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<http://dspace.daffodilvarsity.edu.bd:8080/bitstream/handle/123456789/5284/171-15-1272%3d20%25.docx?isAllowed=y&sequence=1>

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http://www.myhealthavatar.eu/wp-content/uploads/2013/04/MHA_Deliverable_D2-2_Scenario-based-user-needs.pdf

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COMSATS University Islamabad (CUI) Child Immunization and Growth Tracking System By Shariq Ahmed Umar Khalid CIIT/SP18-BSC-151/ISB CIIT/SP18-BSC-164/ ISB Supervisor Dr. Ashfaq Farooqi 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 (CUI) Child Immunization and Growth Tracking System A project presented to COMSATS University Islamabad In partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science (2018-2022) By Shariq Ahmed Umar Khalid CIIT/SP18-BSC-151/ISB CIIT/SP18-BSC-164/ISB DECLARATION We hereby declare that this software, neither whole nor as a part has been copied out from any source. It is further declared that we have developed this software and accompanied report entirely on the basis of our personal efforts. If any part of this project is proved to be copied out from any source or found to be reproduction of some other. We will stand by the consequences. No Portion of the work presented has been submitted of any application for any other degree or qualification of this or any other university or institute of learning. Shariq Ahmed Umar Khalid -----
----- 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. Dr. Ashfaq Farooqi ----- Supervisor
----- External Examiner

----- Head of Department (Department of Computer Science) Executive Summary Pakistan is one of the two countries who 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. Acknowledgement 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 Table of Contents
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1 Introduction Pakistan is an underdeveloped country with numerous problems but the top of them is not having basic health facilities. There is a lack of hospitals, health centers, education, and responsibility. [Pakistan is one of those countries](#) which has [the highest](#) infant and [child](#) mortality rate. Half of them are due to vaccine-preventable diseases. In 2019 mortality rate of children was 67 out of 1000. These numbers are reducing with time. In 1970 the mortality rate was 190 out of 1000 (Knoema). But still, we are unable to stop these deaths. Because we don't have a proper system to monitor all the health-related issues. Pakistan has started its Expanded Program on immunization (EPI) in 1978 (WHO) but its result is not satisfactory. One of the major things is that we are one of the two countries where polio is not eradicated. Another is Afghanistan. The government spends millions on polio and other vaccination campaigns but results are not much fruitful. The main problem which we have noted is that our vaccination system is not tracking infants from their birth. We have a manual system which consists of a book. Another problem which we noted during our research is the lack of education in people. Many people think especially in the rural and backward areas where there is a lack of education that these vaccines are not good for their children. Many religious extremists believe that these vaccines will create infertility problems in the children so they don't take their children to vaccination centers and even if the polio workers come, they lie to them, and in extreme cases especially in KPK, some polio workers got killed too for this reason. Apart from the vaccination, another reason for the high mortality rate among children is lack of nutrition among them. There is no proper monitoring of the child's growth which leads them towards having diseases or in many cases these infants or children die too.

1.1 Brief Overview We are proposing a model Child immunization and growth tracking which covers both of the above-mentioned problems. This model will try to track the children and will tell the authorities about the infants and their parents' details so the authorities can track them. This system will add all the details about infants, notify them before their vaccination dates, mark their presence or absence, and report of the absentees. This will be going to help the authorities to track the children and their parents so if anyone tries to escape they will be tracked easily. It will also predict which area could have more children with these diseases. Stats on a yearly and monthly basis will be generated to see how many children got the vaccine and how many were left. Child growth and vaccination tracking will also be done by the system. Through strong database, this system will be able to track all the vaccination details. With the help of machine learning, parents will be able to check growth of their child time to time.

1.2 Relevance to Course Modules Below are the Concepts that we applied while implementing this project:

1.2.1 [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.

1.2.2 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

1.2.3 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.

1.2.4 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.

1.3 Project Background Pakistan is an underdeveloped country with numerous problems

but the top of them is not having basic health facilities. There is a lack of hospitals, health centers, education, and responsibility. [Pakistan is one of](#) those [countries](#) which has [the highest](#) infant and [child](#) mortality rate. Half of them are due to vaccine-preventable diseases. In 2019 mortality rate of children was 67 out of 1000 (Knoema). These numbers are reducing with time. In 1970 the mortality rate was 190 out of 1000. But still, we are unable to stop these deaths. Because we don't have a proper system to monitor all the health-related issues. Pakistan has started its Expanded Program on immunization (EPI) in 1978 but its result is not satisfactory. One of the major things is that we are one of the two countries where polio is not eradicated. Another is Afghanistan. The government spends millions on polio and other vaccination campaigns but results are not much fruitful. The main problem which we have noted is that our vaccination system is not tracking infants from their birth. We have a manual system which consists of a book. Another problem which we noted during our research is the lack of education in people. Many people think especially in the rural and backward areas where there is a lack of education that these vaccines are not good for their children. Many religious extremists believe that these vaccines will create infertility problems in the children so they don't take their children to vaccination centers and even if the polio workers come, they lie to them, and in extreme cases especially in KPK, some polio workers got killed too for this reason (ReliefWeb). Apart from the vaccination, another reason for the high mortality rate among children is lack of nutrition among them. There is no proper monitoring of the child's growth which leads them towards having diseases or in many cases these infants or children die too.

1.4 Literature Review

In 2019 mortality rate of children was 62 out of 1000. These numbers are reducing with time. In 1970 the mortality rate was 190 out of 1000. But still, we are unable to stop these deaths. Because we don't have a proper system to monitor all the health-related issues. Pakistan has started its Expanded Program on immunization (EPI) in 1978 but its result is not satisfactory.

1.5 Analysis from Literature Review

Application Name	Weakness	Proposed Project Solution
Immunization information system (CDC)	Limited to only tracking of vaccines	Not keeping track of individuals
?	Cannot predict about future vaccine requirement	Only US-based
?	Only web-based application	?
?	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 (Project Topics; CDC)	Only web-based application	Limited to only track the vaccine record
?	Track both child and vaccination record	Track the child growth
?	Mobile and web-based application	Don't have prediction ability
?	Can generate reports and statistical graphs	Child vaccination schedule
?	User can only add a schedule and they will get the reminder	Only mobile application
?	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		
?	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
?	Don't keep a record of vaccinator and vaccine	Don't have a good UI
?	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 easy if something wrong happens	The system will have a user-friendly UI

Table 1: Similar System Analysis

1.6 Methodology and Software Lifecycle for this Project

Below are the methodologies used while implementing this application

1.6.1 Process Methodology

We are going to use the incremental model in our project. Reasons for choosing an incremental model are

- Our project is long which consists of different modules
- Some modules can be implemented individually
- Requirements of the project are defined and won't change during development

So, the incremental model suits our project as we can implement different modules and later we can develop and test them. In this way, the system will get a test in every possible way and we will get efficient results.

1.6.2 Design Methodology

We are going to Object Oriented Methodology. Reason for using OOP methodology is

- System can be decomposed in smaller parts components which makes management easy
- Communication between components become easy
- System becomes

understandable and less complex which makes implementation easy ? System can be easily modified if required

2 Problem Definition

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 Deliverables and Development Requirements Following are the deliverables for Child Immunization and Growth Tracking system

1. Scope Document
2. Software Requirement Document
3. Software Design Description Document
4. Test Document
5. Final Report
6. Source Code of System
7. APK files for mobile applications

3 Requirement Analysis

3.1 Use Cases

Diagram(s)

Login <> Check future <> Stock <> Cases <> by Area by City <> View Stats <> View Hospitals Admin View Vaccine centers <> Search Stats <> Assign Vaccine Stocks <> Manage sub- <> admins <> View by city View by area Search by ID Search Cases Search By city Search Stock Search by area Add Sub-admin Remove Sub- admin View Progress

Figure 1: Usecase-Admin

Signup Make campaign <> Login <> <> <> View campaign status Allot workers Manage Campaign <> Allot Stock Allocate vaccination <> Notify Public Request stocks Check vaccine requirement Vaccination Center Employee Update child record Send Notification <> Vaccination Confirmation <> Recieve Confirmation <> Report cases Update status

Figure 2: Use case-Vaccination center employee

Signup <> Login Update child record Send Notification <> Vaccination Confirmation <> Recieve Confirmation <> Check Polio Polio Worker Symptoms Update status Report cases

Figure 3: Usecase-Polio worker

Signup <> Login Add child details <> Search information <> Search by child ID Search by parent ID Add stock Manage stock View Stock Check vaccine Request for requirement stock Hospital employee Update child record Send Notification <> Recieve Vaccination <> Confirmation Confirmation <> Update status Print details <> Print Birth Certificate <> Print Vaccine dates Report Authorities

Figure 4: Use case-Hospital Employee

Signup <> Login View child details View Vaccination schedule Recieve Notification Vaccination Confirmation Parent Predict child growth <> Add information view vaccination details View suggested diet

Update settings

Figure 5: Usecase-Parent

3.2 Detailed Use Cases

3.2.1 Module 1: Child record management and tracking:

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 form to register account.

Normal Flow:

1. User will enter name, email, password, confirm password, address.
2. User will click on signup.
3. User account will be registered.

Alternative Flows:

- 1n step 1, If user enter an email that is already registered: 1. He will be asked to add another email. 2. He can resume from step 2.
- 1n step 1, If password does not match with confirm password 1. User will be asked to enter the password 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:

1. User should be able to access website.
2. User should have an email account and phone no.

Table 2: Signup

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: 1. User will enter email and password. 2. User will click on sign in. User will be directed to dashboard. Alternative Flows: 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. In step 1: If password is wrong, user will be asked to enter the correct password. 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 3: Login as hospital Use Case ID: UC-24 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: 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: In step 1: If user entered invalid contact number. 1. User will be asked to enter contact number again. User can resume from step 2. Exceptions: In step 1: If user 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 4: Add child record 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 is already entered in the system Post conditions: POST-1. User will be able to provide the birth certificate or vaccine details Normal Flow: 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. Both documents will be printed. Alternative Flows: After step 1, User can use control + p to print both things User will be directed to 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 Table 5: Print Certificate and Schedule 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: 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 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 6: Search Child details by hospital 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: 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: 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 Table 7: Update Child Vaccination Record 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: 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 8:Manage stock **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:** 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. Table 9:Check vaccine requirements 3.2.2 Module 2: Vaccine center management **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 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 10: Make 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 11: View Campaign **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:** 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 12: Allot vaccine and worker for campaigns **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:** 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 13: Notify public about vaccination campaign **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 got 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 14: Report cases **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 **POST-1:** 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 should be able to access website. 2. User must be logged in as admin.

Table 15: Add 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 **POST-1:** 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: 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 1. User will click on update. 2. Polio worker will be updated. **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 should be able to access website. 2. User must be logged in as admin.

Table 16: Update 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 **POST-1:** 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: 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:** 1. User should be able to access website. 2. User must be logged in as admin.

Table 17: View/delete 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 **POST-1:** 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: 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: 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:** 1. User should be able to access website. 2. User must be logged in as admin.

Table 18: Assign Vaccine stock to polio worker **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 **POST-1:** 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 19: Request vaccine stock from sub-admin

3.2.3 Module 3: Parent and Polio worker management: 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: 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 should be downloaded the application 2. User should have and email account and phone no. Table 20: Sign up 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:** 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 21: Sign in from mobile app 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: 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: 1. User must be registered. 2. Child must also be registered in our system. Table 22: View child info 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: 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. Table 23: Vaccination Confirmation 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:** 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: 1. User must be registered. Table 24: Update settings 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: 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: 1. User must be registered. Table 25: Vaccination Schedule [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: 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 26: Learn about vaccinations [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](#): 1. [User will](#) 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. Table 27: Check polio symptoms [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](#): 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: In step 1: If user entered invalid ID: 1. User will be asked to enter valid ID 2. User can resume from step 2. In step 4: If user entered wrong code: 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 28: Update child record from mobile app [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: 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. Table 29: Report cases 3.2.4 Module 4: Child growth prediction [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: 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: 1. User must be registered. Table 30: Predict child growth [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: 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: 1. User must be registered. Table 31:View diet plans [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](#): 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 32:Sign out from mobile app 3.2.5 Module 5: Admin Panel Use Cases [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](#): 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 33:View Stats [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](#): 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. 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 34:View Stats by city/area [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](#): 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 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 35:Search Stats [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](#): 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: 1. User is prompted to enter email again. 2. User will continue from step 3. Exceptions: N/A Business Rules N/A Assumptions: 1. User should be able to access website. 2. User must be logged in as admin. Table 36:Add 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](#): 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: 1. User is prompted to enter email again. 2. User will continue from step 3. Exceptions: N/A Business Rules N/A Assumptions: 1. User should be able to access website. 2. User must be logged in as admin. Table 37:Update 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 38:View/delete sub admin \[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: 1. User will click on add vaccine 2. User will enter details of vaccine i.e name, quantity, expiry date etc 3. User will click on add. 4. Vaccine will be added. Alternative Flows: In step 2, if user entered expiry data, that is less than the current date: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 39:Add 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: 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 etc. 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 40:Update 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: 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: 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 should be able to access website. 2. User must be logged in as admin. Table 41:Assign Vaccine stock \\\\[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 should be able to access website. 2. User must be logged in as admin. Table 42:View 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 should be able to access website. 2. User must be logged in as admin. Table 43:Search child details [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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 44:View 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: 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 45:Search Hospitals [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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 46:View vaccine center [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: 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 47:Search vaccine centers [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: 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 48: Check vaccine requirements [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: 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 49: Check future possible cases. [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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 50: Check Reports [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: 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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 51: Update user settings [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: 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: 1. User should be able to access website. 2. User must be logged in as admin. Table 52: Log out 3.3 Functional Requirements Login [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 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 should be 8 while maximum should be 20. Lower and upper case should be used with one numeric Dependencies N/A Priority High 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 required \(if Password is compulsory for login User cannot enter any special character. Dependencies FR-1.1.2 Priority Medium 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 required) (if Email is compulsory for login Dependencies FR-1.1.1 Priority Medium 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 Credentials are compulsory for login required) Check box click is mandatory Dependencies FR-1.1.1, FR-1.1.2 Priority Medium View Stats Identifier FR-1.2.1 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 Identifier FR-1.2.2 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 View Stats by city/area Identifier FR-1.3.1 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 Identifier FR-1.3.2 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 Search Stats Identifier FR-1.4.1 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 required) (if N/A Dependencies N/A Priority Low Identifier FR-1.4.2 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 required) (if N/A Dependencies N/A Priority Low Identifier FR-1.4.3 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 N/A required) Dependencies N/A Priority low Add sub admin Identifier FR-1.5.1 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 required) (if Name should not have any special characters or numeric Dependencies N/A Priority low Identifier FR-1.5.2 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 required) (if Email should validate the basic criteria Dependencies N/A Priority low Identifier FR-1.5.3 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 Password minimum length should be 8 while maximum should be 20. required) Lower and upper case should be used with one numeric Dependencies N/A Priority low Identifier FR-1.5.4 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 required) (if CNIC should not have any alphabets or its length should not exceed 13 numeric Dependencies N/A Priority low Identifier FR-1.5.5 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 required) (if N/A Dependencies N/A Priority low Update sub admin Identifier FR-1.6.1 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 Admin must have all the details of the sub-admin required) Dependencies N/A Priority low View/Delete sub admin Identifier FR-1.7.1 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 required) (if [N/A Dependencies N/A Priority low Identifier FR-1.7.2 Title](#) Remove sub admin [Requirement](#) The user [will](#) click on sub-[admin](#) and then remove button Source Admin Rationale To remove sub admins from the system. Business Rule required) (if [N/A Dependencies N/A Priority Medium Add vaccine Stock Identifier FR-1.8.1 Title](#) Manage Vaccine Stock levels [Requirement](#) The user will click on manage stock levels to view or add stock levels Source Teammate Rationale User will be able to manage stocks of vaccine Business Rule required) (if [N/A Dependencies N/A Priority High Identifier FR-1.8.2 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 required) (if Vaccine name should be the one that doesn't exist [in the system Dependencies N/A Priority High Identifier FR-1.8.3 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 required) (if Vaccine quantity should not be negative or zero [Dependencies N/A Priority High Identifier FR-1.8.4 Title](#) Add Vaccine Quantity [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 [N/A required Dependencies N/A Priority High Identifier FR-1.8.5 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 should not be from the past Dependencies [N/A Priority High Update Vaccine Stock Identifier FR-1.9.1 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 Assign Vaccine Stock Identifier FR-1.10.1 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 Identifier FR-1.10.2 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 should not be negative or zero [Dependencies N/A Priority High View Child details Identifier FR-1.11.1 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 Use case 12 Search Child details Identifier FR-1.12.1 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 should not be other than the current available IDs of system [Dependencies N/A Priority Low View Hospital details Identifier FR-1.12.1 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 Search hospital details Identifier FR-1.14.1 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 should be available in system Dependencies [N/A Priority Low View Hospital details Identifier FR-1.15.1 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 Search hospital details Identifier FR-1.16.1 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 should be available in system Dependencies [N/A Priority Low Check vaccine requirement Identifier FR-1.17.1 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 Identifier FR-1.17.2 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 Check future possible cases Identifier FR-1.18.1 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 Identifier FR-1.18.2 Title](#) Check future possible cases for a 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](#) View reports Identifier FR-1.19.1 Title [View vaccinated children report Requirement](#) User will click on vaccinated 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 vaccinated children of past Business Rule required) (if [N/A Dependencies N/A Priority Low Identifier FR-1.19.2 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 required) (if [N/A Dependencies N/A Priority Low Identifier FR-1.19.3 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 N/A required) Dependencies N/A Priority Low Update user settings [Identifier FR-1.20.1 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 Login Identifier FR-2.1.1 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 Identifier FR-2.1.2 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 should be 8 while maximum should be 20. Lower and upper case should be used with one numeric [Dependencies N/A Priority High Identifier FR-2.1.3 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 required) (if Password is compulsory for login User cannot enter any special character. [Dependencies FR-2.1.2 Priority Medium Identifier FR-2.1.4 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 required) (if Email is compulsory for login [Dependencies FR-2.1.1 Priority Medium Identifier FR-2.1.5 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 Credentials are compulsory for login required) Check box click is mandatory Dependencies FR-2.1.1, FR-2.1.2 Priority Medium Add children Identifier FR-2.2.1 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 required) (if Name should not have any numeric of special characters [Dependencies N/A Priority High Identifier FR-2.2.2 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 required) (if CNIC should not have any alphabet or special characters CNIC should not be less than or greater to 13 numeric [Dependencies N/A Priority High Identifier FR-2.2.3 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 \(if N/A required\)](#) [Dependencies N/A Priority High Identifier FR-2.2.4 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 should not have any alphabet Dependencies N/A Priority High Print birth certificate Identifier FR-2.3.1 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 should be available [Dependencies N/A Priority High Identifier FR-2.3.2 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 Printer should be available required) [Dependencies N/A Priority High](#) Search child [Identifier FR-2.4.1 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 should not be other than the current available IDs of system Dependencies N/A Priority Low Use case 27 Update child record Identifier FR-2.5.1 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 Identifier FR-2.5.2 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 should not be other then numeric [Dependencies N/A Priority High Identifier FR-2.5.3 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 should match the system's generated code [Dependencies N/A Priority High Identifier FR-2.5.4 Title](#) [Resend](#) [Requirement](#) User [will](#) click on [resend](#) OTP [Source](#) Teammate [Rationale](#) User will be able to update child vaccination record Business Rule (if required) OTP should match the system's generated code [Dependencies N/A Priority High](#) Manage vaccine stock [Identifier FR-2.6.1 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 required) (if [N/A Dependencies N/A Priority High Identifier FR-2.6.2 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 required) (if Quantity should not be zero or negative [Dependencies N/A Priority High Identifier FR-2.6.3 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 [N/A](#) required) [Dependencies N/A Priority High](#) Check vaccine requirements [Identifier FR-2.7.1 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](#) Make campaign [Identifier FR-3.1.1 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 Identifier FR-3.1.2 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 required) (if Name should be based on the diseases only Dependencies N/A Priority High [Identifier FR-3.1.3 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](#) required) (if [N/A Dependencies N/A Priority High Identifier FR-3.1.4 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 [N/A](#) required) [Dependencies N/A Priority High](#) View campaign [Identifier FR-3.2.1 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 Use case 32 Allot vaccine and workers Identifier FR-3.3.1 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 Identifier FR-3.3.2 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 Identifier FR-3.3.3 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 required) (if [N/A Dependencies](#) [N/A Priority High](#) Notify public [Identifier FR-3.4.1 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 required) (if [N/A Dependencies](#) [N/A Priority High Identifier FR-3.4.2 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](#) required) (if [N/A Dependencies](#) [N/A Priority High Identifier FR-3.4.3 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](#) Report cases [Identifier FR-3.5.1 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 Business Rule (if required) [N/A Dependencies](#) [N/A Priority High Identifier FR-3.5.2 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 required) (if [N/A Dependencies](#) [N/A Priority High](#) Add polio workers [Identifier FR-3.6.1 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 required) (if Name should not have any special characters or numeric [Dependencies](#) [N/A Priority](#) low [Identifier FR-3.6.2 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 required) (if Email should validate the basic criteria [Dependencies](#) [N/A Priority](#) Low [Identifier FR-3.6.3 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 required) (if CNIC should not have any alphabets or its length should not exceed 13 numeric Dependencies N/A Priority low Identifier FR-3.6.4 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 [N/A](#) required) [Dependencies](#) [N/A Priority High](#) Update polio workers [Identifier FR-3.7.1 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 Identifier FR-3.8.1 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 Identifier FR-3.8.2 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](#) Assign Stock [Identifier FR-3.9.1 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](#) Request vaccine stock [Identifier FR-3.10.1 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 should not be zero or negative [Dependencies N/A Priority High Identifier FR-3.10.2 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 Sign in from mobile application Identifier FR-4.1.1 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 Identifier FR-4.1.2 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 should be 8 while maximum should be 20. Lower and upper case should be used with one numeric Dependencies N/A Priority High View child information Identifier FR-4.2.1 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](#) Notifications / Vaccination confirmation [Identifier FR-4.3.1 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 Identifier FR-4.3.2 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](#) Update settings [Identifier FR-4.4.1 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 required) (if [N/A Dependencies N/A Priority low Identifier FR-4.4.2 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 required) (if [N/A Dependencies N/A Priority low Identifier FR-4.4.3 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 Pictures should be in specific format only required) [Dependencies N/A Priority low Identifier FR-4.4.3 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 required) (if Pictures should be in specific format only [Dependencies N/A Priority low](#) Vaccine schedule [Identifier FR-4.5.1 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 required) (if N/A Dependencies N/A Priority low Use case 46 General guidance about vaccination Identifier FR-4.6.1 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](#) Use case 47 Check polio symptoms Identifier FR-4.7.1 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 Identifier FR-4.7.2 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 Update child record from mobile app (Polio worker) Identifier FR-4.8.1 Title Select vaccine to update child record on mobile application Requirement User will select vaccine from the available vaccines Source Teammate Rationale User will be able to update child vaccination record on mobile application Business Rule (if required) [N/A Dependencies N/A Priority Low Identifier FR-4.8.2 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 should not be other than numeric [Dependencies N/A Priority High Identifier FR-4.8.3 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 should match the system's generated code [Dependencies N/A Priority High Identifier FR-4.8.4 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 should match the system's generated code [Dependencies N/A Priority High Update child record from mobile app \(Polio worker\) Identifier FR-4.9.1 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 [N/A](#) required) [Dependencies N/A Priority High Identifier FR-4.9.2 Title](#) Send [report](#) from mobile application [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 from mobile application Business Rule (if required) [N/A Dependencies N/A Priority High](#) Predict child growth [Identifier FR-5.1.1 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 required) (if [N/A Dependencies N/A Priority High Identifier FR-5.1.2 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 required) (if [N/A Dependencies N/A Priority High Identifier FR-5.1.3 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 [N/A](#) required) [Dependencies N/A Priority High](#) View diet plan [Identifier FR-5.2.1 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 Identifier FR-5.2.2 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 [Non-Functional Requirements](#) Non-Functional requirements [are](#) required to be explicitly mention in this section. 3.4.1 Reliability REA-1: Parent and child data should be added accurately as whole system is build on this single thing REA-2: Admin approval is important for all the work done 3.4.2 Usability USE-1: The system must allow user to see his child vaccine data with only one click USE-2: The system shall provide information for conforming notification USE-3: The system shall work in those areas too where internet facility is not good 3.4.3 Accessibility ACC-1- It must be accessible from remote areas. It must be accessible through mobile and web efficiently 3.4.4 Compatible COM-1- The system shall be compatible with both Android and iOS. Web should be easily compatible on all major browsers 3.4.5 Security SEC-1: Security in this system should be very high as it contains sensitive information. 4 Design and Architecture. 4.1 System Architecture 4.1.1 Three Tier Architecture Description 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. 4.1.2 3 Tier Architecture Figure 6: 3 Tier Architecture Diagram 4.2 Data Representation 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(), require: 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(), require: true }, quantity: { type: Number, default: "" },
organization: { type: schema.Types.ObjectId, required: true, ref: "userAccounts" },
});
4.3 Process Flow/Representation Figure 7: Process Flow 4.4 Design Models 4.4.1
Structural Diagrams 4.4.1.1 Class diagram Web Figure 8: Web Class Diagram 4.4.1.2
Mobile Class Diagram Polio Symptoms User -Sorethroat -ID -Fever -name 1
-Tiredness 1 -email -Nausea -password -Headache -role -Stomachpain +signup()
+addDetails() +login() +checkResults() +recover_password() +change() +logout()
Parent M -CNIC Vaccine Center -address Child Follow Up 1 -contactNo
+viewChildDetail() +searchVaccineDetails() 1 +recieveNoti() +alotVaccine()
-getChildRecord() +vaccineConfirmation() +viewPolioWorkerPerformance()
-updateChildRecord() +checkVaccineDates() 1 1 M M Polio Worker -assignedArea
-noOfChildinArea() +reportCases() +checkSymptoms() M Child Growth -weight
-height -age -gross motor -fine motor -communication Diet 1 -planning/ organising 1
-problem solving -emotional development -attention and concentration -overactivity
and impulsivity -passivity/ inactivity -growthResults -suggestedDiet
+viewSuggestedDiet() -perception of directions -perception of visual forms and
figures -memory -spoken language -reading/writing -social skills -emotional
problems -growth +validateData() +processData() +displayResults() Figure 9:
Mobile Class Diagram 1 1 4.4.2 Behavioral Diagrams 4.4.2.1 Activity diagram Login

```

Email password Validate Dashboard Update vaccine Information? Add Child details
 Add child detail? Update child info Father Father name CNIC Parent Contact City No
 Vaccine name Dose Number Date Submit Update OTP sent Print details Validate OTP
 Vaccine Information Updated Birthcertificate Print details Figure 10: Hospital Add
 and update child data Activity Diagram Login Email password Validate Dashboard
 Manage campaigns Add campaign? Notify Public? View campaign? Add new
 Campaign View Campaign Progress Notify Public View current campaigns Campaign
 Start name Date End date Click on running campaigns View current campaign Select
 campaign Progress Notify public Allot Workers Allot Stocks View Stock Levels View
 vaccinated children stats Notification Sent Make Campaign If low stocks Sms sent All
 ok? Notify Public Stock level updated View Campaign Figure 11: Manage Campaign
 Activity Diagram Logged in as sub-admin Dashboard View Stock Requests Allot to
 hospitals? Allot to vaccine center? Allot Stock to Allot Stock to Hospital Vaccine
 Center View current Stock levels Allot Stocks Select vaccine Enter quantity Enter
 hospital name Enter hospital city If wrong information Validate entered information
 Allot Allot Vaccine Stock Figure 12: Stock Allocation Activity Diagram Logged in As
 Admin Dashboard View Stats Search Stats View Stock Stats View vaccination Search
 vaccination Stats Search Stock Stats Stats View Stats by City Select City View Stats
 by Area Select Area Search Stats by City Select City Search Stats by Area Select
 Area Stats displayed Stats displayed Figure 13: View And Search Stats Activity
 Diagram Logged in as parent Dashboard Check child growth Add Information Add
 child weight Select Add child height characteristic of skillsets Invalid details added
 predict Validate entered information Show Results Show suggested Diet No? Save
 diet Diet saved Figure 14: Check Child growth 4.4.2.2 Sequence diagram Hospital
 employee User Hospital Server Database Login alt If credentials true Verify
 credentials Credentials matched Login() else Enter credentials again Wrong
 credentials Add child data() Enter information alt information added If id correct
 Validate information add information Else View information information added Enter
 ID Record not found Enter parent or child id Verify ID Id matched Data fetched Fetch
 data against id Data of particular child Query sent Figure 15: Add and view child
 Data by hospital sequence Diagram Vaccine Center Employer User Vaccine Center
 Server Database Login Validate Credentials Validated Login() Add Campaign Enter
 Data add detail() makecampaign() Allot workers and vaccines() Data Added Workers
 and vaccines Alloted Store data Notify Public Get Registered Contact Numbers Fetch
 Data sendnotification() Data fetched view campaign() Fetch Data Data fetched
 displaydata() Figure 16: Campaign management by vaccine Center Sequence
 Diagram Parent User Child Growth Database Login Validate Credentials Login
 Successfully Predict () Enter Required data adddetails() Validating Data Data
 updated Processing data Store Results Show Prediction Suggest Diet Process and
 suggest Store Results Show Diet Figure 17: Child Prediction Hospital employer User
 Hospital Database Parent Login Validate User Credentials Verified Validation
 Successful Login Successful Search Child ID Validate Child ID alt ID Found Found ID
 Found Select and Update information Code Sent Code Entered Code Validated
 Information Updated Data Updated Not Found Please Enter Correct ID Id not found
 Figure 18 Polio worker User Child Followup Database Parent Login Validate User
 Validation Successful Credentials Verified Login Successful searchchild() Validate
 Child ID alt ID Found Found ID Found adddetails() Code Sent Code Validated
 updaterecord() Store update Not Found Id not found Please Enter Correct ID Check
 Symptoms Add Data addsymptoms() Data Stored Process Data Processing Data
 Showing Results Figure 19: Polio worker vaccine update 5 Implementation 5.1
 Algorithm Assign Vaccine API: First find organization from req.body.organization
 Then find vaccine from req.body.vaccineName If vaccine is available then update the
 organization vaccine after adding the new vaccine to its list. Now update the admin
 vaccine quantity by subtracting the assigned vaccine from previous vaccine quantity.
 Send response to user. 5.1.1 NodeJs Server Globa. `server = http.createServer(App)`
 Global. `server.listen(3001)` Global. `server.on(error, onError())` Global.
`server.on(listening, onListening())` App.use(cors()) App.use(helmet()) 5.1.2 Child
 Prediction API: Parent will add data in to the system. System will go through a
 prediction model which is connected to a flask API Flask API is connect to our node js
 backend on the route "/parent/checkgrowth/ System will show the results on the
 screen. According to results, users can check diet plans. 5.2 External APIs [Name of
 API Description of API Purpose of Usage List down the function/class name in which](#)

it is used twilio [Used for](#) sending SMS [To](#) send OTP for vaccine update and notifications about vaccine campaigns Table 53: API 5.3 User Interface Figure 20: [Screen 1 Figure 21: Screen 2 Figure 22: Screen 3 Figure 23: Screen 4 Figure 24: Screen 5 Figure 25: Screen 6](#) 141 [6 Testing and Evaluation 6.1 Manual Testing 6.1.1 Unit Testing Unit Testing 1](#): Admin [Login Testing Objective: To ensure the admin](#) can be [login](#) successfully [Test Case Id: CI_001 Test Case Description: Test](#) that the admin can [login with](#) the provided [credentials](#) successfully [Test Scenario: Verify on entering](#) predefined [username and password](#), admin can sign [in](#). [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Enter the predefined login details Username: ahmed@gmail.com Password: 12345 [Successfully log into the main page of the system as Admin As Expected Pass 2](#). Enter any other credentials to login Username: umar@gmail.com Password: Umar123 Failed to login into the system as admin As Expected Pass Table 54: Test case for admin login Unit Testing 2: Add Sub-Admin Testing Objective: To ensure the admin can add sub admins successfully Test Case Id: CI_002 Test Case Description: Test that the admin can add sub-admins successfully into the system Test Scenario: Verify admin can successfully setup the sub-admin details into the system [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Admin will click [on the](#) add sub-admins and enter credentials and click on add button Username: umar@gmail.com Password: umar12345 Sub-admin successfully added in the system As Expected Pass Table 55: Test case for add sub-admin Unit Testing 3: Add stock levels Testing Objective: To ensure the admin can add stock levels successfully Test Case Id: CI_003 Test Case Description: Test that the admin can add stock levels successfully into the system Test Scenario: Verify admin can successfully add stock details into the system [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Admin will click [on the](#) add stock select vaccine, enter details and click on add Select Polio, Manufacturer: Global pharma Expiry-28-10- 2021 Stock levels added in the system As Expected Pass 2 Admin don't enter the expiry date Stock update don't As Expected Pass Table 56: Test case for add stock levels Unit Testing 4: Allot vaccine to Sub admin Testing Objective: To ensure the admin can add stock levels successfully Test Case Id: CI_004 Test Case Description: Test that the admin can add stock levels successfully into the system Test Scenario: Verify admin can successfully add stock details into the system [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Admin will click [on the](#) assign stock select vaccine, enter details and click on assign Available vaccine quantity, date of assigning Stock levels added in the system Sub admin allotted vaccine As Expected Pass 2 Admin will click on the assign stock select vaccine, enter details and click on assign Admin add more value than available quantity Stock don't update Vaccine don't update As Expected Pass Table 57: Test case for allot vaccines to sub-admin Unit Testing 5: Monitor vaccinated children in city Testing Objective: To ensure the regional admin can view child details successfully [Test Case Id: CI_005 Test Case Description: Test](#) that the regional admin can [view](#) child [details](#) successfully [Test Scenario: Verify](#) regional admin can see the details [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Regional Admin will click on children of particular city System shows all the details of the children vaccinated in the city As Expected Pass Table 58: Test case for monitor vaccinated children Unit Testing 6: add child details Testing Objective: To ensure the Hospital sub-admin can add child details successfully [Test Case Id: CI_006 Test Case Description: Test](#) that the Hospital sub-admin can add child details successfully [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Hospital sub-admin [at](#) the [time](#) of child birth will add child information and system gets updated 35446523, Shariq,33665932, rwp etc. System shows add this child into the system As Expected Pass Table 59: Test case for add child details Unit Testing 7: Print child details Testing Objective: To ensure the Hospital sub-admin can print child details [successfully Test Case Id: CI_007 Test Case Description: Test](#) that the Hospital sub-admin can print child details successfully [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Hospital sub-admin [after](#) adding child details will click on the print details System prints the birth certificate and vaccine schedule dates As Expected Pass 2 Hospital sub-admin after adding child details will click on the print details System prints the birth certificate and vaccine schedule dates

Printer not found Fail Table 60: Test case for print child details Unit Testing 8: update child details Testing Objective: To ensure the Vaccine Center sub-admin can update child details successfully [Test Case Id: CI_008 Test Case Description: Test the update function successfully](#) [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Vaccine Center sub-admin after vaccination will select the vaccine and click on update. Parent will get the OTP which will be verified by the system and data will be updated Homophiles,28/09/2021 System updated the child data As Expected Pass Table 61: Test case for update child details Unit Testing 9: Request stocks Testing Objective: To ensure Vaccine Center sub-admin can request stocks to regional admin [Test Case Id: CI_009 Test Case Description: Test the request function successfully](#) [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Vaccine Center sub-admin click on request stocks, enter details, and click on request Homophiles,5000,28/09/2021 Request sent to Regional admin As Expected Pass 2 Vaccine Center sub-admin click on request stocks, enter details, and click on request Influenza, -5000,29/08/2021 Request Not sent As Expected Pass Table 62: Test case for request stocks Unit Testing 10: Add polio workers and allot areas Testing Objective: To ensure Vaccine Center sub-admin can add polio worker and assign the areas for vaccination [Test Case Id: CI_010 Test Case Description: Test the update function successfully](#) [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Vaccine Center sub-admin click on add polio workers and assign them area and stocks Umar, PWD, 28/09/2021, Influenza, 5000 Allot successfully As Expected Pass Table 63: Test case for add polio workers and allot areas 6.1.2 Integration Testing Please specify the type of applied integration strategy, i.e. top down, bottom up. Also, elaborate the applied integration strategy. [No. Test Case/Test Script Test Data Expected Result Actual Result Pass/Fail/Not Executed/ Suspended 1](#). Login as admin Email: ahmed@gmail.com Password: 12345 Login as admin successful. And user is redirected to admin dashboard. As Expected Pass 2. View registered children <https://localhost:3001/admin/children> Children successfully displayed on screen As Expected Pass 3. Add Vaccine stock vaccineName: "polio", quantity: 100, manufacturer: "abc", expiryDate: 21-10-2021 Vaccine added successfully. As Expected Pass 4. View vaccine stock <https://localhost:3001/admin/vaccines> Vaccines successfully displayed on screen As Expected Pass 5 View Hospitals <https://localhost:3001/admin/hospitals> Hospitals successfully displayed on screen As Expected Pass 6 Assign vaccine to sub admin vaccineName: "polio", quantity: 50, subAdminID: "12345" Vaccine assigned successfully. As Expected Pass 8 Login as sub admin Email: ali@gmail.com Password: 12345 Successfully logged in as sub admin. As Expected Pass 9 Assign vaccine to hospitals and vaccine centers vaccineName: "polio", quantity: 50, organization: "12345" Vaccine assigned successful As Expected Pass 10 Login as hospital Email: Usman@gmail.com Password: 12345 Successfully logged in as hospital As Expected Pass 11 Add child <https://localhost:3001/hospital/children/add> Child added successfully. As Expected Pass 7 Conclusion and Future Work 7.1 Conclusion 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, we will try to work on enhancing its efficiency by implementing this project with data warehouses. Apart from that in future, we can also update in to general vaccinations too. 8 References ? ? ? ? bank, World. <https://data.worldbank.org/indicator/SH.DYN.MORT?locations=PK>. 2020. CDC. June 2019. IIS. 2020. <<https://www.cdc.gov/vaccines/programs/iis/index.html>>. Knoema. n.d. <<https://knoema.com/atlas/Pakistan/Child-mortality-rate>>. Post, Frontier. n.d. . ? ? ? Project Topics. 2019. ReliefWeb. 30 January 2020. unicef. Unicef. January 2021. 15 Januray 2021. . ? WHO. 2020. <<http://www.emro.who.int/pak/programmes/expanded-programme-on-immunization.html#:~:text=The Expanded Programme on Immunization,%20pertussis,tetanus and measles.>>. ? WHO. 05 Dec 2020. 1 2 3 4 5 6 7 8 9 10 11 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101

102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
140 142 143 144 145 146 147 148 149 150 151 152