# SOEN 390/F: SPRINT 3 REPORT (TEAM #14)

**Software Engineering Team Design Project**

**Instructor: Dr. Yann-Gaël Guéhéneuc**

**Winter 2022**


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# 1.0 INTRODUCTION

Team 14 is working towards developing an application called COVID-19 Tracking app which will allow medical doctors and government health officials to monitor patients infected with COVID-19. Currently, with the rise in cases, it is extremely difficult for doctors to prioritize infected patients and many of them are overloaded. The application will eliminate overloading and place a limitation on the number of patients assigned per doctor. Additionally, the COVID-19 Tracking app will ensure infected patients can be categorized as priority or not and emergency communication can be established between the doctor and patient. The application aims to facilitate the monitoring of COVID-19 patients and lowering the percentage of cases.

## 1.1 Purpose

The purpose of this document is to outline the content of the project's first iteration which consists of the primary user requirements, release planning for following iterations, architectural structure, risk management plan, user interface designs, and testing plan for the various software components. The project contains a total of five iterations involving the development of the main functionalities such as notifications through Bluetooth system to inform a patient to self-quarantine and more.

### 1.1.1 System

The purpose of this project is to find a solution to keep track of individuals infected with COVID-19. This would be done via a system which would give updates on the status of COVID-19 patients, as well as provide advice to them.

### 1.1.2 Document

The purpose of this document is to:

- Describe the Project
- Detail the requirements
- Summarize the release planning
- Provide an overview of the architecture of the system
- Summarize high risk issue and possible solutions to minimize their impact
- Detail the user interface of the system
- Provide a testing plan in order to ensure the correctness of the system in terms of functionality and performance.
- Provide any information on possible defects that may have occurred during Sprint 1
- Detail any quality measurements taken

## 1.2 Targeted Users

The targeted users would primarily be patients with COVID-19, doctors, immigration officers, health officials and the administrators of this system.

### 1.3 Targeted Readers

The targeted readers for this document are any possible stakeholders for this system. The intended audience of this report is Yann-Gaël Guéhéneuc and Wei Liu, the product owner for the development of COVID-19 Tracking app.

# 2.0 PROJECT DESCRIPTION

The system in development will allow medical doctors and government health officials to monitor patients infected with COVID-19.

Agile methodology was selected because it allows us to develop the system in increments and allows for continuous feedback from stakeholders during development and allows for continuous improvement of the product.

## 2.1 Sprint Schedule

The sprint schedule will be as follows:

| Sprint | Date |
|---|---|
| 1 | 11/01/2022 - 02/02/2022 |
| 2 | 03/02/2022 - 23/02/2022 |
| 3 | 24/02/2022 - 16/03/2022 |
| 4 | 17/03/2022 - 06/04/2022 |
| 5 | 07/04/2022 - 18/04/2022 |

Table 1: Sprint Schedule

# 3.0 REQUIREMENTS

The following requirements were elicited from the product owner and have been turned into user stories approved by the product owner. **4 user stories** have been elicited for a total of **17 user story points.**

In the following subsections, we first present the backlog as an overview, and then look at each user story in detail.

## 3.1 Backlog

Per our backlog, these were the user stories related to sprint 3::

| ID | Name | USP | Priority |
|---|---|---|---|
| Issue-11 | As a doctor or health official, I want to monitor the status & symptoms of confirmed and unconfirmed patients so that I can prescribe a suitable treatment for the patient. | 2 | 3 |
| Issue-16 | As a doctor, I want to see which patient's updates I have reviewed and which ones I have not reviewed yet so that I dont review over the same file again | 2 | 2 |
| Issue-37 | As a patient, I want to be able to edit my profile so that doctor has all the up to date information. | 8 | 2 |
| Issue-103 | As a patient, I want to see my profile with basic details such as my status, temperature, weight, address, etc so that I can know if the information is correct or needs modification. | 5 | 1 |
| **Total** | | 17 | |

Table 2: Sprint 3 User Stories

### 3.2 User Stories

In the following subsection, we look at each user story in detail and provide additional information for each (if applicable)

| Issue-11 | **As a doctor or health official, I want to monitor the status & symptoms of confirmed and unconfirmed patients so that I can prescribe a suitable treatment for the patient.** |
|---|---|
| USP | 2 |
| Priority | 3 |
| Description | Acceptance criteria:<br><br>Given: The user is logged in as a doctor or health official.<br>When: The user is on the Profile of the Patient page<br>Then: The user can select status from the dropdown. |

Table 3: User Story 1

| Issue-16 | **As a doctor, I want to see which patient's updates I have reviewed and which ones I have not reviewed yet so that I dont review over the same file again** |
|---|---|
| USP | 2 |
| Priority | 2 |
| Description | Acceptance criteria:<br><br>Given: The user is logged in as a doctor and is on the patient page.<br>When: The user updates and reviews a patient profile.<br>Then: The application shows profiles that have not been reviewed yet. |

Table 4: User Story 2

| Issue-37 | **As a patient, I want to be able to edit my profile so that doctor has all the up to date information.** |
|---|---|
| USP | 8 |
| Priority | 2 |
| Description | Acceptance criteria:<br><br>Give: Patient is logged in successfully<br><br>When: Patient clicks on profile page<br><br>Then: the basic fields should be editable |

Table 5: User Story 3

| Issue-103 | **As a patient, I want to see my profile with basic details such as my status, temperature, weight, address, etc so that I can know if the information is correct or needs modification.** |
|---|---|
| USP | 3 |
| Priority | 1 |
| Description | Acceptance criteria:<br><br>Given: The user is logged in as a patient on the client app.<br><br>When: The user clicks on profile button on bottom of the navbar.<br><br>Then: The user is redirected to their profile displaying a list of given details about the patient. |

Table 6: User Story 4

# 4.0 RELEASE PLANNING

### 4.1 Sprint 3 Summary

Sprint 3 focused on delivering a variety of features as can be seen in the table below. In this sprint, work was performed in the frontend and backend, although the majority of the work was completed in the frontend and some on the backend. The problems we faced in this sprint included merging changes from main to branches faster so there wouldn't be too many merge conflicts upon completion of branch code ready to merge to main. During this sprint, issues 10, 19 and 38 were brought forward to be completed in Sprint 4 due to time constraints.

| Story ID | Story Title | USP | Status |
|---|---|---|---|
| Issue-11 | Monitor status & symptoms of confirmed and unconfirmed patients | 2 | DONE |
| Issue-16 | Display / show that a patients' status updates have been reviewed | 2 | DONE |
| Issue-37 | Allow Patient to edit profile page | 8 | DONE |
| Issue-103 | Backend for "Profile for patient" | 3 | DONE |
| Issue-2 | Frontend Display for "Arrange Appointments" | 5 | DONE |
| Issue-29 | Frontend Display for "Patient updates status everyday" | 2 | DONE |
| Issue-39 | Frontend Display for "Allow patient to view the basic info of the assigned doctor" | 2 | DONE |
| Issue-41 | Frontend Display for "Allow PATIENTS view the history of his/her updated diary" | 2 | DONE |

| | | | |
|---|---|---|---|
| Issue-80 | Frontend Display for “Create a similar "List of symptoms" page for patients” | 2 | DONE |
| Issue-4 | Frontend Display for “Trace & notify COVID-19 patients” | 2 | DONE |
| Issue-10 | Notify doctor when status is re-updated on the same day | 3 | PUSHED TO SPRINT 4 |
| Issue-19 | Allow admin to manage client account (delete, re-assign role) | 5 | PUSHED TO SPRINT 4 |
| Issue-38 | Patient diary to update locations | 5 | PUSHED TO SPRINT 4 |
| **Total** | | **43** | **30** |

Table 10: Sprint 3 Summary of Stories

An * would be a good way to show stories added during the sprint. And a strikethrough would be good to denote a deleted story.

### 4.2 Sprint 4 Planning

Sprint 4 will focus on delivering the next set of important features which can be seen in the table below. In this sprint, our team is planning on covering 17 user stories which sum up to a total of 64 user story points. As compared to the previous sprint, the workload can be seen to have remained relatively the same for Sprint 4. We might face the same problem as in the previous sprint since we might possibly have to push forward some user stories to later sprints due to time constraints. In this fourth sprint, we are also catching up on three user stories (Issue-10, Issue-19, and Issue-38) from the last sprint which have additionally added onto the overall sum of user story points to be completed.

| Story ID | Story Title | USP | Status |
|---|---|---|---|
| Issue-4 | Backend for “Trace & notify COVID-19 patients” | 3 | |
| Issue-10 | Notify doctor when status is re-updated on the same day | 3 | |
| Issue-2 | Backend for “Arrange Appointments” | 8 | |
| Issue-12 | Notify Covid-19 patients & self-quarantine individuals to update status daily | 3 | |
| Issue-14 | Different visibility for different users | 3 | |
| Issue-80 | Backend for “Create a similar "List of symptoms" page for patients” | 3 | |
| Issue-19 | Allow admin to manage client account | 5 | |
| Issue-29 | Backend for “Patient updates status everyday” | 5 | |
| Issue-38 | Patient diary to update locations | 5 | |
| Issue-39 | Backend for “Allow patient to view the basic info of the assigned doctor” | 3 | |
| Issue-41 | Backend for “Allow PATIENTS view the history of his/her updated diary” | 3 | |
| Issue-43 | Allow DOCTORS to view the history of symptoms for each patient | 2 | |

| | | | |
|---|---|---|---|
| Issue-238 | Admin List for superadmin to view/edit | 5 | |
| Issue-42 | (optional) Allow patient to view the message from the assigned doctor via notification panel | 3 | |
| Issue-44 | (optional) Allow doctor to view the list of assigned patients & past assigned patients | 2 | |
| Issue-45 | (optional) Allow doctor to change status of a patient to a non-patient | 3 | |
| Issue-46 | (optional) Allow health officer to view statistics like the number of patients for each district daily | 5 | |
| **Total** | | **64** | |

Table 11: Sprint 4 Story Planning

# 5.0 ARCHITECTURE

In this section, we present a high level overview of the system, illustrate all the use cases, provide a domain model diagram as well as detail our database design.

## 5.1 High-Level Overview of System

The diagram below illustrates how the application communicates with the backend via Redux store (the centralized state management component). In particular, for most of the events that need to manipulate / access some piece of data, the component will first dispatch an action to the local data storage to be processed, then the local data storage will communicate with the database to update information (if some local states are changed).

The frontend application is planned to build with Material-UI & Semantic-UI library in order to save time and boost developers' workflow. In addition, the usage of these libraries guarantees that the application will have a consistent look and feel.

The backend of the system is managed by Firebase (an abstraction layer of Google Cloud) which provides NoSQL database system, user authentication, and some advanced custom functions.

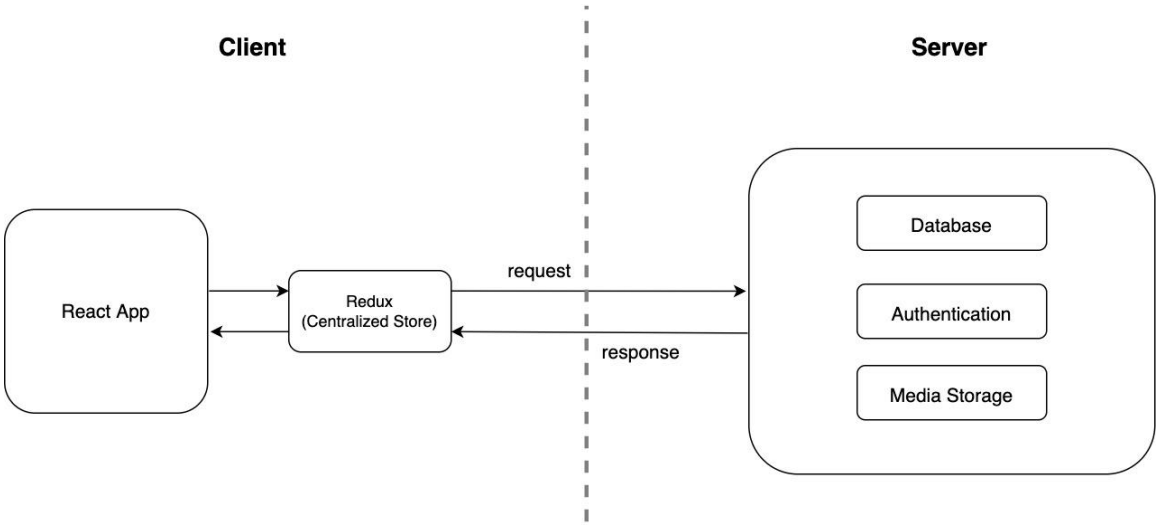



Figure 1: High-level overview system diagram

### 5.2 Use Case Diagrams

In our application, there are several important use cases to consider which illustrate the different interactions between the users and the system.

#### 5.2.1 Use Cases related to the Admin App

For the Admin App, the “User” stakeholder contains doctors, admins, health officials and immigration officers.

- **Register:** A User of Covid Track must be able to register an account with email and password.

- **Login:** A registered user of Covid Track must be able to login with a registered email and password.

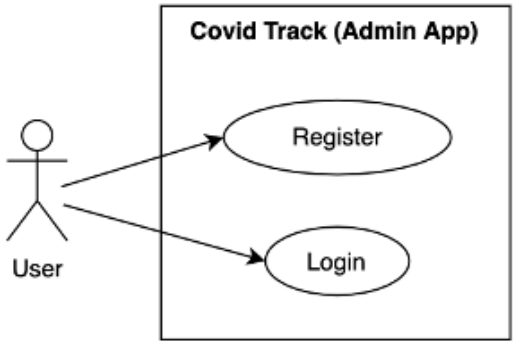



Figure 2: Use case diagram for authentication and registration on the Admin App.

- **View Dashboard:** A registered doctor of Covid Track can view their dashboard.

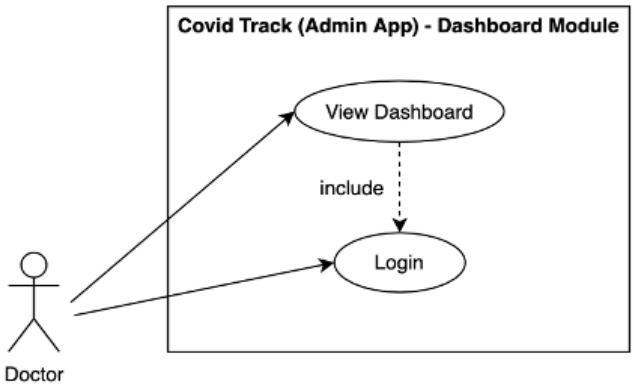



Figure 3: Use case diagram for dashboard view on the Admin App.

- **View Patient Profile:** Registered users of Covid Track can view a patient's profile.

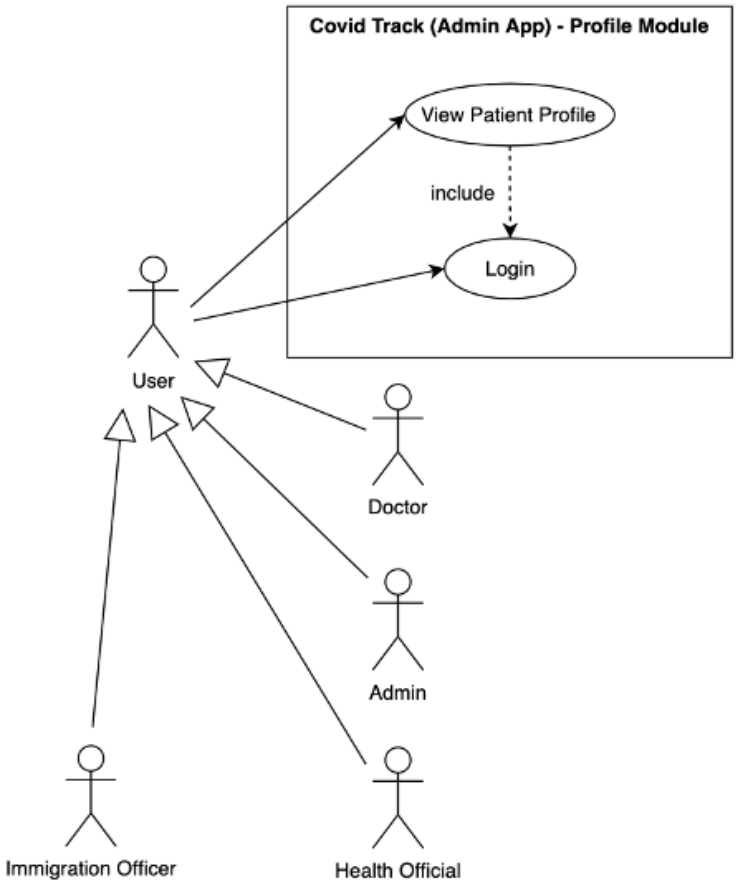



Figure 4: Use case diagram for patient profile view on the Admin App.

- **Flag Patient:** A registered doctor, health official or immigration officer of Covid Track can flag a patient in order to prioritize the patient's updates.

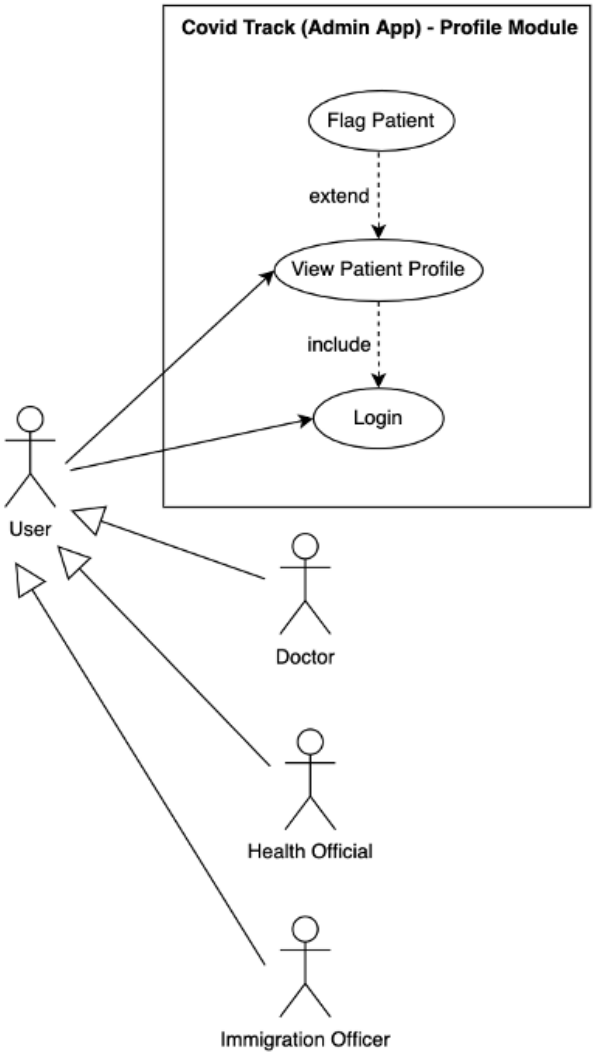



Figure 5: Use case diagram for prioritizing patient updates on the Admin App.

- **Patient Status Review:** A registered doctor of Covid Track can mark a profile as reviewed after reviewing the patient's status.

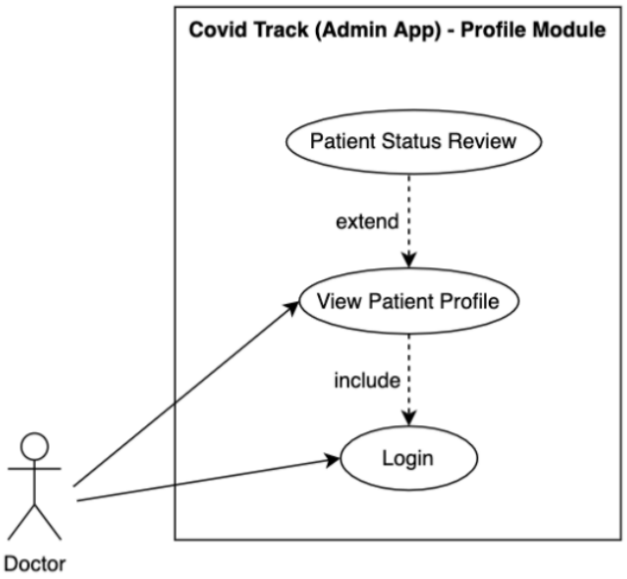



Figure 6: Use case diagram for patient status review on the Admin App.

- **Notify Covid Patient Contacts:** A registered health official of Covid Track can trace and notify the people with whom Covid-19 patients have been in contact.

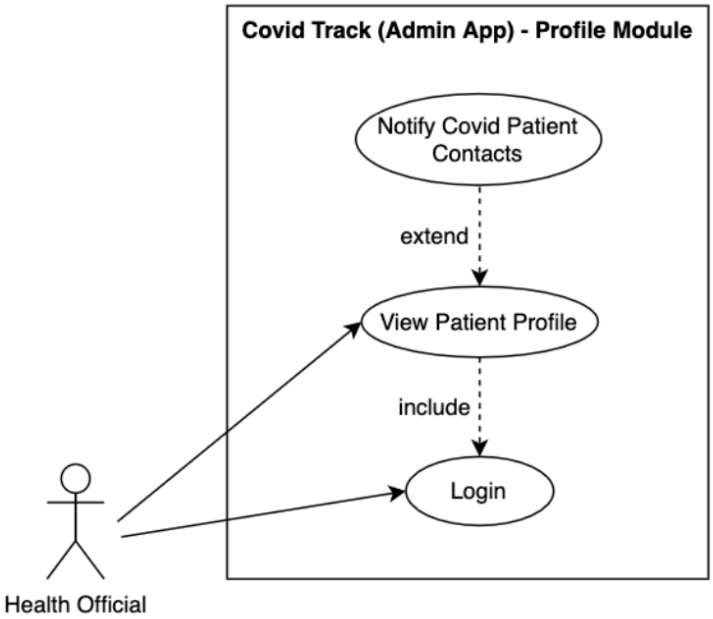



Figure 7: Use case diagram for notifying Covid-19 patient contacts on the Admin App.

- **Select Patient Status from Dropdown:** A registered doctor and health official of Covid Track can monitor and select the status of a patient from the dropdown located on the patient's profile.

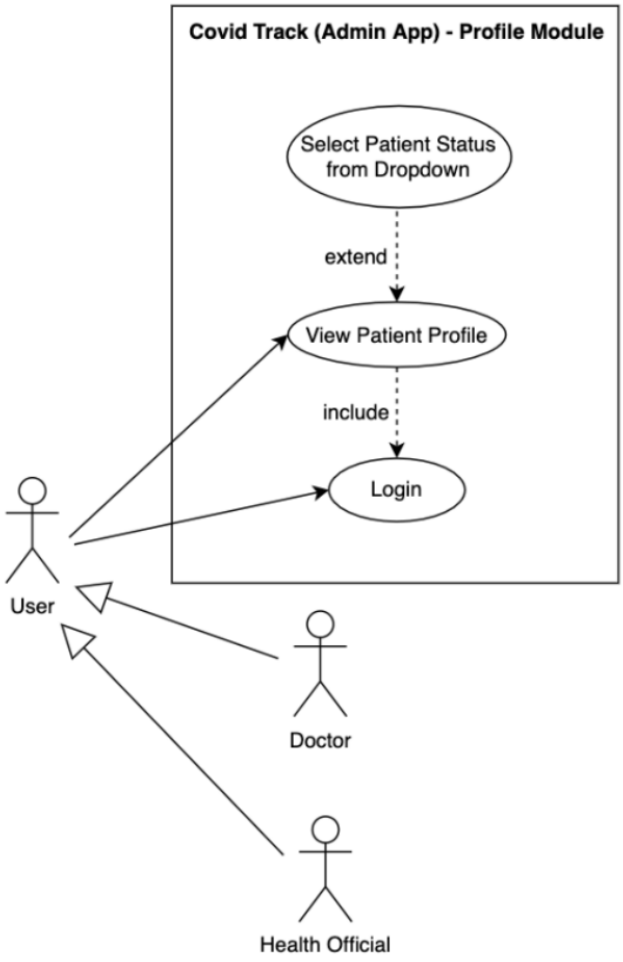



Figure 8: Use case diagram for monitoring status of confirmed and unconfirmed patients on the Admin App.

- **View Patient List:** A registered doctor and health official of Covid Track can view the patient list.

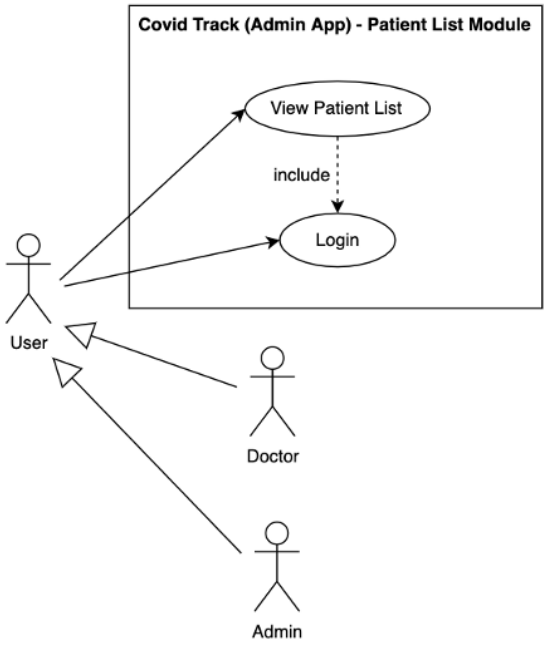



Figure 9: Use case diagram for patient list view on the Admin App.

- **Assign Doctor to Patient:** A registered admin can assign doctors to incoming patients.
- **Re-assign Patient to Another Doctor:** A registered admin can re-assign a patient to another doctor.

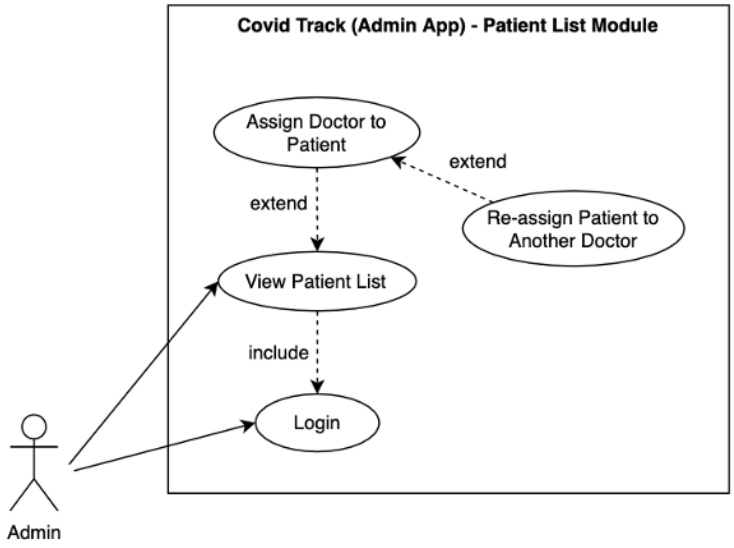



Figure 10: Use case diagram for assigning doctors to patients and re-assigning a patient to another doctor on the Admin App.

- **View Inbox:** A registered doctor can view their inbox.
- **Contact Patient:** A registered doctor can contact a patient.

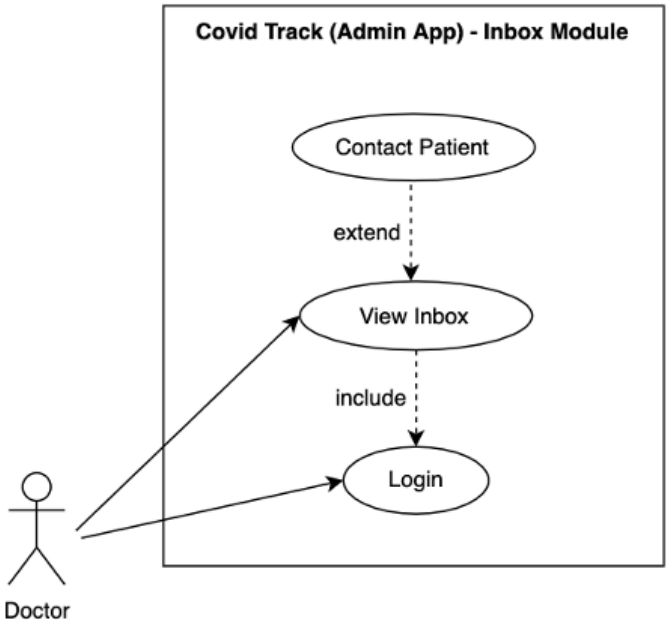



Figure 11: Use case diagram for contacting a patient on the Admin App.

- **View Appointments:** A registered doctor can view their appointments.

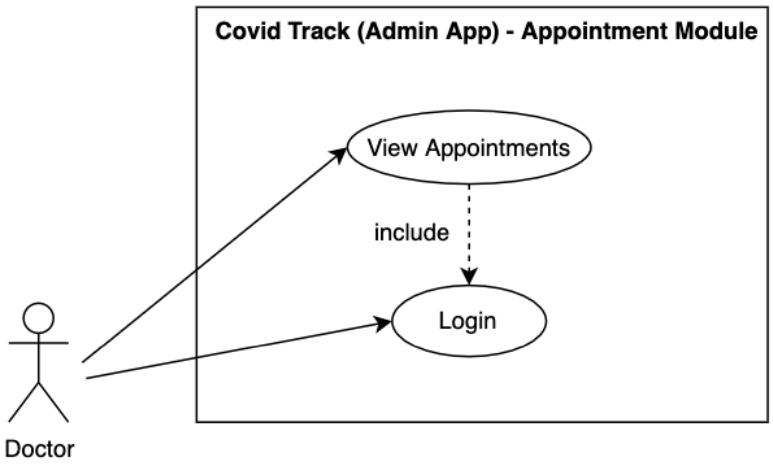



Figure 12: Use case diagram for appointments view on the Admin App.

### 5.2.1 Use Cases related to the Client App

For the Client App, the “User” stakeholder only contains Patients.

- **Register:** A User of Covid Track must be able to register an account with email and password.

- **Login:** A registered user of Covid Track must be able to login with a registered email and password.

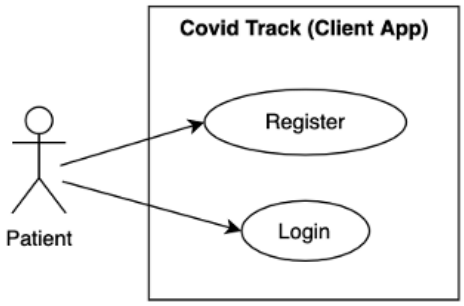



Figure 13: Use case diagram for authentication and registration on the Client App.

- **View Profile:** A registered patient can view their profile.

- **Edit Profile:** A registered patient can edit their profile.

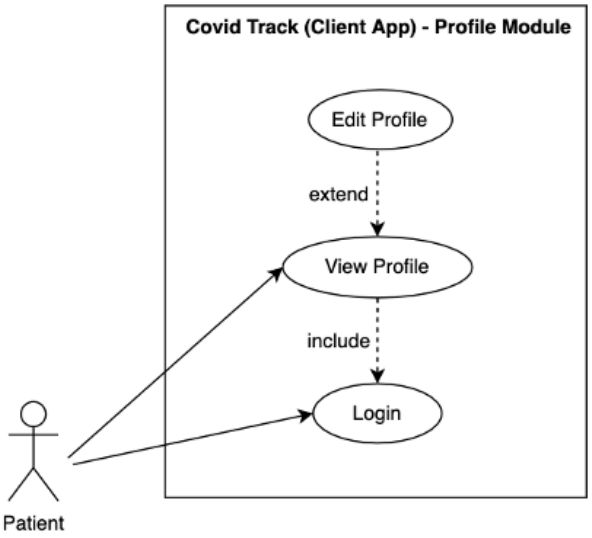



Figure 14: Use case diagram for profile view and edit on the Client App.

- **View Send Message Page:** A registered patient can view the page to send messages.
- **Contact Doctor:** A registered patient can contact a doctor.

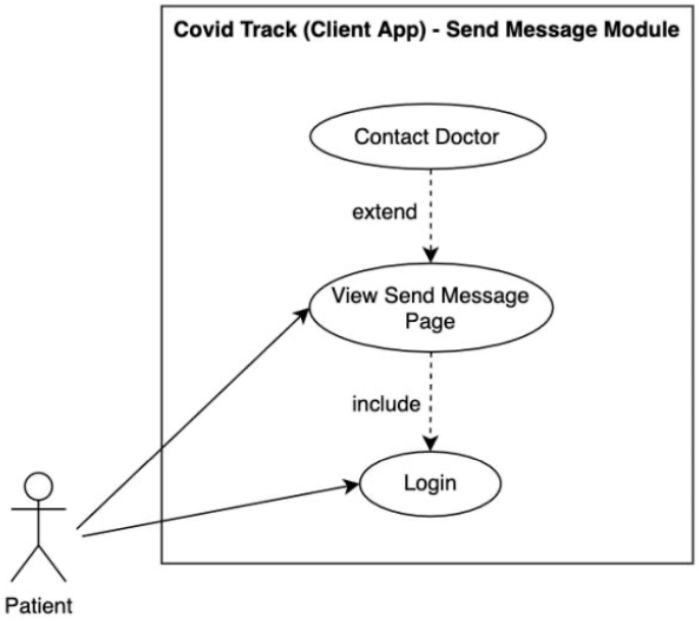



Figure 15: Use case diagram for contacting a doctor on the Client App.

- **View My Doctor:** A registered patient can view the basic information of their assigned doctor.

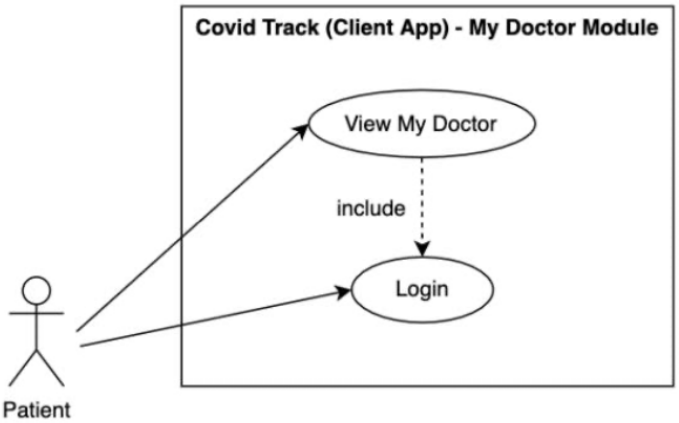



Figure 16: Use case diagram for viewing the basic information of the assigned doctor on the Client App.

- **View Diary:** A registered patient can view their diary.

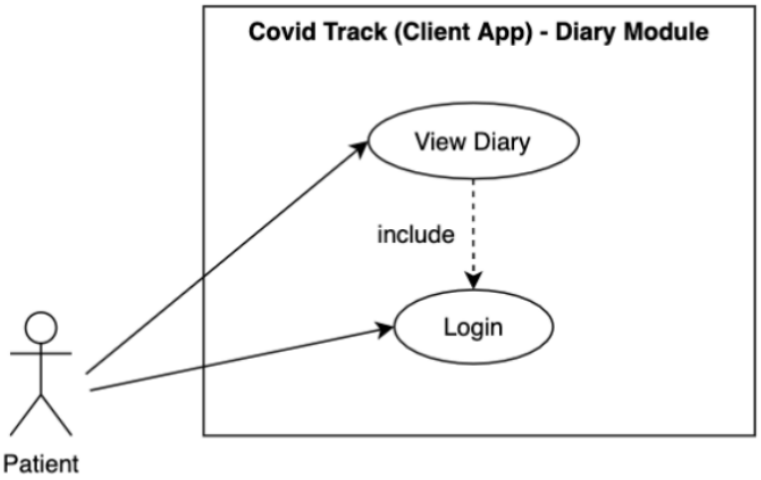



Figure 17: Use case diagram for diary view on the Client App.

- **View Update Status Page:** A registered patient can view their updated status page.
- **Add Status:** A registered patient can add a status.

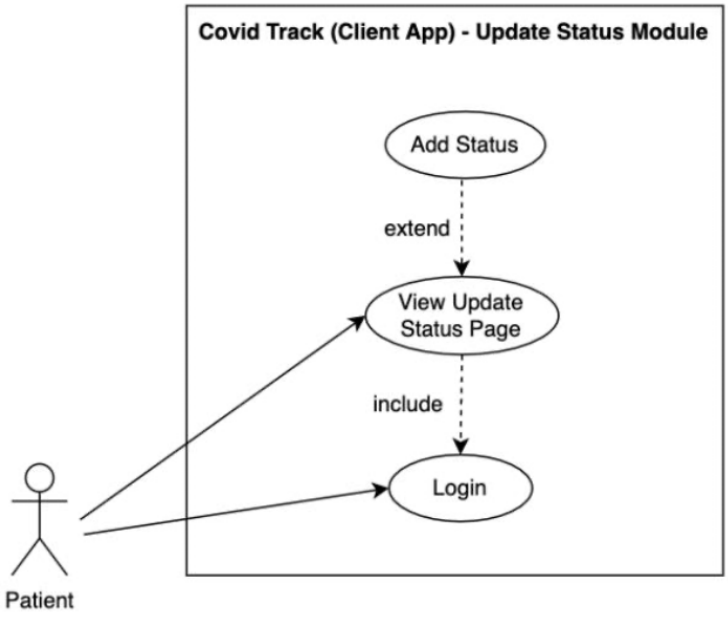



Figure 18: Use case diagram for viewing and adding status on the Client App.

- **View Appointment:** A registered patient can view their appointment.

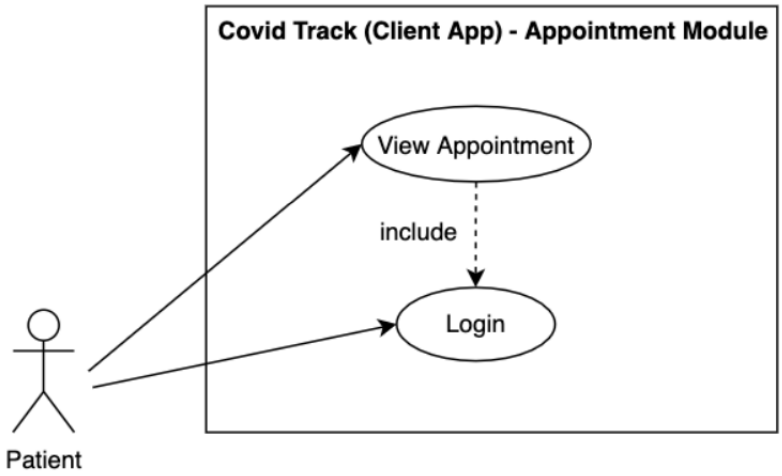



Figure 19: Use case diagram for appointment view on the Client App.

### 5.3 Domain Model Diagram

The domain model diagram describes the relationship between different entities in our application. In particular, each patient could have only one *ProfileDetails* and each *ProfileDetails* should only belong to one patient. Besides the basic patient details such as date of birth, name, address; every *ProfileDetails* is additionally composed of a *ListOfSymtoms*. Each patient registered in our platform will also own a *QRCode* and a *Diary*.

Both *Doctor* and *Patient* entities can only have one *Inbox* which contains one or more messages. The difference here is each *Inbox* belongs to one patient but it could be assigned to different doctors so that the new doctor can join and continue the conversation from the previously assigned doctor.

For the *Appointment*, each patient is allowed to book only one (concurrent) appointment at a time to ensure that they do not overload the system. However, for doctors, they can have multiple (concurrent) appointments with their patients. In addition, patients are able to see the history of all of their previous appointments.

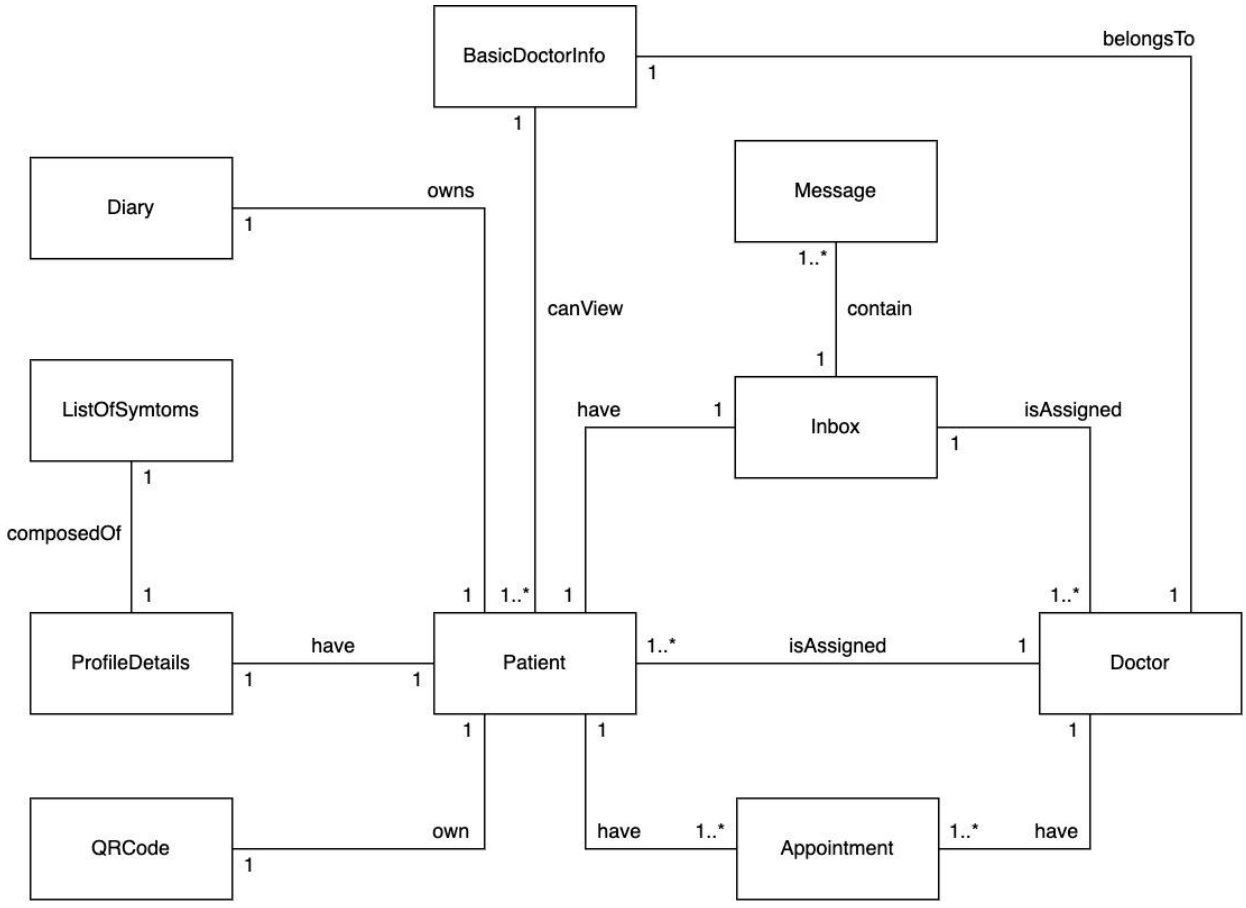



Figure 20: Domain model diagram

### 5.4 Database Design

The firebase backend comes with a NoSQL database due to its capability of being highly scalable. Even though it may not be as straightforward as a SQL database when modeling relationships, NoSQL “collections” and “documents” structures are simple and fast to create. Moreover, it can be modeled to mimic the table relationships from SQL using JSON-like syntax.

In this schema design, a doctor can have many patients but every patient can only be assigned to one doctor at a time. Both doctors and patients can have an inbox, and each inbox can contain a list of messages (conversations). Every patient in our platform will have a *ProfileDetails*, a *ListOfSymptoms*, a *Diary*, and a unique *QRCode* that belongs to his/her profile. For the appointment, it makes sense to allow a doctor to have many concurrent *Appointments*, however, each patient should be allowed to make only one concurrent appointment at a time to avoid overwhelming the system. The reason that the relationship between a patient to an appointment is a one-to-many relationship is that the patient needs to have access to (many) past appointments that they have.

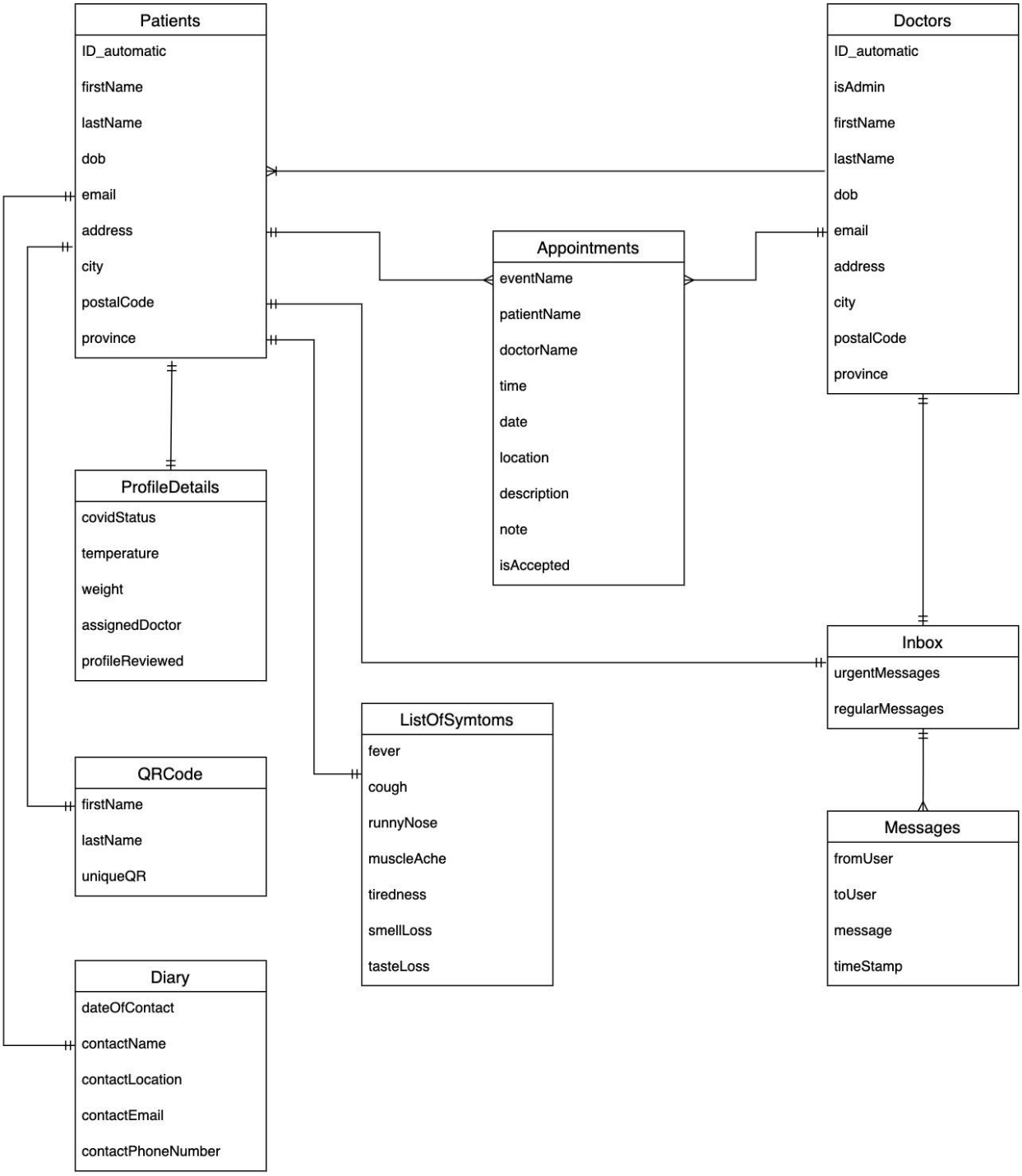



Figure 21: Database design

### 5.5 Physical Design of the Database

Firebase is a part of Google Cloud Service. It offers Cloud Firestore which is a highly scalable NoSQL database that can be used through various business applications regardless of the size. Using real-time listeners, Firebase stores and keeps the data in sync across the application. Cloud storage provides robust operations with highly secured data transactions. In addition, it serves user-generated content from the database in real-time. Moreover, it offers data analytics so that developers could draw meaningful insights from the application they build. Figure 14 below illustrates the architecture of the system. On a regular workflow, everytime a request arrives to the backend, it could be passed through different flows of connected cloud services.

**The Cloud Logging service**: is a fully managed, real-time log management system that comes with search, analysis and alerting features.

**The Analytics service**: enables developers and business owners to apply Machine Learning models, or other analytics assets to increase the ROI.

**The Dataflow service**: allows batch data processing with automated provisioning and horizontal scaling to maximize resource utilization.

**The Data Storage service**: allows reliable, high performance and secured data transfer.

**The App Engine service**: enables developers to build scalable applications on a fully managed serverless platform.

**The Compute Engine service**: helps creating and running virtual machines on Google's infrastructure.

**The Big Query service**: a multi cloud data warehouse designed for business agility.

**The Dataproc service**: a managed and a scalable service for running different open source tools and frameworks.

**The Datalab service**: used to explore, visualize, analyze, and transform data easily.

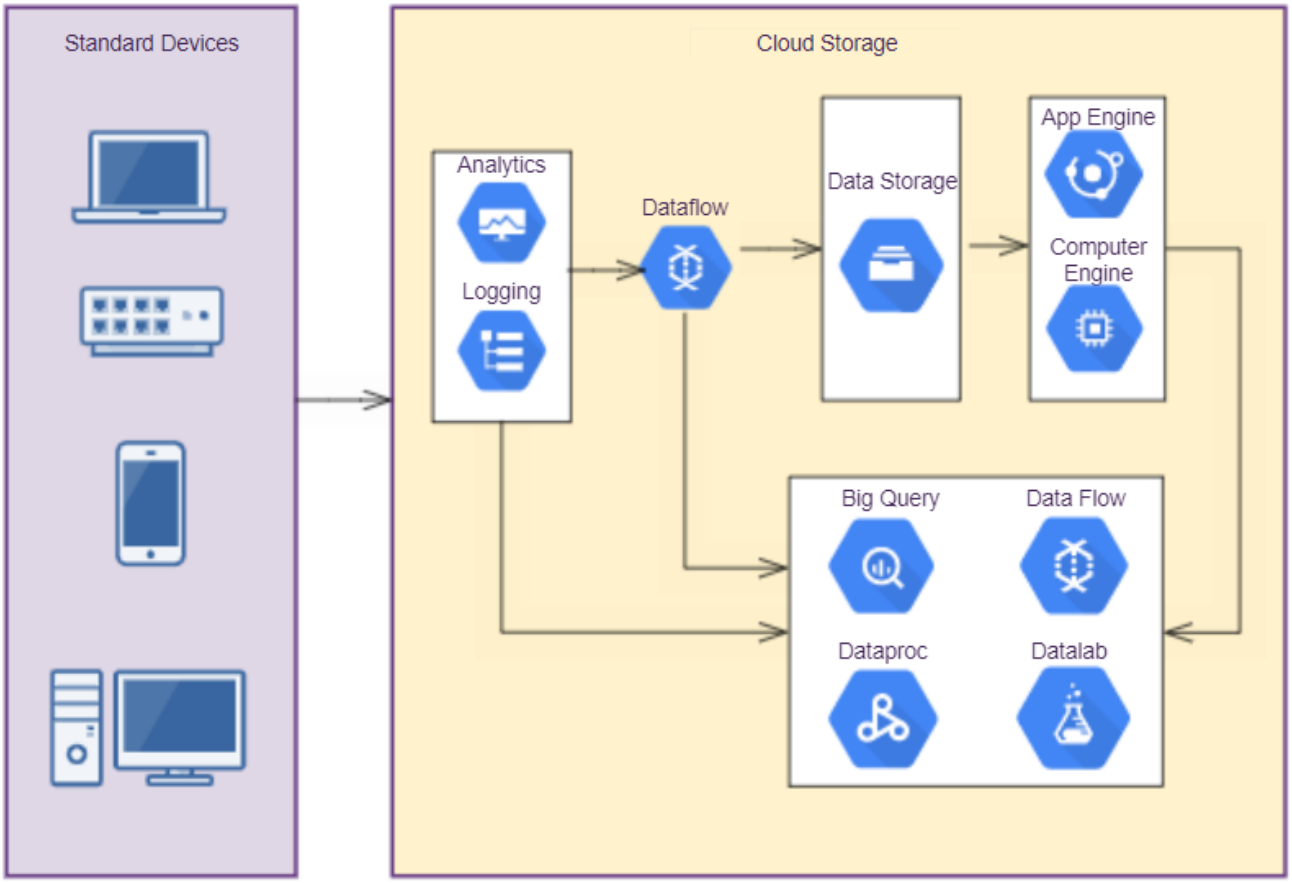



Figure 22: Physical Design of the Database

### 5.6 Sequence Diagrams

All processes in the COVID-19 tracking application system can be presented by a sequence diagram. The first process is the login/sign in process that is illustrated in figure 5. After the patients register, they will be directed to the dashboard page and they will be assigned to a doctor if they are new registered patients.

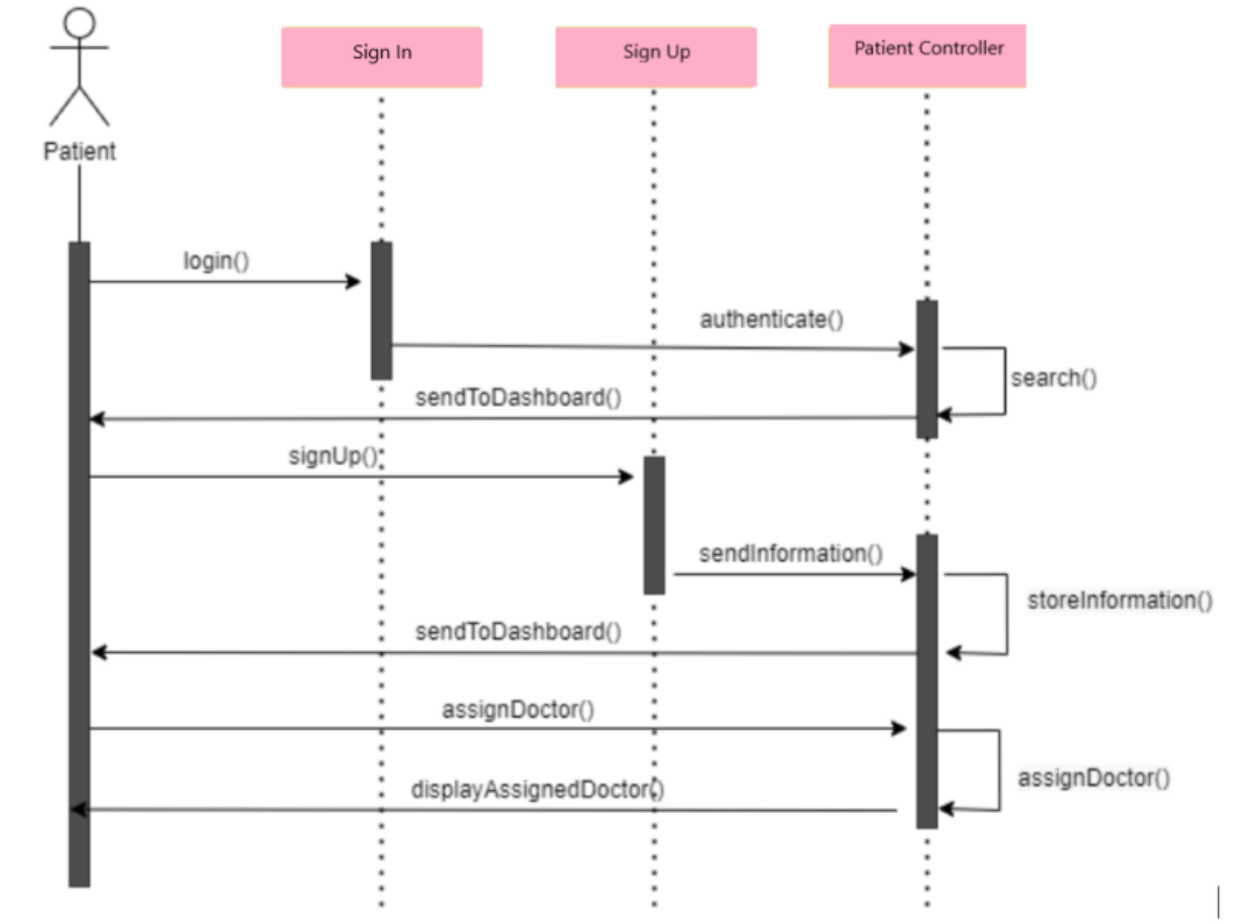



Figure 23: Sign In/ Sign Up for Patient Sequence Diagram

After signing in, the patients will be able to update their profiles. If a patient was tested positive, she/he can update their status to notify the doctor with the updates. The patient will get a notification therefore when the doctor reviews their status as represented in figure 6.

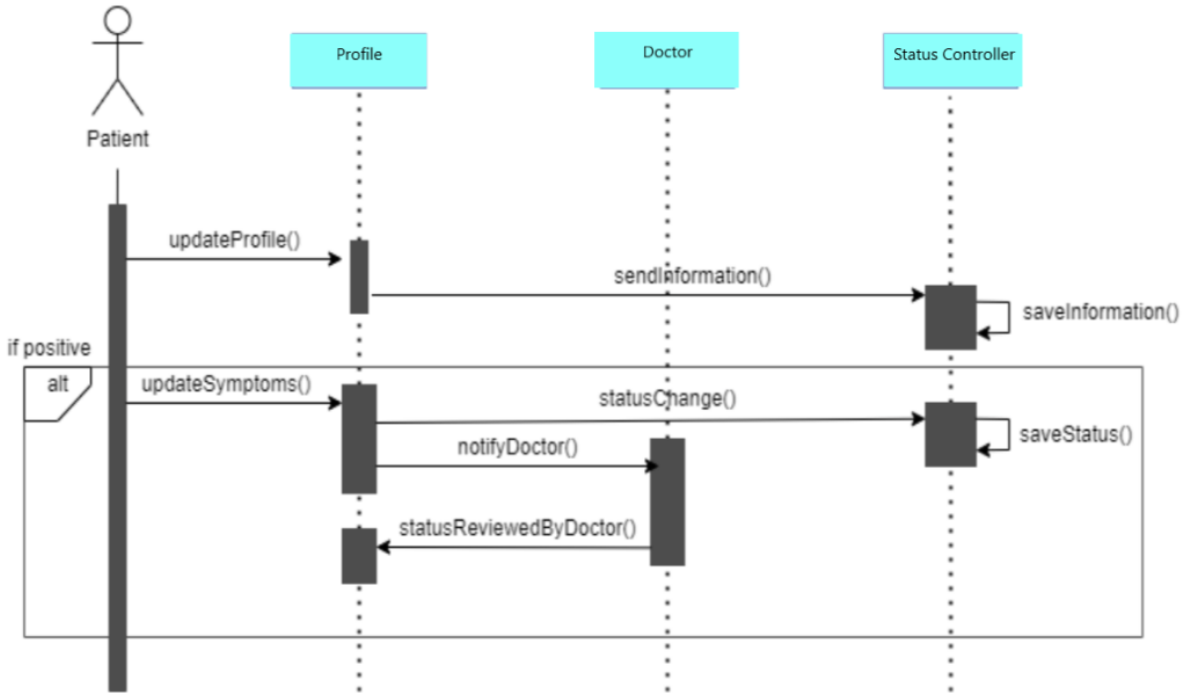



Figure 24: Status Update for Patients Sequence Diagram

If a patient has a question, they can always message their assigned doctor. The patients will be prompted a question to determine the urgency of their situation. If urgent, they will be given the priority to be answered by the doctor.

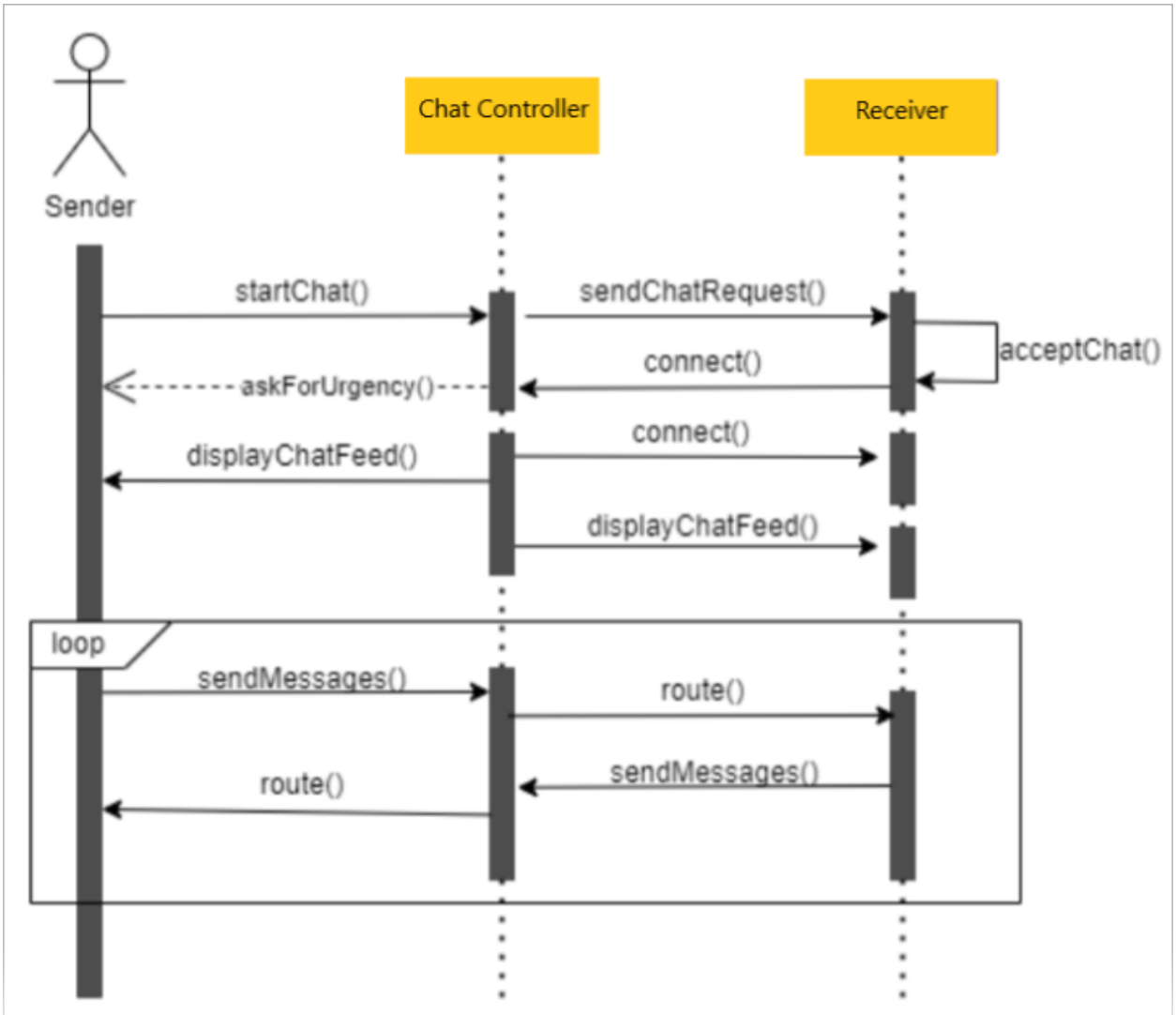



Figure 25: Chatting System Sequence Diagram

All patients will have a unique QR Code, that they can view on their account. The admins will be able to scan a QR code to get a patient's record. If the record doesn't exist, it will return an error message. Otherwise, it will return the profile of the patient as displayed in Figure 8.

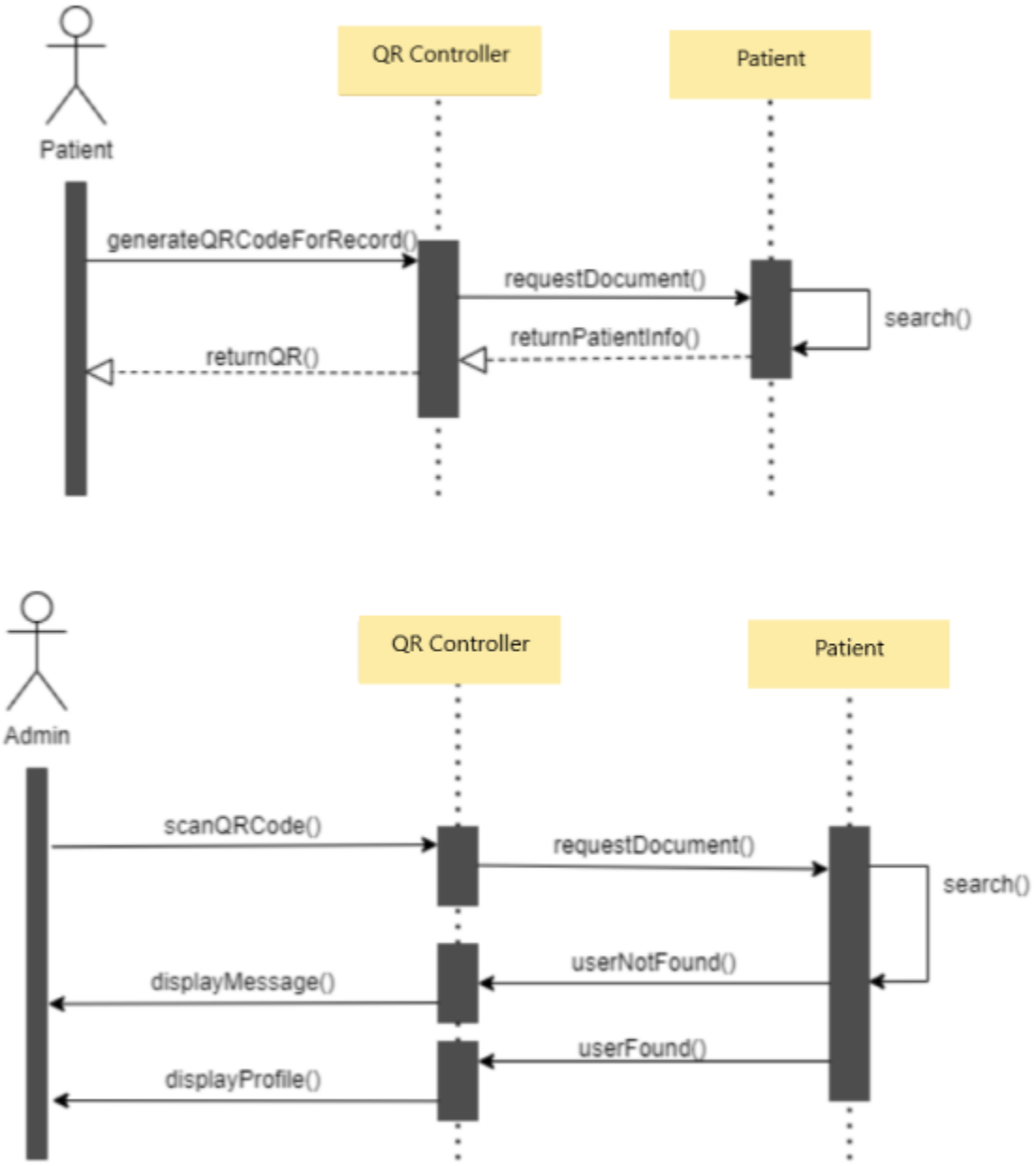



Figure 26: QR Feature Sequence Diagram for Patients and Admins

Every patient will be assigned to an available doctor when registering in the covid tracking application as shown in figure 19.

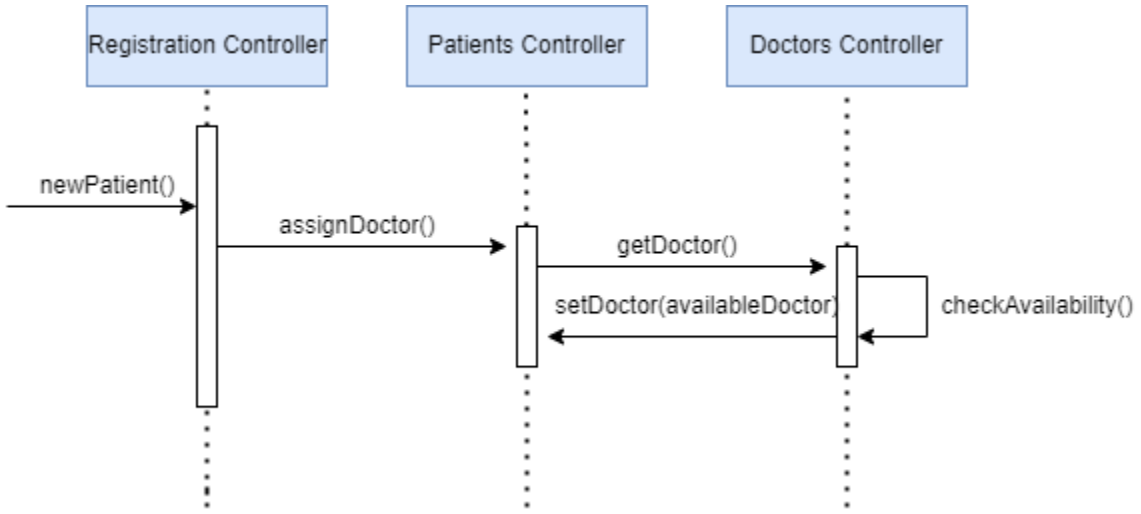



Figure 27: Assigning Patients to Doctors Feature Sequence Diagram

Every patient will be required to update the symptoms everyday. However, the doctor will be notified if the patient updates her/his status twice a day.

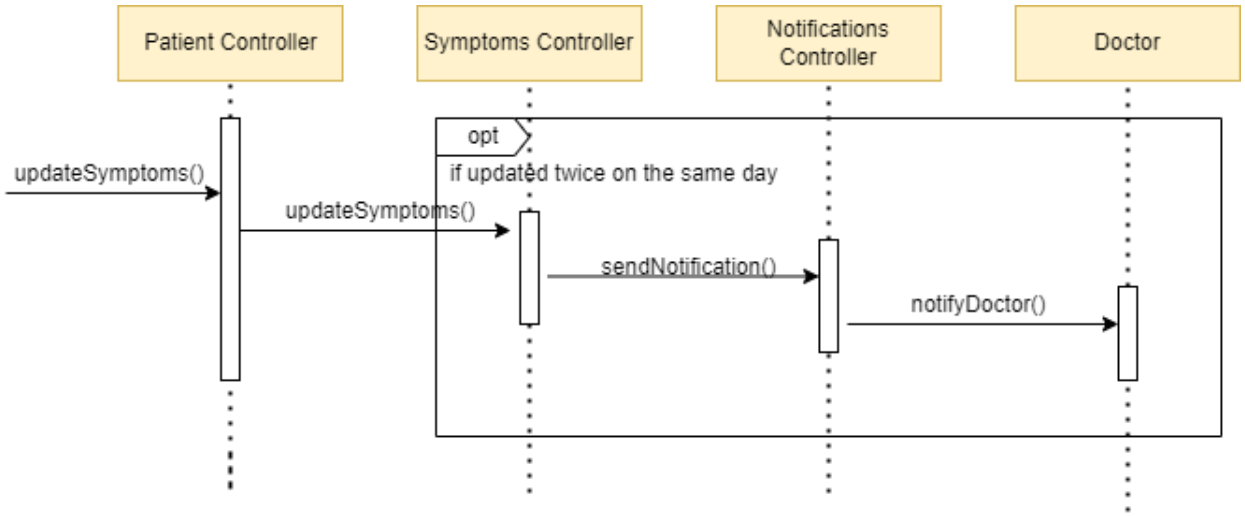



Figure 28: Updating Symptoms Feature Sequence Diagram

# 6.0 RISK MANAGEMENT

In this section, we present the purpose of the risk management plan, it's procedure, an analysis, a response, and methods for monitoring, controlling and reporting risks.

# VERSION HISTORY

| Version # | Implemented By | Revision Date | Approved By | Approval Date | Reason |
|---|---|---|---|---|---|
| 1.0 | Laila Alhalabi, Marwa Khalid | 01/17/22 | Quang Tran | 02/02/22 | Initial Risk Management Plan draft |

Table 12: Risk Management Plan Version History

## 6.1 Purpose of the Risk Management Plan

Risk management is one of the most important aspects of any business as it has a direct effect on a project's objectives. The RMP is a process designed to identify and evaluate all possible risks and hazards that can affect the COVID-19 Tracking application. The process involves performing activities such as: identifying and analyzing risks, assessing the impact of risks as well as monitoring and controlling risks throughout the project lifecycle. The Risk Management Plan (RMP) will be updated at each stage of the project life-cycle.

## 6.2 Risk Management Procedure

In this subsection, we detail the risk management process and identifying risks.

### 6.2.1 Process

The project manager will serve as the Risk Manager within this project, with responsibilities such as developing and updating the project scope and schedule, communicating with stakeholders, and maintaining the project in a manner that ensures a high-quality product in a timely manner. Nonetheless, it is important to identify all the risks that could possibly happen in the project so that they can be avoided. The following sections will identify the steps for accomplishing risk management.

### 6.2.2 Risk Identification

The identification of risks is an important part of the project management process. It helps in identifying all the possible risks that could occur during the project. The risk identification will include all the risks of the project.

| Risk ID | Description | Probability | Impact |
|---|---|---|---|
| R-1 | Patient can alter another patient's data | Moderate | High |
| R-2 | Application crashes unexpectedly | Moderate | High |
| R-3 | Patient data accessible by anyone. | Moderate | High |
| R-4 | Login Security is Weak | Moderate | High |
| R-5 | Inability to complete requirements/features by the deadline | High | High |
| R-6 | User unable to update their status | Moderate | Moderate |
| R-7 | Doctor isn't notified when patient changes status on the same day | Moderate | Moderate |
| R-8 | Not enough test coverage to identify bugs/issues | Moderate | Moderate |
| R-9 | User is unable to log in | Low | Low |
| R-10 | User Interface isn't intuitive | Low | Low |

| Risk ID | Description | Resolved in Sprint | Strategy and Effectiveness |
|---|---|---|---|
| **R-1** | Patient can alter another patient's data | | Nothing has been decided yet. |
| **R-2** | Application crashes unexpectedly | | Nothing has been decided yet. |
| **R-3** | Patient data accessible by anyone. | | Nothing has been decided yet. |
| **R-4** | Login Security is Weak | | Nothing has been decided yet. |
| **R-5** | Inability to complete requirements/features by the deadline | | Nothing has been decided yet. |
| **R-6** | User unable to update their status | | Nothing has been decided yet. |
| **R-7** | Doctor isn't notified when patient changes status on the same day | | Nothing has been decided yet. |
| **R-8** | Not enough test coverage to identify bugs/issues | | Nothing has been decided yet. |
| **R-9** | User is unable to log in | | Nothing has been decided yet. |
| **R-10** | User Interface isn't intuitive | | Nothing has been decided yet. |

Table 13: Risk Identification Table

### 6.3 Risk Analysis

In this section, we will identify the risks that are likely to affect the project and assess the possible outcomes. Risks that may affect this project include work-breakdown structure (WBS), deliverables and cost and effort assessments of the project.

### 6.3.1 Qualitative Risk Analysis

The project manager will analyze the likelihood and impact of occurrence for each identified risk. Risks Probability:

- High Risk: If there is a greater than 70% chance that a risk can happen, it is considered high.
- Medium Risk: If there is between 30%-70% chance that a risk can happen, it is considered medium.
- Low Risk: If there is less than 30% chance that a risk can happen, it is considered low.

| PROBABILITY | THREATS | | | | |
|---|---|---|---|---|---|
| High | | | | R5 | |
| Moderate | | | R6, R7, R8 | R1, R2, R3, R4 | |
| Low | | R9, R10 | | | |
| | Very low | Low | Moderate | High | Very High |
| | IMPACT | | | | |

Table 14: Risk Analysis Table

### 6.3.2 Quantitative Risk Analysis

The qualitative risk analysis technique is used to examine risk occurrences that have been prioritized.

## 6.4 Risk Response Planning

Each high risk will be allocated to a project team member for monitoring purposes, and they will be responsible for monitoring the risks that they are assigned. One of the following approaches will be used to handle each main risk:

- Avoid: Avoiding the risk by avoiding the cause of this risk.
- Mitigate: Mitigating risk by minimizing its impacts on the system.
- Accept: Accepting the risk - nothing to be done.
- Transfer: Transferring the responsibility of monitoring and controlling a risk to a third party, such as buying insurance.

### 6.5 Risk Monitoring, Controlling and Reporting

Throughout the project lifespan, the amount of risk will be measured, managed, and reported. The project team will keep a "Top 10 Risk List" that will be disclosed as part of the project status reporting procedure for this project.

# 7.0 USER INTERFACE DESIGN

To construct the user design, Figma was used as well as the following community templates; https://www.figma.com/community/file/987982429991608576/Semantic-UI---Figma, https://www.figma.com/community/file/912837788133317724/MUI-for-Figma-v5.4.0-(Community)

In this section, the **UI mockup** for each feature (user story) completed in Sprint 1 and the ones we intend to complete in Sprint 2.

## 7.1 Sprint 1 UI Mockups

Here are the UI mockups of user stories completed in Sprint 1.

### 7.1.1 Admin Portal Sprint 1

The following figures are the UI mockups for the Admin portal.

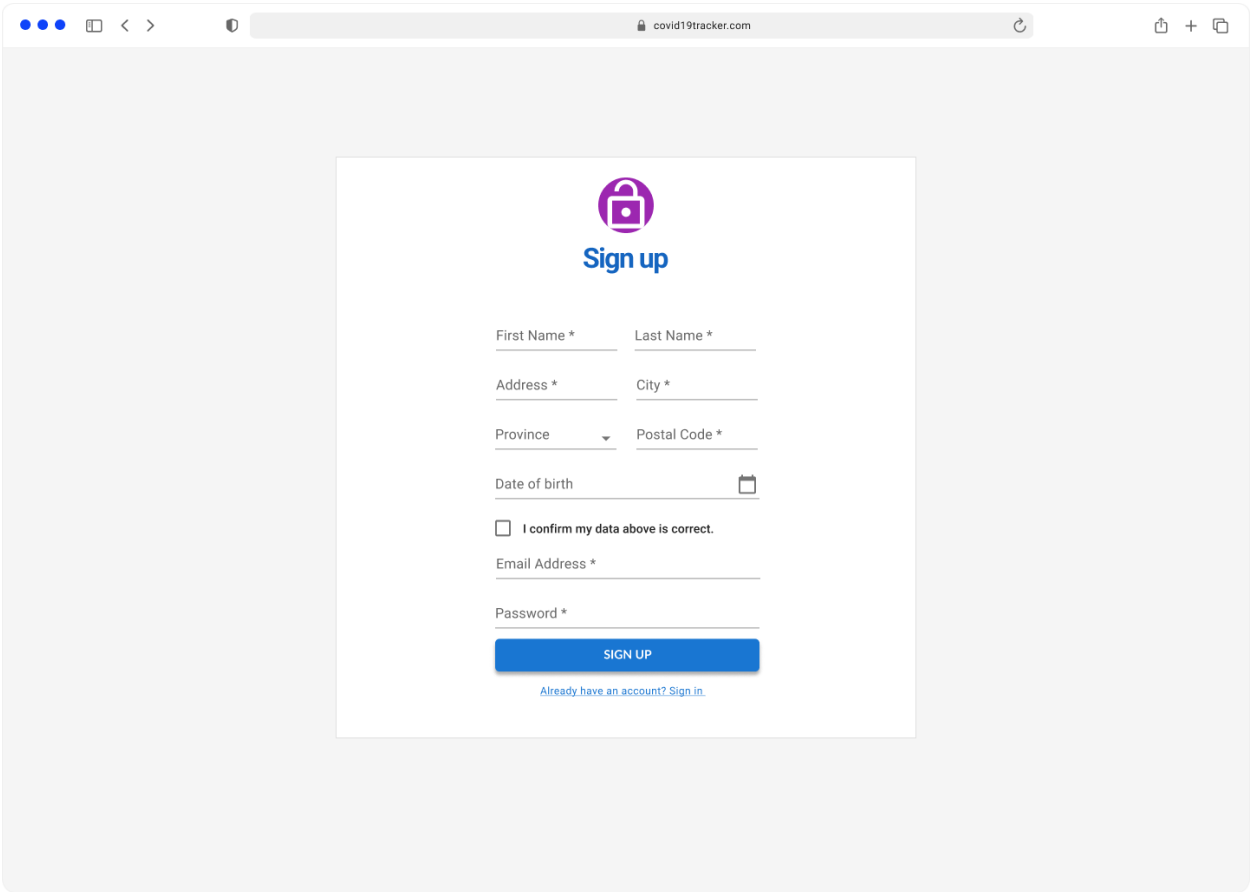



Figure 29: UI Admin Sign-up for User Story **Issue-7**

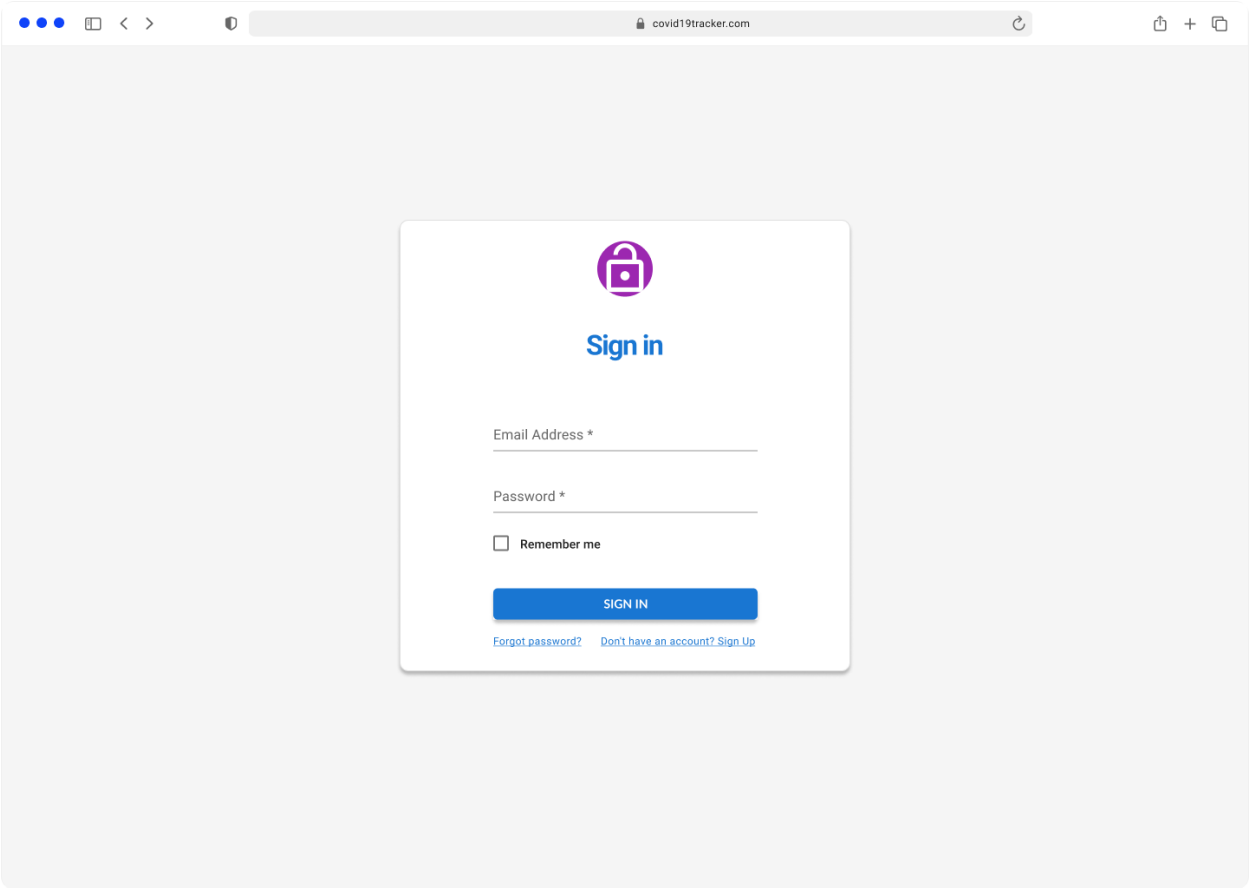



Figure 30: UI Admin Sign-in for User Story [Issue-7]

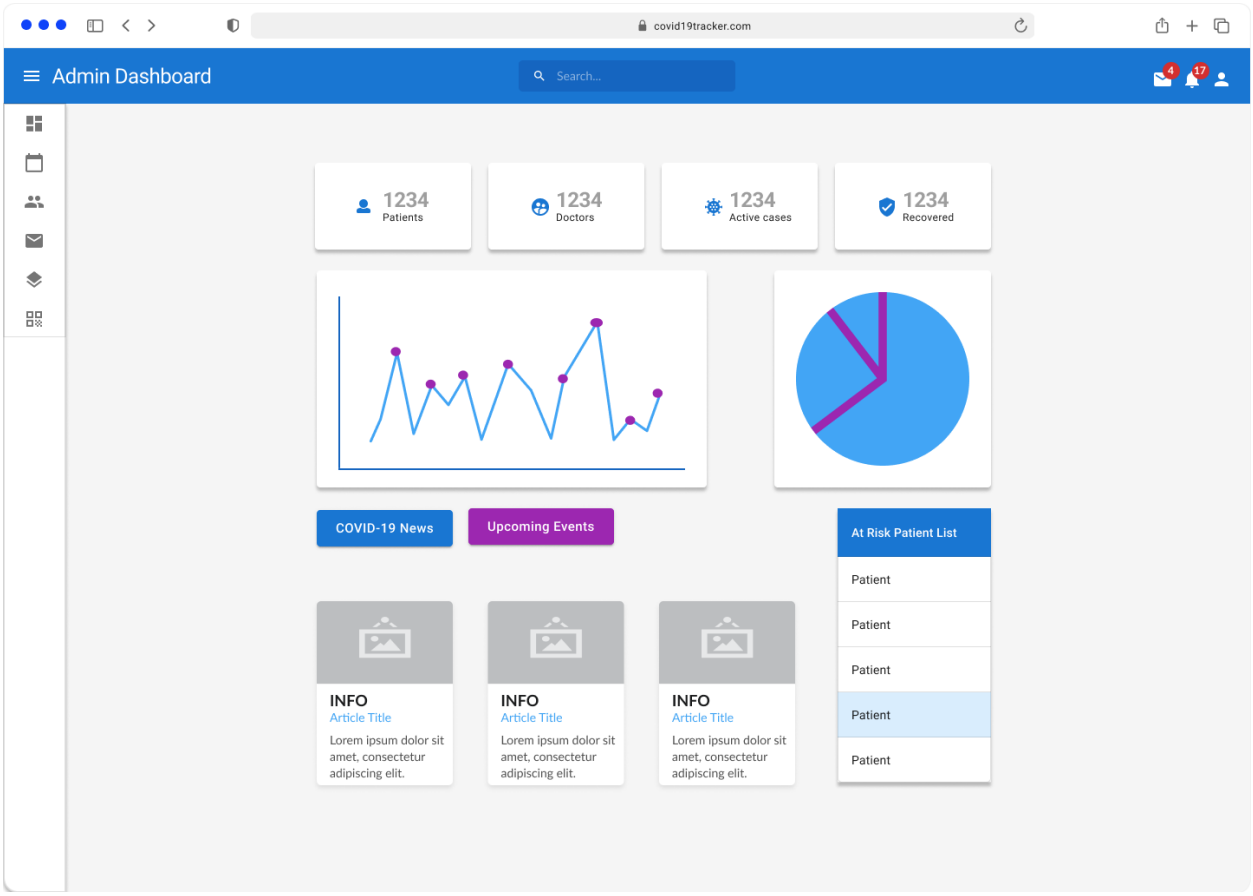



Figure 31: UI Admin Dashboard for User Story [Issue-5]

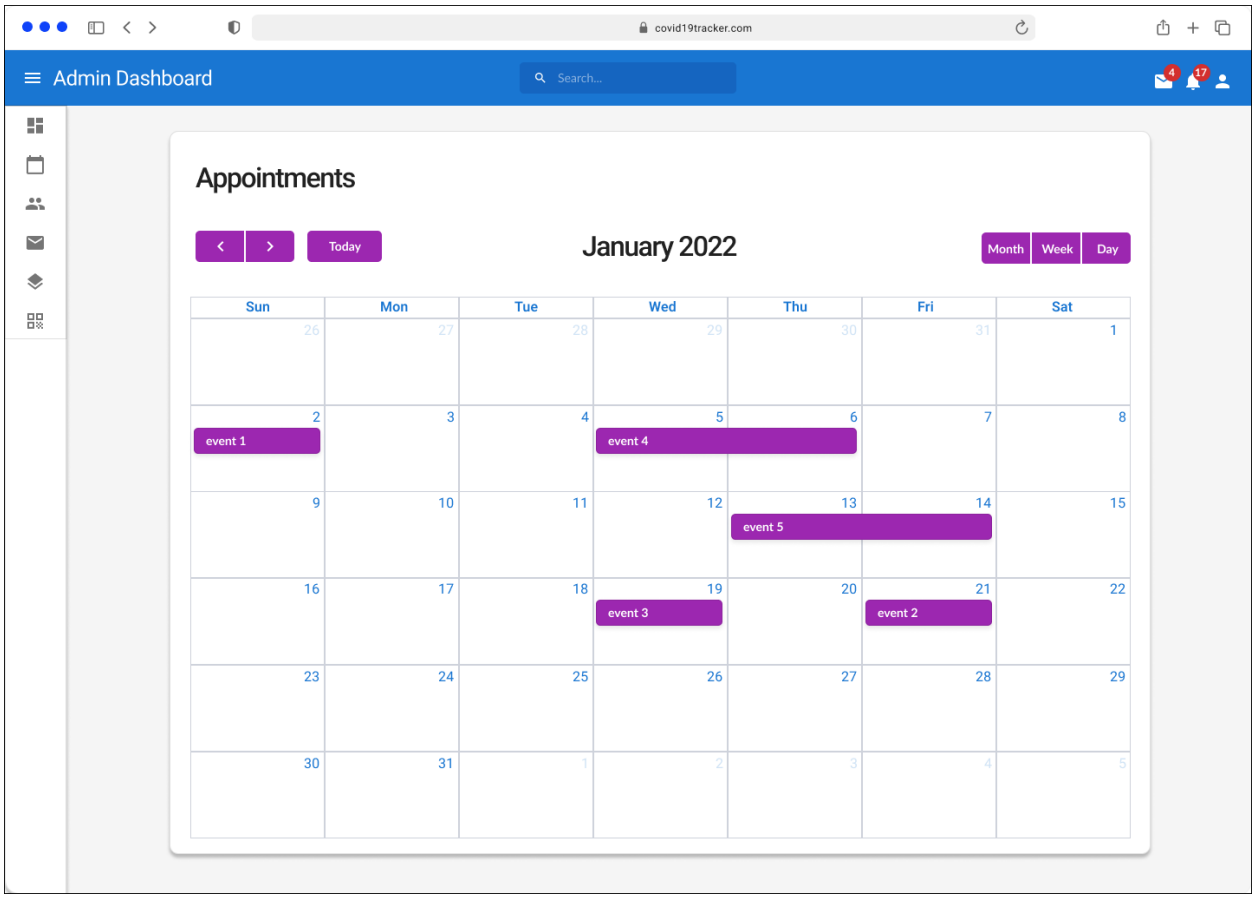



Figure 32: UI Admin Appointments for User Story [Issue-5]

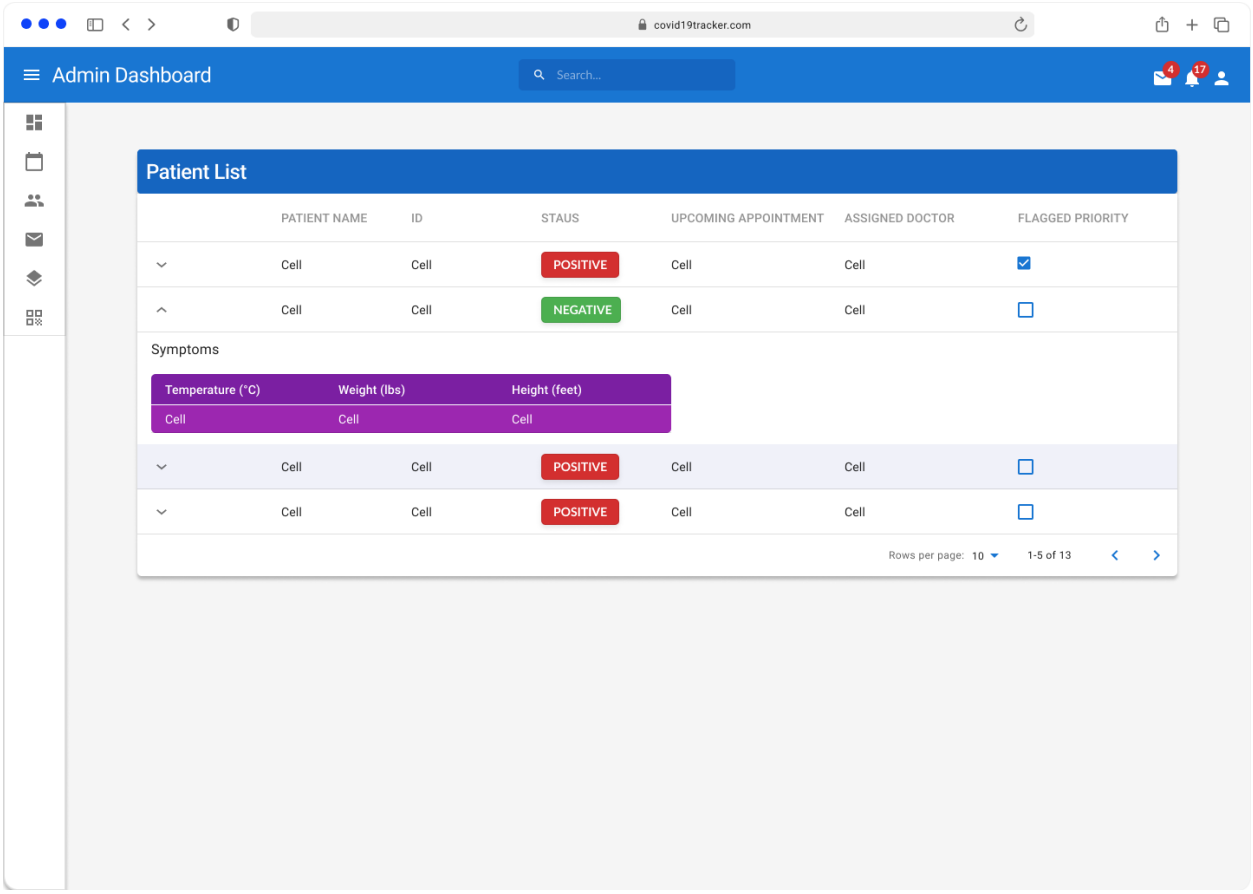



Figure 33: UI Admin Patient List for User Story [Issue-89]

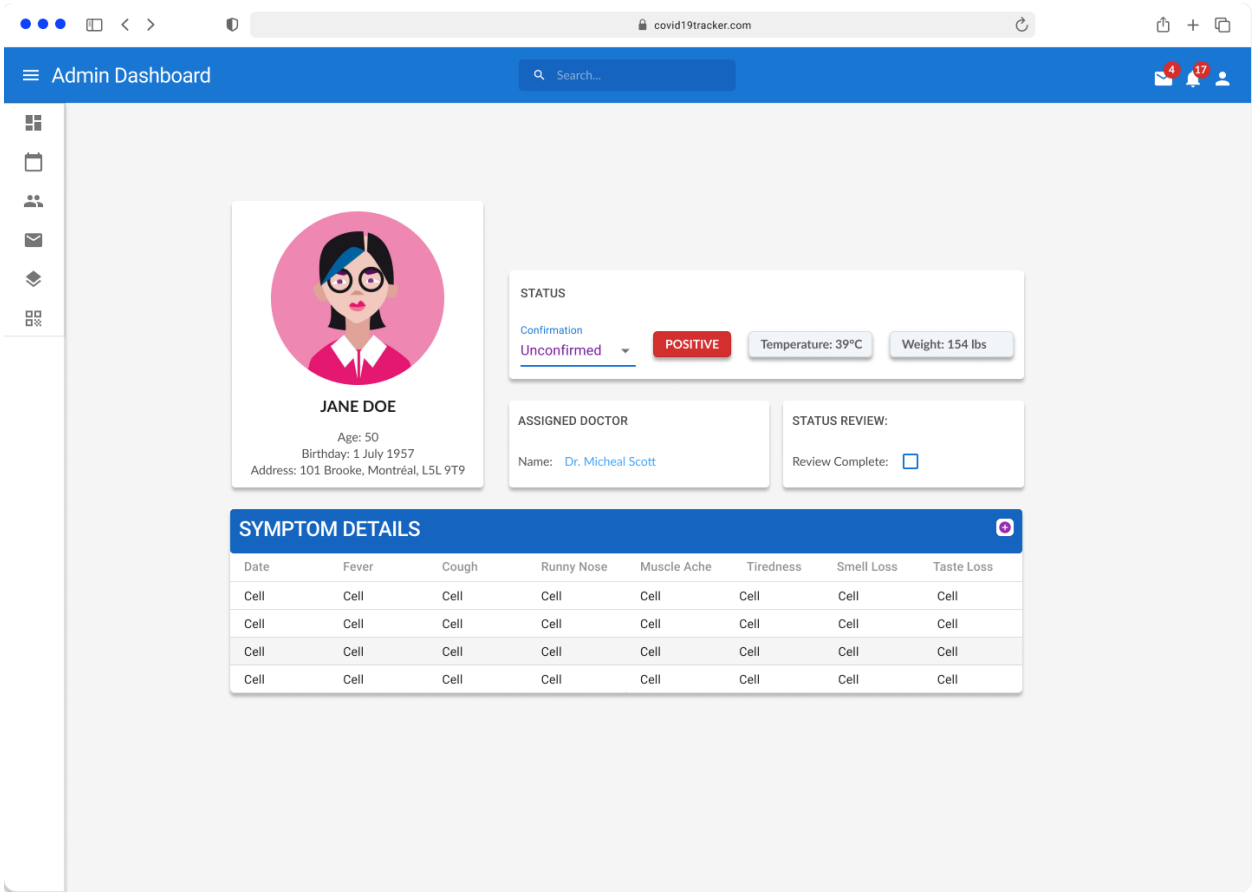



Figure 34: UI Admin Patient Details for User Story [Issue-9]

### 7.2 Sprint 2 UI Mockups

Here are the UI mockups of user stories completed in Sprint 2.

#### 7.2.1 Admin Portal Sprint 2

The following figures are the UI mockups for the Admin portal.

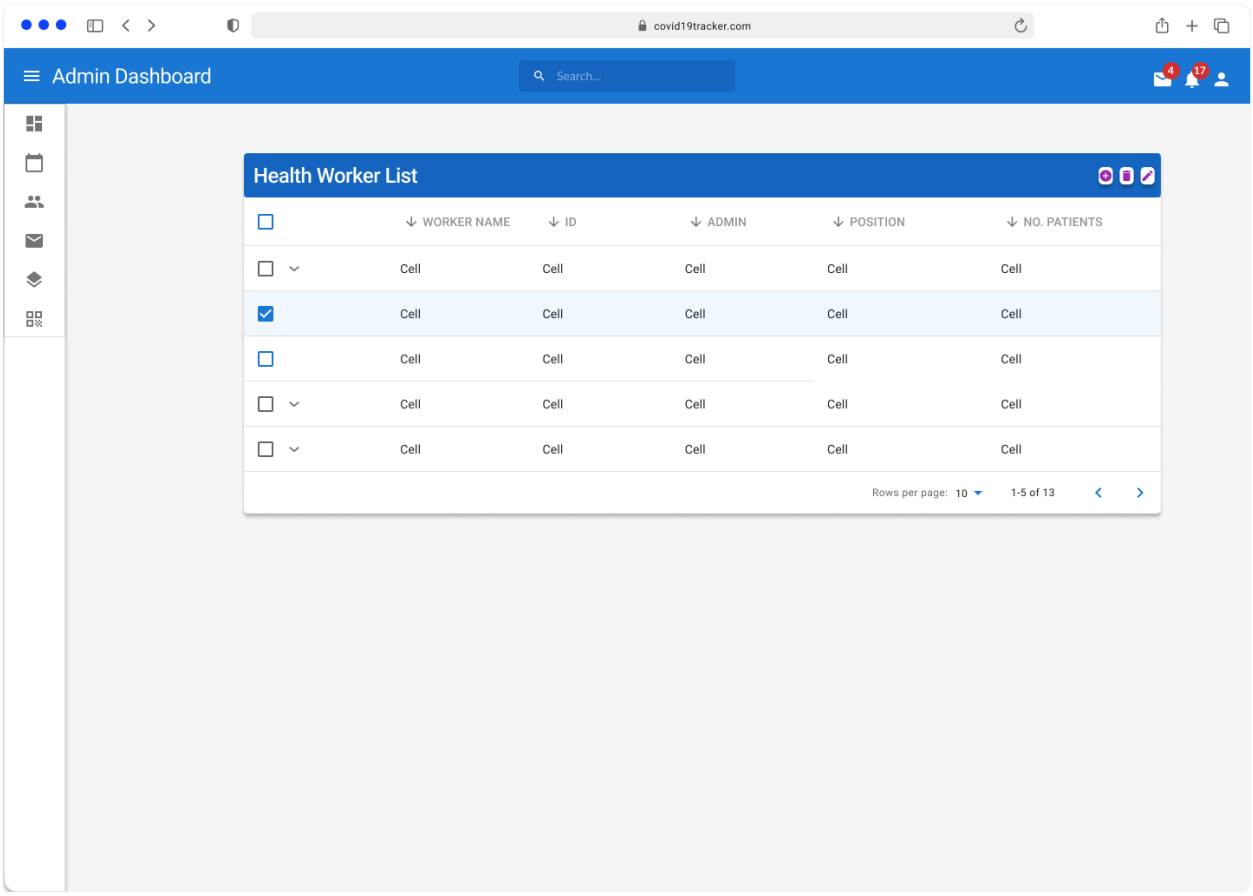



Figure 35: UI Admin Health Worker List for User Story Issue-17 and Issue-19

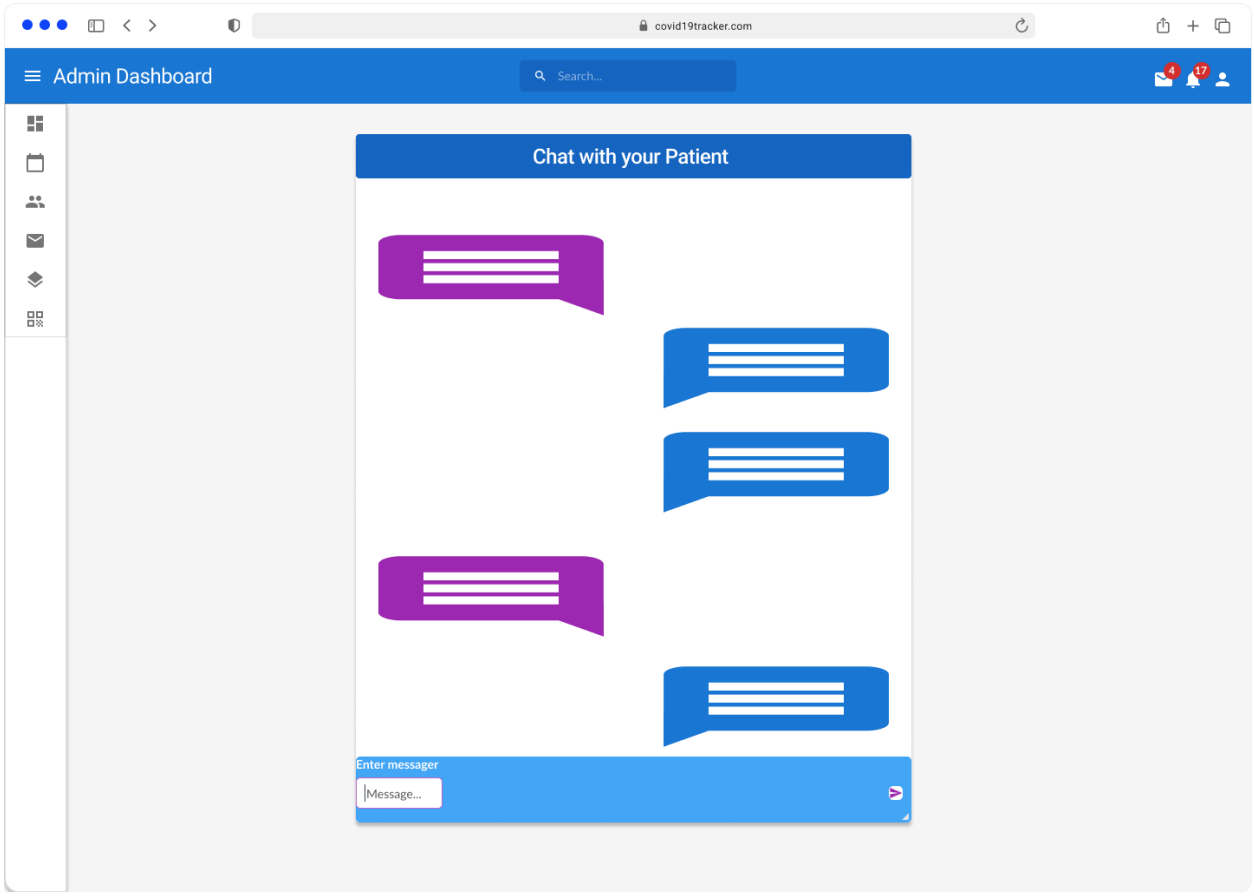



Figure 36: UI Admin Chat with patient for User Story [Issue-13]

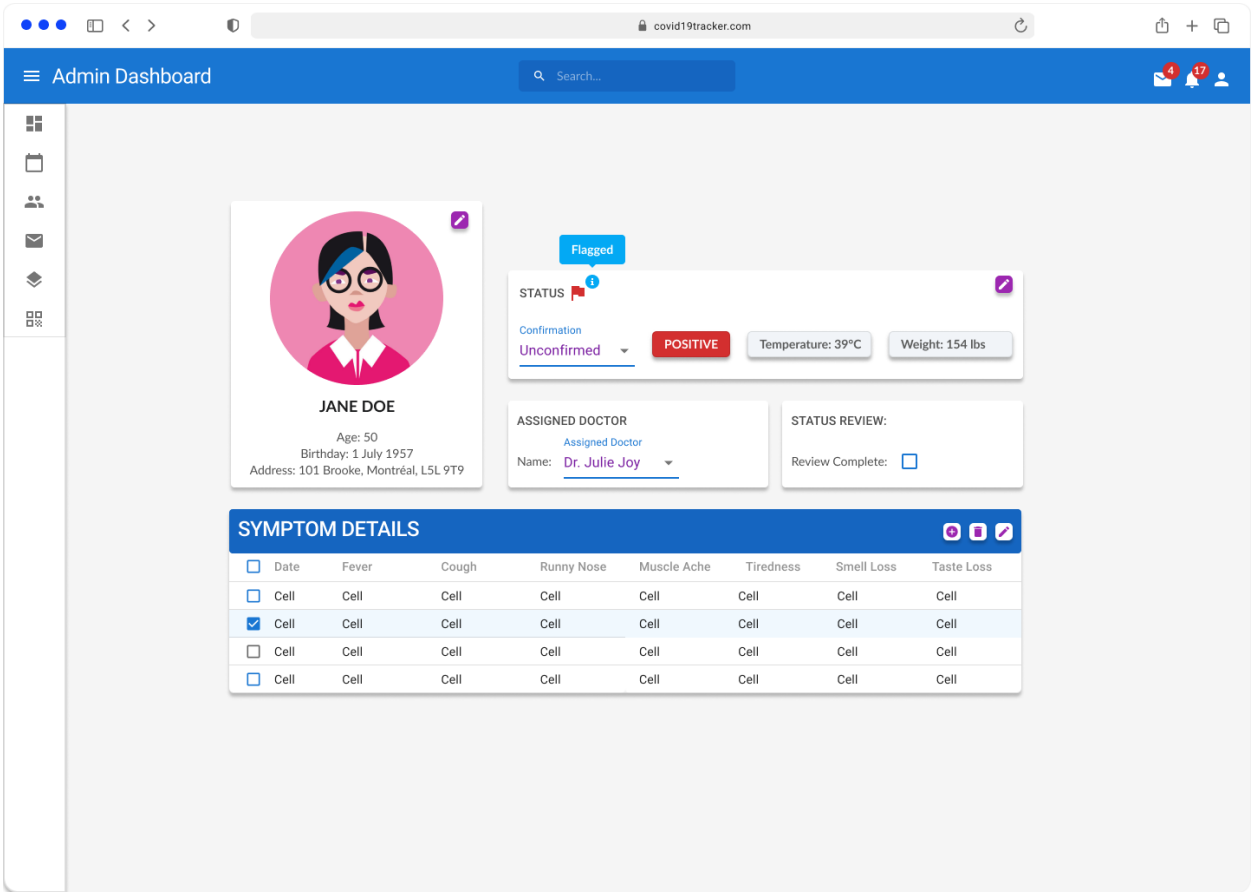



Figure 37: UI Patient Profile where you can edit symptoms, re-assign doctor, view if patient is flagged, review status, and edit patient info, for User Stories [Issue-3], [Issue-16], [Issue-18], [Issue-20].

### 7.2.2 Client Portal Sprint 2

The following figures are the UI mockups for the Client portal.

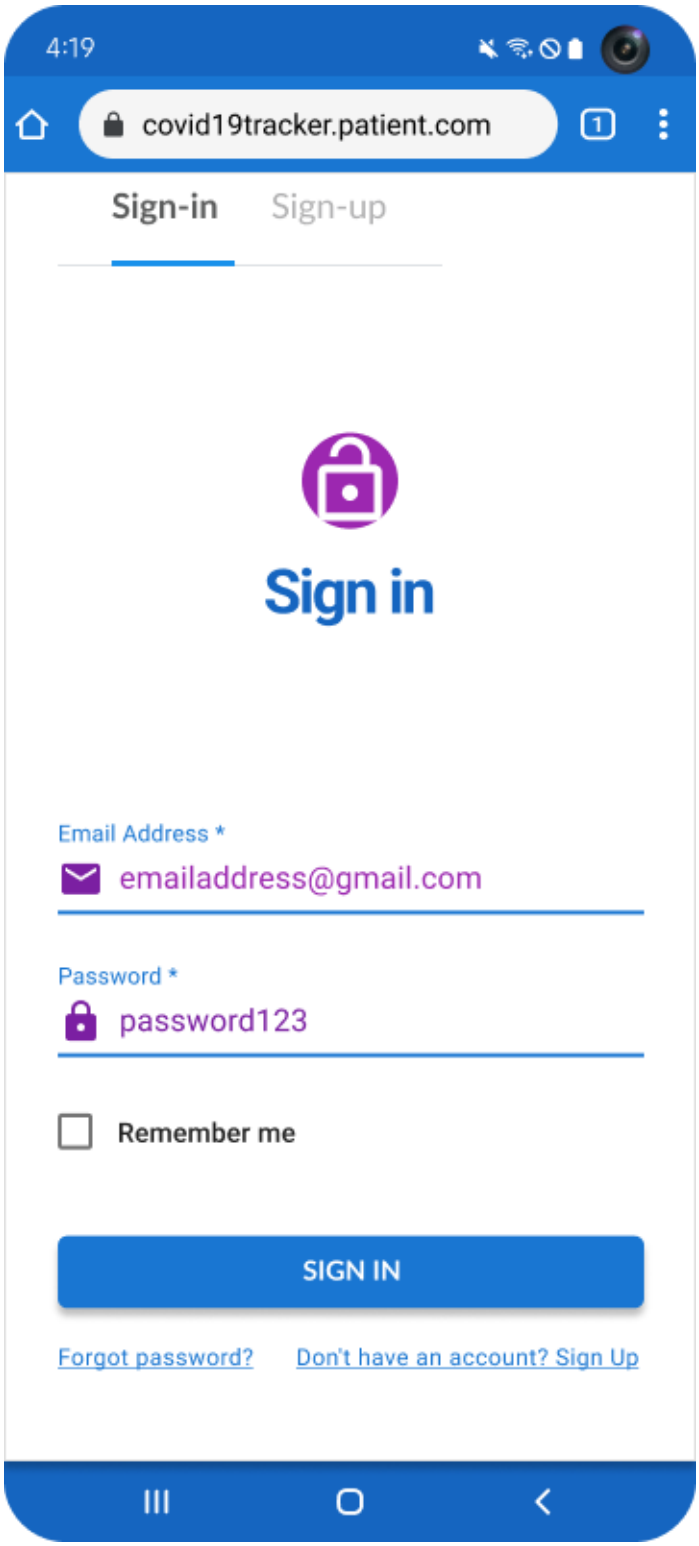



Figure 38: UI Client Sign-in for User Story [Issue-7]

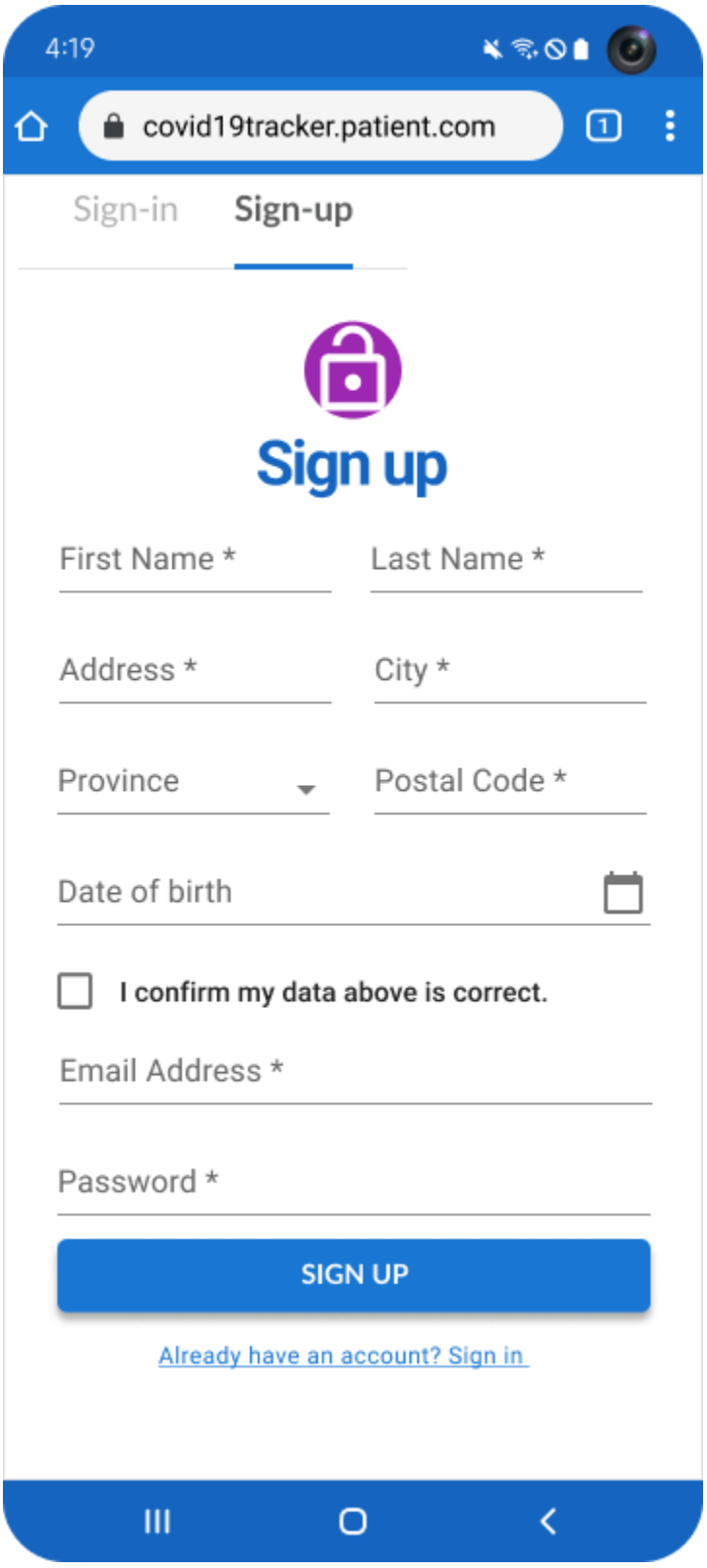



Figure 39: UI Client Sign-up for User Story [Issue-7]

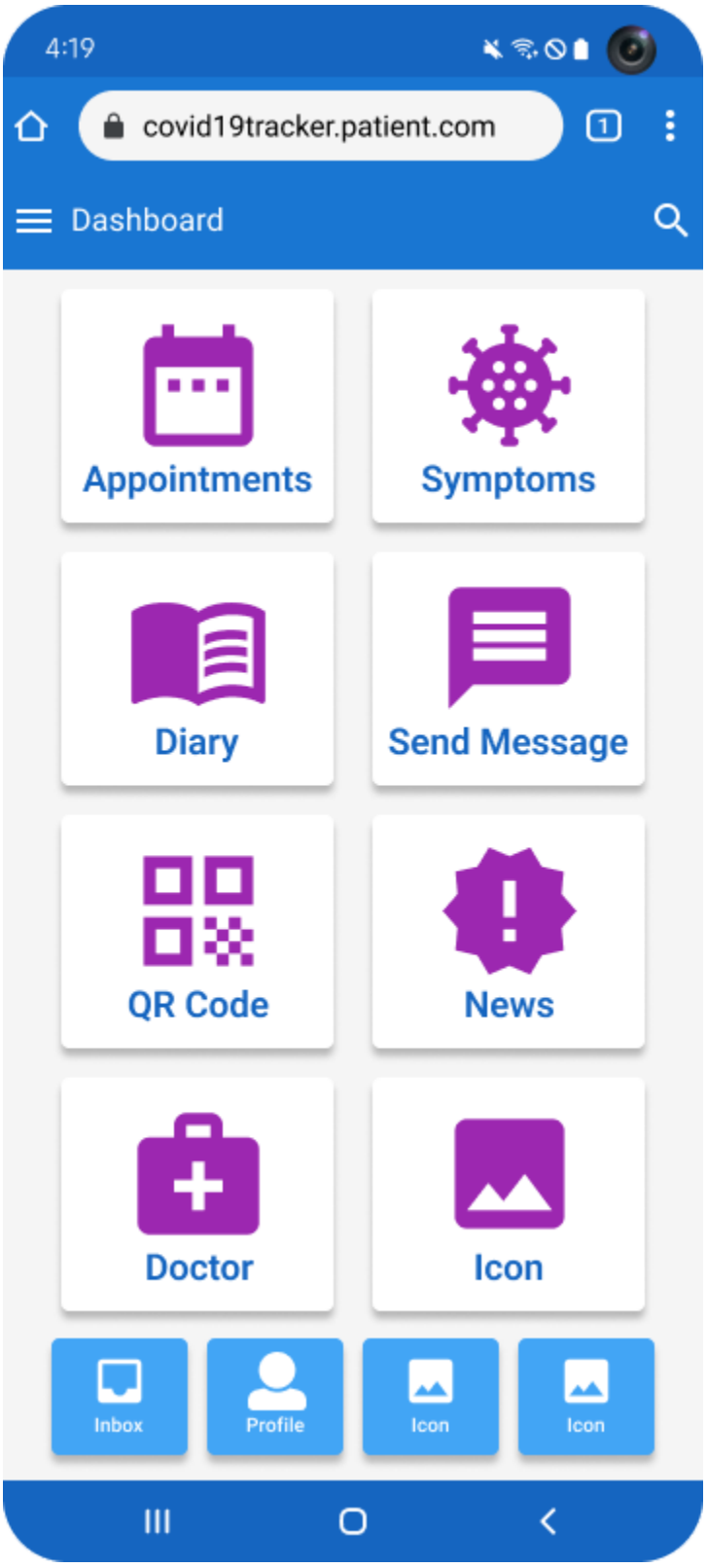



Figure 40: UI Client Dashboard

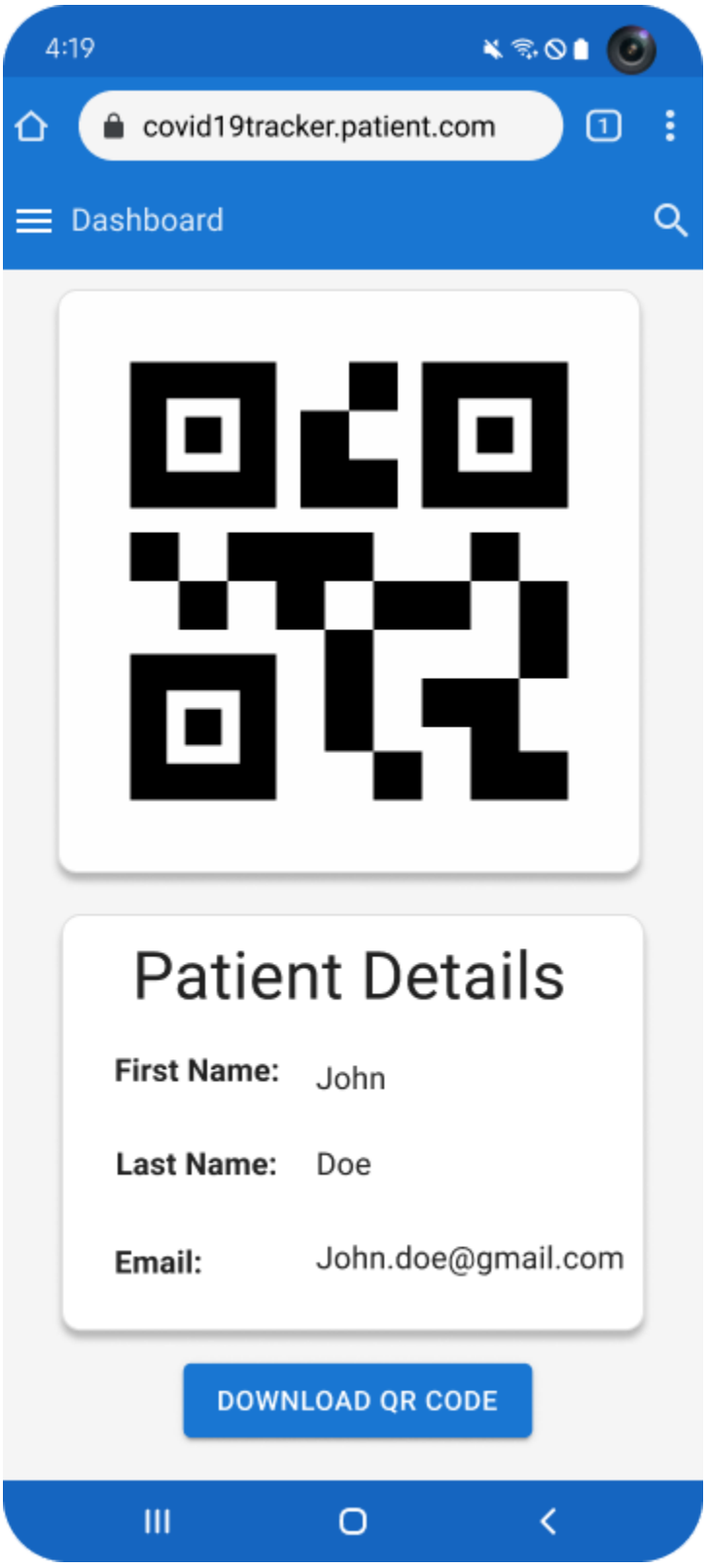



Figure 41: UI Client QR code for User Story [Issue-22]

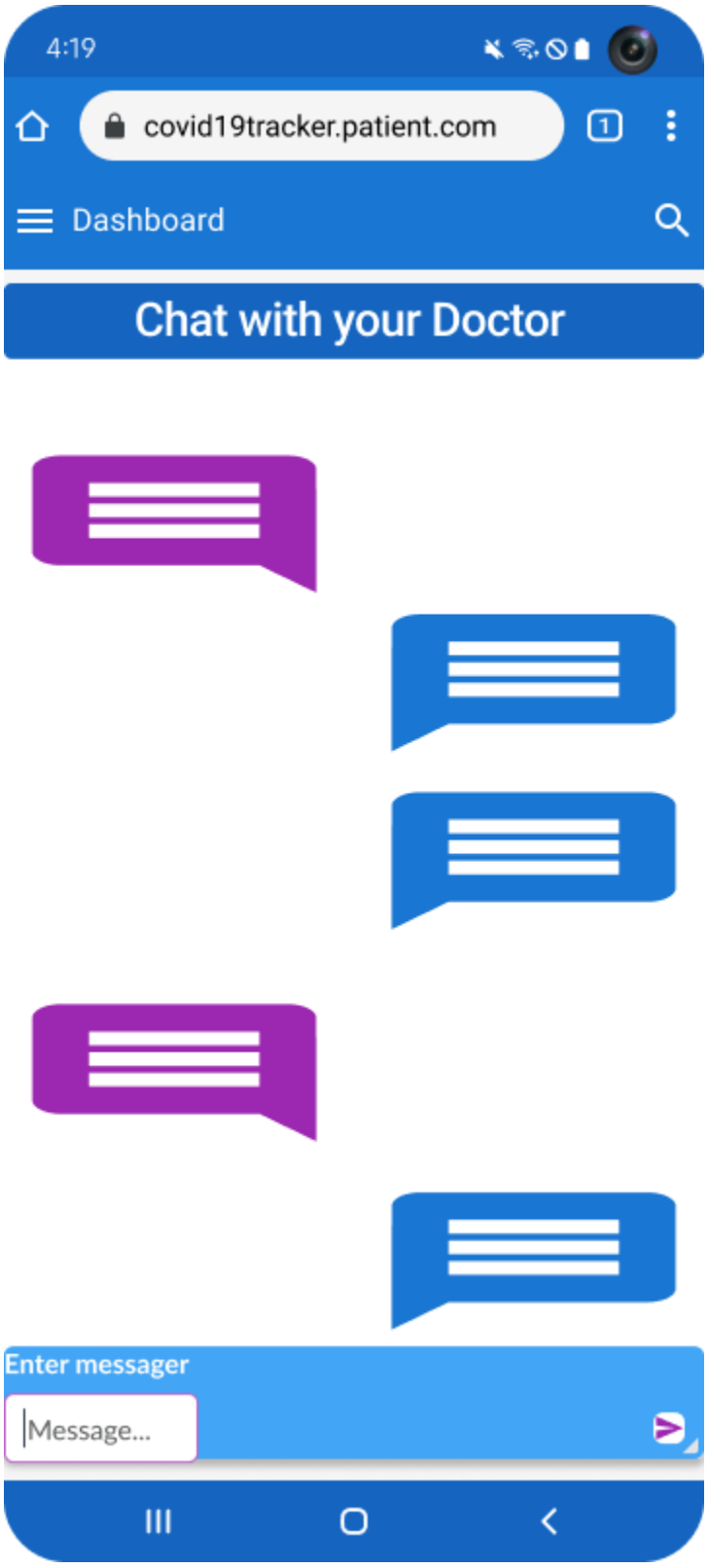



Figure 42: UI Client Chat with patient for User Story [Issue-13]

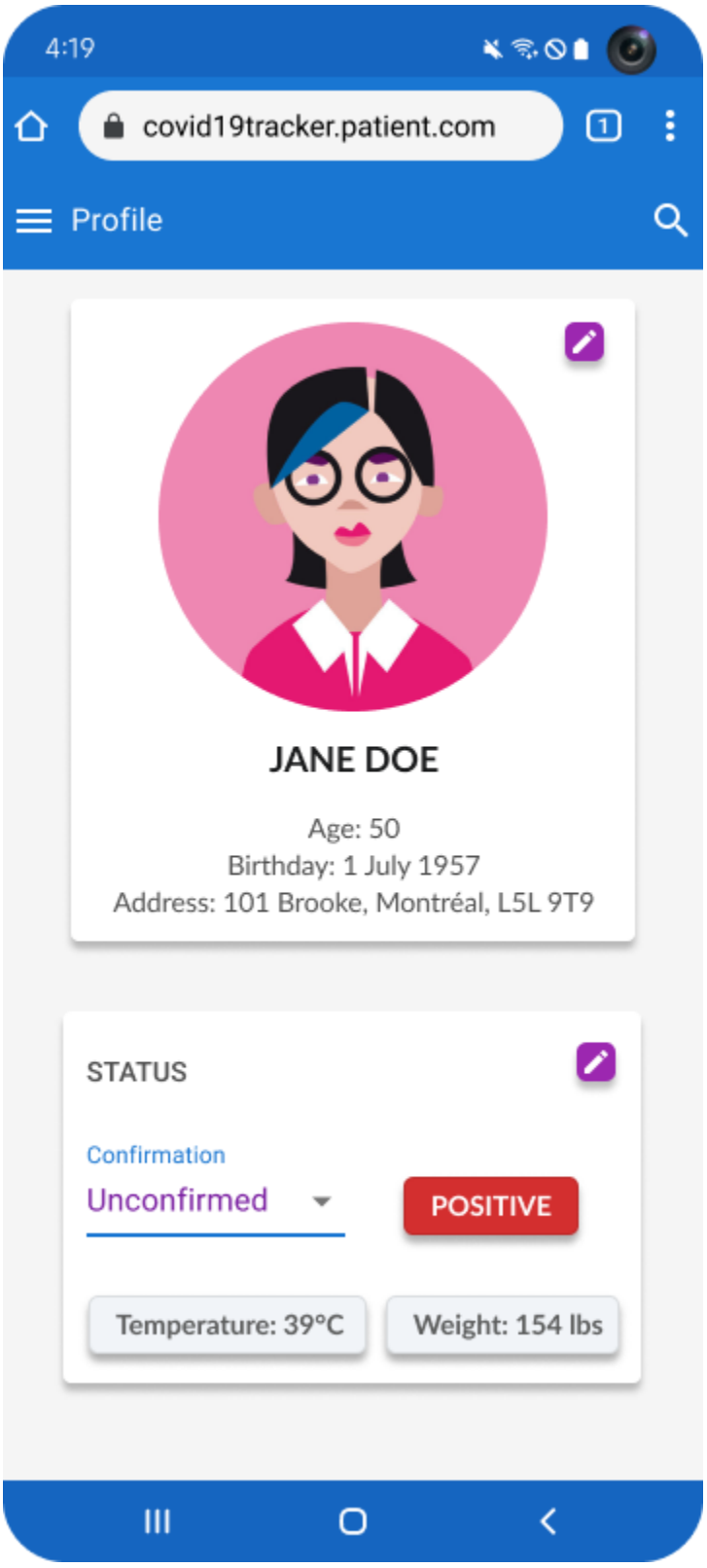



Figure 43: UI Client Patient for User Story Issue-37

### 7.3 Sprint 3 UI Mockups

Here are the UI mockups of user stories completed in Sprint 3.

#### 7.3.1 Dark Theme Update

During the course of sprint 2, a styling decision was made to opt for a dark mode palette. The following figure illustrates the palette selection.


Figure 44: Theme Palette

Here are the previous sprints' mockups supporting the new dark theme.

7.3.1.1 Dark Theme Update Admin Portal

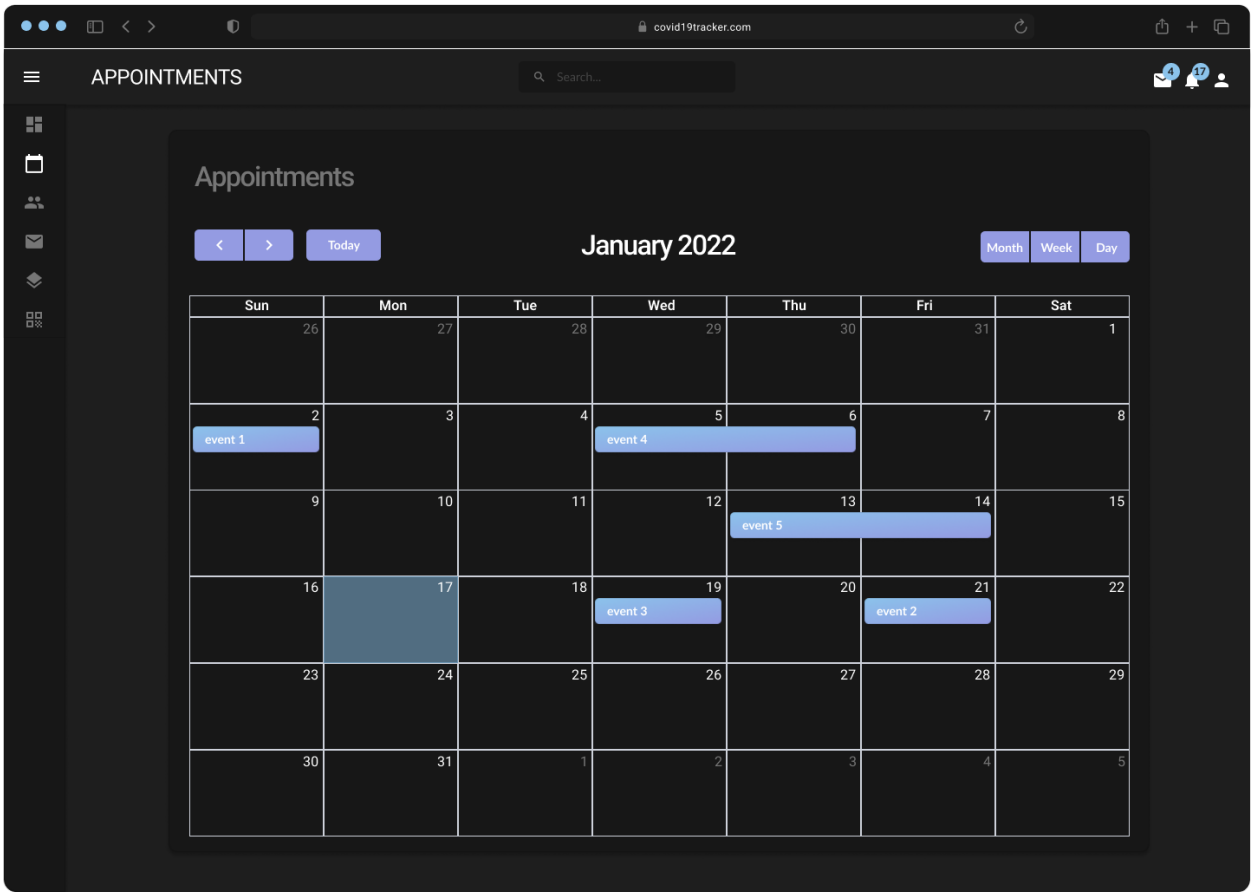



Figure 45: UI Admin Appointments for User Story [Issue-5]

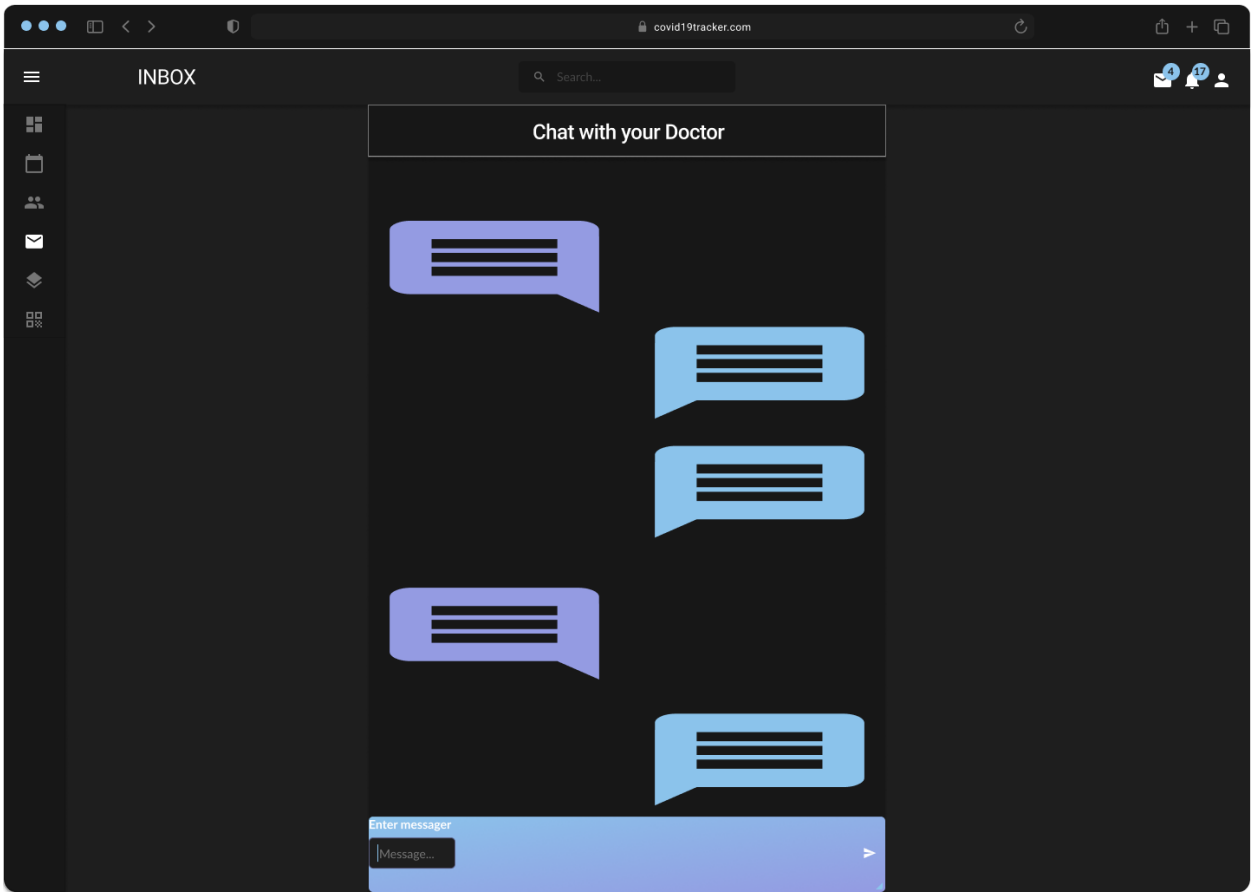



Figure 46: UI Admin Chat with patient for User Story [Issue-13]

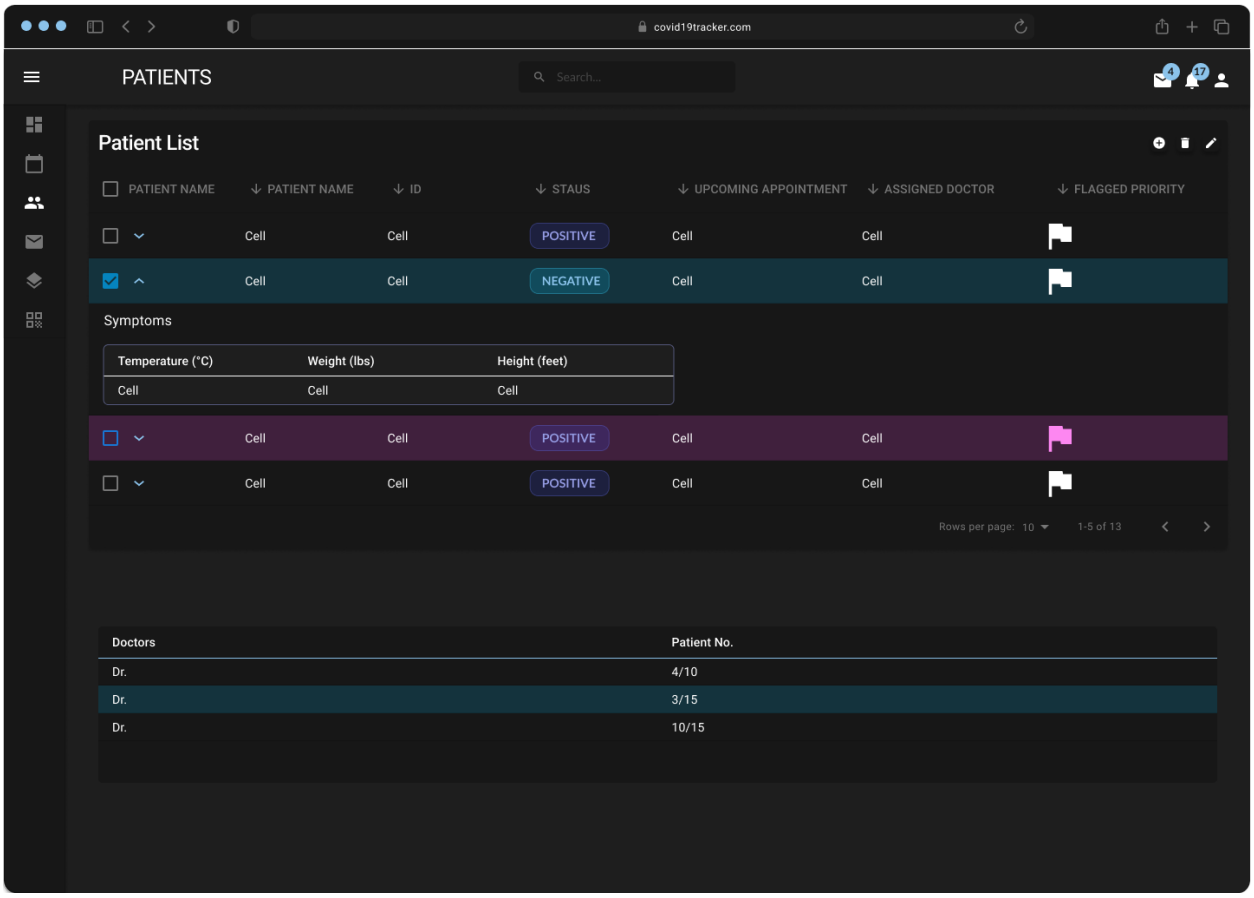



Figure 47: UI Admin Patient List for User Story [Issue-89]

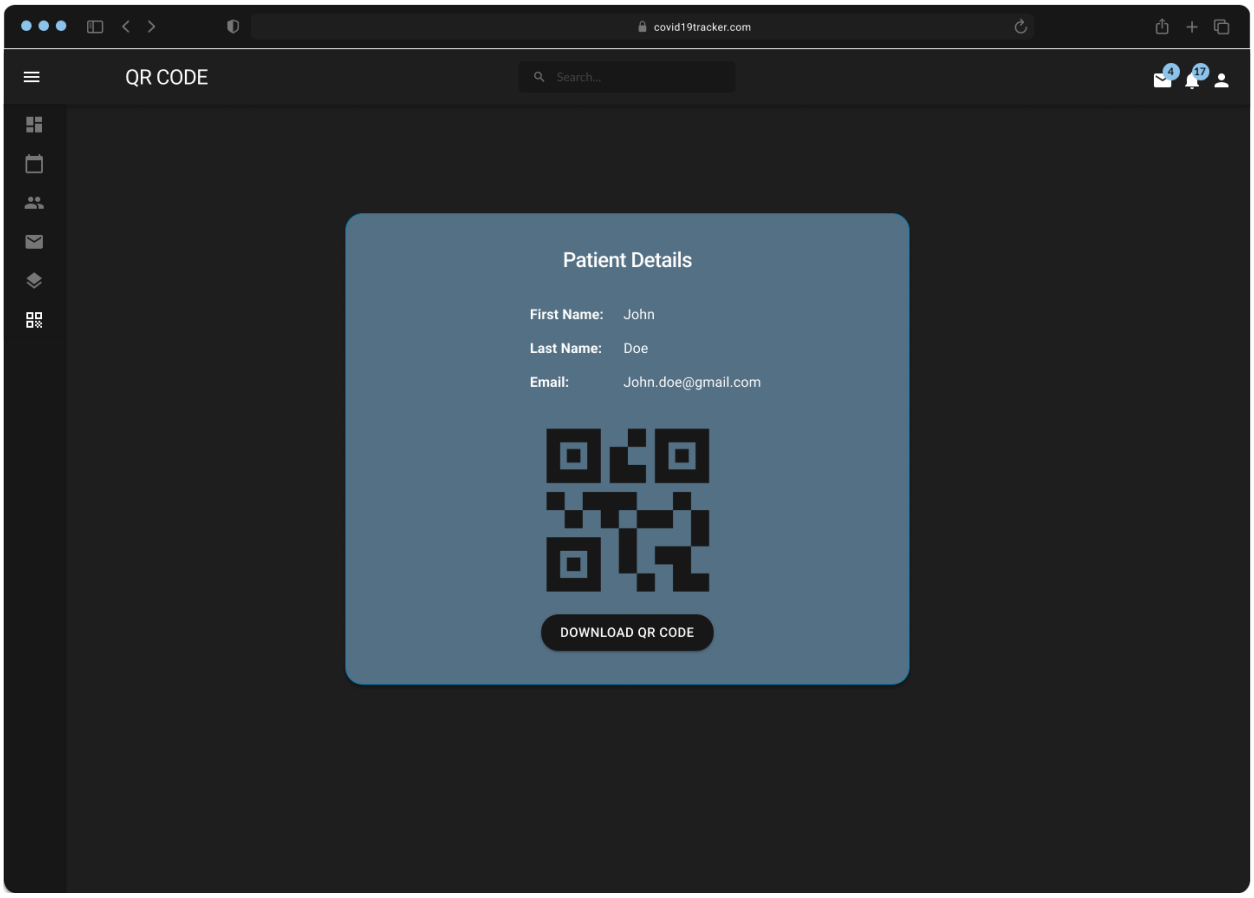
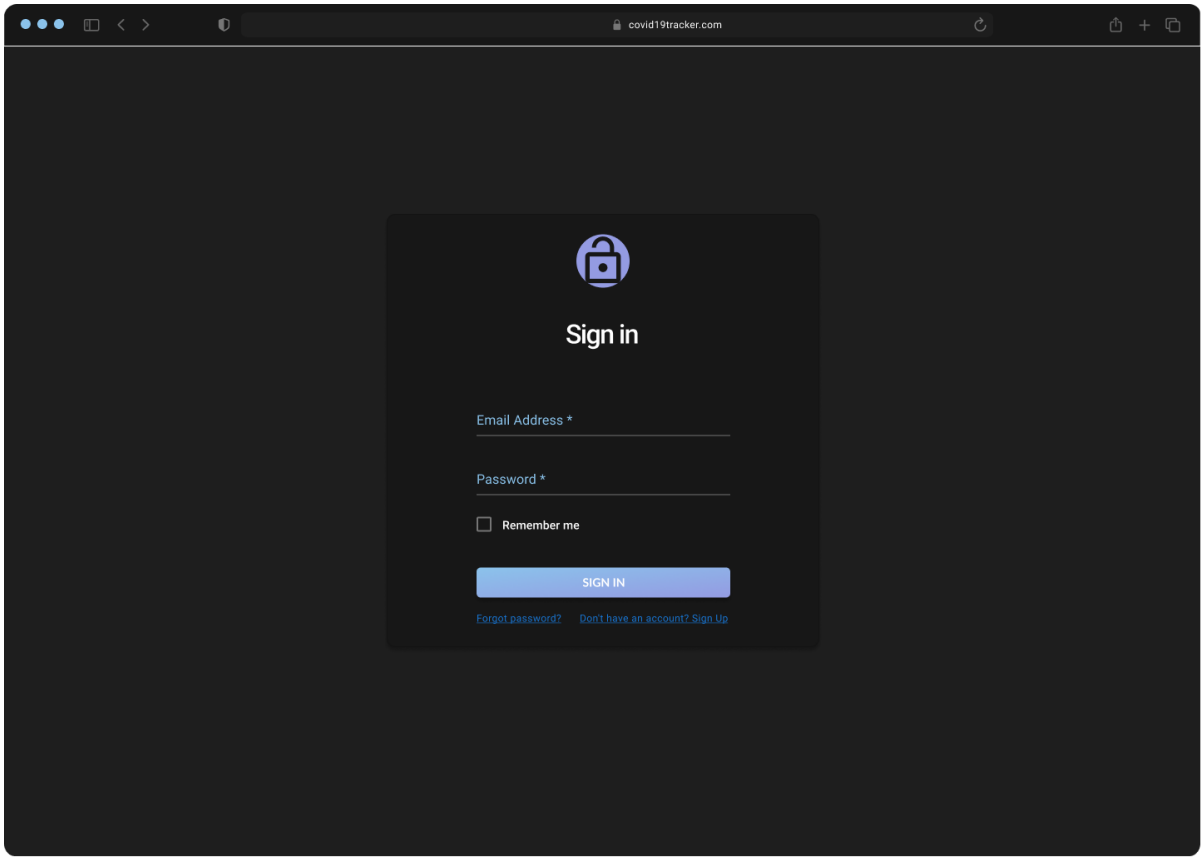



Figure 48: UI Client QR code for User Story [Issue-22]


covid19tracker.com
Sign in
Email Address *
Password *
Remember me
SIGN IN
Forgot password?
Don't have an account? Sign Up

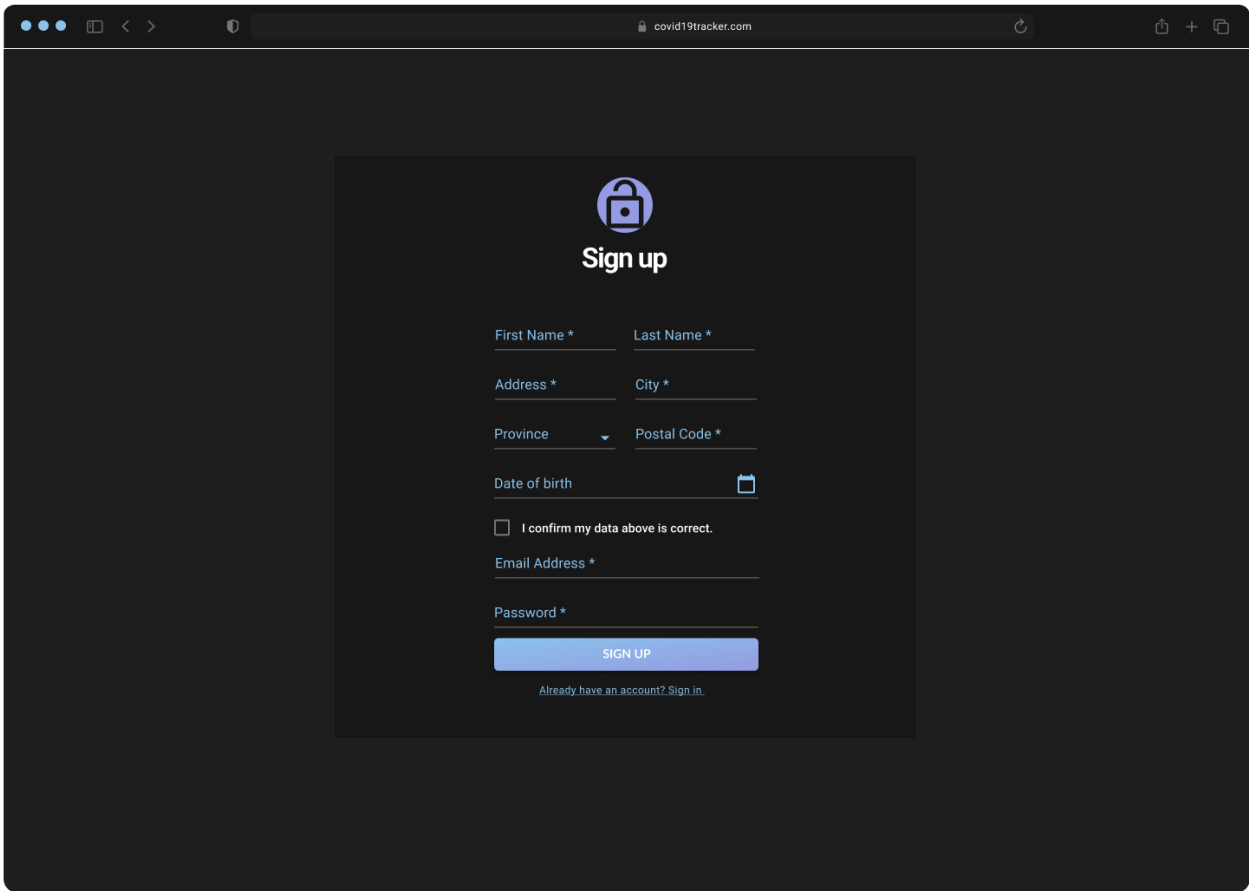

covid19tracker.com
Sign up
First Name *
Last Name *
Address *
City *
Province
Postal Code *
Date of birth
I confirm my data above is correct.
Email Address *
Password *
SIGN UP
Already have an account? Sign in

Figure 50:

#### 7.3.1.2 Dark Theme Update Client Portal

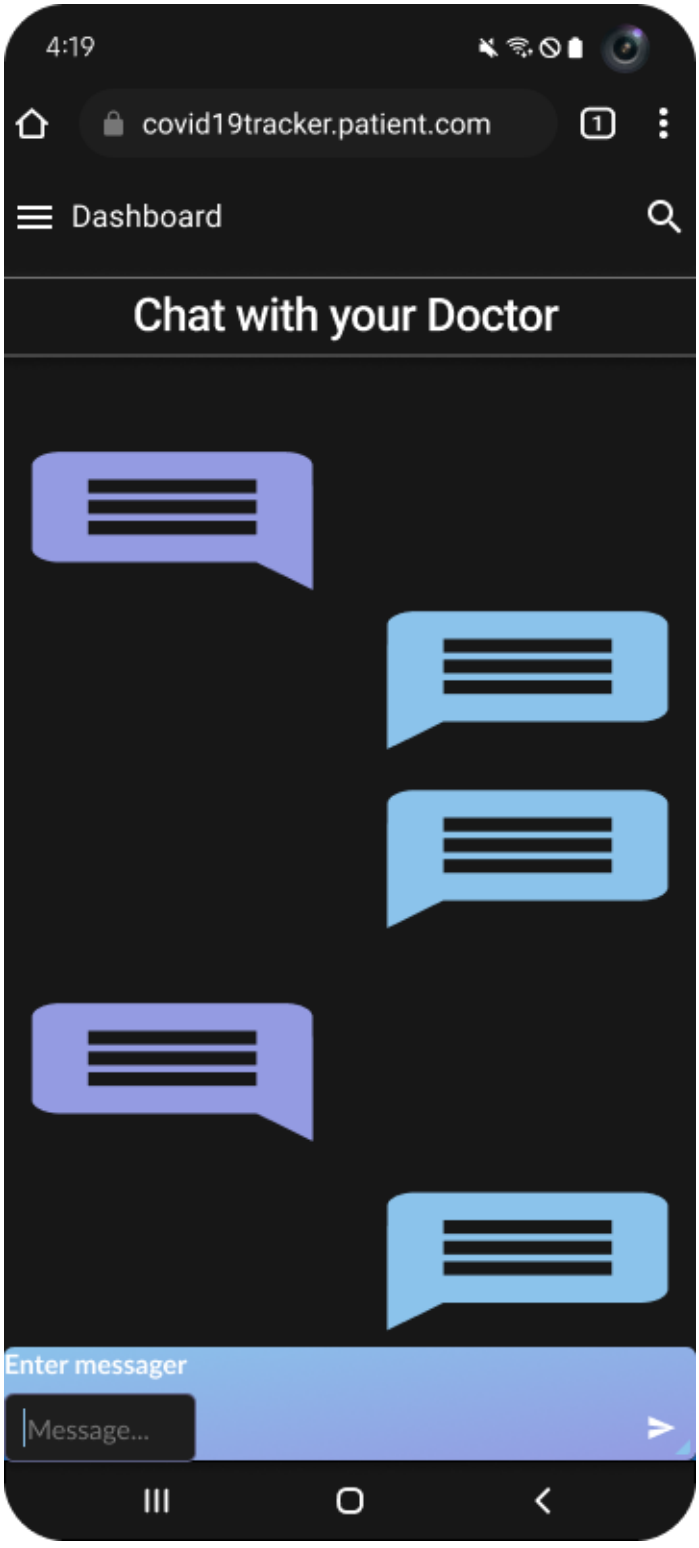



Figure 51: UI Patient Chat

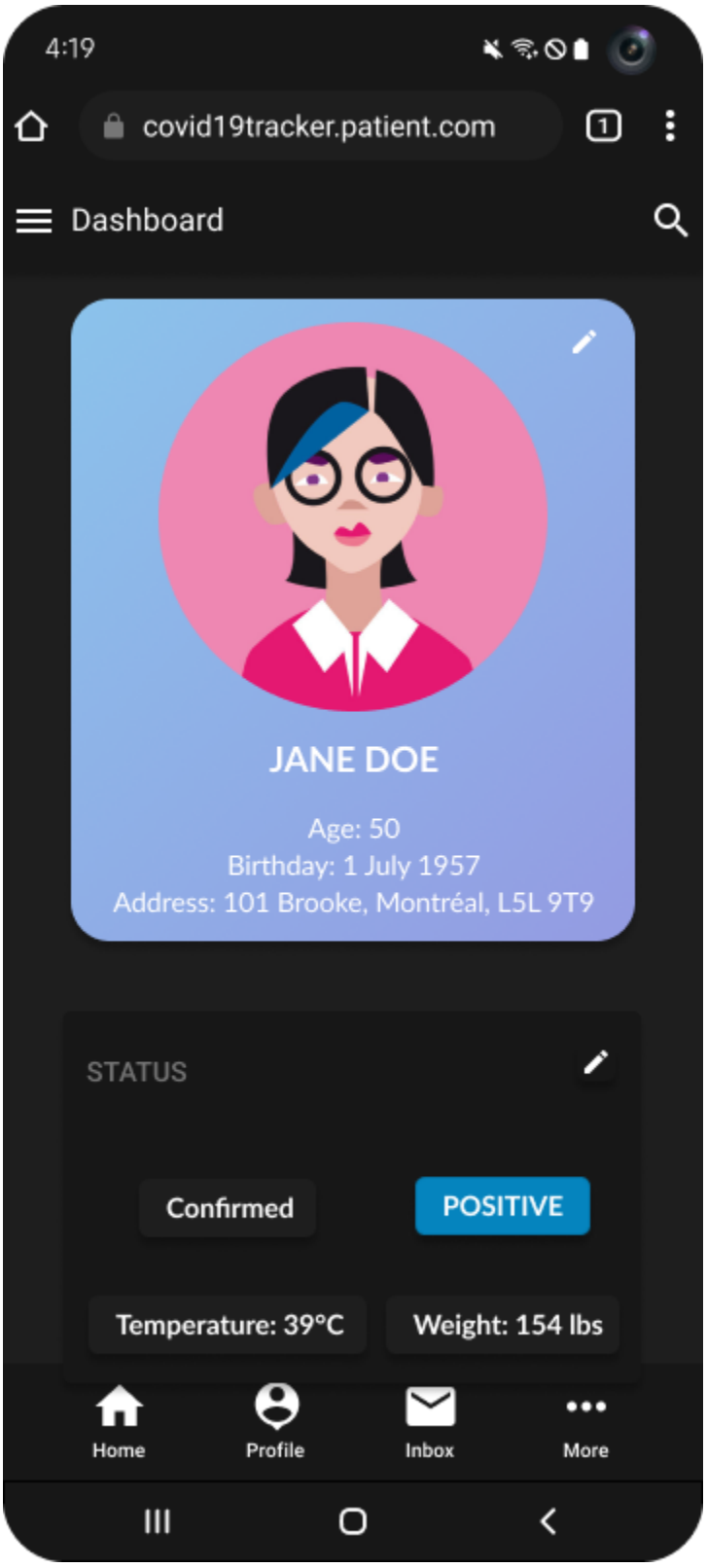



Figure 52: UI Patient Profile

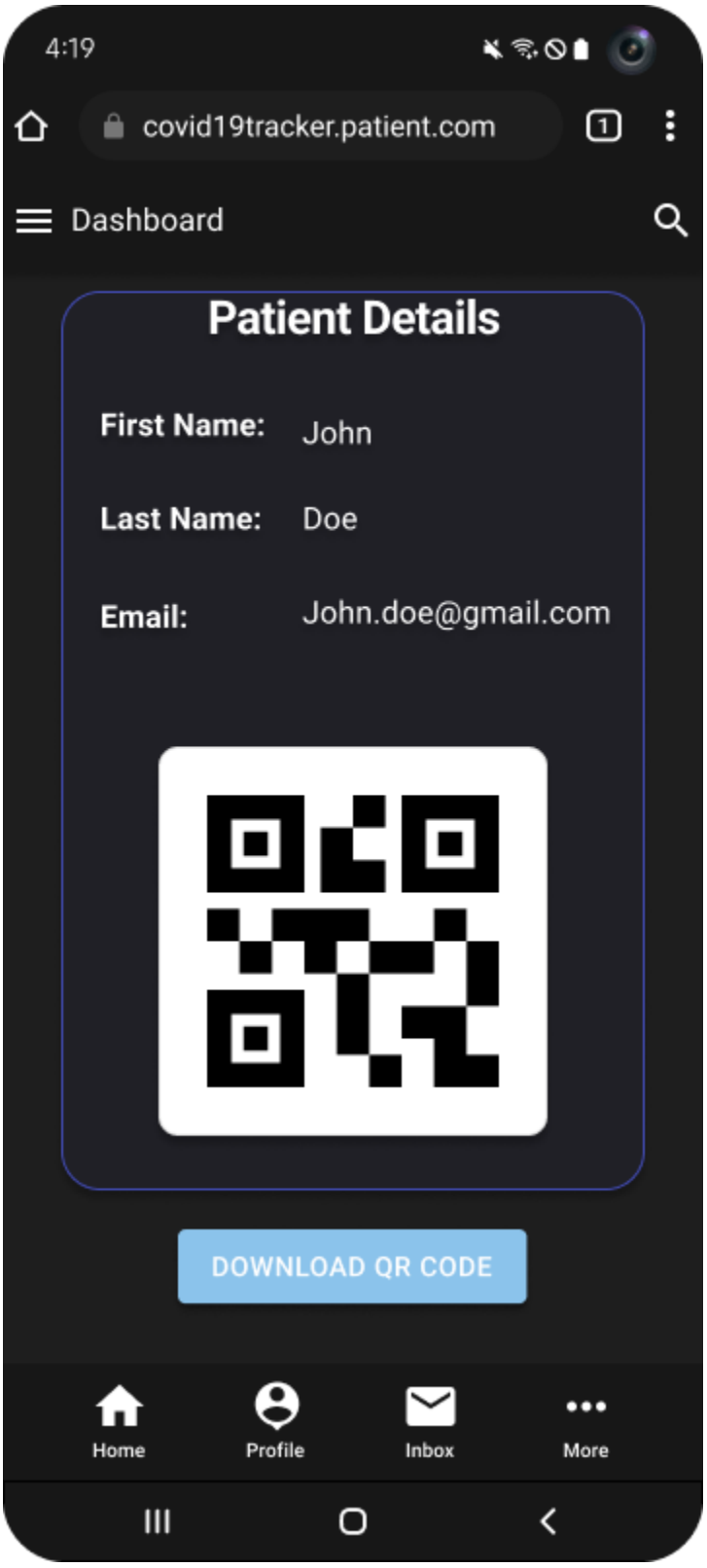



Figure 53: UI Patient QR Code

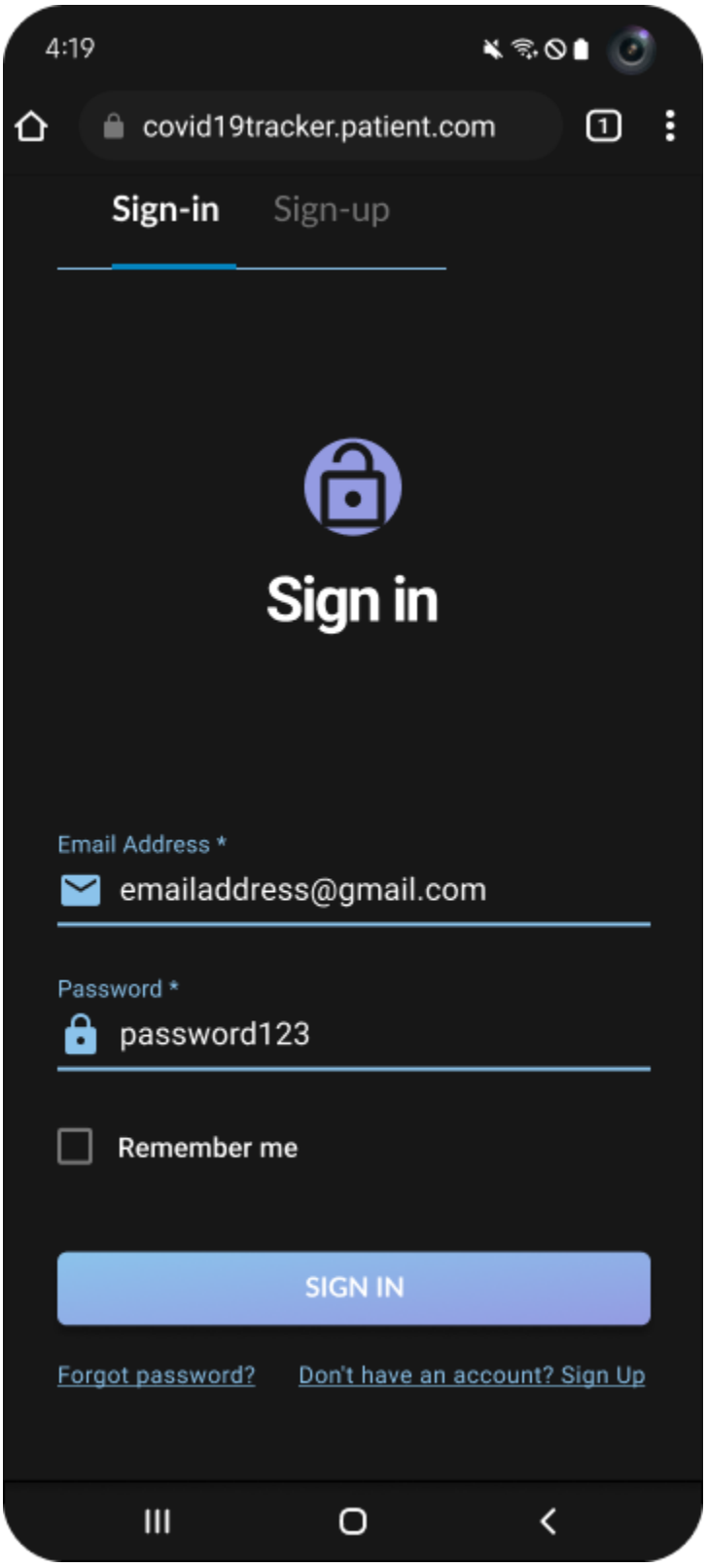



Figure 54: UI Client App Sign In

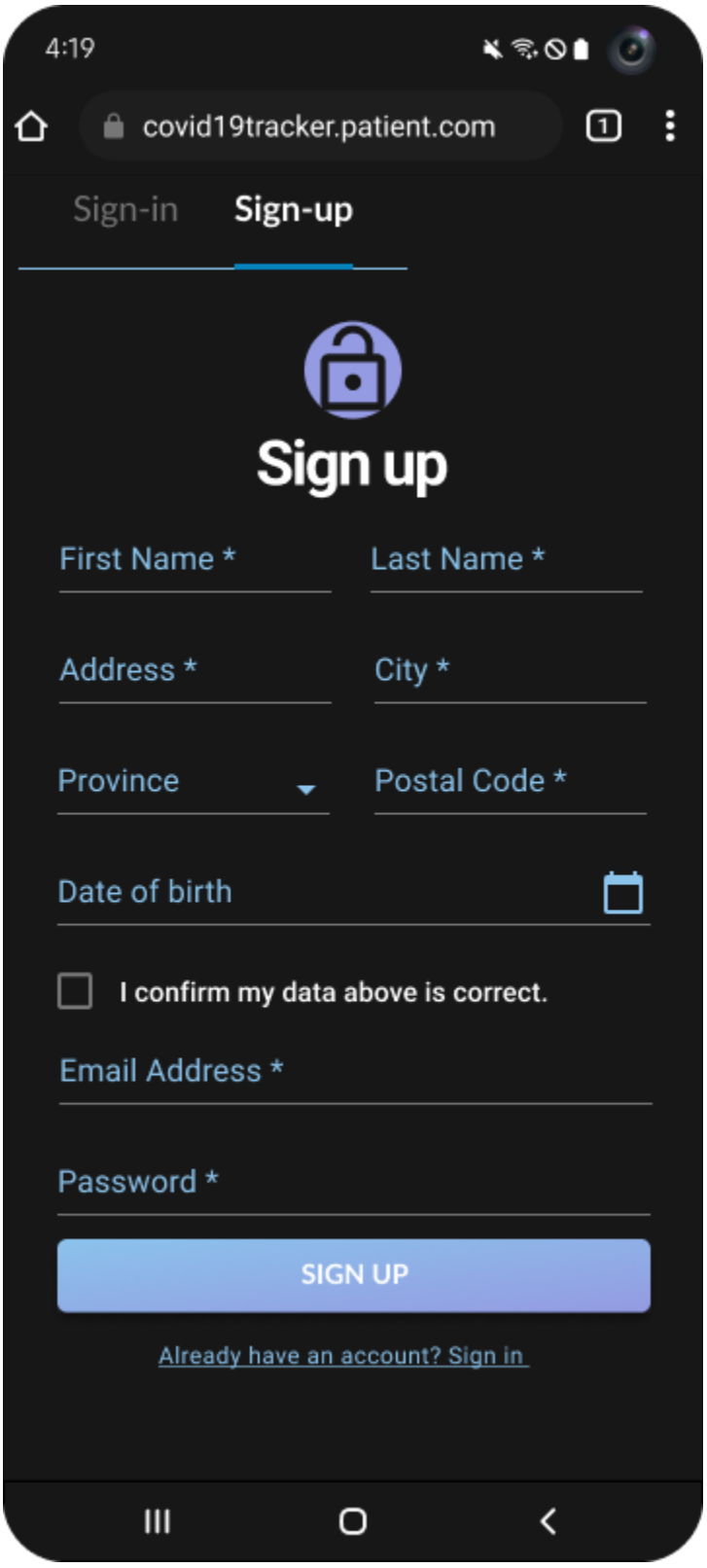



Figure 55: UI Client App Sign In

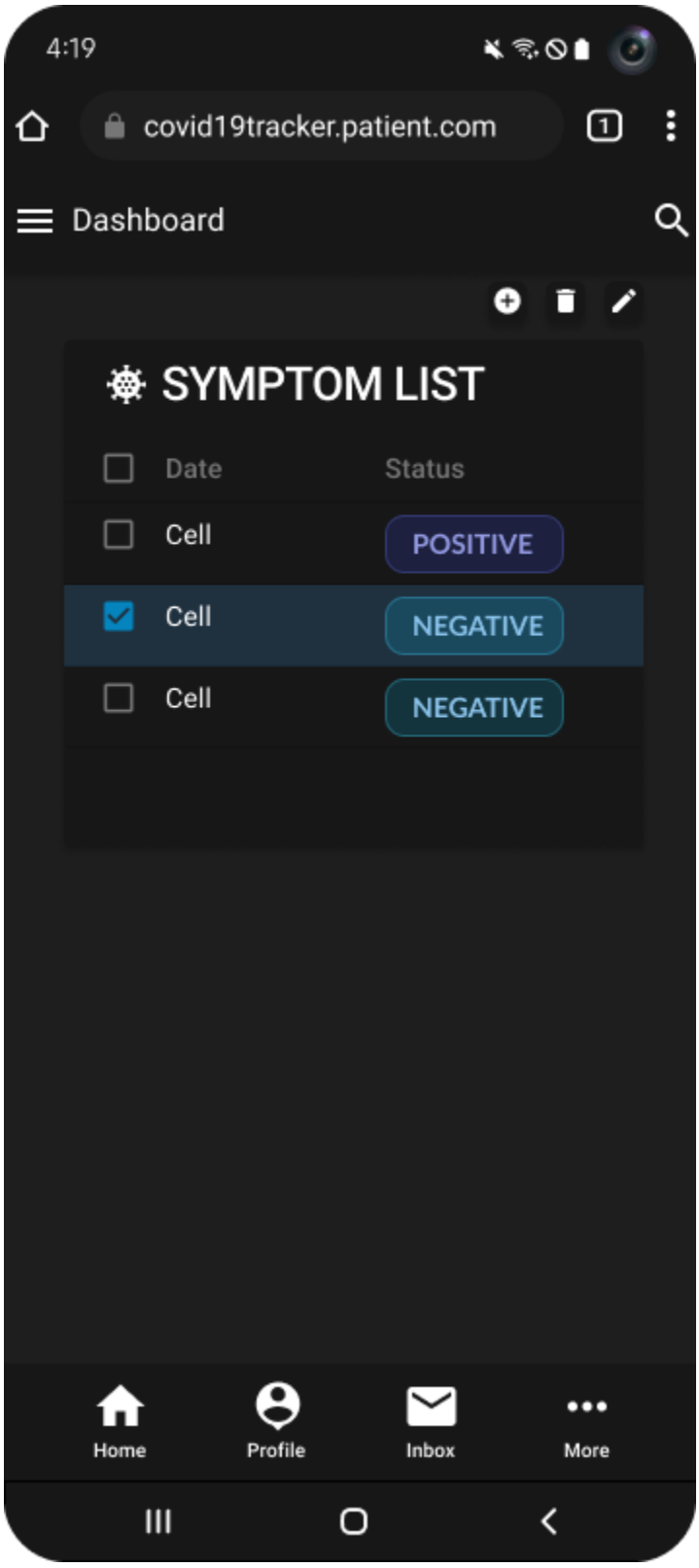



Figure 56: UI Client Symptoms List

### 7.3.2 Admin Portal Sprint 3

The following figures are the UI mockups for the Admin portal.

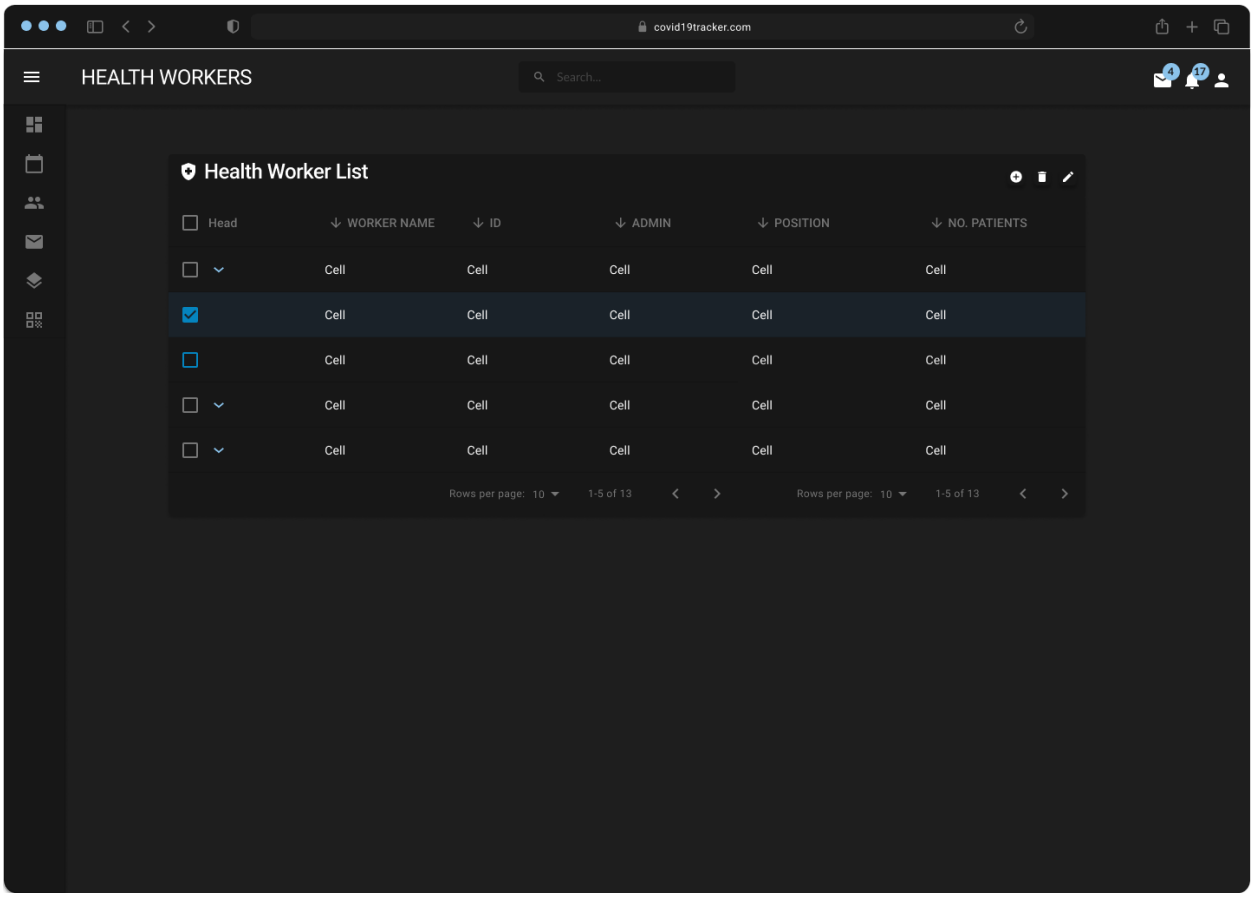



Figure 57: UI Admin Health Worker List for User Story Issue-19

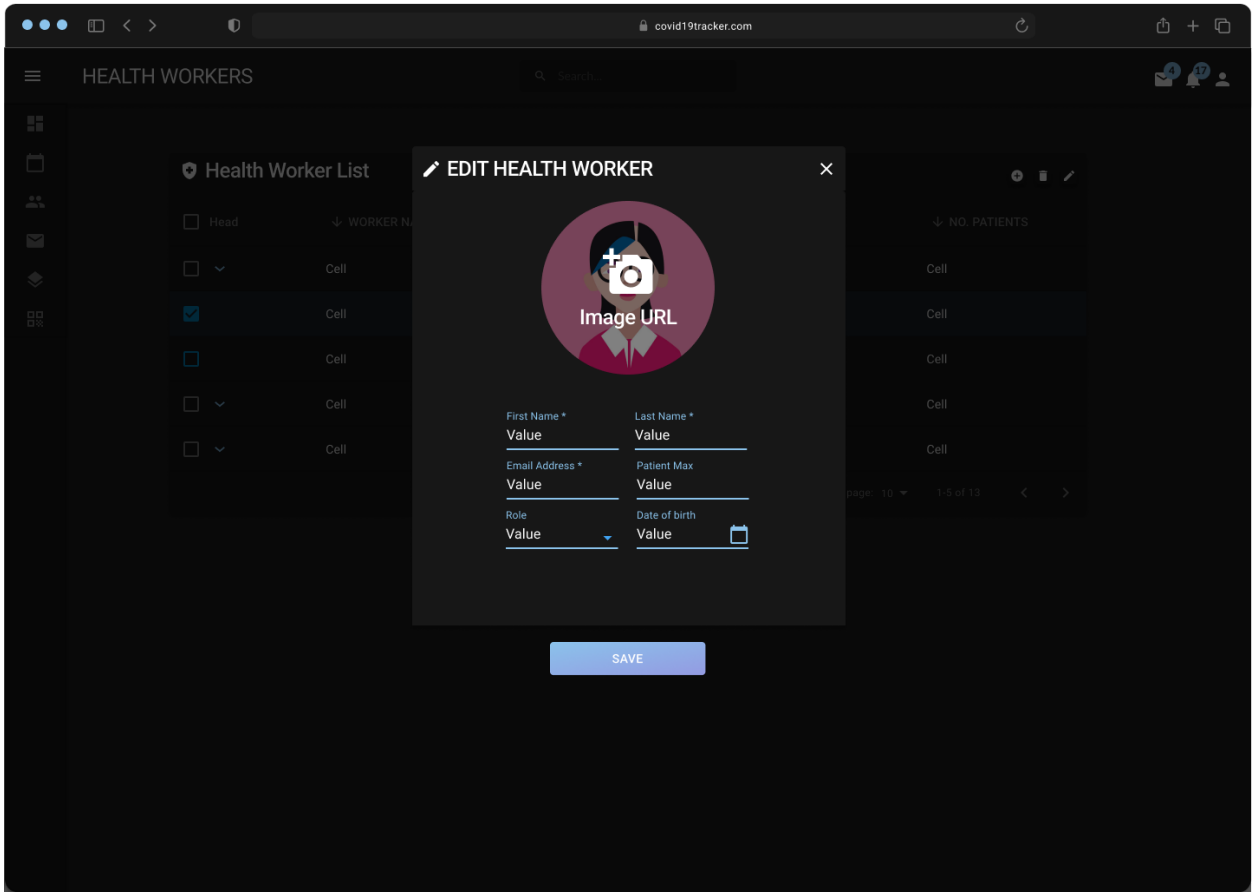



Figure 58: UI Admin Health Worker Edit for User Story [Issue-19]

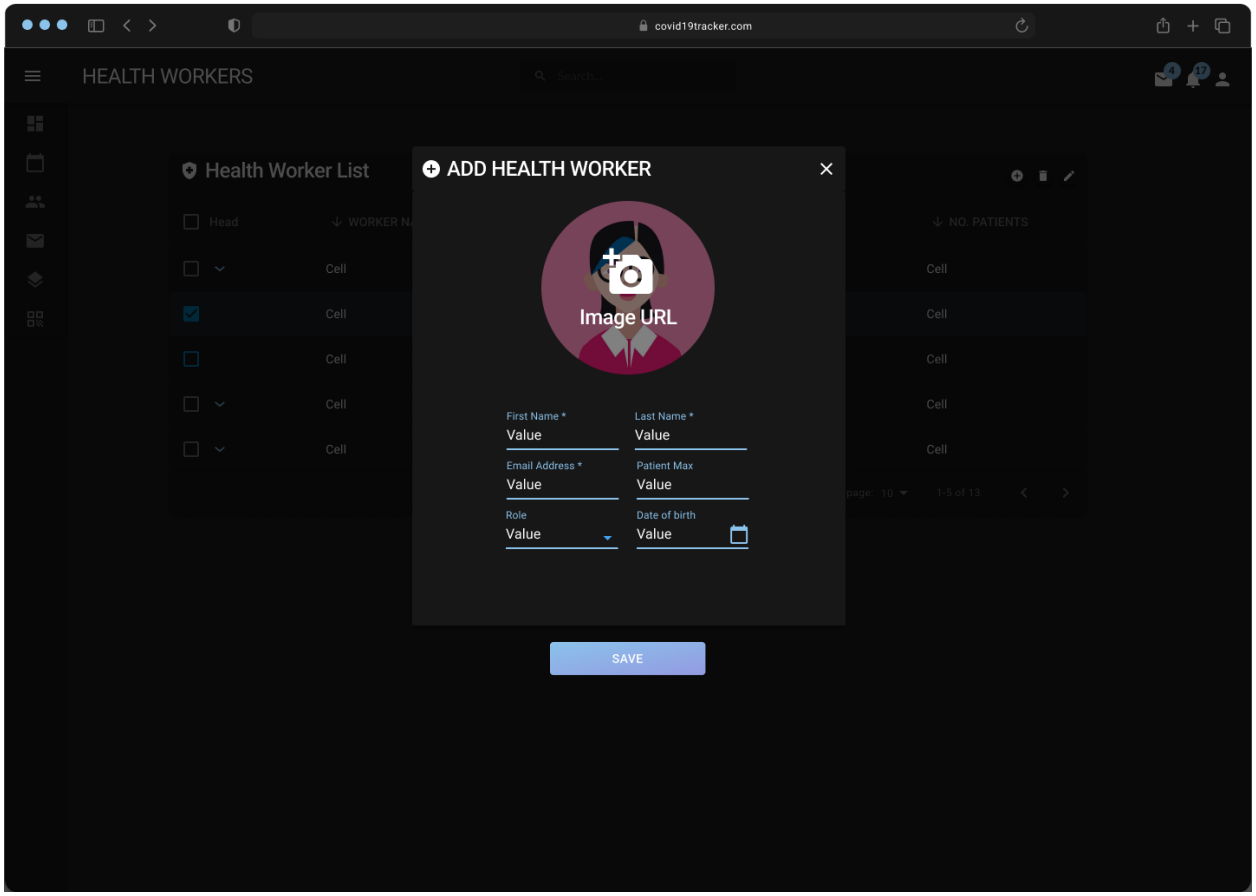



Figure 59: UI Admin Health Worker Add for User Story [Issue-19]

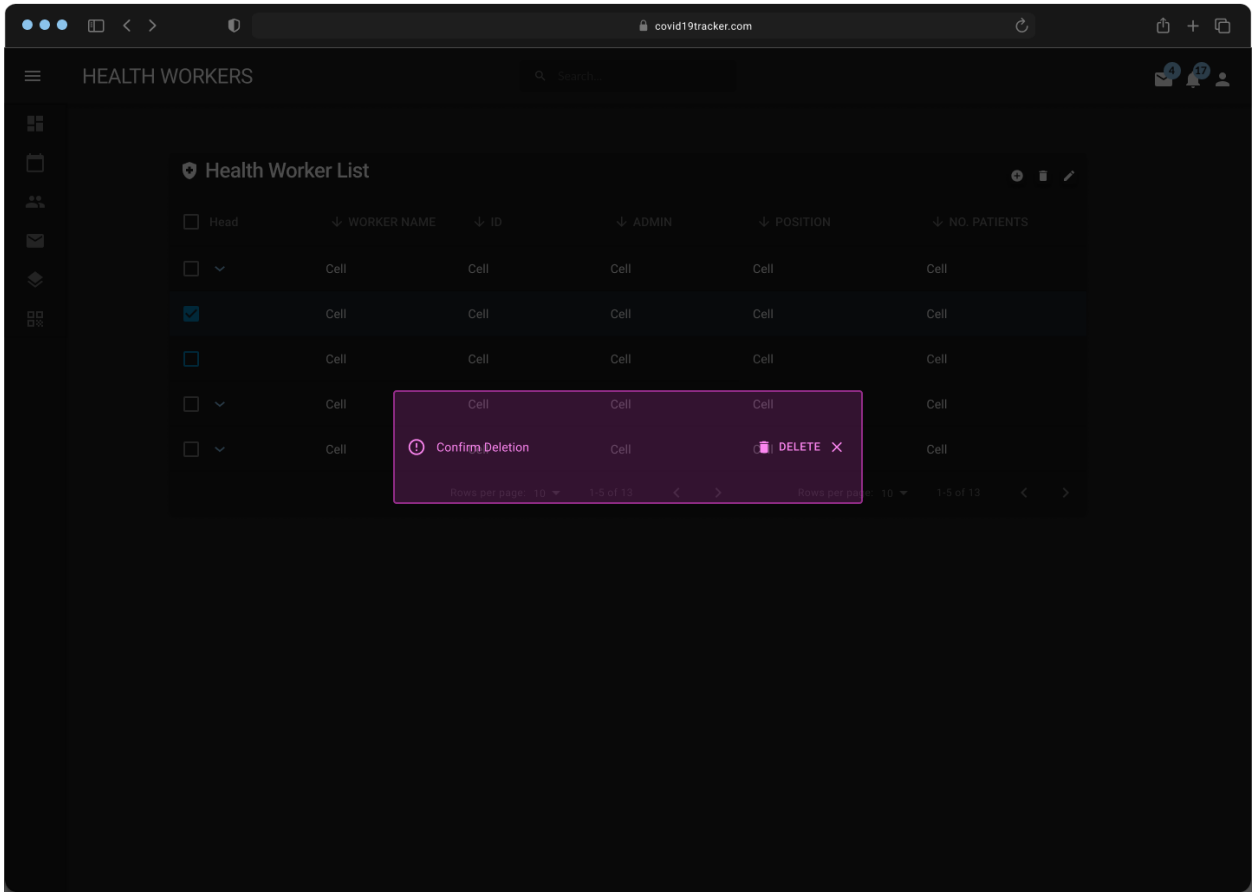



Figure 60: UI Admin Health Worker Delete for User Story Issue-19

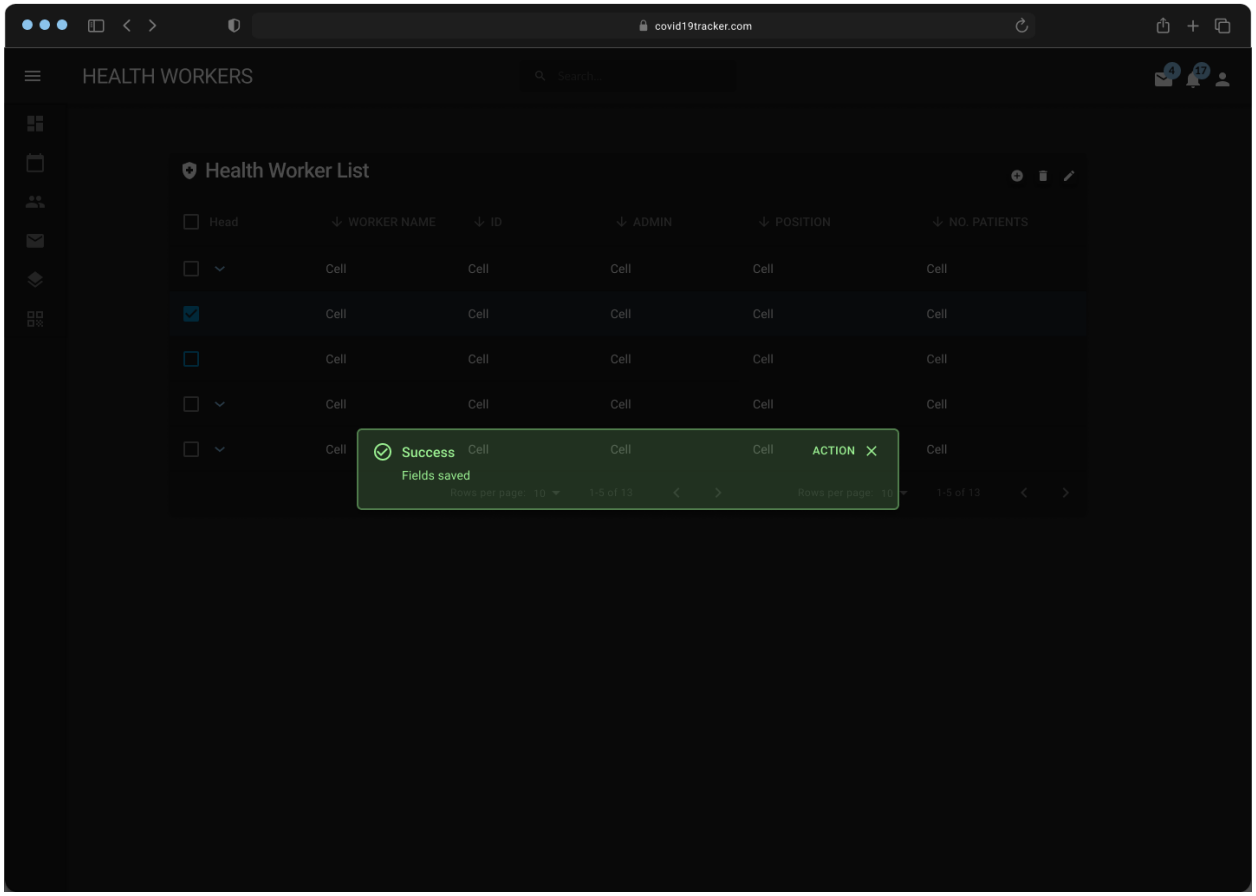



Figure 61: UI Admin Health Worker Success for User Story [Issue-19]

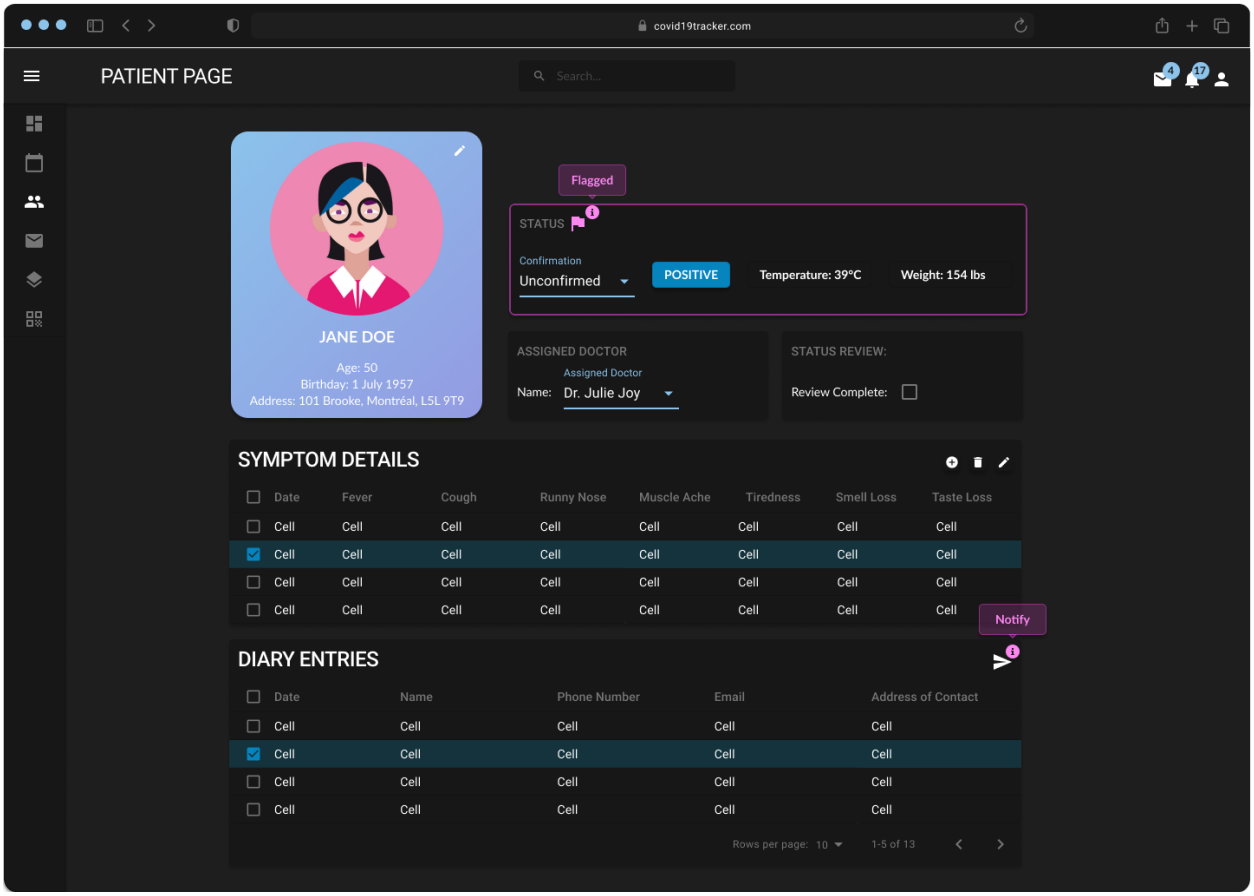



Figure 62: UI Patient Page for Issue-4, Issue-19

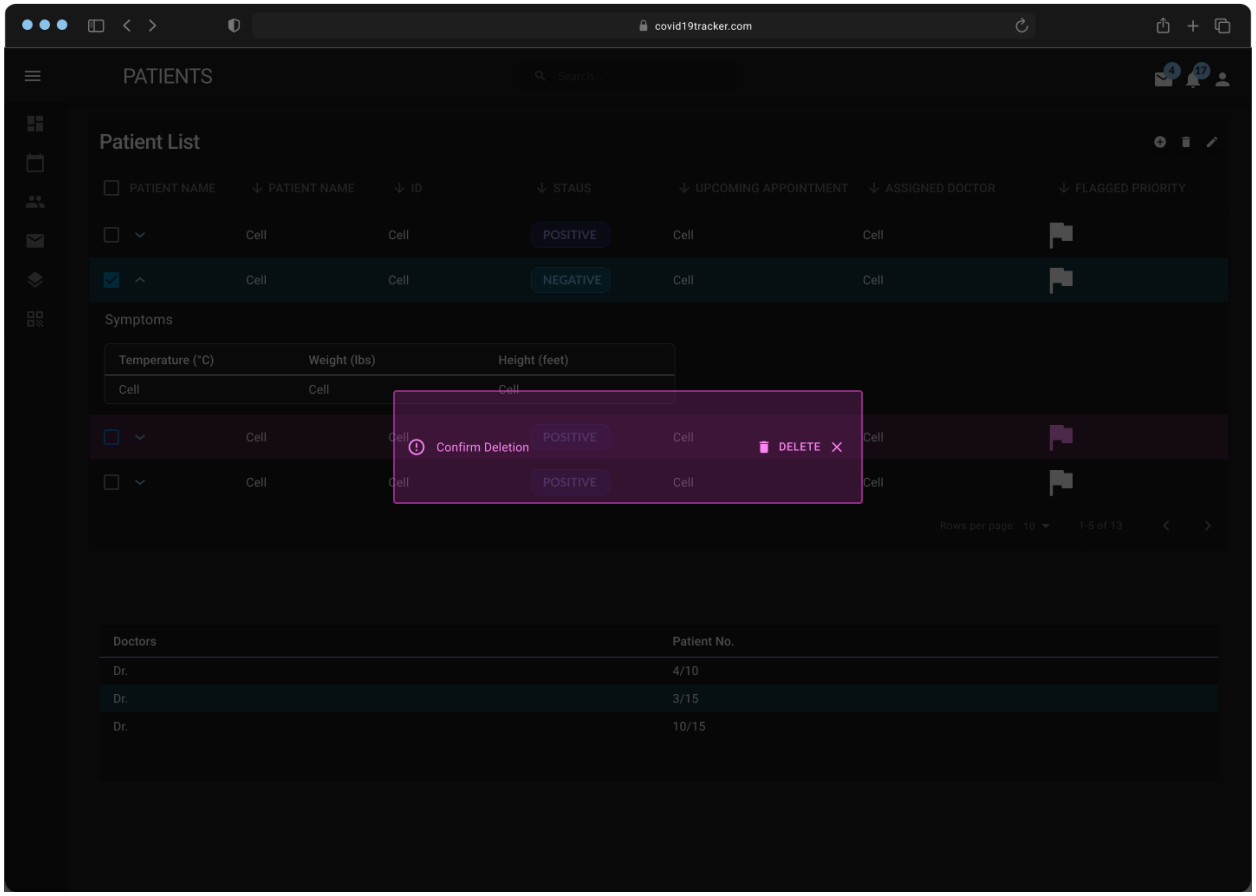



Figure 63: UI Patient Delete Modal

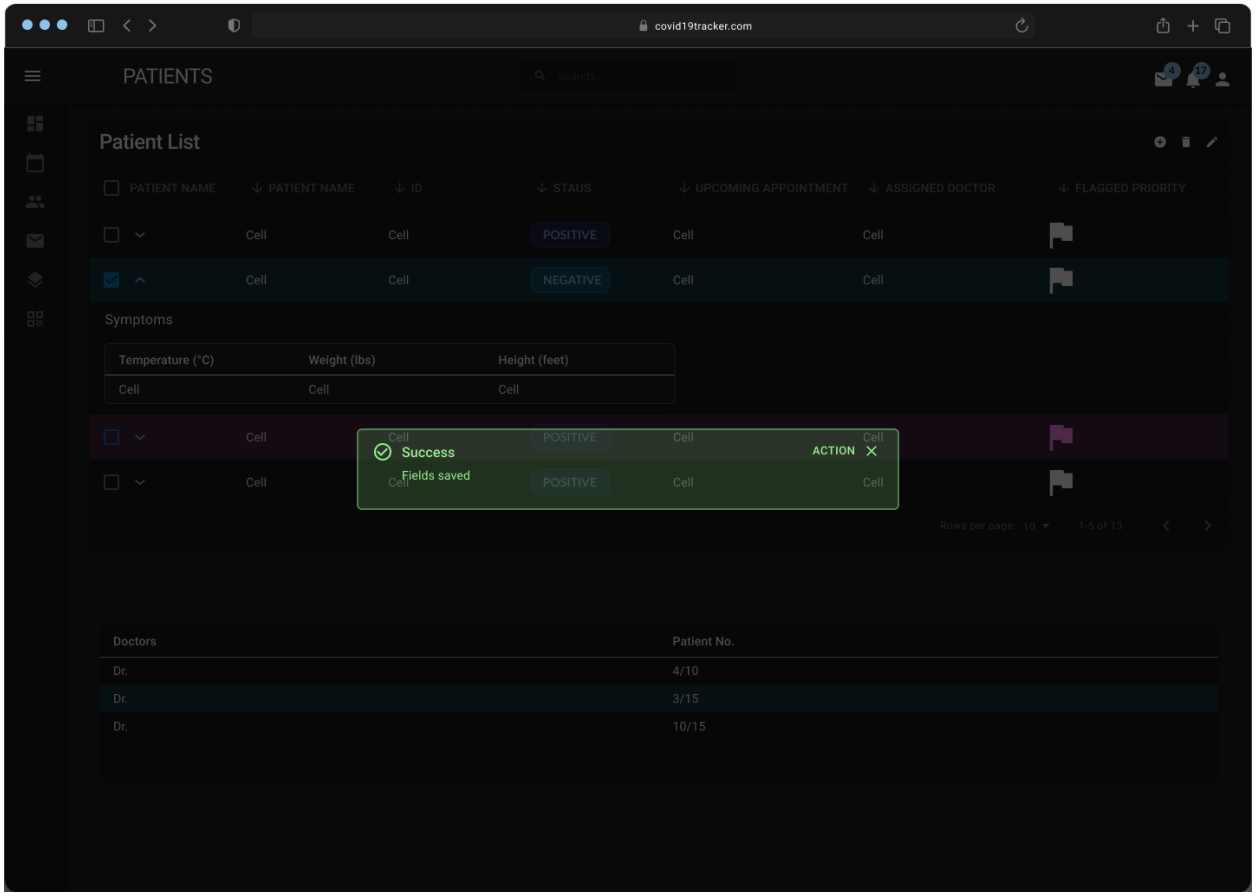



Figure 64: UI Patient Success Modal

### 7.3.3 Client Portal Sprint 3

The following figures are the UI mockups for the Client portal.

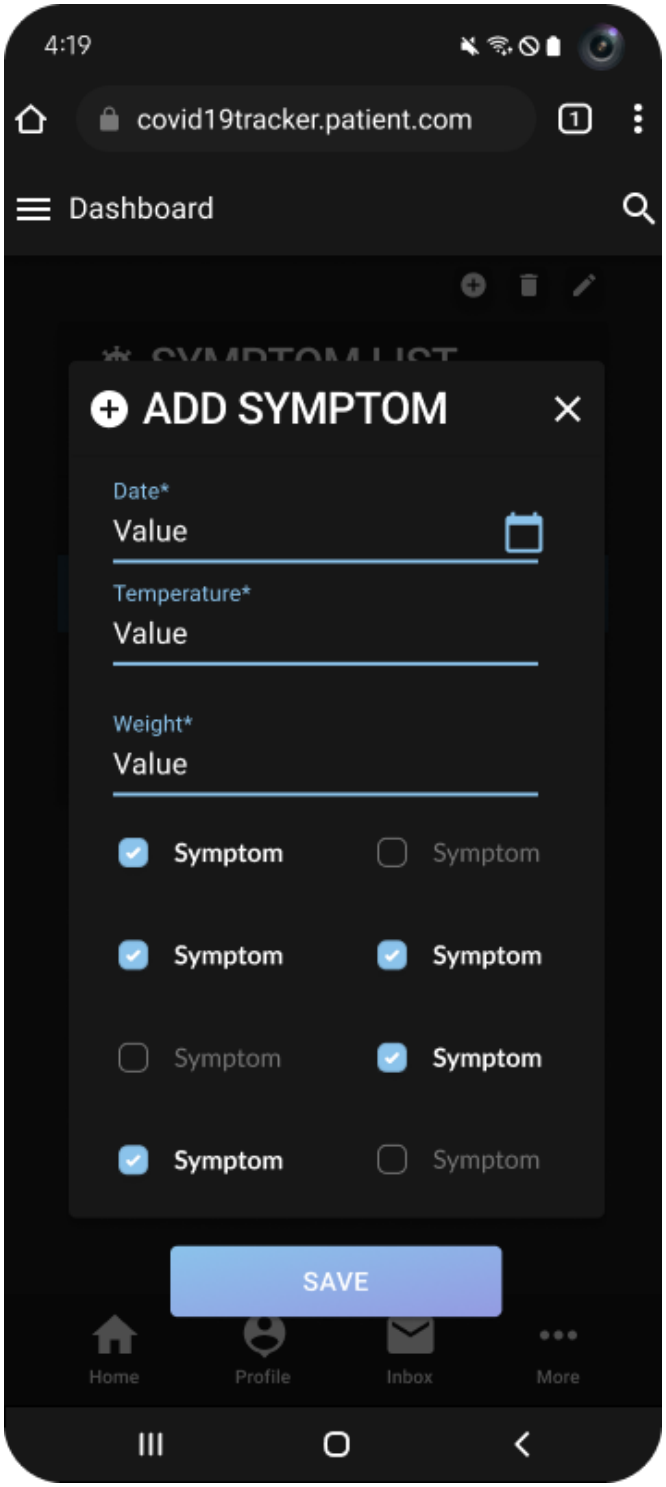



Figure 65: UI Symptoms Entry Add for User Story Issue-41

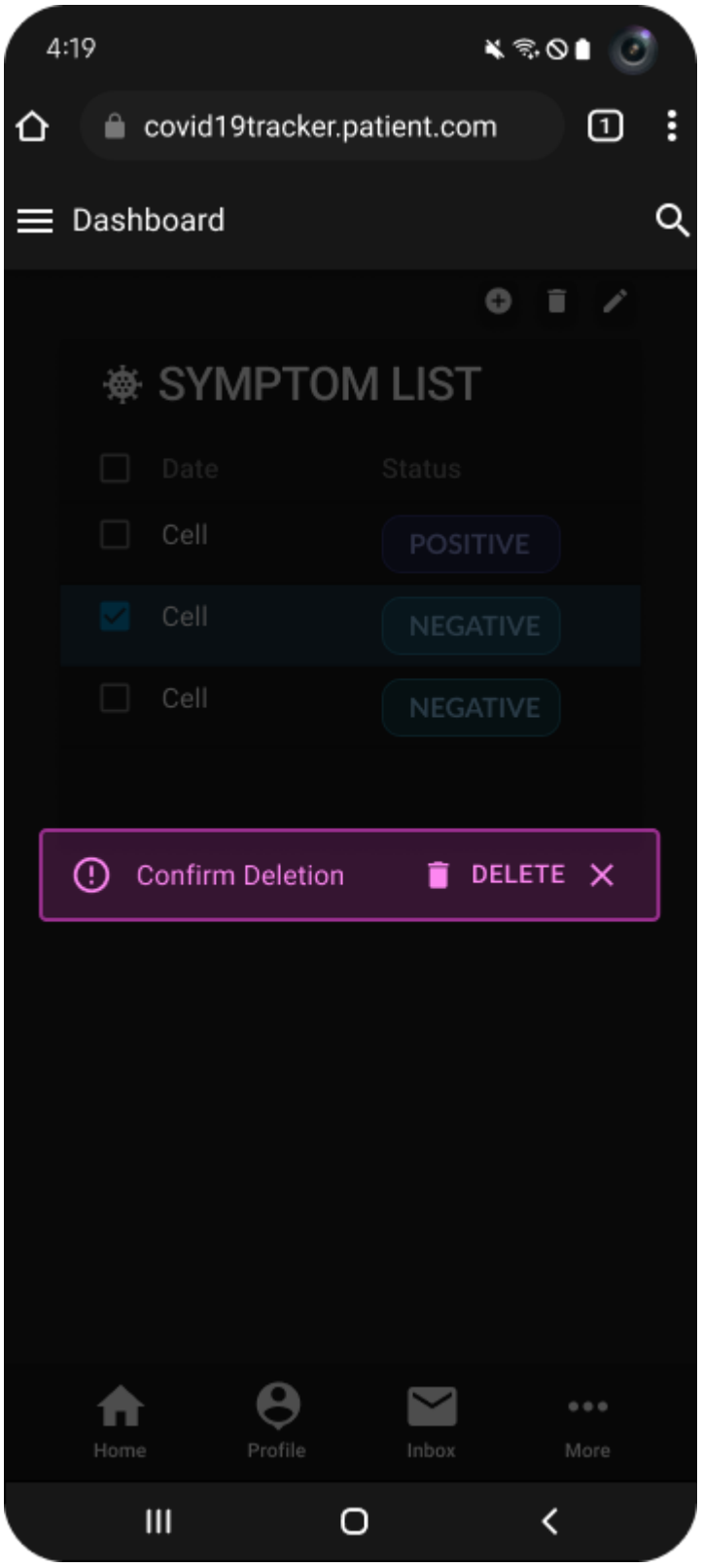



Figure 66: UI Symptoms Entry Delete for User Story [Issue-41]

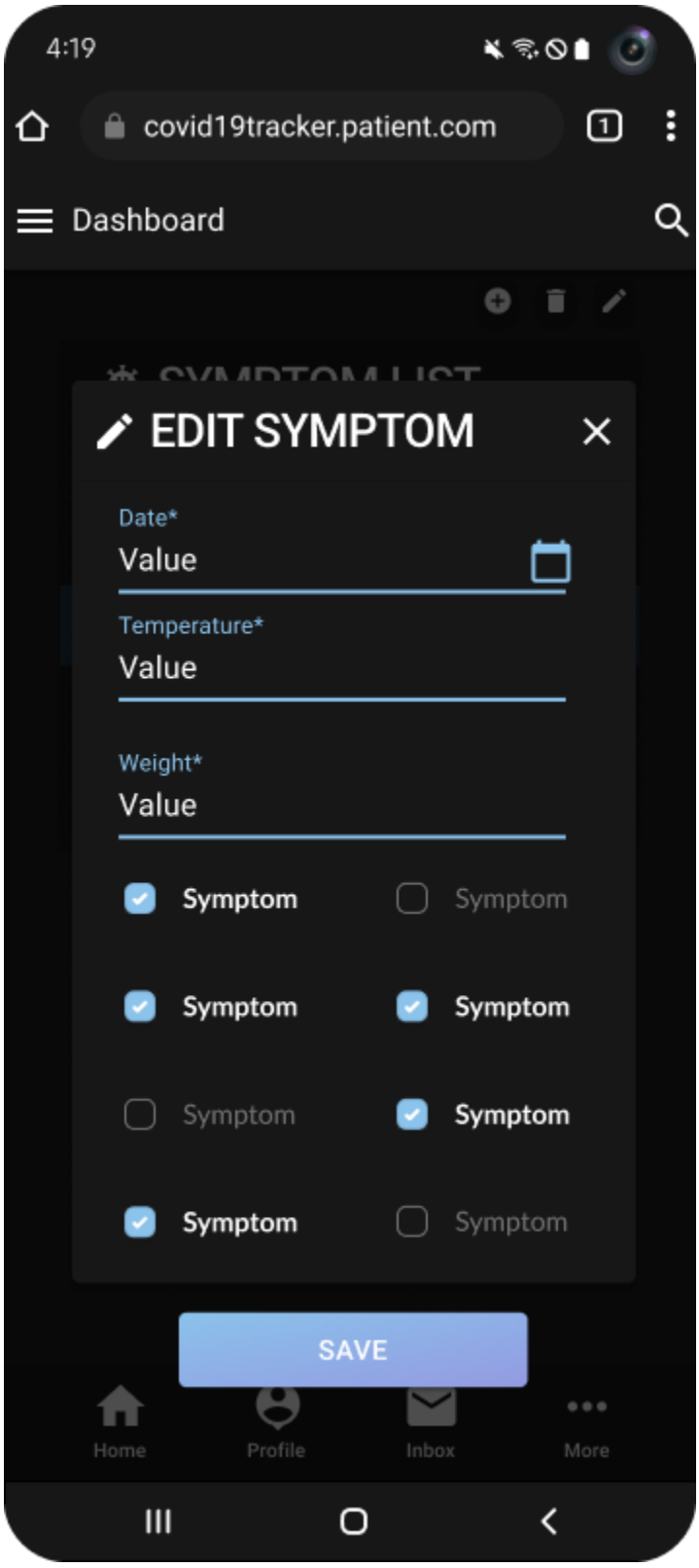



Figure 67: UI Symptoms Entry Edit for User Story Issue-41

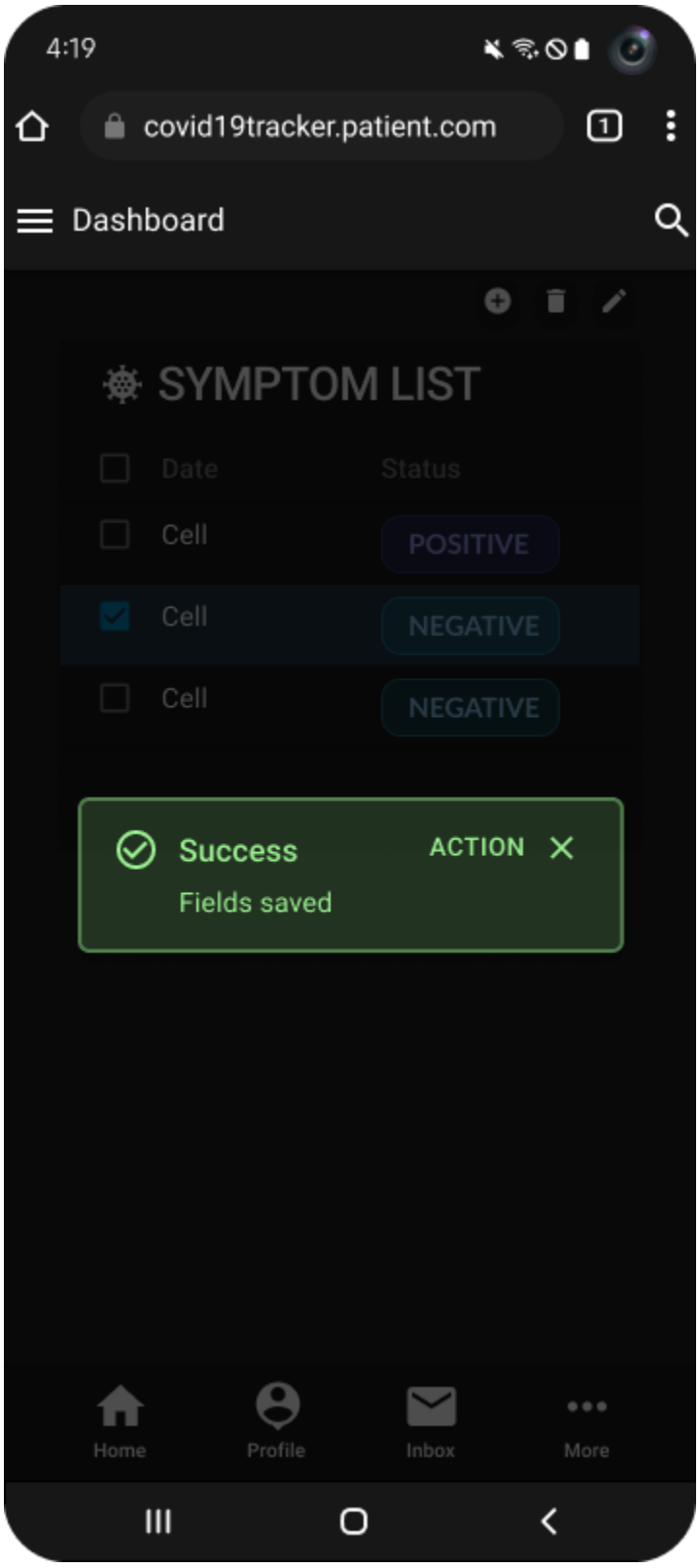



Figure 68: UI Symptoms Entry Success for User Story Issue-41

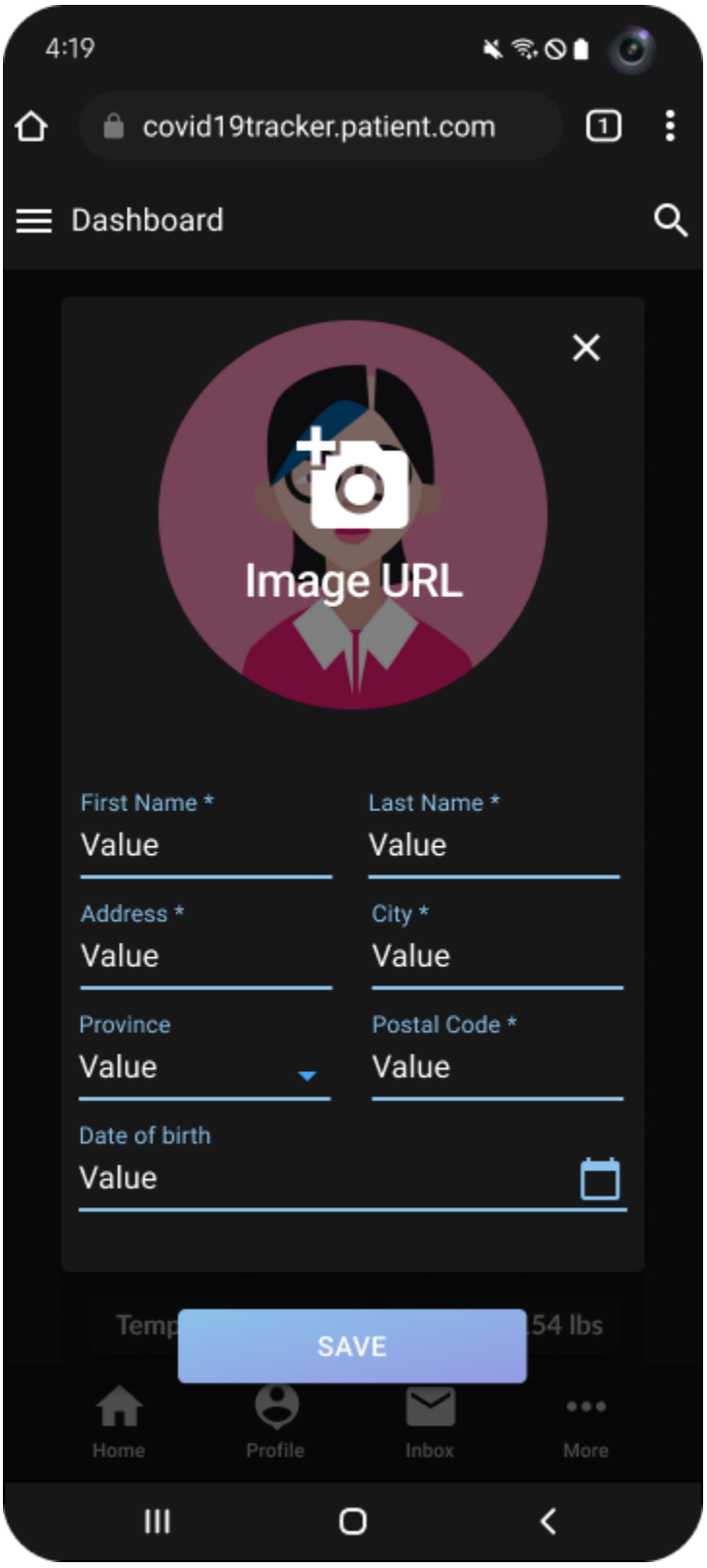



Figure 69: UI Client Patient Edit for User Story [Issue-37]

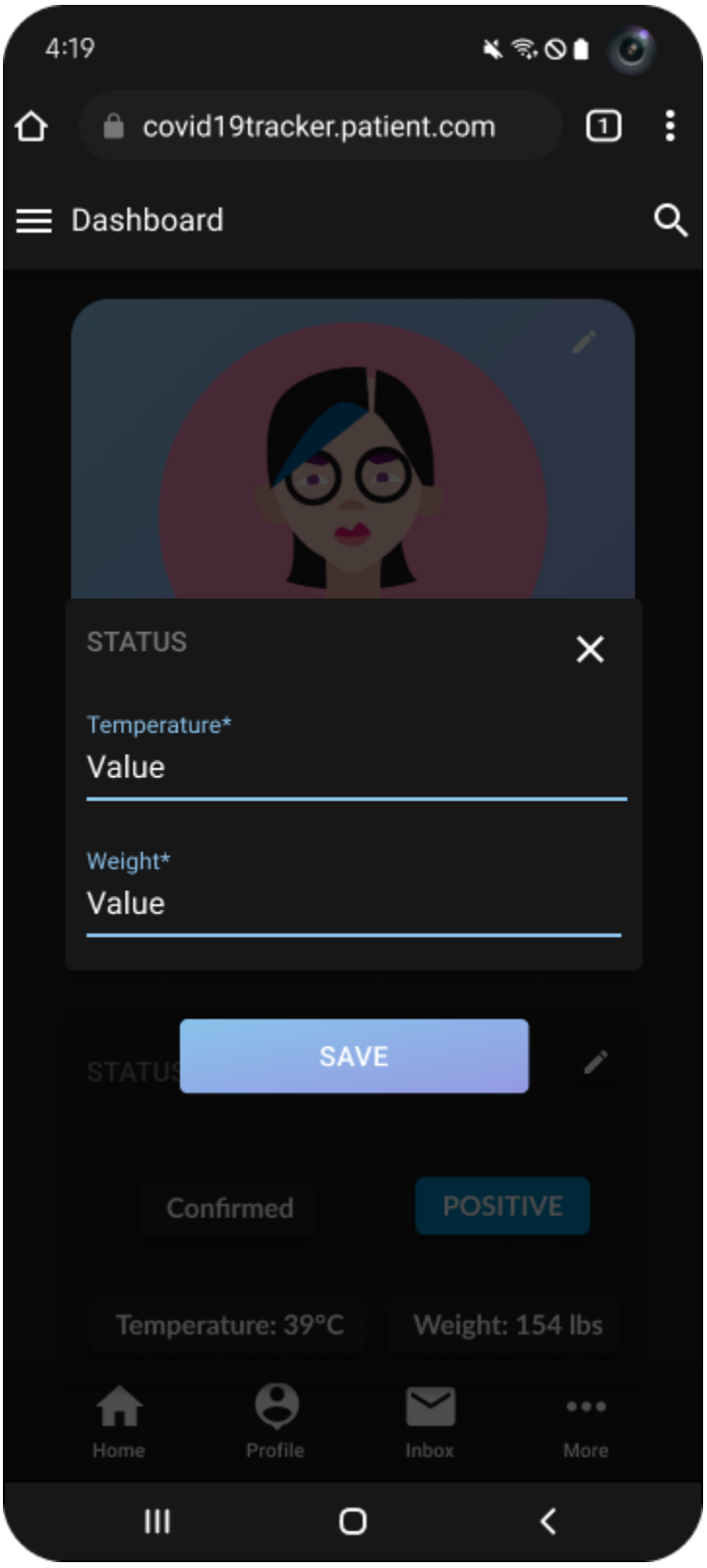



Figure 70: UI Client Patient Edit for User Story Issue-37

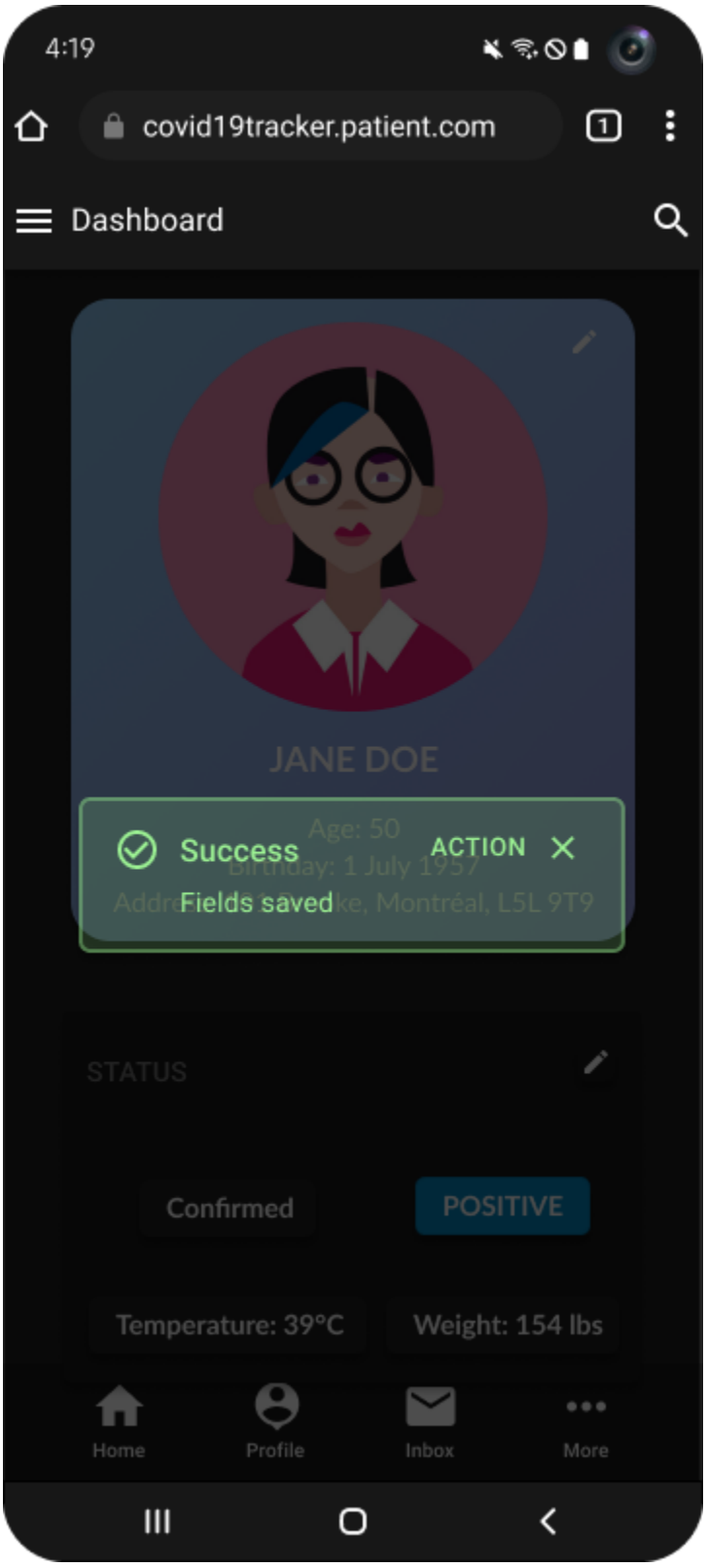



Figure 71: UI Client Patient Success for User Story [Issue-37]

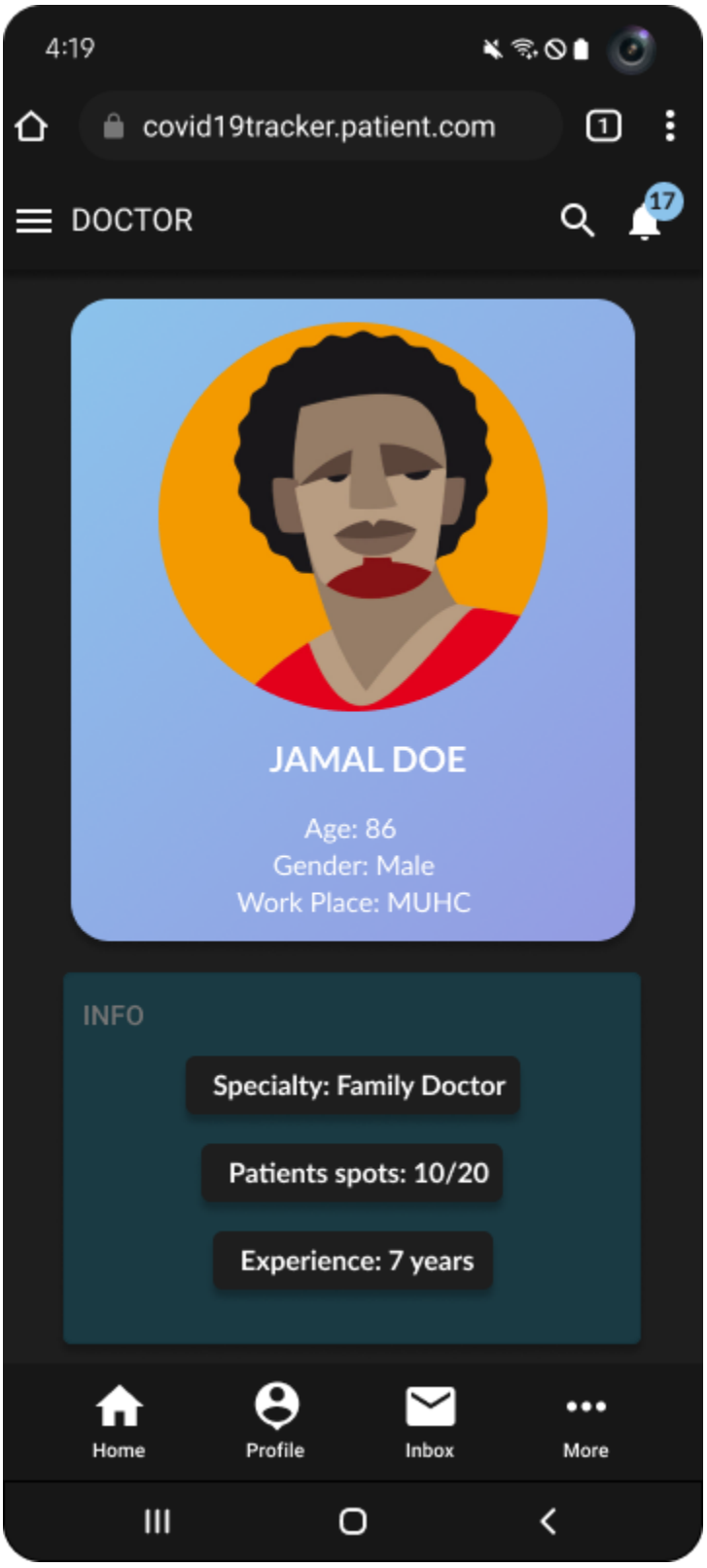



Figure 72: UI Doctor Info for User Story Issue-39

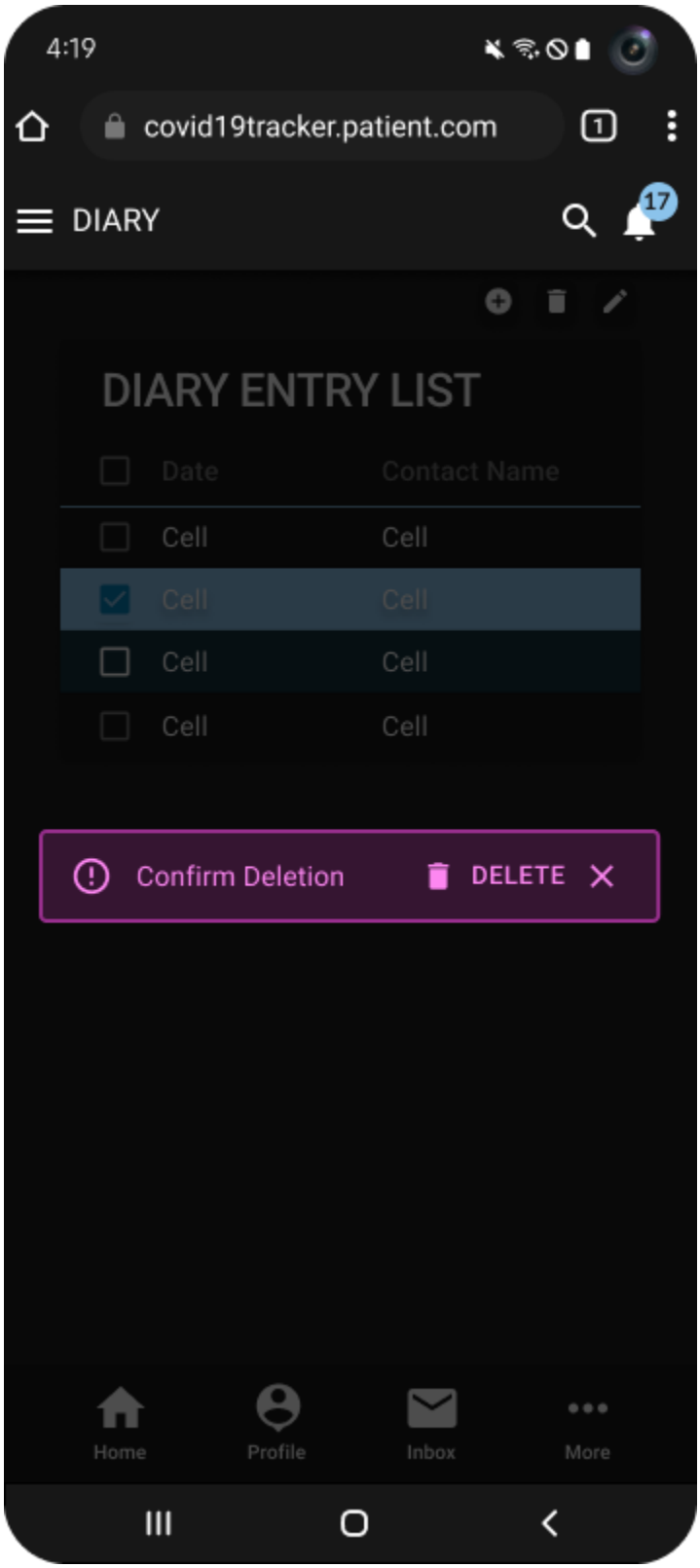



Figure 73: UI Diary delete

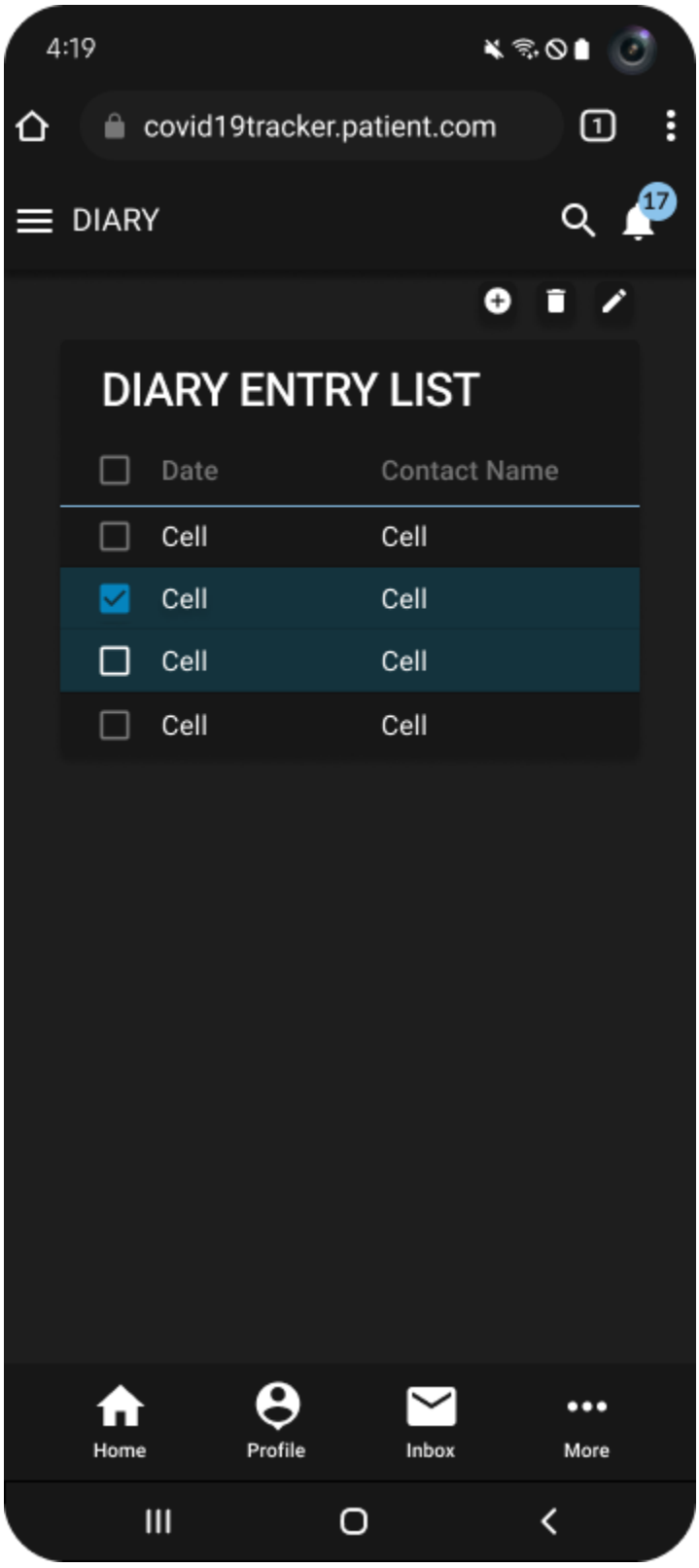



Figure 74: UI Diary list

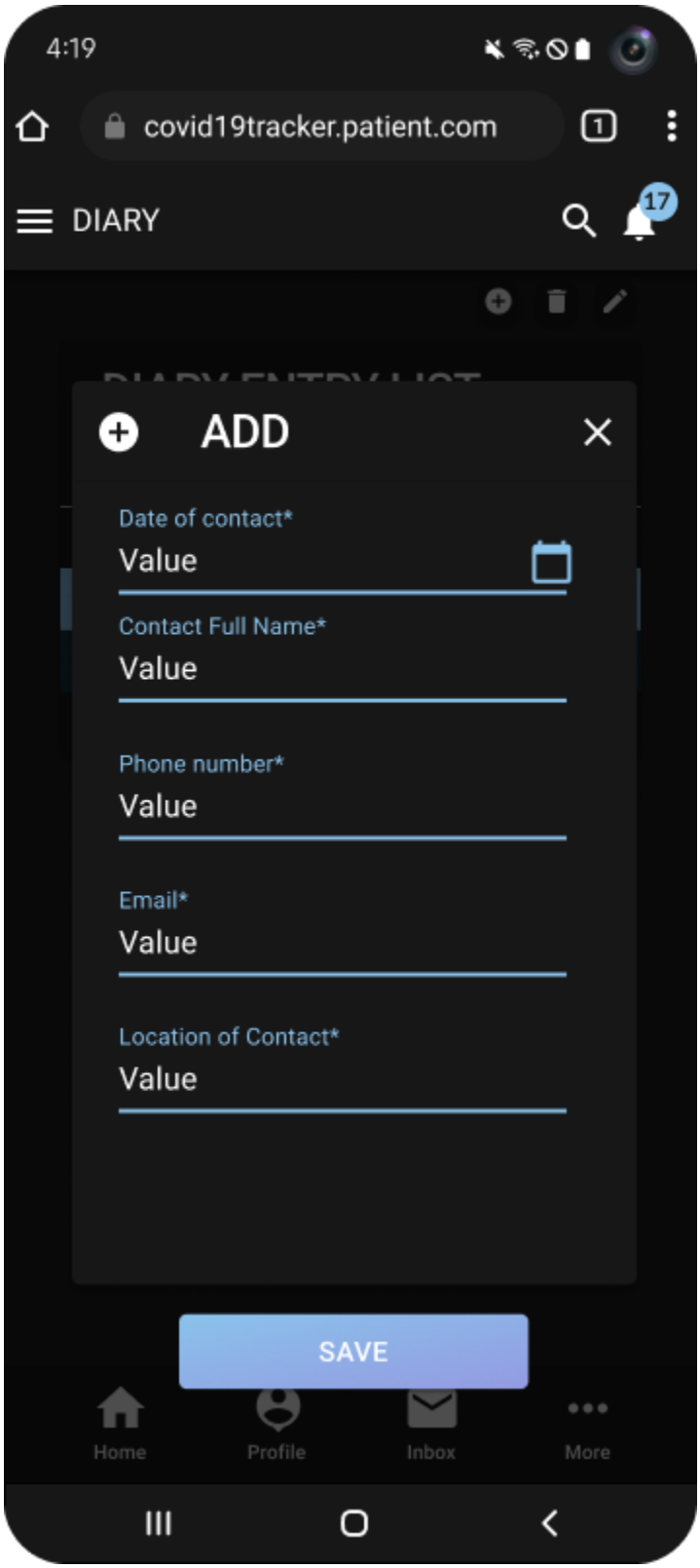



Figure 75: UI Diary Add

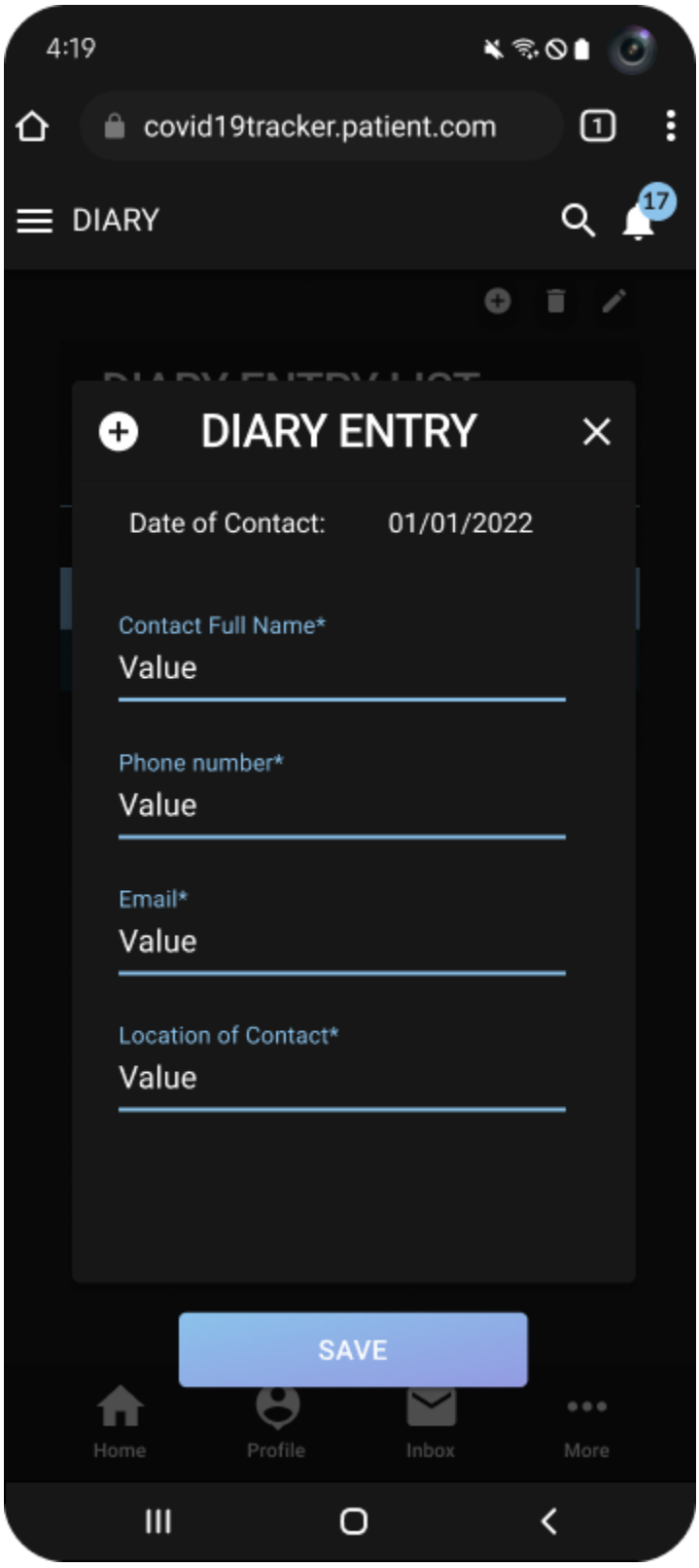



Figure 76:UI Diary Entry

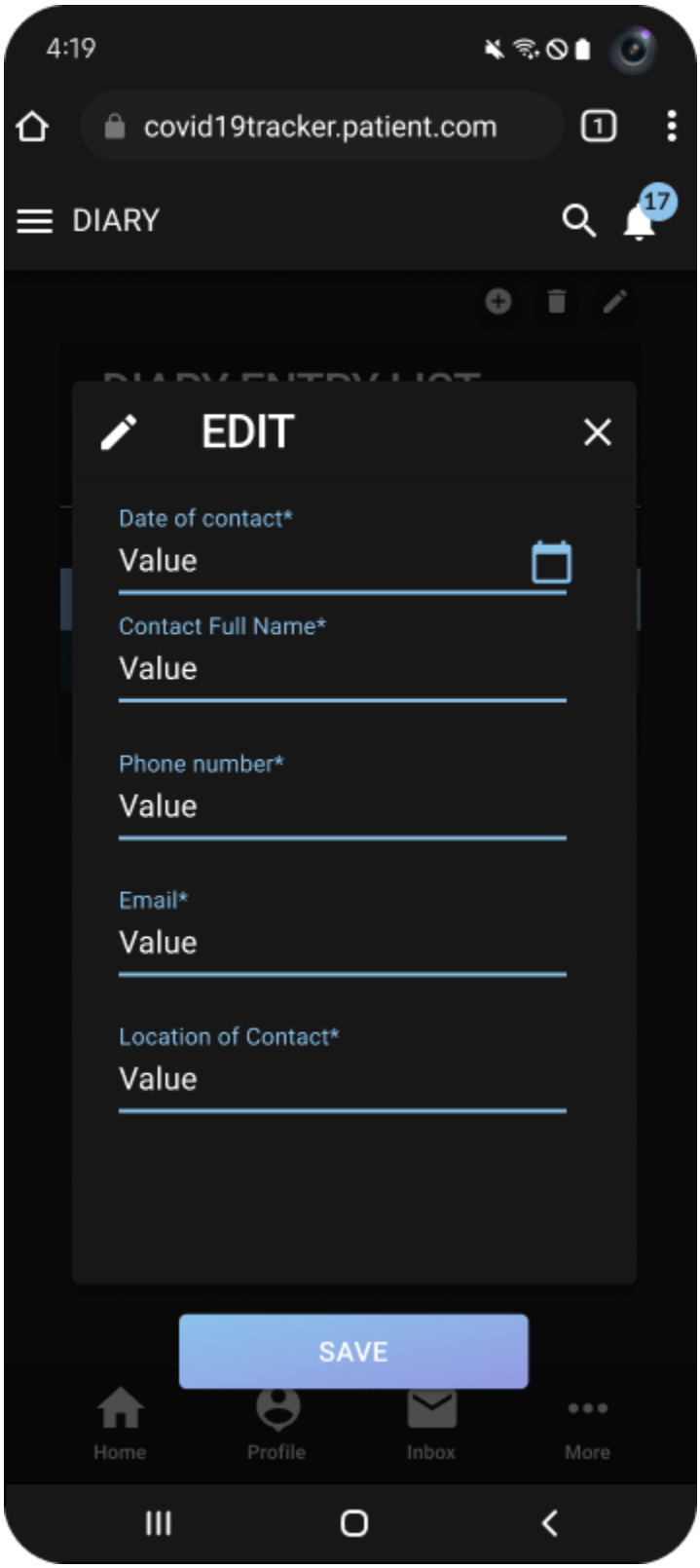



Figure 77: UI Diary Edit

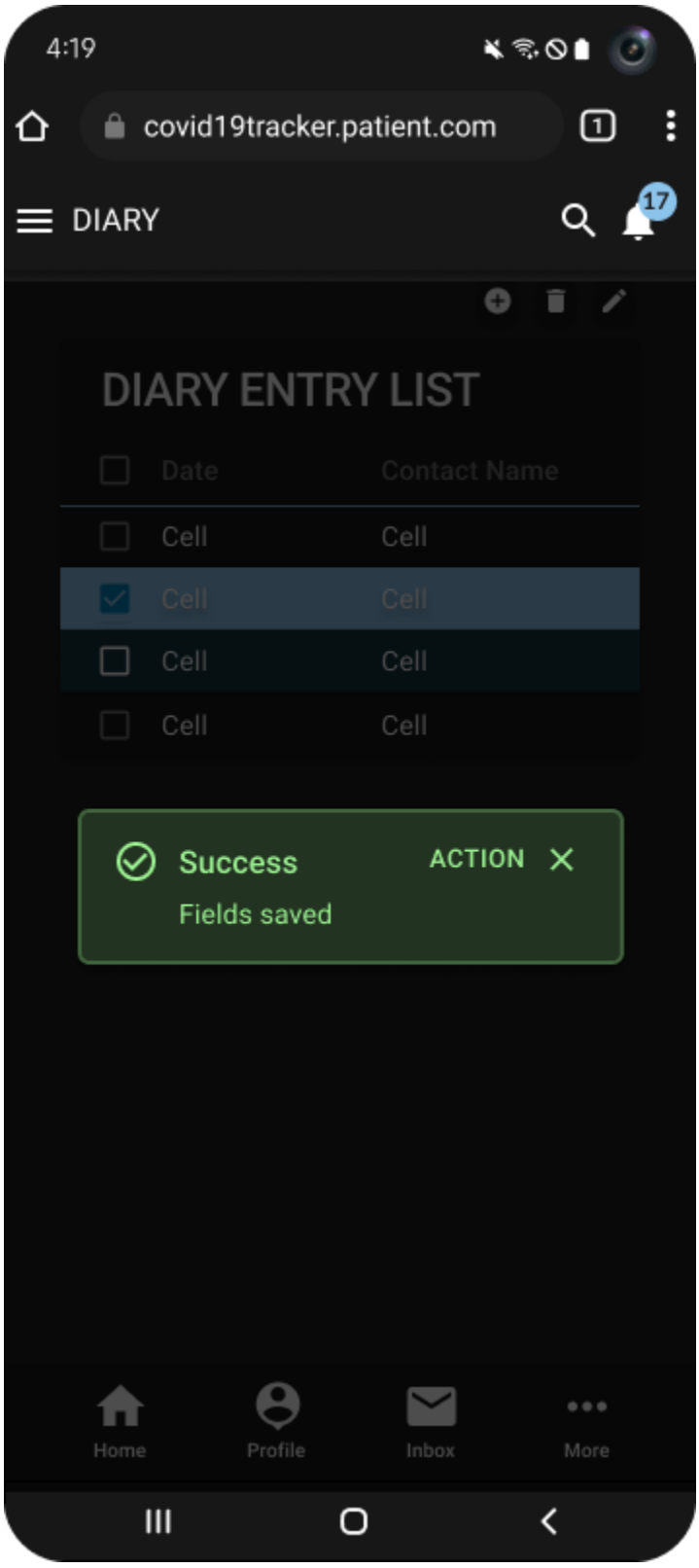



Figure 78: UI Diary Success

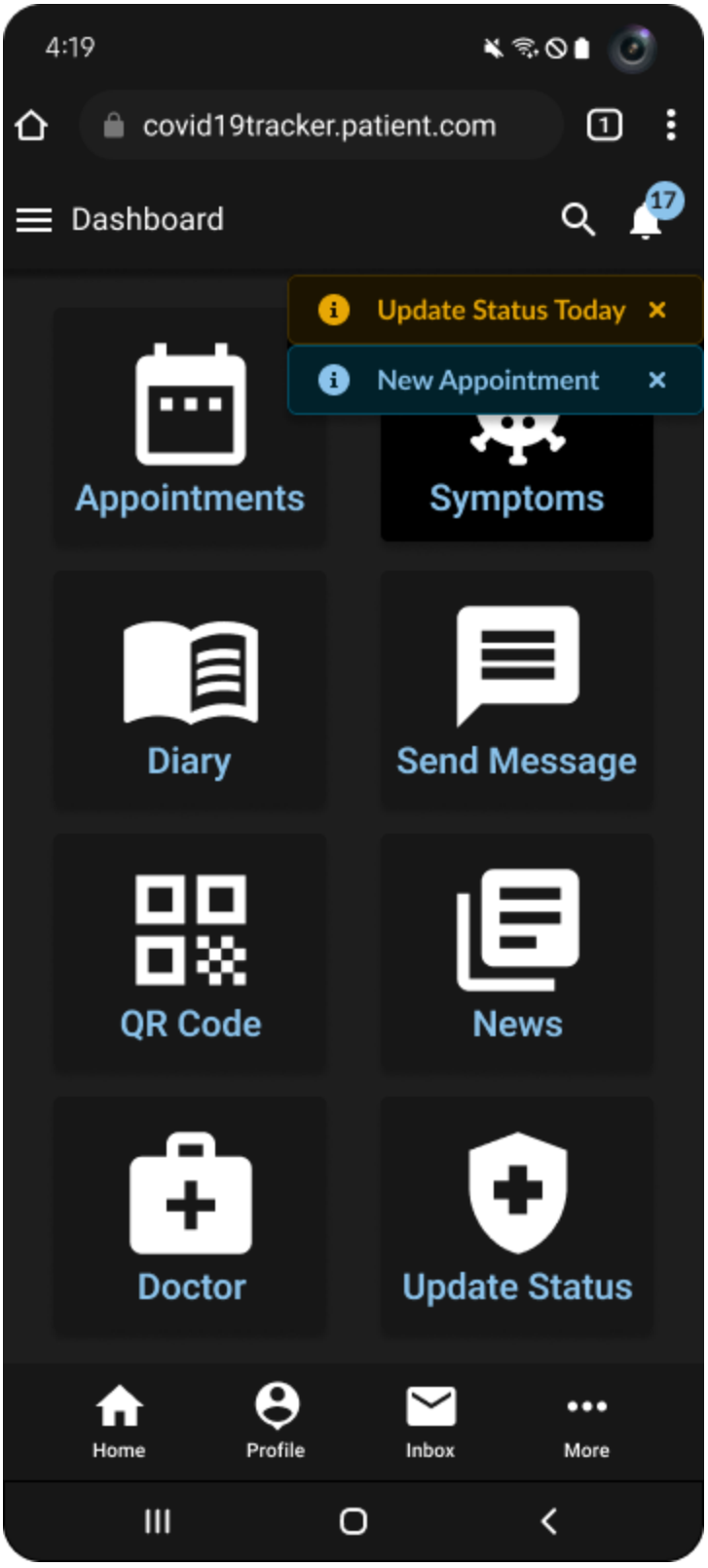



Figure 79: UI Notifications

### 7.4 Sprint 4 UI Mockups

Here are the UI mockups of user stories completed in Sprint 4.

#### 7.4.1 Admin Portal Sprint 4

The following figures are the UI mockups for the Admin portal.

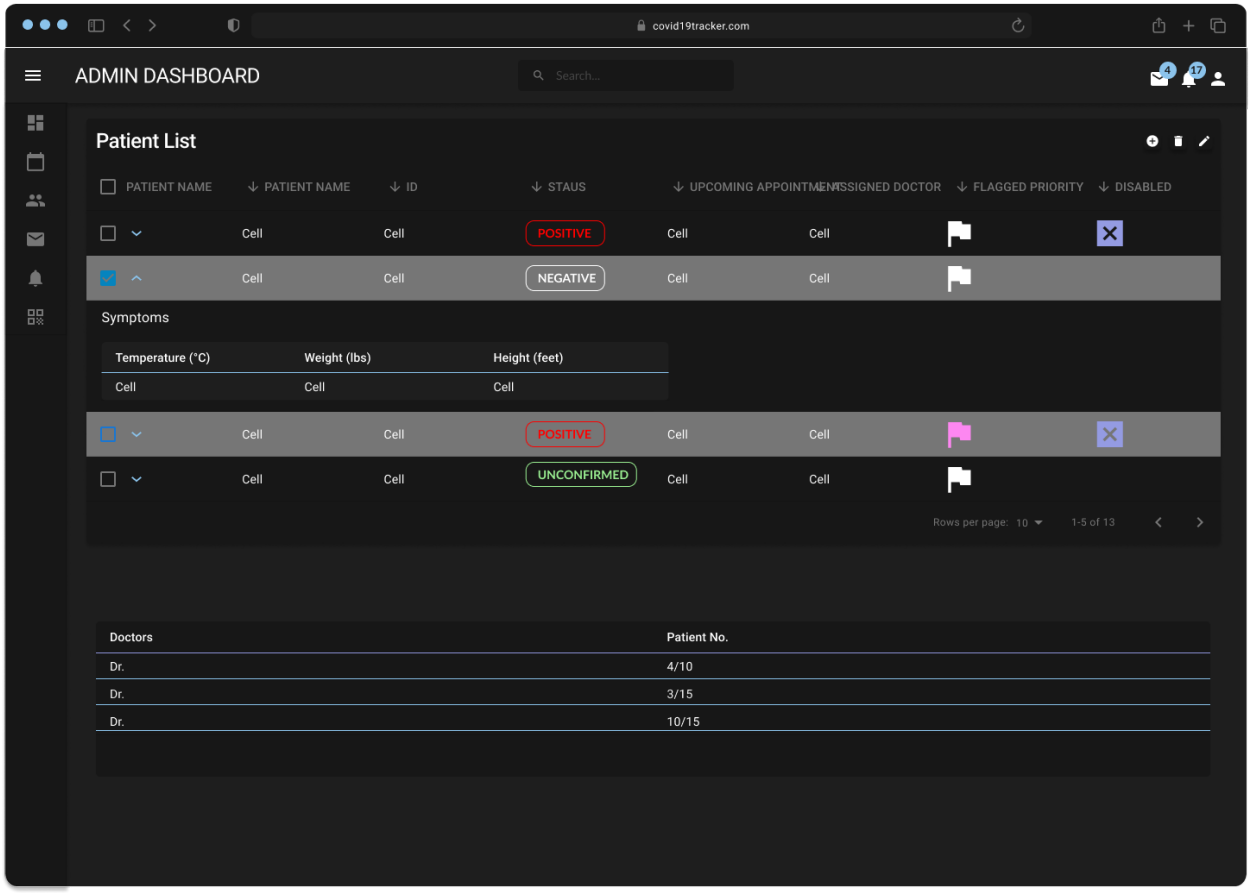



Figure 80: UI Patient List with disabled patient column Issue #45

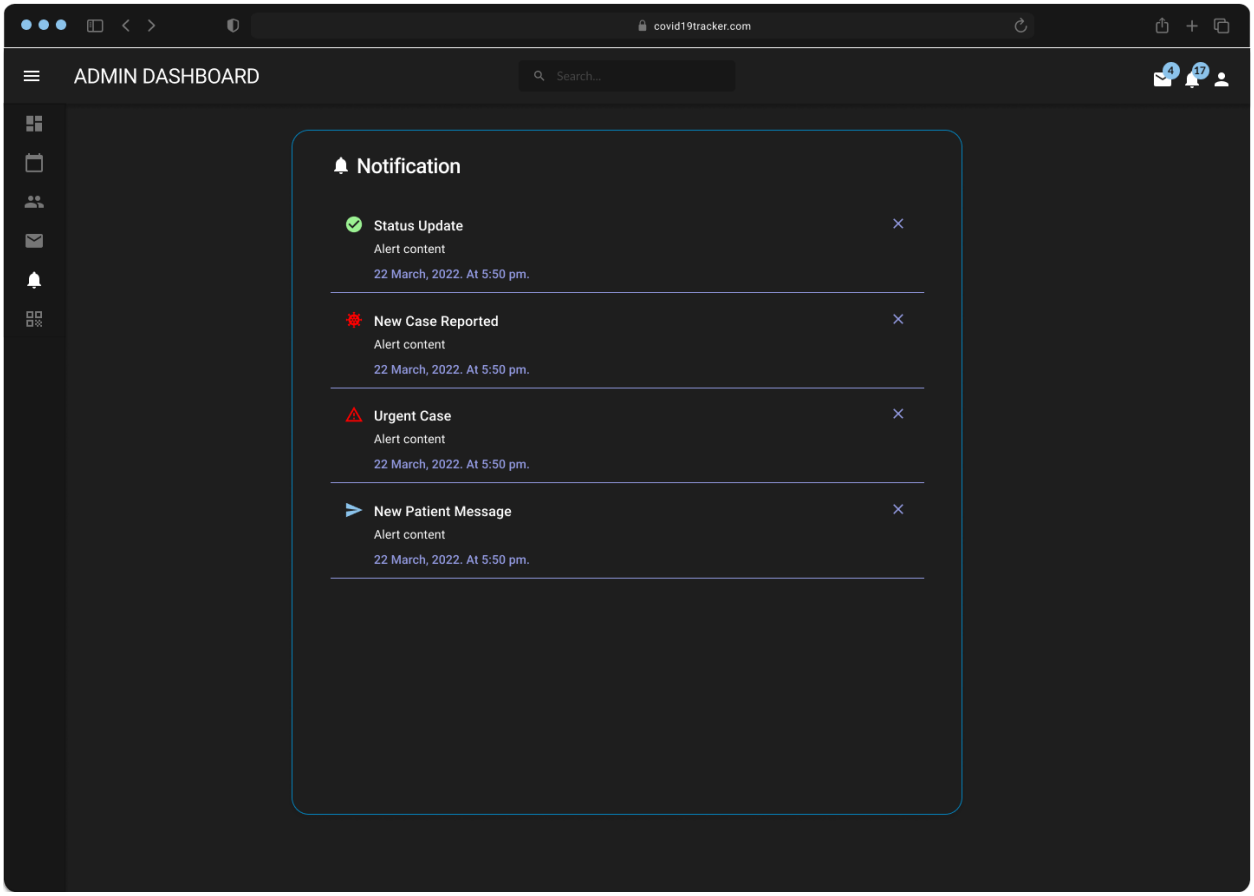



Figure 81: UI Notifications Issue #2 #10 #13

### 7.4.2 Client Portal Sprint 4

The following figures are the UI mockups for the Client portal.

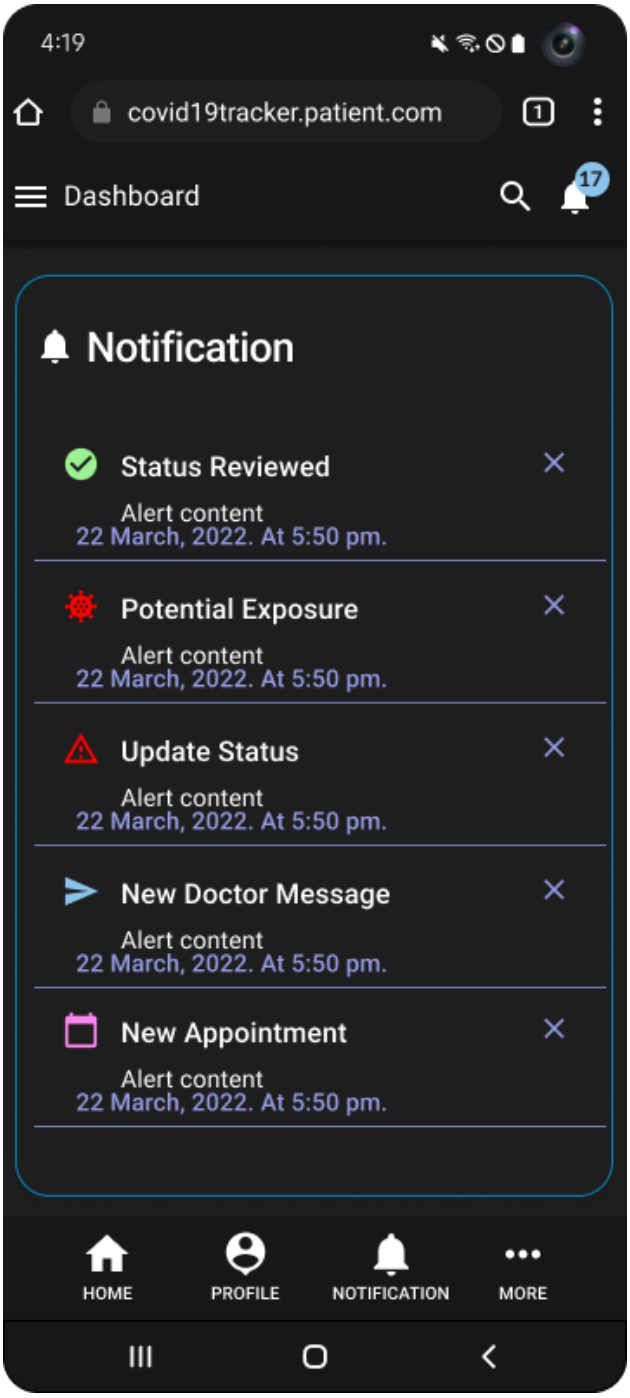



Figure 82: UI Notifications Client Issue #4 #12 #42


Figure 83: UI Symptoms List Client Issue #80

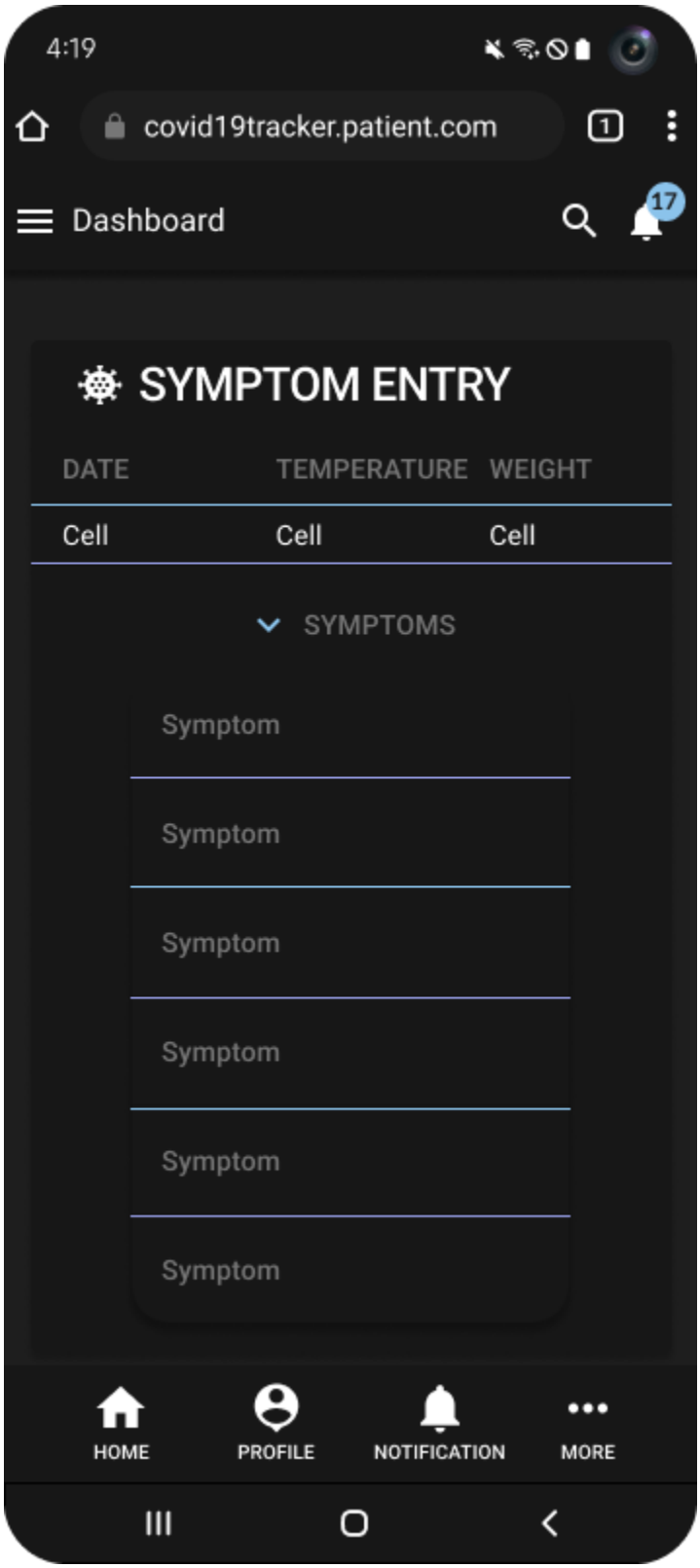



Figure 84: UI Symptoms Entry Client Issue #80

# 8.0 TESTING PLAN AND REPORT

In this section, we detail the unit testing, the code coverage, acceptance testing and system tests.

## 8.1 Unit Testing

Unit testing is the most fundamental type of test that guarantees a unit of code function properly on its own. A unit test is the smallest testable part of an application. The main purpose is to test each function or component as soon as they are constructed. A unit test usually has one or more inputs and produces a single output.

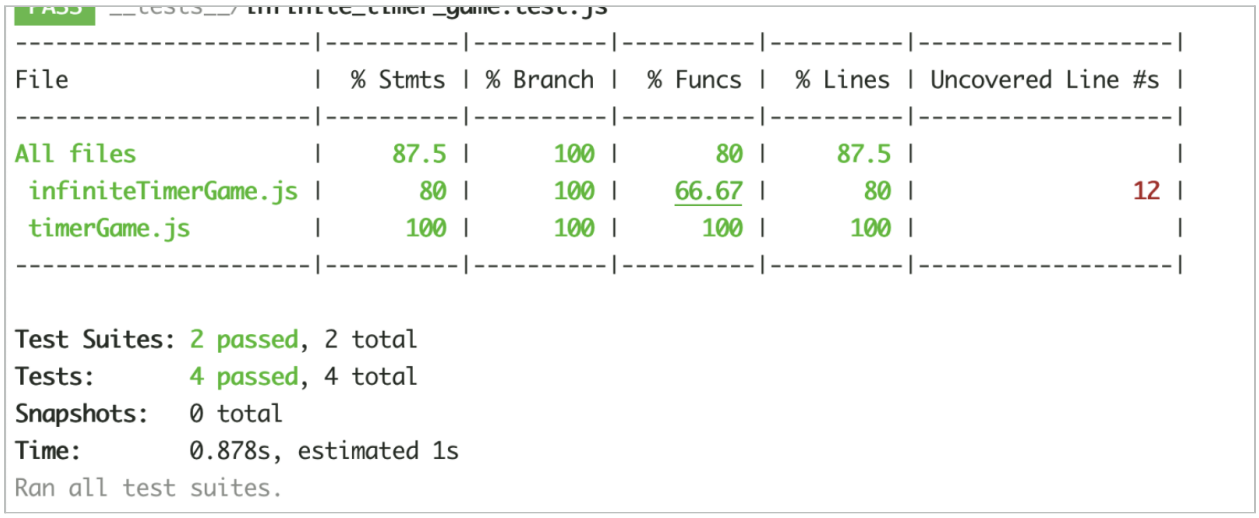
Jest's main focus is on the simplicity of the provided functions and good support for large web applications. It works with web applications using Babel, TypeScript, Node.js, React, Angular, Vue.js, Svelte, and more. We chose Jest since it is an already established framework in the JavaScript ecosystem. In addition, their documentation is very clear and concise. Thus, the learning curve for developers would be less compared to other unit testing frameworks.

Some of the obvious benefits of using Jest for unit testing are:

- Improving the overall quality of the codebase.
- Ensure code reusability and reliability.
- Help seamless integration with other modules/components.

## 8.2 Code Coverage

Code coverage tools may not guarantee to find all defects hidden in the current codebase but it allows developers to see how complete the test cases cover the code base. Thus, having code coverage results will help gaining confidence in developers. Code coverage tool that comes with Jest can be enabled by simply adding the "*--coverage*" flag in the test run command. No other additional setup required, Jest will automatically run through the project to collect all the written test files.



```
PASS __tests__/infinite_timer_game.test.js
----------------------|----------|----------|----------|----------|-------------------|
File                  |  % Stmts | % Branch |  % Funcs |  % Lines | Uncovered Line #s |
----------------------|----------|----------|----------|----------|-------------------|
All files             |     87.5 |      100 |       80 |     87.5 |                   |
 infiniteTimerGame.js |       80 |      100 |    66.67 |       80 |                12 |
 timerGame.js         |      100 |      100 |      100 |      100 |                   |
----------------------|----------|----------|----------|----------|-------------------|

Test Suites: 2 passed, 2 total
Tests:       4 passed, 4 total
Snapshots:   0 total
Time:        0.878s, estimated 1s
Ran all test suites.
```

Figure 84: Sample code coverage screenshot using Jest

### 8.3 Acceptance Testing

An acceptance test is a formal description of certain behaviors of a system when some conditions have been met. An acceptance test is usually expressed as a scenario statement or a group of statements. Like unit tests, acceptance tests also have a binary result (either passed or failed). A passed acceptance test is the base indicator of a correctly implemented function/feature that met the requirements.

In our project management backlog, every user story has its Acceptance Test written under the description section so that we can refer to it at the end of the Sprint to ensure that the feature has met the requirements.

| **AT-1** | **Monitor status & symptoms of confirmed and unconfirmed patients** |
|---|---|
| **Acceptance Criteria** | Given: The user is logged in as an Admin (doctor or health official).<br><br>When: The user is on the Profile of the Patient page.<br><br>Then: The user can select the patient's status from the dropdown. |
| | |
| | |
| **Result** | **PASS** |

| | |
|---|---|
| **Comments** | NONE |

| **AT-2** | **Display / show that a patients' status updates have been reviewed** |
|---|---|
| **Acceptance Criteria** | Given: The user is logged in as a doctor and is on the patient page.<br><br>When: The user updates and reviews a patient profile.<br><br>Then: The application shows profiles that have not been reviewed yet. |
| | |
| | |
| **Result** | **PASS** |
| **Comments** | NONE |

| **AT-3** | **Allow Patient to edit profile page** |
|---|---|
| **Acceptance Criteria** | Give: Patient is logged in successfully.<br><br>When: Patient clicks on profile page.<br><br>Then: All the basic fields should be editable & updatable. |
| | |
| **Result** | **PASS** |
| **Comments** | NONE |

| **AT-4** | **Profile for patient** |
|---|---|

| | |
|---|---|
| **Acceptance Criteria** | Given: The user is logged in as a patient on the client app.<br><br>When: The user clicks on the profile button on the bottom navbar.<br><br>Then: The user is redirected to their profile displaying a list of given details about the patient. |
| | |
| | |
| **Result** | **PASS** |
| **Comments** | NONE |

### 8.4 System Tests

System testing (or end-to-end testing) is a common methodology used in the software development process to test if an application works well under product-like circumstances and with data that replicates live settings. The goal is to create a realistic experience that follows the steps of a real user scenario. To fully validate the system, testing should not only be performed on the system under test, but also on any other subsystems that are related.

We chose Cypress because it is one of the most famous frameworks for system (end-to-end) testing in the JavaScript ecosystem. Compared to other similar frameworks such as Selenium or Splinter, Cypress takes much less time to learn and much less code to write in order to achieve the same results. In addition, Cypress also comes with extra functionalities to help developers observe the testing steps visually which is very convenient to pinpoint exactly where the test failed (if it happened).

Some of the "best-selling" features that are packed with Cypress:

- Time travel: Cypress can take snapshots as it runs the test suite.
- Debugging: Readable and traceable errors.
- Automatic waiting: Waits for commands and assertions before moving on.
- Spies, stubs, and clocks: Verify and control the behavior of functions, server responses, or timers.
- Network Traffic Control: Control, stub, and test edge cases without involving the server.

- Screenshots and videos: View screenshots were taken automatically on failure.
- Cross-browser Testing: Run tests within Firefox or Chrome browsers locally

### 8.5 Testing Procedure

Using automated workflow is the best way to save the team's time on testing. Writing tests is often time-consuming, running them on the local machine every time a new function is added (repeatedly) can be tedious. This is the reason why we planned to continuously run tests and deploy code on the remote server. This way our team can save some more time focusing on development.
Travis CI already comes with every Github project, it takes a minimal setup time in exchange for a full pack of benefits:

- Quick setup.
- Live build views.
- Pull request support.
- Pre-installed database services.
- Auto deployments on passing builds.
- Clean VMs for every build.
- Mac, Linux, and iOS support.

### 8.6 Test Results

This section contains the information about our actual test results (Unit test, Integration test and System test) from both Admin app and Client app. The details for each are presented below.

### 8.6.1 Unit & integration test for Admin app

| Test file name | Description | Result |
|---|---|---|
| Dashboard.test.js | Test if the patient list and some card components are rendered correctly on Dashboard. | PASSED |
| PatientProfile.test.js | Check if some basic patient info (such as age, status), the assigned doctor, and the symptom details show up in the patient profile. | PASSED |
| Dropdown.test.js | Check if certain select options are visible inside this component. | PASSED |
| Calendar.test.js | Check if the month-view button, week-view button, and day-view button are contained in the rendered calendar element. | PASSED |
| EventTest.test.js | Integrate the EventDetails component with the MemoryRouter component. | PASSED |
| DoctorList.test.js | Verify whether the DoctorList component is being attached to the document (the DOM tree). | PASSED |
| UpcomingEvents.test.js | Test if certain classes and text contents can be found in the rendered component. Integrate the UpcomingEvents component with the MemoryRouter component. | PASSED |
| NewsTest.test.js | Integrate the NewList component with the MemoryRouter component. | PASSED |
| CovidButton.test.js | Check if the COVID19Button component is rendered to the DOM tree. | PASSED |
| Notifications.test.js | Check if the Notifications component has an expected text content. | PASSED |
| SmallStatBox.test.js | Test if one of the small statistic boxes contains a certain class. | PASSED |
| DoughnutChart.test.js | Test if the DoughnutChart component is rendered out correctly. | PASSED |
| LineChart.test.js | Test if the LineChart component is rendered out correctly. | PASSED |
| PatientList.test.js | Test if the PatientList component is rendered out correctly. | PASSED |

| | | |
|---|---|---|
| SignIn.test.js | Test if the SignIn component is rendered out correctly. | PASSED |
| SignUp.test.js | Test if the SignUp component is rendered out correctly. | PASSED |

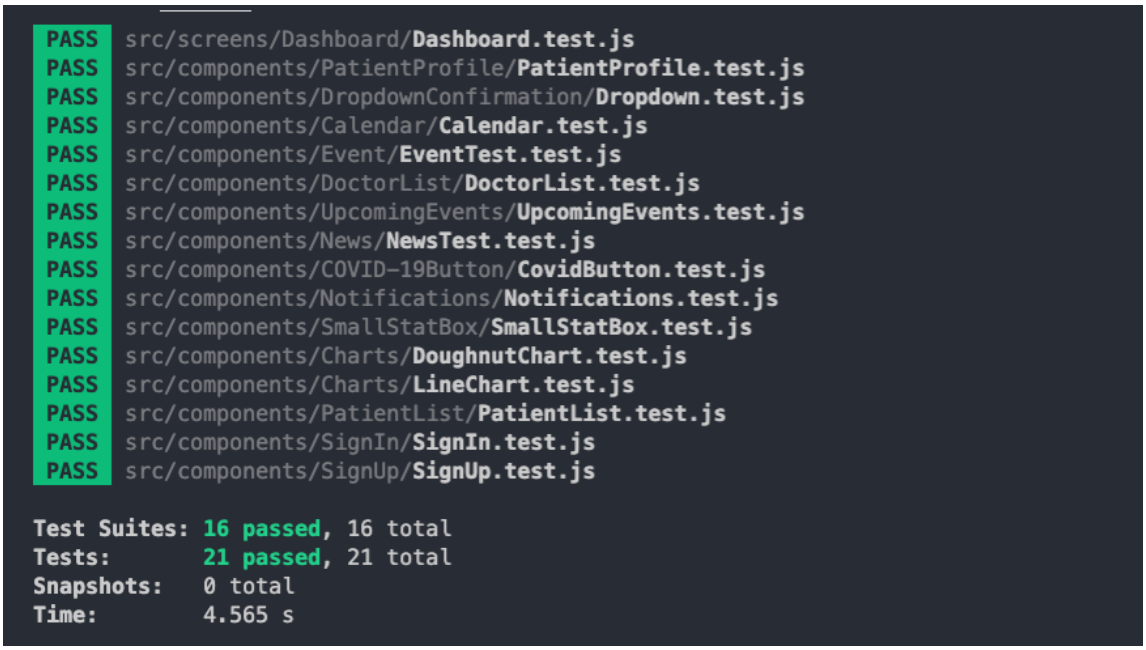



Figure 85: Screenshot from actual test results for Admin app

### 8.6.2 Unit & integration test for Client app

| Test file name | Description | Result |
|---|---|---|
| DoctorInfo.test.js | Test if the DoctorInfo component is present in the document, has the text content “Jamal Doe”, and has class “doctorInfo-card__profileName” | PASSED |
| Dashboard.test.js | Check if the ‘Appointment’ is visible through the Dashboard. | PASSED |
| NavBar.test.js | Check if the NavBar component integrates well with the MemoryRouter component. Also verify that the client app title is visible. | PASSED |
| SymptomsTable.test.js | Check if the SymptomsTable is rendered correctly | PASSED |

| | | |
|---|---|---|
| | to the screen. | |
| BottomNav.test.js | Test if the bottom navigation bar contains the ‘bottomNav-iconTitle’ class and contains the ‘Profile’ text content. | PASSED |
| Signin.test.js | Check if the Signin page is rendered correctly to the screen. | PASSED |
| ClientProfile.test.js | Check if the avatar component is visible and contains the ‘profile-name’ class. | PASSED |
| SignUp.test.js | Test if the Signin page is rendered correctly to the screen. | PASSED |
| DiaryTable.test.js | Test if DiaryTable component is rendered correctly | PASSED |
| Chat.test.js | Test if Chat component is rendered correctly | PASSED |

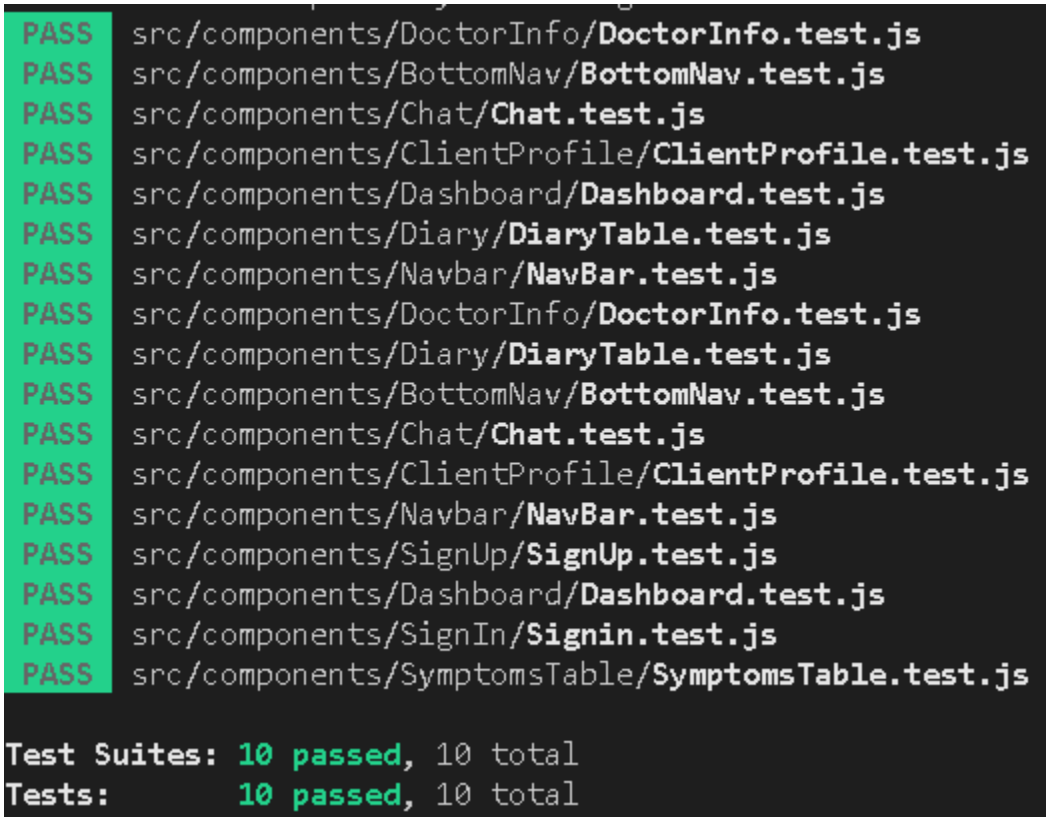



Figure 86: Screenshot from actual test results for Client app

### 8.6.3 System test for Admin app (Cypress)

| Test file name | Description | Result |
|---|---|---|
| dashboard.spec.js | Test if user could visit the Dashboard page and click on the 'Appointment for vaccination' link | PASSED |
| loginTest.spec.js | Mimics the user login flow (sign-in and click on different pages) with different sign-in credentials. | PASSED |

### 8.6.4 System test for Client app (Cypress)

| Test file name | Description | Result |
|---|---|---|
| dashboard.spec.js | Test if user could visit the Dashboard page | PASSED |

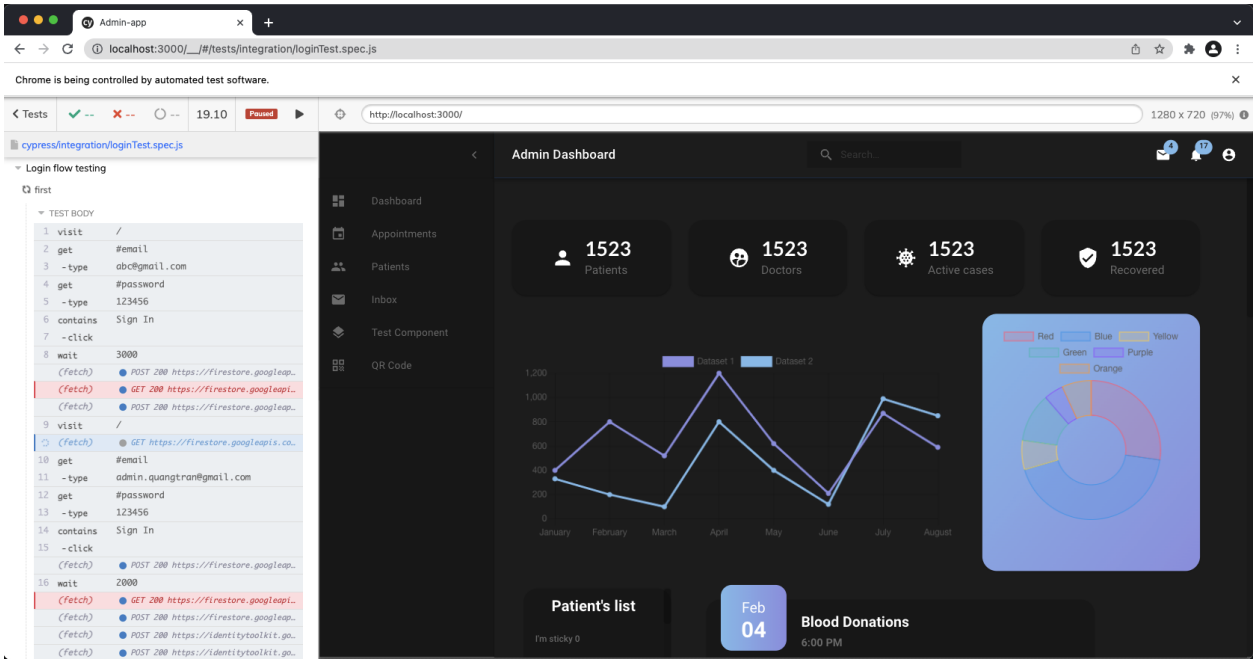



Figure 87: Screenshot from Cypress system test results

# 9.0 SPRINT RETROSPECTIVES

### 9.1 What went wrong

- **Lack of commenting on the code early:** During the sprint, we had a problem where we did not comment out our code as regularly as we should have. This sometimes created a bit of confusion amongst the team where we could look at another team member's code and would have to message them to understand it. This had no impact at all as we fixed this as soon as we did our first team meeting.

- **Struggle to adhere to consistent agile methodology:** During the sprint, a lot of team members had many other exams and assignments for other courses. This meant that many of them could not attend the two weekly meetings that we had amongst ourselves to discuss our progress of the project. Another reason for this was also that the sprint coincided during our one-week break, and a lot of the team was studying/relaxing during that time. Overall, while this did have an impact on the overall scrum meetings, and to see what the overall progress of the team was, we did have a written description of what we did, and we will be doing during the meetings in our team server.

- **The application appears differently among devices:** During the sprint, sometimes the application when we would run it, especially the client application looked different for different people. The code would be similar for everyone since we mostly dealt with pull requests and needed approval before making big changes, however, the layout sometimes and some functions would be different for some people. To fix this, we usually ended up having a call with other members of the team and went through step-by-step to solve the problems. Overall, this could have had a large impact on the project, but the issue was still solved due to teamwork we displayed.

### 9.2 What went well

- **Separate branches to reduce merge conflicts:** After sprint 2, we knew that we would be dealing a lot more with the backend in sprint 3. Because of this, we decided after the last sprint, that it would be a good idea to have a develop branch, where we could create other different branches from, and then later create pull requests to merge the code in. This was easier for the team to handle, instead of always merging pull requests to the main branch and then merging it to their specific branch. Overall, this had a big positive aspect on the workflow since nobody had to wait until something was merged from the main branch to continue working on their own branch.

- **Everyone doing more on the project:** In sprint 2, we only assigned one tester to write most of the tests. This meant one teammate had to write many of the tests, which also

meant that he had to understand how the other code worked to do it. While this was still not a bad thing, as we were able to do the tasks very well for the last sprint, in this sprint, everyone was able to write tests based on their own code, a code they would understand, and could hence write better tests for it. Overall, this also had a good impact on the team since we were able to learn more stuff to do, which at the end of the day is the goal of this project.

- **Team communication:** As in the other sprints, our team communication was again on point for this sprint. Multiple times in the sprint, we encountered bugs on the application which one teammate could not figure out how to solve. This prompted someone else from the team who could fix the issue to step in, and either call the person, or even screen share to help figure out the issue at hand. Another example of this would be the implementation of the backend. As most of the team are more comfortable with the backend, there was always bound to be some hiccups transitioning to that aspect, but once again, if someone was stuck in the team, another teammate who could help always stepped in to help the person in need. Overall, this had a very good impact on the project, as it did not derail anyone in the team, as well as letting us work on our tasks in a timely manner, which allowed us to finish the sprint stories in a timely manner as well.