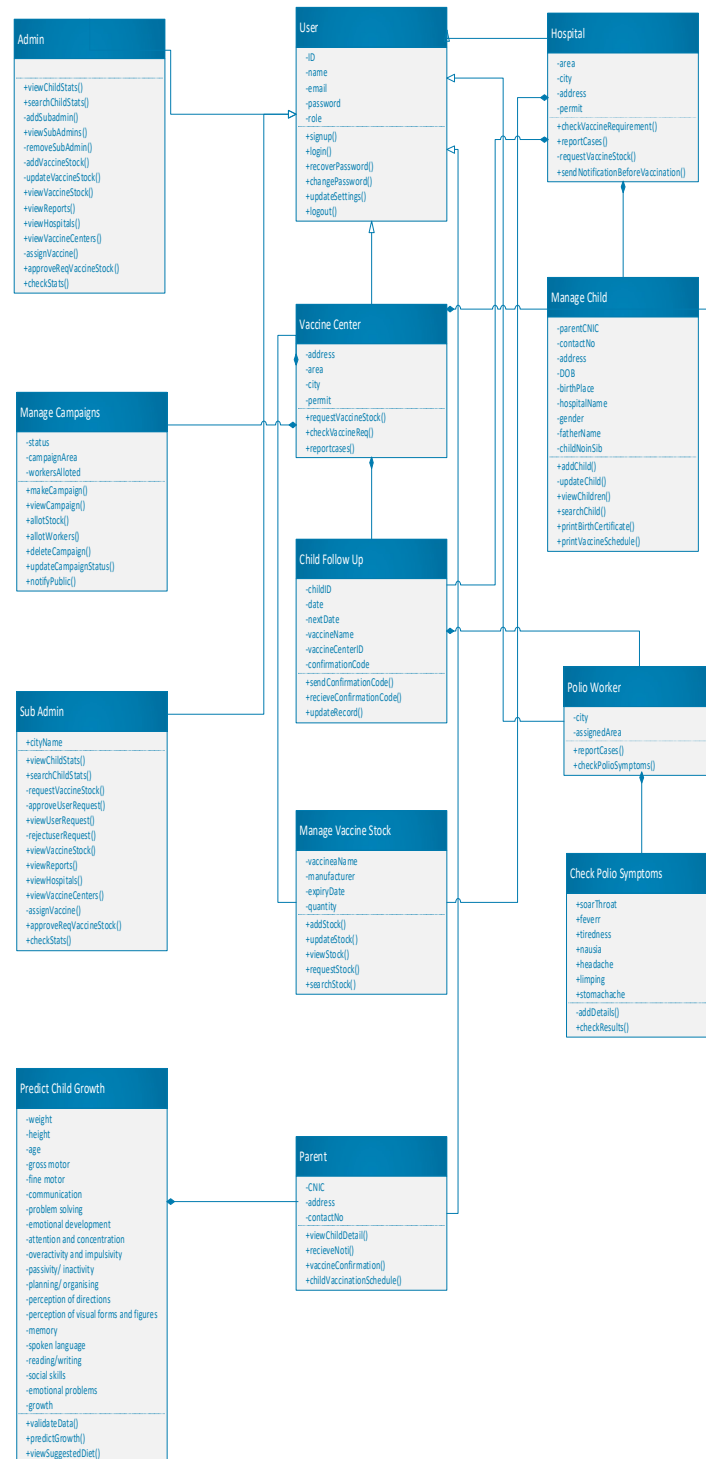
```

const assignVaccineToSchema = new schema({
  vaccine: { type: schema.Types.ObjectId, required: true, ref: "Vaccine" },
  date: { type: Date, default: Date.now(), required: true },
  quantity: { type: Number, default: "" },
  organization: { type: schema.Types.ObjectId, required: true, ref: "userAccounts" },
});

```

4.3 Design Models

4.3.1 Class Diagram



4.3.2 Activity Diagrams

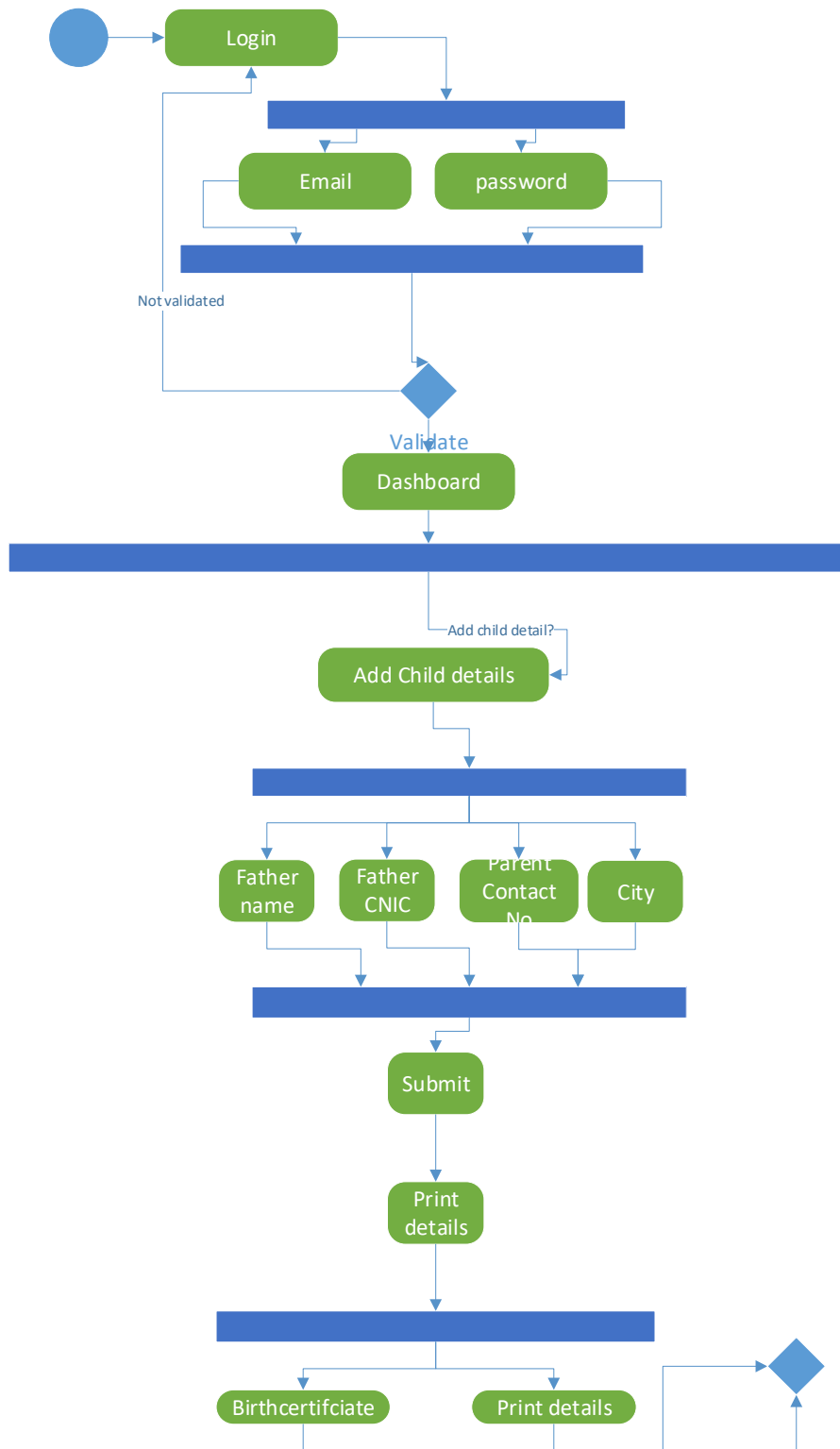


Figure 7: Activity diagrams for add and update child information (Hospital Module)

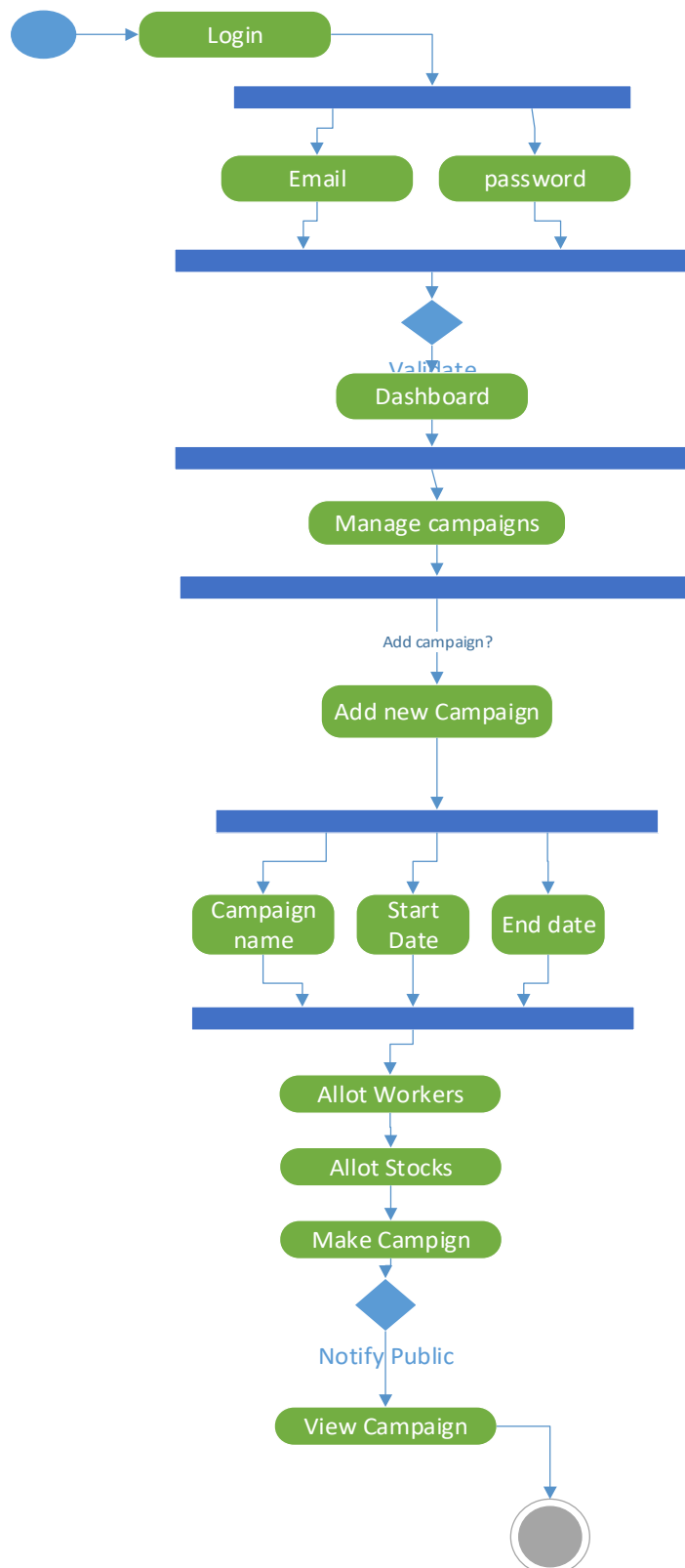


Figure 8: Activity Diagrams for Manage Campaign (Vaccine Center)

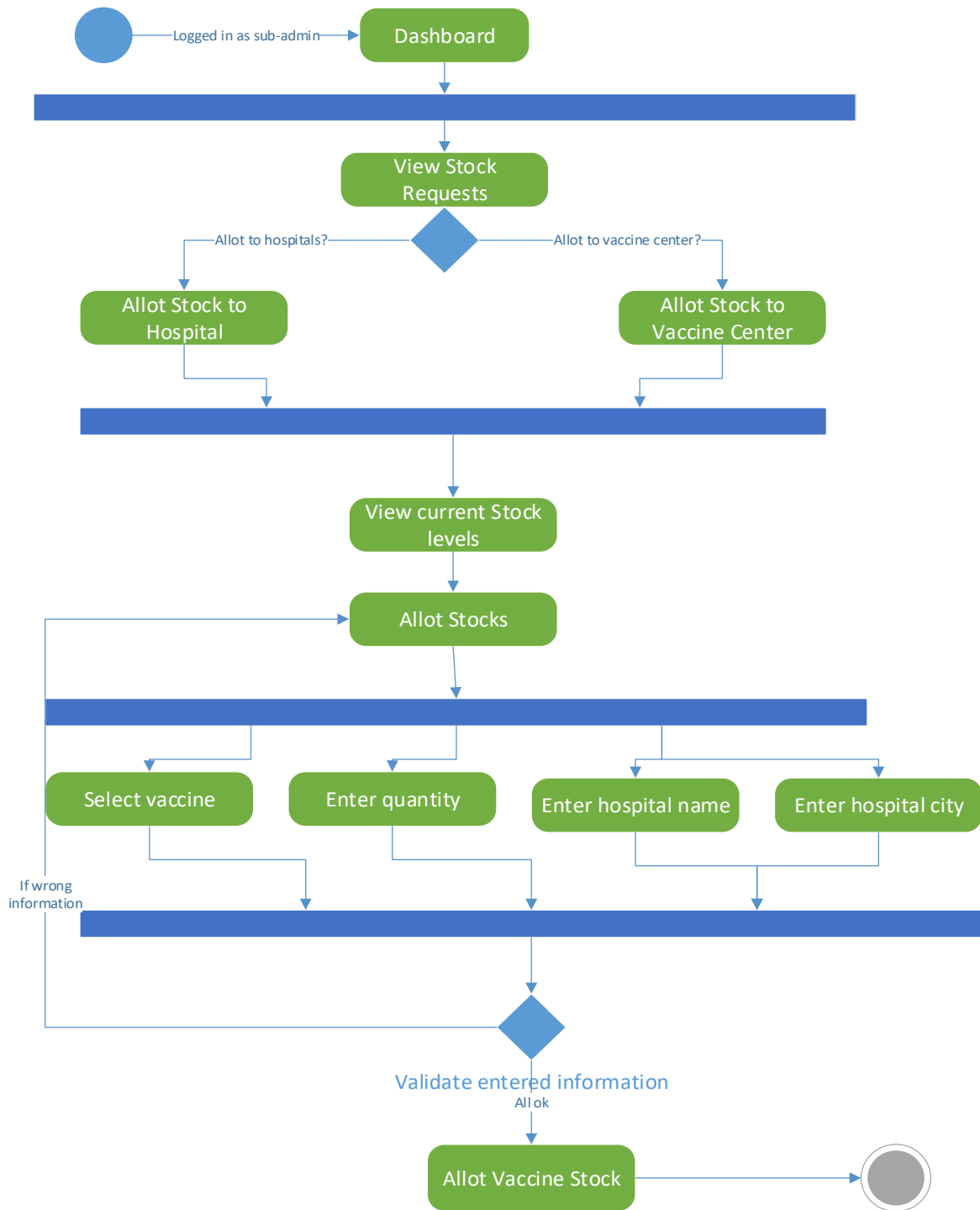


Figure 9: Activity Diagram For Stock Allocation

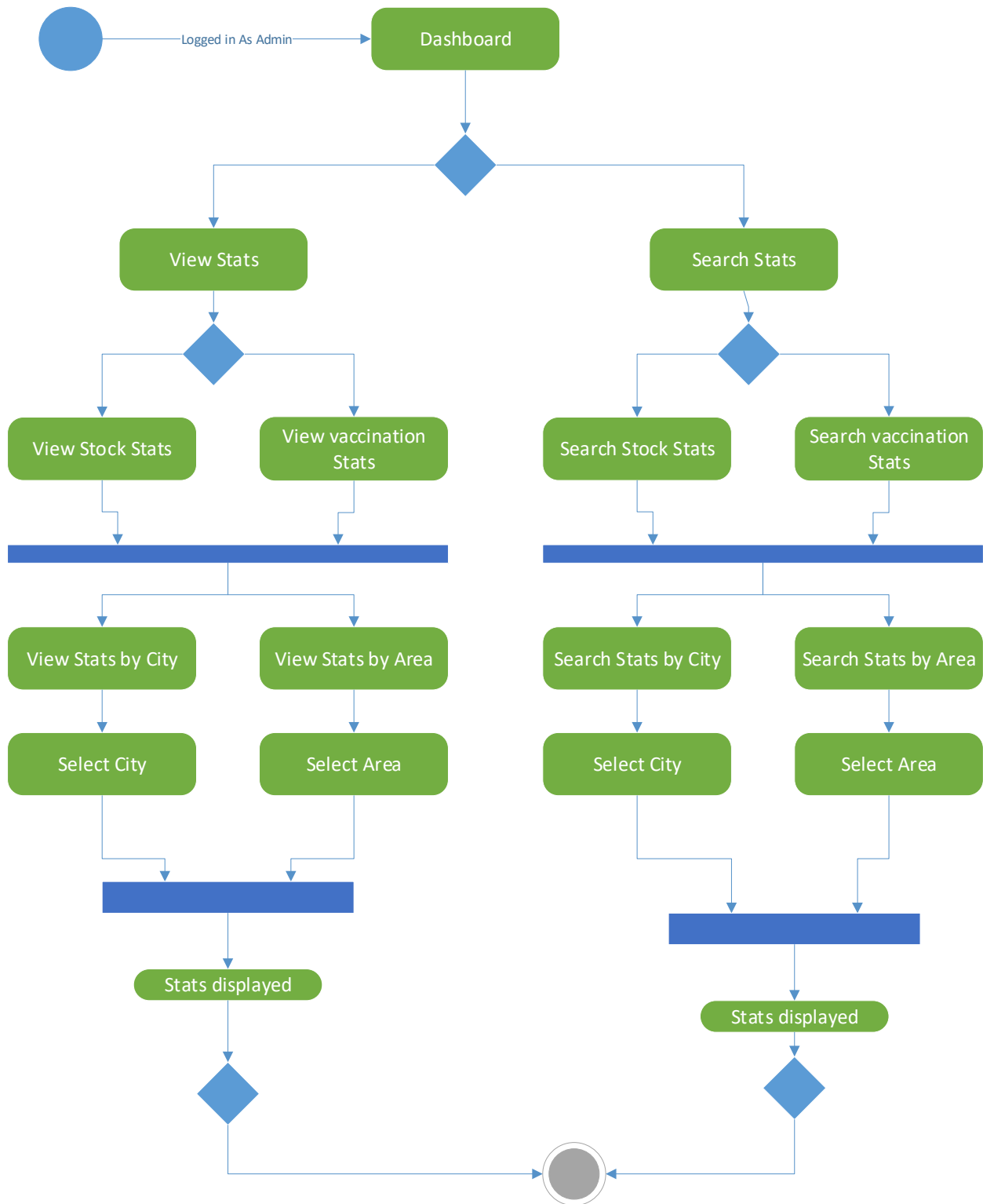


Figure 10: Activity Diagram for View and Search Stats

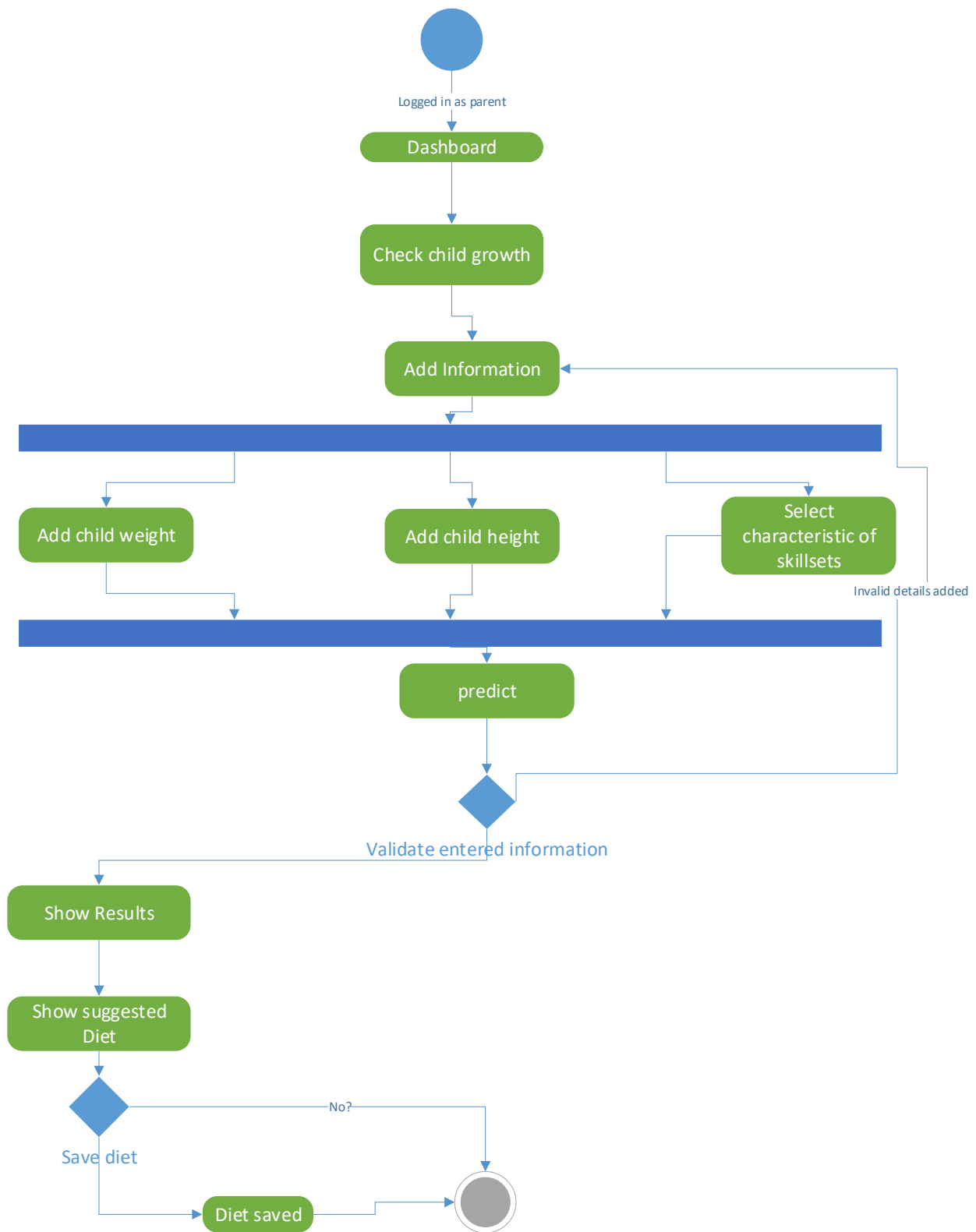


Figure 11: Activity Diagram for Check Child growth

4.3.3 Sequence Diagram

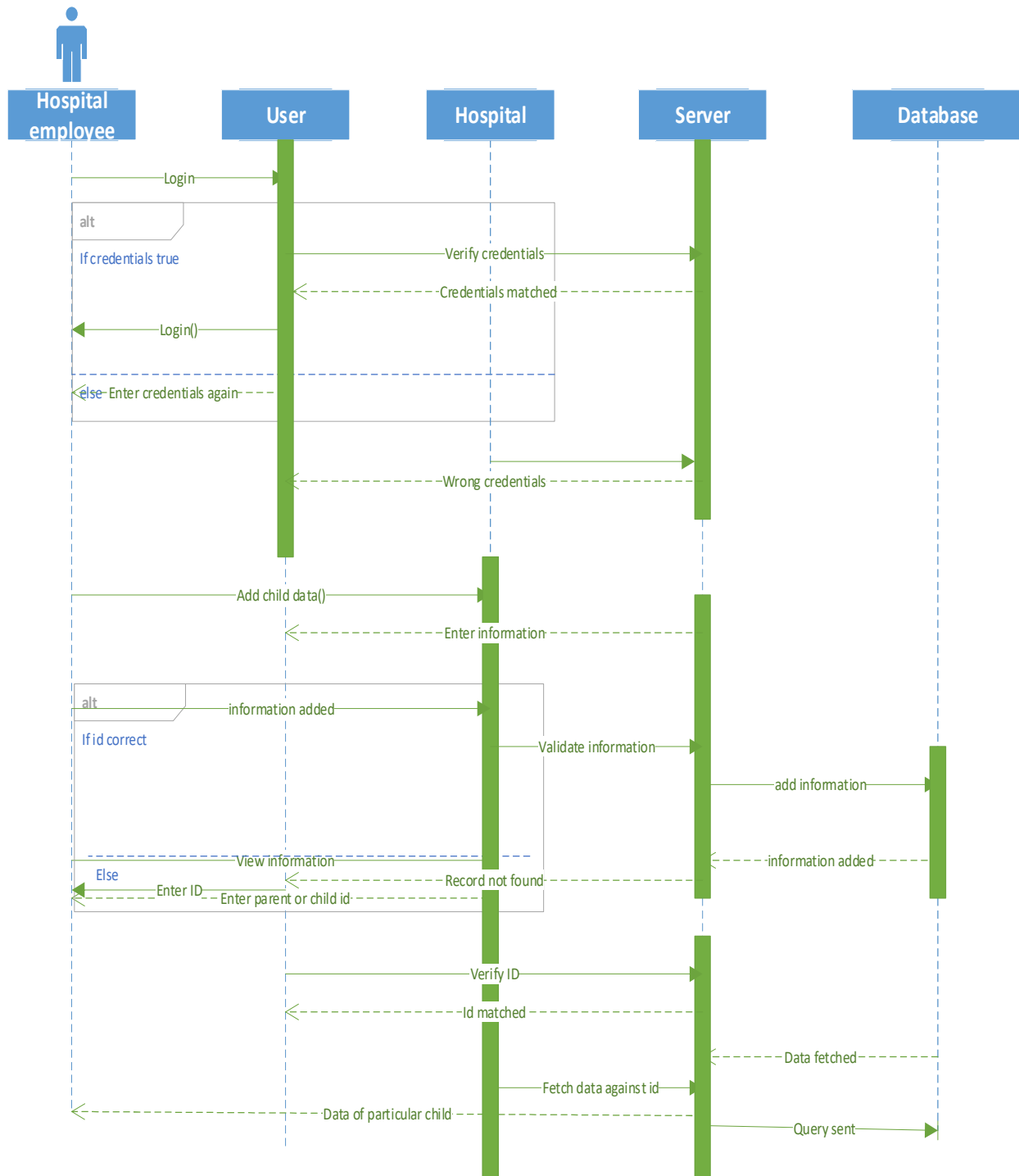


Figure 12: Sequence Diagram for Add and View Child Data

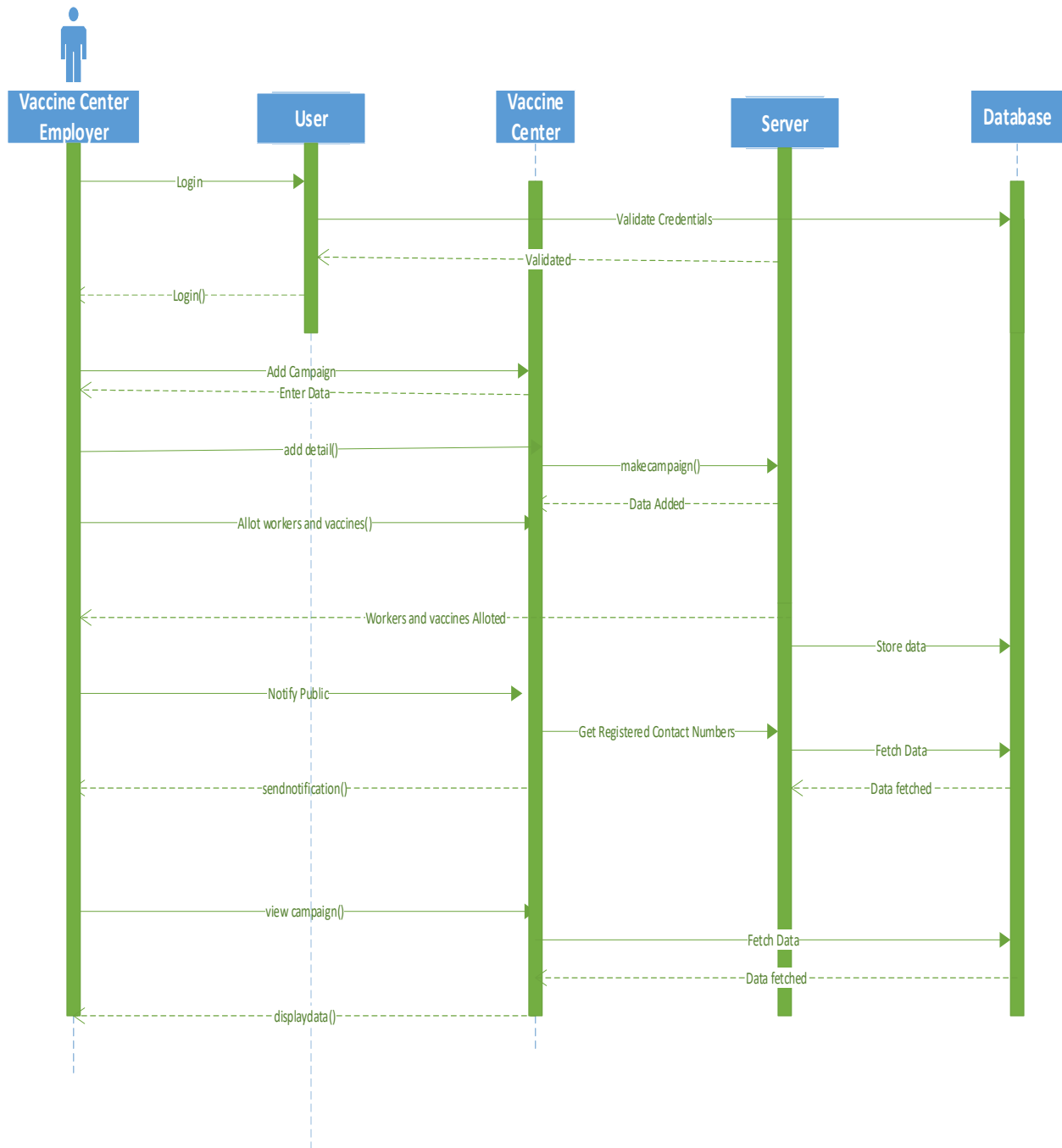


Figure 13: Sequence Diagram for Campaign management (Vaccine Center)

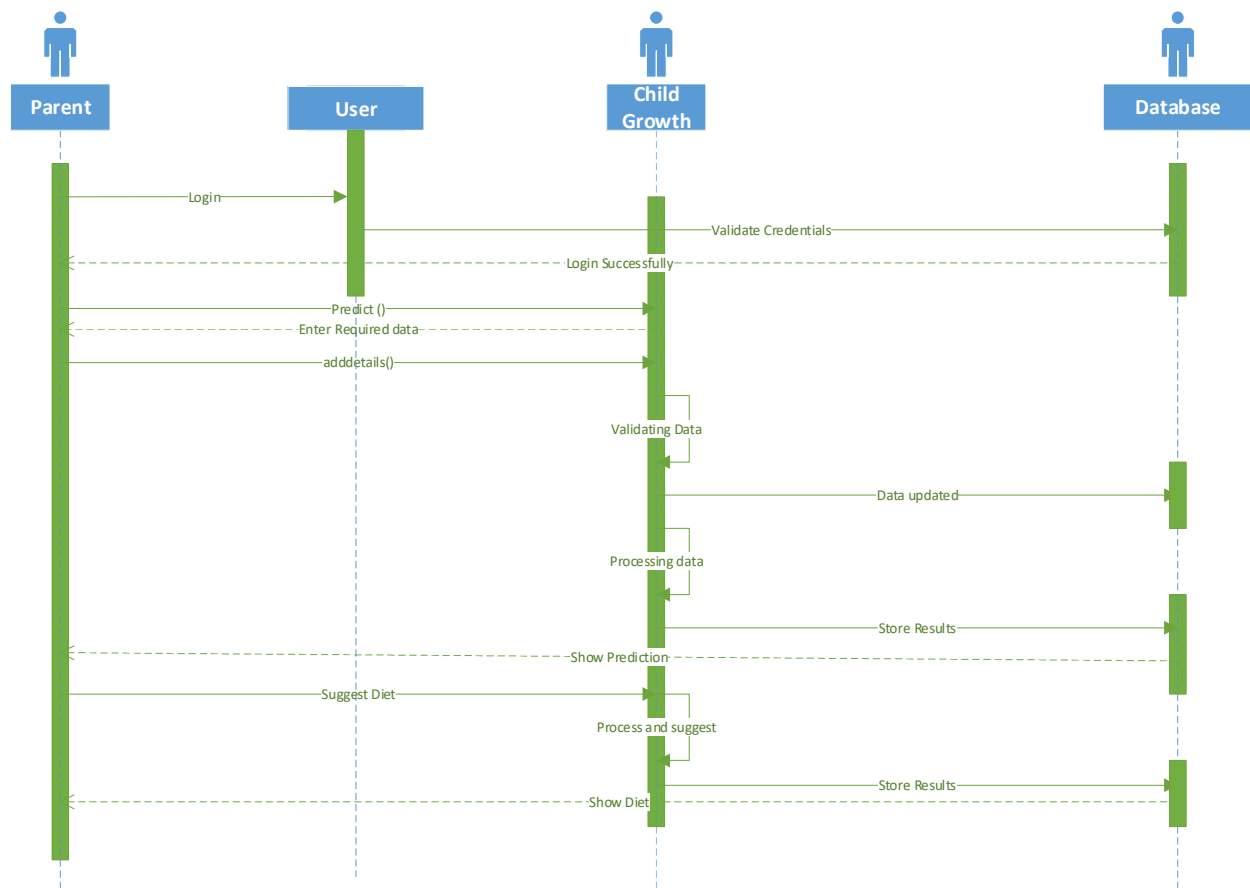


Figure 14: Sequence Diagram for Child Prediction

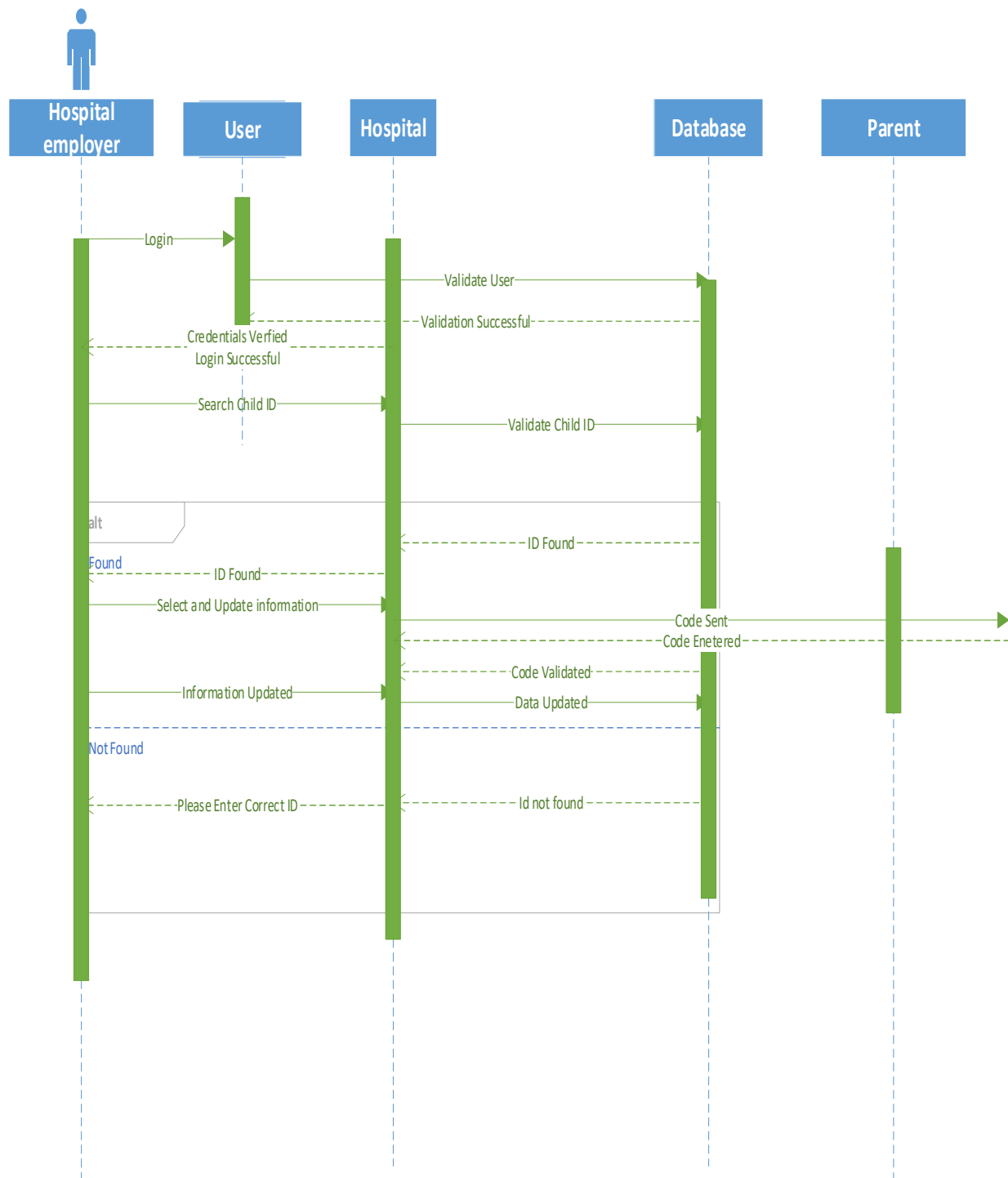


Figure 15: Sequence Diagram for Update child vaccine information

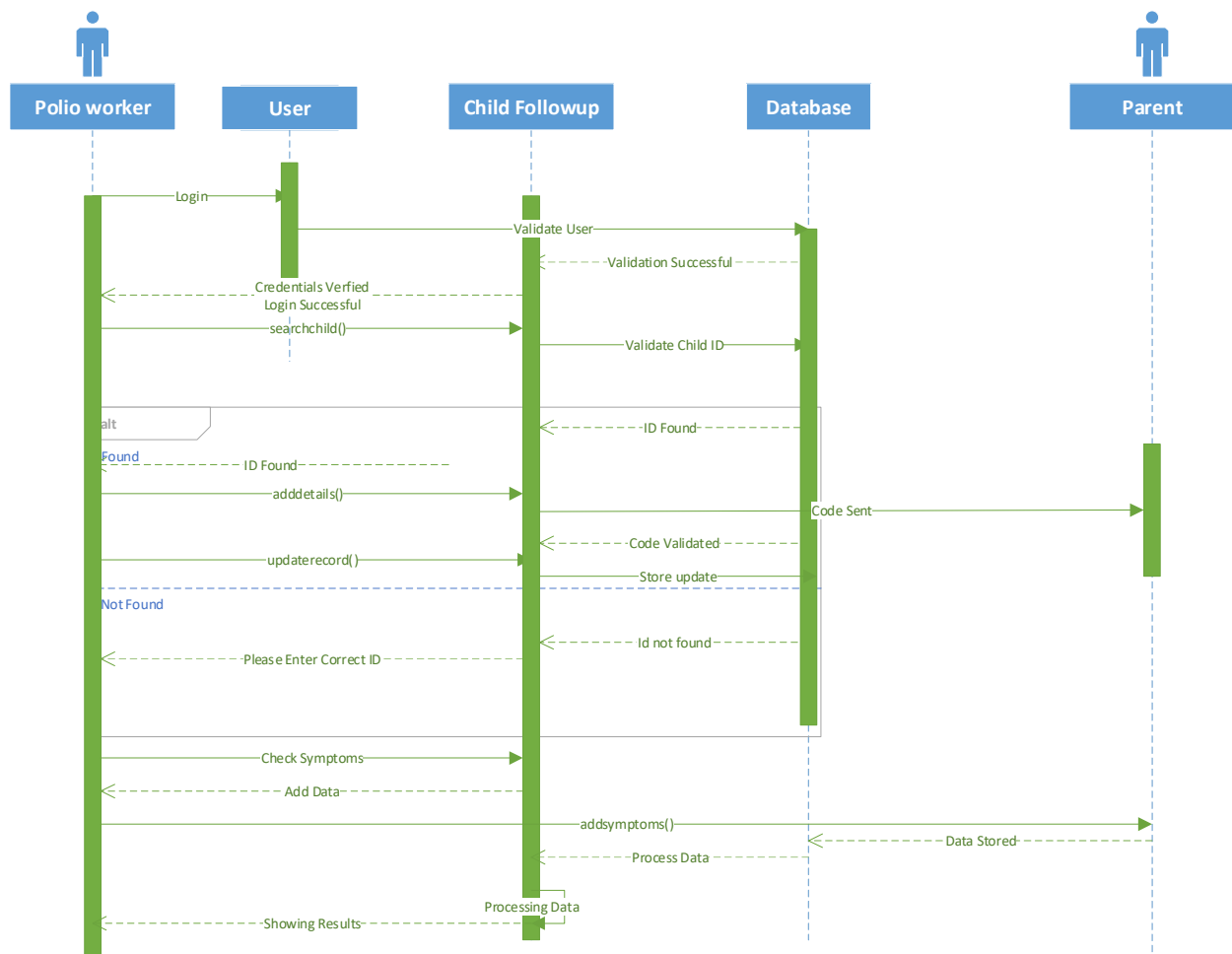


Figure 16: Sequence Diagram for update child information for polio worker

4.4 Data Design

We have designed our database in MongoDB. It is flexible, change friendly and easily scalable.

4.4.1 Data Dictionary

Following is the list of system entities, along with their brief descriptions:

Campaign	Area, workers, start date, end date, status
Child Follow up	child, date, vaccine name, organization
Children	Parent name, parent CNIC, contact number, emergency contact number, address, birth place
User	Name, email, password, CNIC, permit, address, user type
Vaccine	Name, quantity, manufacturer, expiry date
Vaccine Stock Request	vaccine name, quantity, organization

4.5 Human Interface Design

User for web application will open the system and login page will appear. If user is registered with our system, they will have authorized credentials through which they will be able to login. If they are new then they can sign and provide details with certificate, then they can request approval to sub admin. After logging in, user will get a dashboard showing multiple stats and data. These dashboards are based on role of user. On the side bar there are multiple option, which user can click and navigate on that page to perform that specific action. Each user has its own sets of option on side bar based on their roles.

User for mobile application will open the system and login screen will appear. Based on role user can login to the system. On home screen, user will get the child vaccination data. On side bar there is a menu showing multiple options based on user role. User can click and navigate on them to use that feature.

4.5.1 Screen Images



Figure 17: Dashboard Screen (Admin)

4.5.2 Screen Objects and Actions

Web Dashboard Screen:

On Dashboard screen, there are 9 objects on which some actions are performed.

- **Dashboard:** It will navigate the user to dashboard screen.
- **Sub admins:** It will navigate the user to sub admins screen where all the registered sub admins are viewed.
- **Vaccine centers:** It will navigate the user to vaccine centers screen where all the registered vaccine centers are viewed.
- **Children:** It will navigate the user to children screen where all the registered children are viewed.

- **Hospitals:** It will navigate the user to hospitals screen where all the registered hospitals are viewed.
- **Vaccine Stock:** It will navigate the user to available vaccine stock screen.
- **Vaccine Stock Requests:** It will navigate the user to vaccine stock requests page where all the requests for vaccine stock from sub admins, hospitals, and vaccine centers are viewed.
- **Reports:** Reports from different users will be viewed here.
- **Settings:** Update profile will be done from this screen.

Mobile Dashboard:

On mobile Dash Board screen, there are 7 objects on which some actions are performed.

- **Menu sidebar:** It will toggle the sidebar menu to navigate user to respective sections of the system.
- **Dashboard:** It will navigate the user to dashboard screen where child of parents is displayed
- **Child Growth:** It will navigate the user to child growth screen where parent will be able to check their child's growth.
- **Logout:** It will logout the user from the system.

5 Implementation

5.1 Algorithm

Algorithm 1: Update child Record
Input: Vaccination information, OTP
Output: Child Vaccination Record update
<pre>Child <- find child from req.params.id updateChild <- update Child with data from req.body VaccineSchedule <- find vaccine schedule where child -> req.params.id organizationVaccines <- find organization vaccines where org = req.user._id if (child.vaccination[0].noOfDoses of vaccine !== updateChild.vaccination[0].noOfDoses) { add daily consumption -> { vaccineName <- req.body.vaccineName, child <- req.params.id, date <- new Date(), organization <- req.user._id } Update remaining vaccine stock of organization <- { ...organizationVaccines.vaccines, Req.body.vaccineName <- organizationVaccines.vaccines.vaccineName.quantity - 1 } Update child vaccination schedule <- { VaccineSchedule.child <- req.params.id, Vaccines: { ...VaccineSchedule.vaccines, Req.body.vaccineName <- { Date <- new Date(), Done <- true } } } }</pre>
Algorithm 2: Vaccine Stock Requirement
Input: Current vaccination details
Output: upcoming requirements
<pre>orgDailyConsumption <- dailyConsumption of organization from req.user._id opvDaily, bcgDaily, pcvDaily, measlesDaily, pentavalentDaily <- 0</pre>

```

orgDailyConsumption.map((item) <- {
  if (item.vaccineName === opv) <- opvDaily += 1
  if (item.vaccineName === bcg) <- bcgDaily += 1
  if (item.vaccineName === pcv) <- pcvDaily += 1
  if (item.vaccineName === measles) <- measlesDaily += 1
  if (item.vaccineName === pentavalent) <- pentavalentDaily += 1
})

Requirements <- {
  Opv <- {
    sevenDays <- opvDaily*7
    thirtyDays <- opvDaily*30
  },
  Bcg <- {
    sevenDays <- bcgDaily*7
    thirtyDays <- bcgDaily*30
  },
  Pcv <- {
    sevenDays <- pcvDaily*7
    thirtyDays <- pcvDaily*30
  },
  Measles <- {
    sevenDays <- measlesDaily*7
    thirtyDays <- measlesDaily*30
  },
  Pentavalent <- {
    sevenDays <- pentavalentDaily*7
    thirtyDays <- pentavalentDaily*30
  },
}
Return requirements

```

Algorithm 3: Non Vaccinated Children

Input: Current vaccination details

Output: upcoming requirements

```

Children <- find children where hospitalName=req.user._id
childrenVaccines <- find vaccination schedule of all CHILDREN
threeDaysInMs <- 86400000 * 3;
nonVaccinated <- []

childrenVaccines.map((item) <- {
  if (item.vaccineName.done <- false && item.vaccineName.date < threeDaysInMs) {
    nonVaccinated.push(item.child)
  }
}

```

```
}}
```

```
return nonVaccinated;
```

Algorithm 4: Check Polio Symptoms

Input: child, symptoms, vaccination, genetical information

Output: possibility of polio symptoms

If

```
noOfDays>20 && noOfDoses ==0 && limping ==”yes” -> polio(true)
```

else if

```
noOfDoses>0 && limping==”yes” && symtoms==”yes” -> polio(true)
```

else if

```
noOfDoses>0 && limping==”yes” && polioaround==”yes” -> polio(true)
```

else

```
polio(false)
```

5.2 External APIs/SDKs

Table 162:API Used in this Project

Name of API and version	Description of API	Purpose of usage	List down the API endpoint/function/class in which it is used
Twilio	Used for sending SMS	To send OTP for vaccine update and notifications about vaccine campaigns to parents	updateChildRecord() notifyPublic() addChildRecord()
Nodemailer	Used for sending emails	To send emails to users	Signup() AcceptUserRequest() forgetPassword()

5.3 User Interface

5.3.1 Splash Screen

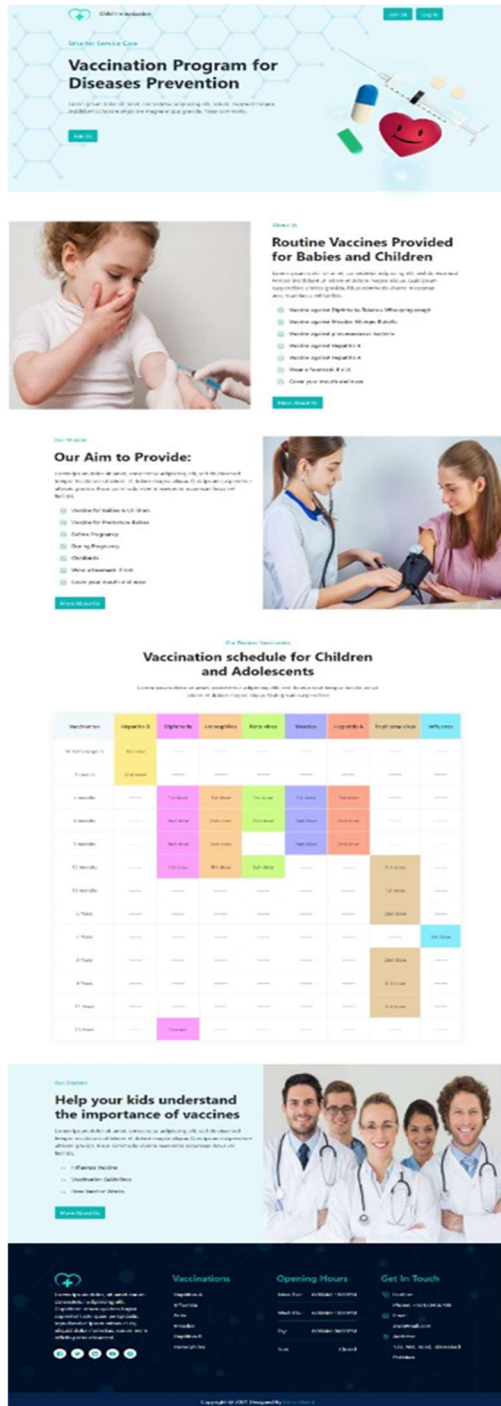


Figure 18: Splash Screen

5.3.2 Signup Screen

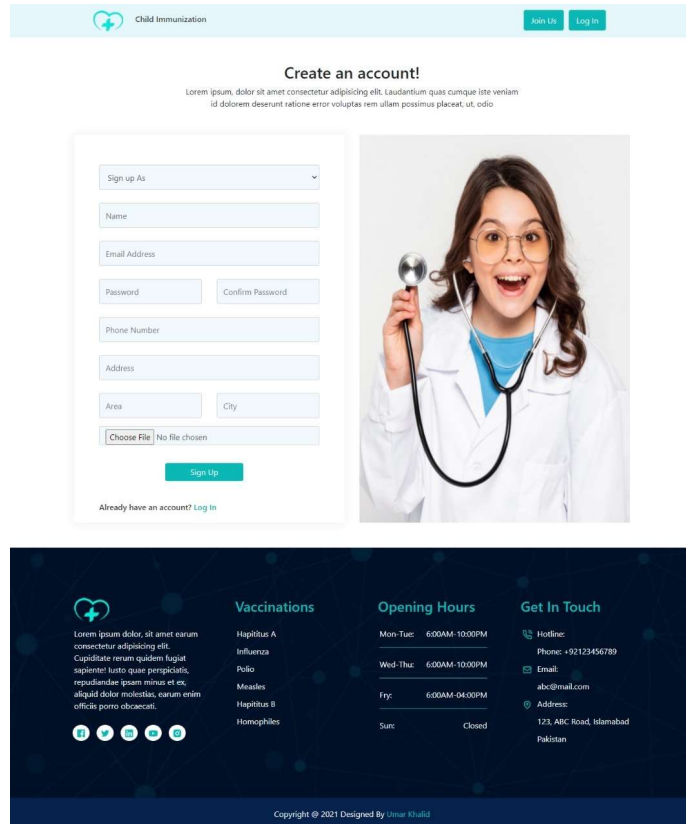


Figure 19: Signup Screen

5.3.3 Dashboard

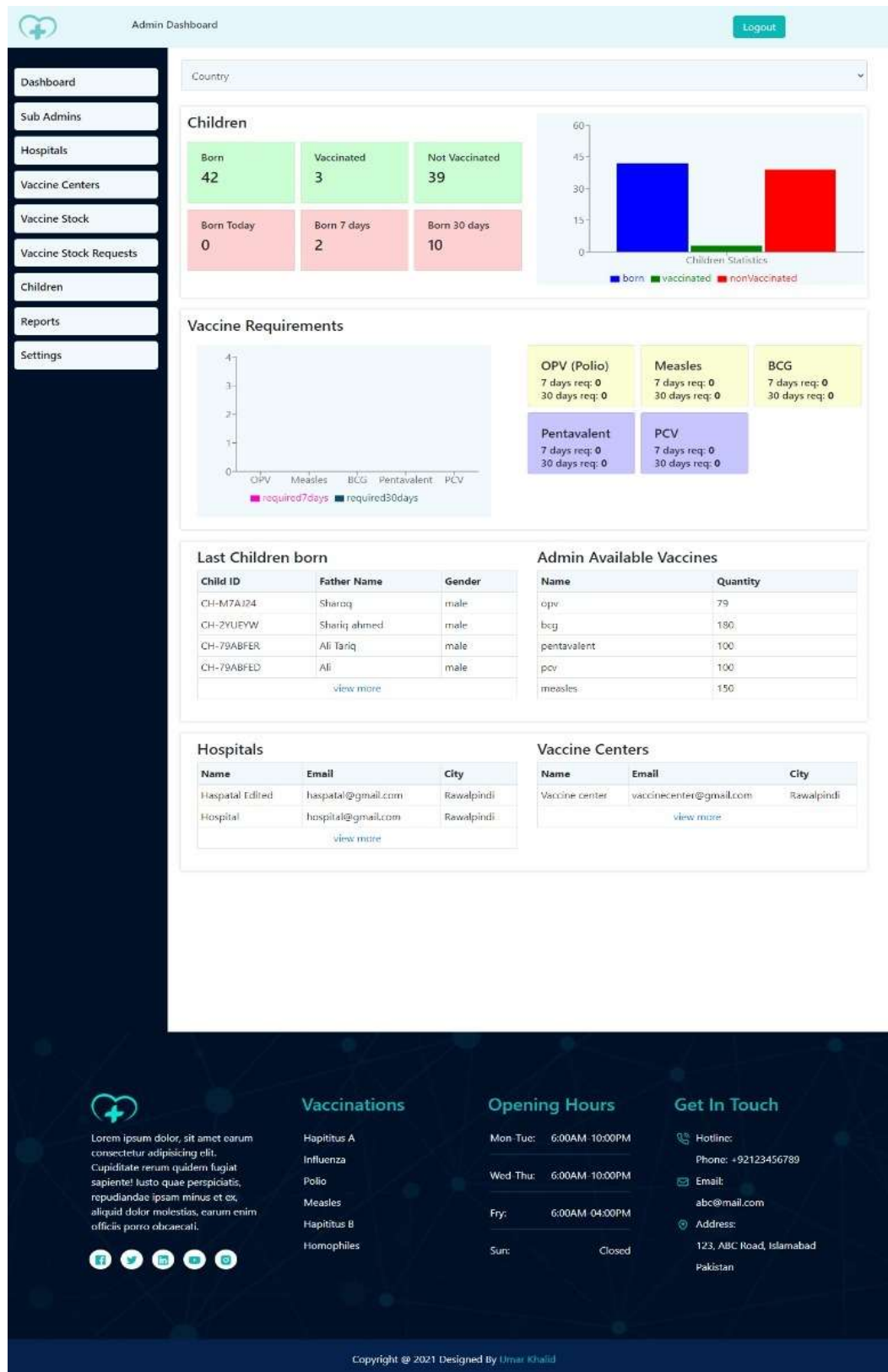



Figure 20: Admin Dashboard

5.3.4 Child Detail



Admin Dashboard

Logout

Dashboard

Sub Admins

Hospitals

Vaccine Centers

Vaccine Stock

Vaccine Stock Requests

Children

Reports

Settings


Details of Child ID: CH-M7AJ24

Vaccination Schedule






Child ID	CH-M7AJ24
Parent Name	Sharoq
Parent CNIC	13101-1511644-0
Contact No	03159499374
Date of Birth	Thu Dec 02 2021
Gender	male
Sibling Number	1
Gender	male
City	Rawalpindi
Hospital where born	

Vaccination Details

Vaccine Name	Number of doses
OPV (Polio)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Pentavalent	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
PCV (Pneumonia)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Measles	<input type="checkbox"/> <input type="checkbox"/>
BCG (Children's TB)	<input checked="" type="checkbox"/>



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Vaccinations

Hapititus A

Influenza

Polio

Measles

Hapititus B

Homophiles

Opening Hours


Mon-Tue: 6:00AM-10:00PM

Wed-Thu: 6:00AM-10:00PM


Fry: 6:00AM-04:00PM

Sun: Closed


Get In Touch

 Hotline:

Phone: +92123456789

 Email:

abc@mail.com

 Address:


123, ABC Road, Islamabad

Pakistan

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Figure 21: Child Detail

5.3.5 Sub Admin Details

Admin Dashboard

Logout

Dashboard

Sub Admins

Hospitals

Vaccine Centers

Vaccine Stock

Vaccine Stock Requests

Children

Reports

Settings

Sub admin Details

Name	Sub admin
Email	subadmin@gmail.com
Phone Number	234567
CNIC	12345
Address	Street 1, Khuram Colony, Rawalpindi

Sub admin Vaccine Stock Details

Name	Quantity
opv	11
measles	20
bcg	14
pentavalent	30
pcv	50

Sub admin Vaccine Usage Details


► Sub admin assigned opv vaccine quantity 2 to Vaccine center

► Sub admin assigned bcg vaccine quantity 2 to Hospital




► Sub admin assigned opv vaccine quantity 2 to Hospital

► Sub admin assigned opv vaccine quantity 2 to Vaccine center

► Sub admin assigned bcg vaccine quantity 2 to Vaccine center



Lorem ipsum dolor, sit amet earum consectetur adipiscing elit. Cupiditate rerum quidem fugiat sapiente! Iusto quae perspiciatis, repudiandae ipsam minus et ex, aliquid dolor molestias, earum enim officiis porro obcaecati.



Vaccinations

Hapititus A

Influenza

Polio

Measles

Hapititus B

Homophiles

Opening Hours

Mon-Tue: 6:00AM-10:00PM

Wed-Thu: 6:00AM-10:00PM

Fry: 6:00AM-04:00PM

Sun: Closed

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Phone: +92123456789

Email:

abc@mail.com

Address:


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Pakistan

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Figure 22: Sub-Admin Details

5.3.6 Signup Request

Sub Admin Dashboard

Logout

Dashboard

User Requests

Hospitals

Vaccine Centers

Vaccine Stock

Vaccine Stock Requests

Children

Reports


Settings

Signup request from: New Vaccine center






Approve

Reject

Name	New Vaccine center
Email	newvc@gmail.com
User Type	vaccinecenter
Contact No	03159499376
Address	B-VII 338, hello, Rawalpindi
Permit	View Permit



Lorem ipsum dolor, sit amet earum consectetur adipisicing elit. Cupiditate rerum quidem fugiat sapiente! Iusto quae perspiciatis, repudiandae ipsam minus et ex, aliquid dolor molestias, earum enim officis porro obcaecati.



Vaccinations

Hapititus A

Influenza

Polio

Measles

Hapititus B

Homophiles

Opening Hours


Mon-Tue: 6:00AM-10:00PM


Wed-Thu: 6:00AM-10:00PM


Fry: 6:00AM-04:00PM

Sun: Closed

Get In Touch

 Hotline:
Phone: +92123456789


 Email:
abc@mail.com

 Address:
123, ABC Road, Islamabad
Pakistan

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Figure 23: Signup Request

5.3.7 Add Child Record

Hospital Dashboard

Logout

Dashboard

Children

Vaccine Stock

Reports

Settings

Add Child Details

Gender

Gender

Date of Birth

12/06/2021

Parent name

Parent Name

Parent CNIC

Parent CNIC

Contact Number

Contact Number

Emergency Contact

Contact Number

Address

Address

Area

Area

City

Address


Place of Birth

Birth Place






Sibling No.

Sibling number

Add Child



>Lorem ipsum dolor, sit amet earum
consectetur adipiscing elit.
Cupiditate rerum quidem fugiat
sapiente! Iusto quae perspicatis,
repudiandae ipsam minus et ex,
aliquid dolor molestias, earum enim
officiis porro obcaecati.



Vaccinations

Hapitus A

Influenza

Polio

Measles

Hapitus B

Homophiles

Opening Hours

Mon-Tue: 6:00AM-10:00PM

Wed-Thu: 6:00AM-10:00PM

Fry: 6:00AM-04:00PM

Sun: Closed

Get In Touch

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abc@mail.com


Address:

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Figure 24: Add Child Record

5.3.8 Vaccination Schedule Child

Hospital Dashboard

Logout

Dashboard

Children


Vaccine Stock

Reports






Settings

Vaccination Schedule of CHILD:

#	Vaccine name	Date	Done
1	opv0	Mon Nov 08 2021	✓
2	opv1	Wed Nov 10 2021	✗
3	opv2	Wed Dec 08 2021	✗
4	opv3	Wed Jan 05 2022	✗
5	measles0	Sun Jun 26 2022	✗
6	measles1	Fri Dec 23 2022	✗
7	bcg	Mon Nov 08 2021	✓
8	pentavalent0	Wed Nov 10 2021	✓
9	pentavalent1	Wed Dec 08 2021	✗
10	pentavalent2	Wed Jan 05 2022	✗
11	pcv0	Wed Nov 10 2021	✗
12	pcv1	Wed Dec 08 2021	✗
13	pcv2	Wed Jan 05 2022	✗



Lorem ipsum dolor, sit amet eorum
consectetur adipisicing elit.
Cupiditate rerum quidem fugiat
sapiente! Iusto quae perspicatis,
repudiandae ipsam minus et ex,
aliquid dolor molestias, eorum enim
officiis porro obcaecati.






Vaccinations

Hapititus A
Influenza
Polio
Measles
Hapititus B
Homophiles

Opening Hours

Mon-Tue: 6:00AM-10:00PM
Wed-Thu: 6:00AM-10:00PM
Fry: 6:00AM-04:00PM
Sun: Closed

Get In Touch

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 Email:
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Pakistan

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Figure 25: Child Vaccine Schedule

The image shows a mobile application screen for "Parent's Registration". At the top, there is a dark blue header bar with a white back arrow icon on the left and the text "Parent's Registration" in white. Above this header, a status bar shows the time "10:09", a settings gear icon, and signal/battery icons. The main content area has a light gray background and contains seven white input fields with rounded corners, each with a label in the center: "Name", "Email Address", "CNIC", "Password", "Address", "Area", and "City". Below these fields is a large teal button with rounded corners and the word "Submit" in white. At the very bottom, there is a black navigation bar with three white icons: a triangle, a circle, and a square.

10:09

← Parent's Registration

Name

Email Address

CNIC

Password

Address

Area

City

Submit

Figure 26:Parent Signup Screen

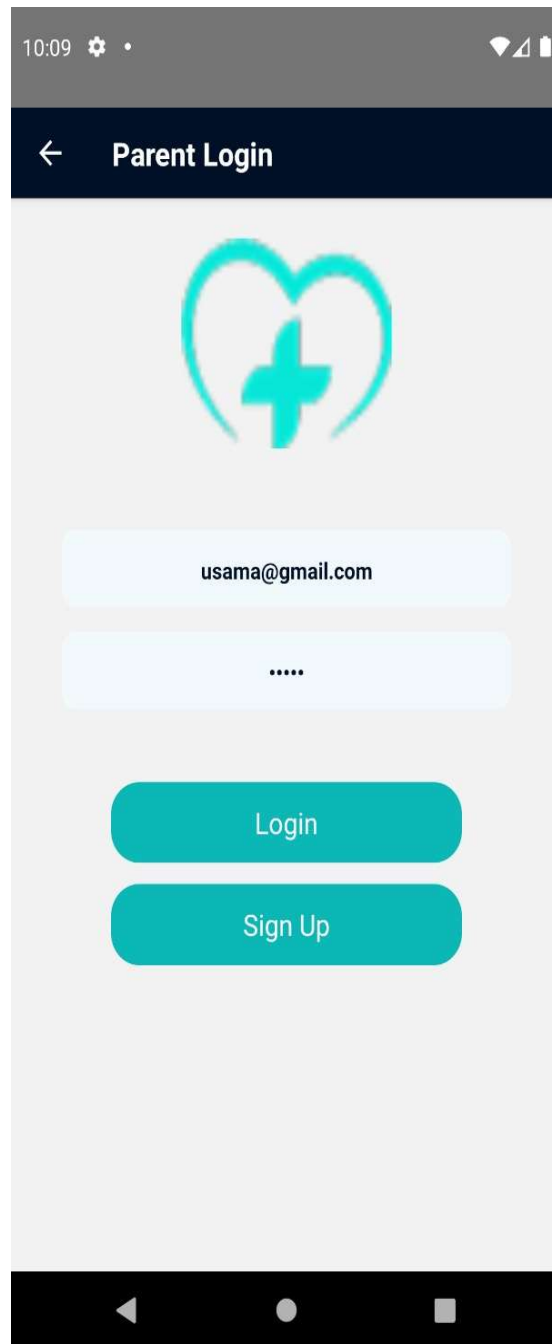


Figure 27: Parent Signin Screen

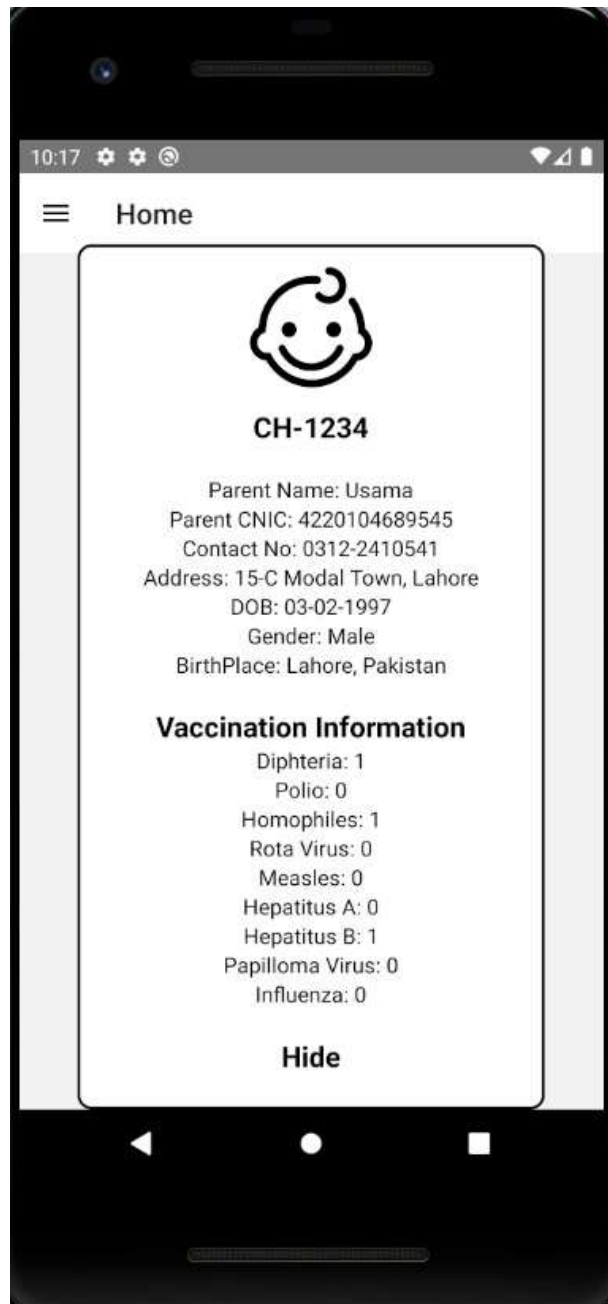


Figure 28: Child information display



Figure 29: Side bar for Web

6 Testing and Evaluation

Following testing is performed upon the complete implementation of the system.

6.1 Unit Testing

Unit Testing 1: Login as Admin with valid and invalid credentials

Testing Objective: To ensure the login form is working correctly with valid and invalid credentials/inputs.

Table 163: Test case 1

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Check the email field of login to validate that it takes proper email	Email: admin@gmail.com	Validates email address and moves cursor to next textbox	Pass
2	Check the email field of login to validate that it displays error message.	Email: admin.gmail.com	Highlights field and displays error message	Pass

Unit Testing 2: Login as Admin with email and password

Testing Objective: To ensure the login of admin is working correctly with valid and invalid credentials/inputs.

Table 164: Test case 2

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Enter valid credentials of admin	Email: admin@gmail.com Password: Qwerty015	Admin logged in successfully.	Pass
2	Enter invalid credentials of admin	Email: admin.gmail.com Password: 12345	Failed to login with error message displayed on screen	Pass

Unit Testing 3: View stats of entire country.

Testing Objective: To ensure that the stats of entire country are being displayed on screen

Table 165: Test case 3

No.	Test case/Test script	Attribute and value	Expected result	Result
1	View stats of entire country	City: Country	Stats of entire country is displayed on dashboard of admin	Pass

Unit Testing 4: View stats of specific city.

Testing Objective: To ensure that the stats of specific city are being displayed on screen

Table 166: Test case 4

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Select city from the dropdown.	City: Rawalpindi	Stats of selected city will be displayed on dashboard of admin	Pass

Unit Testing 5: View registered sub admins.

Testing Objective: To ensure that the registered sub admins are being displayed on screen

Table 167: Test case 5

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on sub admins from side bar.	Click on sub admins	Registered sub admins will be displayed on screen	Pass

Unit Testing 6: View details of any sub admin.

Testing Objective: To ensure that the details of any sub admin are being displayed on screen

Table 168: Test case 6

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on view details from sub admins screen to display details of that sub admin	Sub admin ID	Details of sub admin will be displayed on screen.	Pass

Unit Testing 7: Delete sub admin.

Testing Objective: To ensure the deletion of sub admin.

Table 169: Test case 7

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on delete icon from sub admins screen to delete sub admin	Sub admin ID	Sub admin will be deleted from the system.	Pass

Unit Testing 8: Update sub admin.

Testing Objective: To ensure the updating of sub admin.

Table 170: Test case 8

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on update icon from sub admins screen and enter update data of sub admin.	Name: Sub admin Email: subadmin@mail.com Password: Qwerty015 Address: Rawalpindi	Sub admin data will be updated in the system	Pass

Unit Testing 9: Assign vaccine stock to sub admins.

Testing Objective: To ensure that the assign vaccine stock to sub admins is working.

Table 171: Test case 9

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on assign from sub admin screen to enter data.	Vaccine: opv Quantity: 50	Vaccine stock assigned successfully to sub admin.	Pass

Unit Testing 10: View registered hospitals.

Testing Objective: To ensure that the registered hospitals are being displayed on screen

Table 172: Test case 10

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on hospitals from side bar.	hospitals	Registered hospitals will be displayed on screen	Pass

Unit Testing 11: View registered vaccine centers.

Testing Objective: To ensure that the registered vaccine centers are being displayed on screen

Table 173: Test case 11

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on vaccine centers from side bar.	Click on vaccine centers	Registered vaccine centers will be displayed on screen	Pass

Unit Testing 12: View vaccine stock details.

Testing Objective: To ensure that the vaccine stock details is displayed on screen

Table 174: Test case 12

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on vaccine stock from side bar.	Click on vaccine stock	Added vaccine stock will be displayed on screen	Pass

Unit Testing 13: Add vaccine stock

Testing Objective: To ensure the addition of vaccine stock.

Table 175: Test case 13

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on add vaccine stock from vaccine stock screen and enter details of new vaccine stock.	Name: opv Quantity: 100 Manufacturer: abc company Expiry date: 1-1-2022	Vaccine stock will be added.	Pass

Unit Testing 14: View vaccine stock requests.

Testing Objective: To ensure that the vaccine stock requests from sub admins is displayed on screen

Table 176: Test case 14

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on vaccine stock requests from side bar.	Click on vaccine stock request	Vaccine stock requests will be displayed on screen	Pass

Unit Testing 15: View children of entire country.

Testing Objective: To ensure that the registered children of entire country are being displayed on screen

Table 177: Test case 15

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on children from side bar.	Click on children	Children will be displayed on screen	Pass

Unit Testing 16: View details of specific child.

Testing Objective: To ensure that child details displayed on screen

Table 178: Test case 16

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on view details from children screen.	Child ID	Child data will be displayed on screen	Pass

Unit Testing 17: View vaccination schedule of specific child.

Testing Objective: To ensure that vaccination schedule of child is displayed on screen

Table 179: Test case 17

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on vaccination schedule from child details screen.	Child ID	Child vaccination schedule will be displayed on screen	Pass

Unit Testing 18: View reports of non-vaccinated children

Testing Objective: To ensure that non-vaccinated children are displayed on screen

Table 180: Test case 18

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on reports from side bar.	Click on reports	Non-vaccinated children list will be displayed on screen	Pass

Unit Testing 19: Update profile

Testing Objective: To ensure the working of update profile.

Table 181: Test case 19

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on settings from side bar and enter updated details and click on update.	Name: admin Email: admin@mail.com Password: Qwerty015 Address: Rawalpindi	Profile details will be updated.	Pass

Unit Testing 20: Sign up request as vaccine center / hospital

Testing Objective: To ensure the sign-up request is working correctly with valid and invalid credentials/inputs.

Table 182: Test case 20

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Enter valid credentials for sign up request.	Email: hospital@gmail.com Password: Qwerty015 Name: Hospital Address: Rawalpindi Permit: File	Sign up request sent successfully to sub admin.	Pass
2	Enter invalid credentials for sign up request	Email: admin@gmail.com Password: 12345 Permit: empty	Failed to send sign up request with error message displayed on screen	Pass

Table 20: Test case 20

Unit Testing 21: Search child.

Testing Objective: To ensure that search child is working.

Table 183: Test case 21

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Enter child ID on search bar in children screen	Child ID: CH-1234	Details of that child will be displayed.	Pass
2	Enter invalid child ID	Child ID: 1234	No child available will be displayed on screen	Pass

Unit Testing 22: Logout**Testing Objective:** To ensure that logout is working.

Table 184: Test case 22

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on logout from the navbar.	Click on logout	User will be logged out.	Pass

Unit Testing 23: View user requests of vaccine center and hospital.**Testing Objective:** To ensure that user requests are displayed on screen

Table 185: Test case 23

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on user requests from side bar of sub admin.	Click on user requests	User sign up request will be displayed on screen	Pass

Unit Testing 24: View details of user request of vaccine center and hospital.**Testing Objective:** To ensure that the details of user request are displayed on screen

Table 186: Test case 24

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on view request from user requests screen.	User request ID	User request details will be displayed on screen	Pass

Unit Testing 25: View permit of user request of vaccine center and hospital.**Testing Objective:** To ensure that the permit submitted by vaccine center or hospital is successfully viewed.

Table 187: Test case 25

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on view permit from user request details screen.	Click on view permit.	File will be displayed in new tab	Pass

Unit Testing 26: Approve user request of vaccine center and hospital.**Testing Objective:** To ensure that the approve user request is working.

Table 188: Test case 26

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on approve from user request details screen.	Click on approve.	User request will be approved and the user will be able to login and use the application	Pass

Unit Testing 27: Reject user request of vaccine center and hospital.

Testing Objective: To ensure that the reject user request is working.

Table 189: Test case 27

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on reject from user request details screen.	Click on reject.	User request will be deleted.	Pass

Unit Testing 28: View campaigns from vaccine center side bar.

Testing Objective: To ensure that the added campaigns are viewed successfully.

Table 190: Test case 28

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on campaigns from vaccine center side bar.	Click on campaigns	Campaigns screen will be displayed successfully.	Pass

Unit Testing 29: View campaign details.

Testing Objective: To ensure that the campaign details are viewed successfully.

Table 191: Test case 29

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on view details from campaigns page	Click on view details.	Campaign details will be displayed successfully.	Pass

Unit Testing 30: Notify public about the campaign

Testing Objective: To ensure that notify public is working.

Table 192: Test case 30

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on notify public from campaigns page	Click on notify public.	Messages about the campaign will be sent to registered parents of that area.	Pass

Unit Testing 31: Add campaign

Testing Objective: To ensure that add campaign is working.

Table 193: Test case 31

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on add campaign from campaigns page and enter details of campaign.	Area: sadiqabad Vaccine: opv Workers: w1, w2 Start date: 1-1-2022 End Date: 5-2-2022	Campaign will be created successfully.	Pass

Unit Testing 32: Delete campaign

Testing Objective: To ensure that delete campaign is working.

Table 194: Test case 32

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on delete icon from campaigns page	Campaign ID	Campaign will be deleted successfully.	Pass

Unit Testing 33: View registered polio workers.

Testing Objective: To ensure that the registered polio workers are being displayed on screen

Table 195: Test case 33

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on polio workers from side bar of vaccine center.	Click on polio workers	Registered polio workers will be displayed on screen	Pass

Unit Testing 34: Add polio worker

Testing Objective: To ensure that add polio worker is working.

Table 196: Test case 34

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on add worker from polio workers screen and enter details of worker.	Name: Ali Email: ali@gmail.com Password: 12345 Address: Rawalpindi	Polio worker will be added successfully into the system.	Pass

Unit Testing 35: Delete polio worker.

Testing Objective: To ensure the deletion of polio worker.

Table 197: Test case 35

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on delete icon from polio workers screen to delete worker.	Polio worker ID	Polio worker will be deleted from the system.	Pass

Unit Testing 36: Update polio worker.

Testing Objective: To ensure the updating of polio worker.

Table 198: Test case 36

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on update icon from workers screen and enter update data of polio worker.	Name: Polio worker Email: worker@mail.com Password: Qwerty015 Address: Rawalpindi	Polio worker data will be updated in the system	Pass

Unit Testing 37: Add child from hospital

Testing Objective: To ensure the working of add child in hospital

Table 199: Test case 37

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on add child from children screen in hospital and enter details of child	Parent name: Umar CNIC: 61101 Gender: Male DOB: 6-12-2021 Contact: 0315123 Address: Islamabad Birth Place: Islamabad Sibling No: 1	Child will be added into the system.	Pass

Unit Testing 38: Print birth certificate and vaccination schedule

Testing Objective: To ensure the working of add child in hospital

Table 200: Test case 38

No.	Test case/Test script	Attribute and value	Expected result	Result
1	After child is added, user will be directed to screen where birth certificate and vaccination schedule is displayed. From there, click on print.	Click on print.	Print view will be displayed from where user will be able to print birth certificate and vaccination schedule.	Pass

Unit Testing 39: Send reminders about vaccination to parents

Testing Objective: To ensure that the reminders are being sent automatically to parents before vaccination.

Table 201: Test case 39

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Reminders will be send to parents automatically before one day of their child's vaccination.	Reminders.	Reminders will be sent automatically.	Pass

Unit Testing 40: Update child vaccination record.

Testing Objective: To ensure that the child vaccination record is updating successfully.

Table 202: Test case 40

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Click on view details from children screen and select the checkbox from vaccination update.	OPV: 2, BCG: 1, Measles: 1,	OTP will be sent to parent mobile number, and otp view will be displayed on screen.	Pass

Unit Testing 41: Enter OTP

Testing Objective: To ensure that opt is working successfully.

Table 203: Test case 41

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Enter correct OTP and click submit.	Otp: 1234	Child will be updated successfully.	Pass
2	Enter incorrect OTP and click submit	Otp: 43421	User will be alerted that incorrect otp is entered, kindly enter correct otp. And also resend otp button will be displayed.	

Unit Testing 42: View details of child from parent dashboard

Testing Objective: To ensure that parent is able to view his child details from mobile app.

Table 204: Test case 42

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on child id from parent home screen to view child details	Tap on child ID.	Child details will be displayed in screen.	Pass

Unit Testing 43: View vaccination schedule of child from mobile app.

Testing Objective: To ensure that parent is able to view his child vaccination schedule from mobile app.

Table 205: Test case 43

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on vaccination schedule button from child details screen.	Tap on vaccination schedule.	Child vaccination schedule will be displayed in screen.	Pass

Unit Testing 44: View vaccination information.

Testing Objective: To ensure that parent is able to view vaccination information from mobile app.

Table 206: Test case 44

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on vaccination info from side menu.	Tap on vaccination information.	List of vaccine names will be displayed on screen from where user will be able to click on any vaccine name to display its information.	Pass

Unit Testing 45: View suggested diet plans.

Testing Objective: To ensure that parent is able to check diet plans for his child from mobile app.

Table 207: Test case 45

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on diet plans from child growth screen.	Tap on diet plans	Diet plans according to child growth will be displayed on screen.	Pass

Unit Testing 46: Update profile from mobile app.

Testing Objective: To ensure the working of update profile.

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on settings from side menu and enter updated details and click on update.	Name: parent Email: parent@mail.com Password: Qwerty015 Address: Rawalpindi	Profile details will be updated.	Pass

Unit Testing 47: Update child vaccination record from mobile app.

Testing Objective: To ensure that the child vaccination record is updating successfully.

Table 208: Test case 47

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on view details from children screen and select the checkbox from vaccination update.	OPV: 2, BCG: 1, Measles: 1,	OTP will be sent to parent mobile number, and otp view will be displayed on screen.	Pass

Unit Testing 48: Enter OTP from mobile app

Testing Objective: To ensure that opt is working successfully.

Table 209: Test case 48

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Enter correct OTP and click submit.	Otp: 1234	Child will be updated successfully.	Pass
2	Enter incorrect OTP and click submit	Otp: 43421	User will be alerted that incorrect otp is entered, kindly enter correct otp. And also resend otp button will be displayed.	

Unit Testing 49: Check polio symptoms from mobile app by polio worker.

Testing Objective: To ensure the working check polio symptoms.

Table 210: Test case 49

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on check polio symptoms from side menu of polio worker and enter details and click on check.	Fever: yes Headache: no Limping: no etc	Polio symptoms results will be displayed on screen.	Pass

Unit Testing 50: Login from mobile app by polio worker.

Testing Objective: To ensure the working of login on mobile app.

Table 211: Test case 50

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on login from splash screen and enter correct email and password.	Email: worker@mail.com Password:12345	User will be logged in and home page will be displayed.	Pass
2	Enter invalid credentials of login	Email: worker.mail.com Password: 123451	User will be alerted that incorrect login details are entered kindly re-enter the details.	

Unit Testing 51: Check child growth from mobile app.

Testing Objective: To ensure that parent is able to check his child growth from mobile app.

Table 212: Test case 51

No.	Test case/Test script	Attribute and value	Expected result	Result
1	Tap on check child growth from side menu and rate different skills of child then click on submit.	Communication: **** Social: *** Signs: **** Gross motor: *** etc	Child growth will be displayed on screen.	Pass

6.2 Functional Testing

Functional Testing 1: Testing the process of Login with different roles (Hospital, Vaccine center, Sub admin, Admin)

Objective: To ensure that the correct page with the correct side bar is loaded.

Table 213: Functional test case 1

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Login as a hospital.	LoginAs: hospital Email: hospital@mail.com Password: Qwerty015	Main page for the hospital is loaded with the hospital side bar.	Logged in and redirected to hospitals main page.	Pass
2.	Login as a hospital	LoginAd: admin Email : D003 Password: 1234	Main page for the hospital is loaded with the hospital side bar.	Login failed – invalid credentials error	Fail
3.	Login as a vaccine center.	LoginAs: vaccinecenter Email: vaccinecenter@mail.com Password: Qwerty015	Main page for the vaccine center is loaded with the vaccine center side bar.	Logged in and redirected to vaccine center main page.	Pass
4.	Login as a sub admin.	Email: subadmin@mail.com Password: Qwerty015	Main page for the sub admin is loaded with the sub admin side bar.	Logged in and redirected to sub admin main page.	Pass
5.	Login as a admin.	Email: admin@mail.com Password: Qwerty015	Main page for the admin is loaded with the admin side bar.	Logged in and redirected to admin main page.	Pass

Functional Testing 2: Testing process of view stats of any city of Pakistan on admin dashboard.
Objective: To ensure that the correct stats of selected city are displayed on screen.

Table 214: Functional test case 2

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on dashboard from admin sidebar.	Click on dashboard	Dashboard of admin with whole country stats will be displayed on screen.	As expected.	Pass
2	Select city from dropdown displayed on top of the admin dashboard	City: Rawalpindi	Stats of Rawalpindi will be displayed on screen.	As expected	Pass

Functional Testing 3: Testing the process of assign vaccine stock to sub admin from admin.
Objective: To ensure that the vaccine is assigned successfully to sub admins.

Table 215: Functional test case 3

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on sub admins from admin sidebar.	Click on sub admins	Sub admins will be displayed on screen.	As expected.	Pass
2	Click on assign vaccine displayed in front of every sub admin.	Click on assign vaccine	Assign vaccine page will be displayed.	As expected	Pass
3	Enter vaccine details that needs to be assigned.	Vaccine: opv Quantity: 20 Date: 12-6-2021	Vaccine will be assigned successfully. And assigned vaccine page will be displayed.	As expected	Pass
4	Click on sub admin whom you assigned the vaccine to confirm that vaccine stock is assigned.	Click on view sub admin details	Updated details of sub admin vaccine stock will be displayed.	As expected	Pass

Functional Testing 4: Testing the process of accept user request of vaccine center or hospital from sub admin.

Objective: To ensure that the user request is accepted or rejected successfully.

Table 216: Functional test case 4

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on user requests from sub admin sidebar.	Click on user requests	User requests will be displayed on screen.	As expected.	Pass
2	Click on view request displayed in front of every row from list of requests.	Click on view request	Request details will be displayed on screen.	As expected	Pass
3	Click on reject request.	Click on reject	User request will be deleted from the list of requests	As expected	Pass
4	Click on approve request.	Click on approve request	User request will be approved and he will be added in hospitals or vaccine centers list.	As expected	Pass

Functional Testing 5: Testing the process of campaigns from vaccine centers
Objective: To ensure that the campaigns are created and updated successfully.

Table 217: Functional test case 5

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on campaigns from vaccine center sidebar.	Click on campaigns	Campaigns will be displayed on screen.	As expected.	Pass
2	Click on delete icon from the list of campaigns	Click on delete icon	Campaign will be deleted successfully and user will be directed to campaigns screen.	As expected	Pass
3	Click on notify public from campaigns screen	Click on notify public.	User will be alerted that the public of that area is notified about the vaccine campaign.	As expected	Pass
4	Click add campaign from campaigns page and enter campaign info.	Area: sadiqabad Vaccine: polio Workers: w1, w2 Start Date: 2-dec End date: 4-dec	Campaign will be added successfully in the list of campaigns.	As expected	Pass
5	Click on assign vaccine to campaign from the campaign details page.	Vaccine: opv Quantity: 50	Vaccine stock will be assigned successfully to campaign.	As expected	Pass

Functional Testing 6: Testing the process of children from hospitals**Objective:** To ensure that the children are added and updated successfully.**Table 218: Functional test case 6**

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on children from hospitals sidebar.	Click on children	Children will be displayed on screen.	As expected.	Pass
2	Click on view details from children screen	Click on view details	Details of child will be displayed on screen.	As expected	Pass
3	Click on Add child and enter child info	Parent name: Umar CNIC: 61101 Gender: Male Contact No: 12345 Address: Rawalpindi Etc	Child will be added in to the system	As expected	Pass
4	In child details screen, update child vaccination record by clicking on checkboxes and click on update child	OPV: 2 BCG: 1 Measles: 2 Pentavalent: 1	OTP will be sent to parent phone number and OTP view will be displayed on screen	As expected	Pass
5	Enter OTP and click on submit.	OTP: 1234	Child vaccination record will be updated successfully and user will be directed to child details page.	As expected	Pass
6	Enter wrong OTP	OTP: 4321	User will be alerted that wrong OTP is entered, kindly re-enter OTP or send OTP again	As expected	Pass

Functional Testing 7: Testing the process of check child growth from parent mobile app.
Objective: To ensure that the check child growth is working.

Table 219: Functional test case 7

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on check child growth from side menu of parent.	Click on check child growth	Child growth screen will be displayed	As expected.	Pass
2	Rate different skills of child and click on check growth	Communication: ***** Social: ***** Gross motor: *** Fine motor: ***** ETC	Growth result will be displayed on screen.	As expected	Pass
3	Click on view diet plans from growth results page.	Click on diet plans	Diet plans according to growth will be displayed on screen.	As expected	Pass

Functional Testing 8: Testing the process of check polio symptoms from polio worker mobile app.
Objective: To ensure that the working of polio check polio symptoms process.

Table 220: Functional test case 8

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on check polio symptoms from side menu of worker.	Click on check polio symptoms	Polio symptoms screen will be displayed	As expected.	Pass
2	Answer different questions about health of child	Fever: yes Headache: No Limping: No ETC	Polio symptoms result will be displayed on scree.	As expected	Pass

6.3 Integration Testing

Integration Testing 1: Hospital and vaccine center sign up and approval from sub admin.

Testing Objective: To ensure the user sign up process is being done correctly and the interface between hospital/vaccine center and Sub admin is running correctly.

Table 221: Integration Testing 1

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Sign up	Name: hospital Email: hospital@mail.com Password: 12345 Etc	User request sent successfully to sub admin.	User request sent successfully.	Pass
2.	View user request from sub admin sidebar.	Click on view request	Request details will be viewed.	As expected.	Pass
3.	Approve user request.	Click on approve	User request will be approved and user will be added in hospitals or vaccination centers list.	As expected	Pass
4.	Reject User request	Click on reject	User request will be deleted.	As expected	Pass

Integration Testing 2: Request vaccine stock from sub admin by hospital and vaccine center.

Testing Objective: To ensure the request vaccine stock and assign vaccine stock is working correctly between hospital/vaccine center and sub admin/admin.

Table 222: Integration Testing 2

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Request vaccine stock.	Name: opv Quantity: 20	Vaccine stock request will be sent successful to sub admin	As expected	Pass
2.	View vaccine stock request from sub admin side menu.	Click on request.	Sub admin will be directed to assign vaccine stock page.	As expected.	Pass
3.	Enter vaccine details to assign it to hospitals or vaccine centers	Vaccine: opv Quantity: 20	Vaccine stock will be assigned to hospital/vaccine center	As expected	Pass

7 Conclusion and Future Work

7.1 Conclusion

This project is assisting government authorities and parents at same time to keep their children vaccinated without any delay so that their children remain healthy. This system is providing a complete support since child birth until their child gets fully vaccinated. For officials, it is great source to keep track of all children vaccination, inventory and others stats. While parents can easily check schedules, check their child growth time to time, and also this system can help them to check polio symptoms in their child.

This final report for Child immunization and growth tracking is providing all documents which contains the research, problem, proposed solution, requirements, system design, implementation, testing of the modules. From this project, we are able to learn machine learning, web development with updated tech, mobile development for cross platform.

7.2 Future Work

In the future, the system can be enhanced its efficiency by implementing this project with data warehouses. Centralizing health related record, doctor appointments, general vaccination and more complex algorithm can be applied to get rid of the diseases from the country. For parents, multiple activities can be added to reduce the input from parent to predict the child growth. Multiple languages can be provided. Apart from this, security firewalls or algorithms can be applied in future to secure the application in a better way.

8. References

List any documents or other resources to which this SRS refers, if any. These might include user interface style guides, standards, system requirements specifications, interface specifications, or the SRS for a related product. The following are a few examples of different resources.

Book

Author(s). Book title. Location: Publishing company, year, pp.

Example:

W.K. Chen. Linear Networks and Systems. Belmont, CA: Wadsworth, 1993, pp. 123-35.

Article in a Journal

Author(s). "Article title". Journal title, vol., pp, date.

Example:

G. Pevere. "Infrared Nation." The International Journal of Infrared Design, vol. 33, pp. 56-99, Jan. 1979.

Articles from Conference Proceedings (published)

Author(s). "Article title." Conference proceedings, year, pp.

Example:

D.B. Payne and H.G. Gunhold. "Digital sundials and broadband technology," in Proc. IOOC-ECOC, 1986, pp. 557-998.

World Wide Web

Author(s)*. "Title." Internet: complete URL, date updated* [date accessed].

M. Duncan. "Engineering Concepts on Ice. Internet: www.iceengg.edu/staff.html, Oct. 25, 2000 [Nov. 29, 2003].

9. Plagiarism Report



Figure 30: Plagiarism Report