

Patient Health-Centred Social Network
Design Document



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Date: April 29th, 2022

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1 Introduction

The following documentation will document the design of the health-centred social network application. This documentation will describe the design of the application in great depth. After completion of this document, the reader will have a better understanding of the work required to complete this application.

The document will discuss the tools and technologies chosen to develop the application along with the system's architecture that was designed following some best coding practices. The document will also showcase a prototype of the user interface that was designed. A use case diagram and sequence diagrams will follow in order to explain and demonstrate the functionality of the user interface. Finally, the schema of the database is laid out and explained as well as the use of an application programming interface (API) to display information on certain conditions, including the symptoms and medication used to treat the condition.

2 Prototype UI-UX design

2.1 Colour Palette

The colour palette used to design the prototype screens can be seen below.

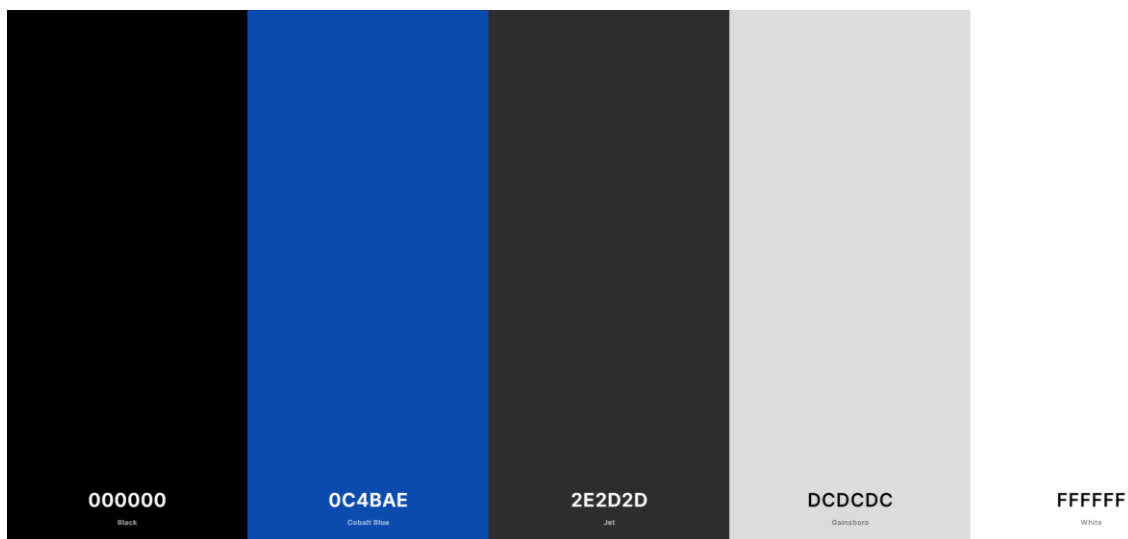


Figure 1. Colour Palette.

2.2 Mobile Application Screens

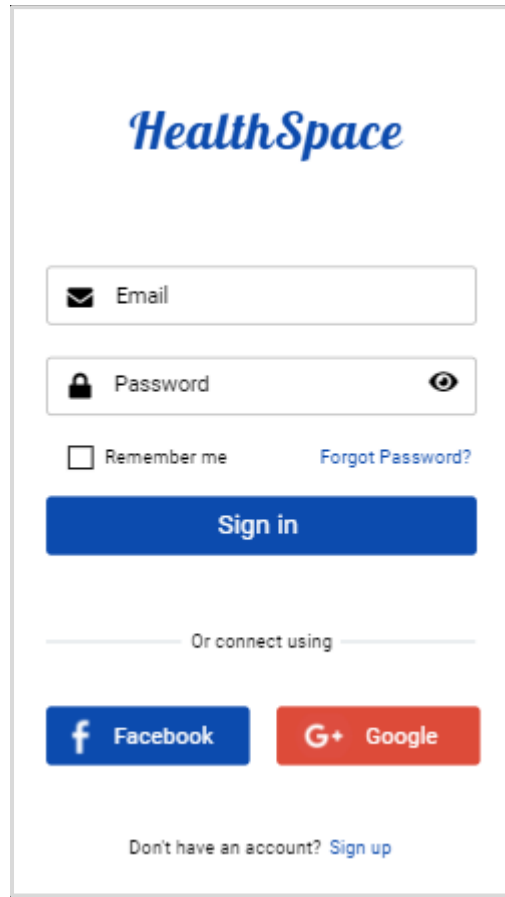
2.2.1 Loading Screen



Figure 2. Loading Screen.

To begin with, the user will be presented with the loading screen each time they open the application. This screen introduces the name of the application "HealthSpace."

2.2.2 Login Screen



The image shows a mobile login screen for HealthSpace. At the top is the HealthSpace logo in a blue serif font. Below the logo are two input fields: one for Email with an envelope icon and one for Password with a lock icon and a toggle eye icon. Under the password field are a 'Remember me' checkbox and a 'Forgot Password?' link. A large blue 'Sign in' button is centered below these elements. A horizontal line with the text 'Or connect using' is positioned below the button. Underneath are two buttons for social login: a blue 'Facebook' button with the 'f' icon and a red 'Google+' button with the 'G+' icon. At the bottom, there is a link that says 'Don't have an account? Sign up'.

Figure 3. Login Screen.

The login screen is where registered users are able to sign-in using a registered email and password. Users can also connect using a Facebook or Google+ account. If a user does not have a registered account, they can tap the “Sign up” button which will bring them to the sign-up page. Once a user logs in, the user will be redirected to the home screen.

2.2.3 Sign-up Screen

The screenshot shows a mobile application sign-up screen. At the top, there is a back arrow and the text "Sign up". Below this is the "HealthSpace" logo in a blue, cursive font. The form consists of five input fields: "Name" (with a person icon), "Date of Birth" (with a calendar icon and a dropdown arrow), "Email" (with an envelope icon), "Password" (with a lock icon and an eye icon), and "Confirm Password" (with a lock icon and an eye icon). At the bottom of the form is a blue button with the text "Sign up" in white.

Figure 4. Sign-up Screen.

The sign-up page allows unregistered users to create an account. A user must enter their name, date of birth, email, and their password. The user will receive an error upon attempting to sign-up if any of the fields are left empty or do not match the requirements. A user must be above the age of 13 when signing up. A user will also receive an error if the email entered matches an already registered account or if the two passwords entered do not match. Once the requirements are met, the account will be created, and the user will be redirected to the login screen.

2.2.4 Home Screen

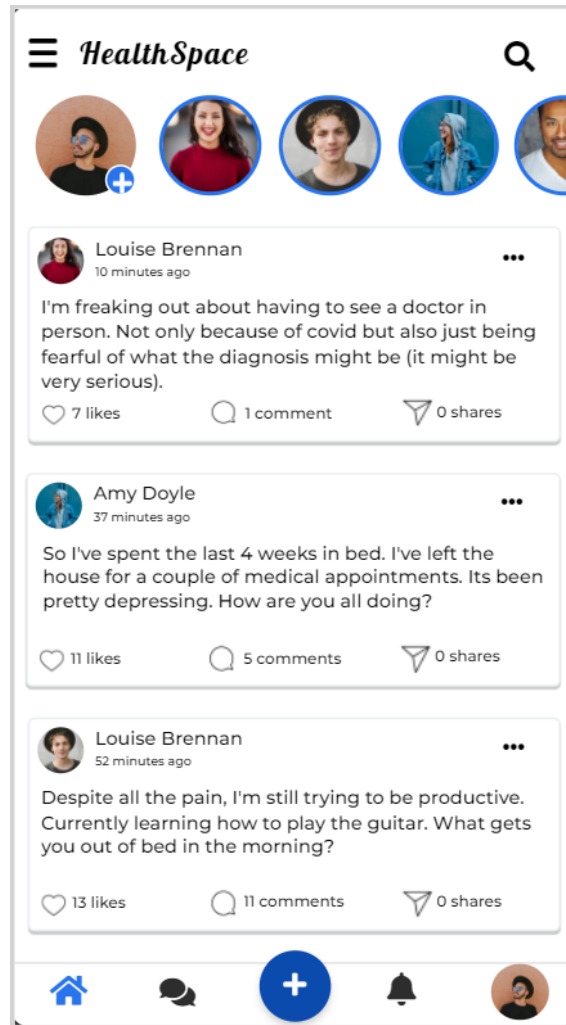


Figure 5. Home Screen.

The home screen consists of a number of features. The user can view a timeline consisting of health-related posts from people the user follows. The user can interact with each post by liking the post, commenting on the post, or sharing the post. Every post can be reported if it does not contain health-related information or is misinforming in any way. The admin deals with each reported post by either removing them or approving them, depending on whether they fit the criteria or not.

2.2.5 Messages Screen

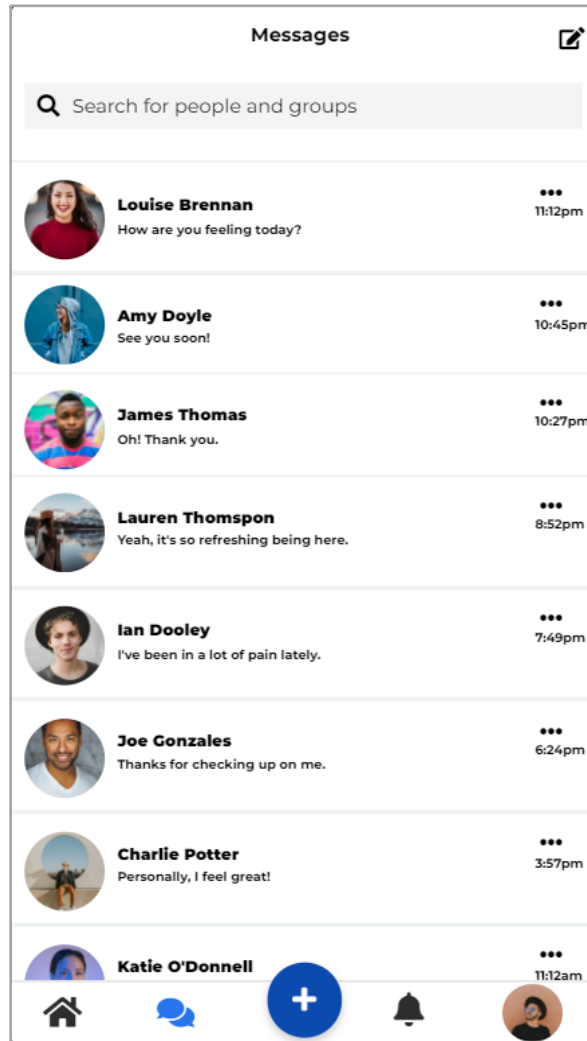


Figure 6. Messages Screen.

The messages screen allows users to view their conversations. The system displays the messages in order of the most recent first. A user can start a conversation from this screen by tapping the icon in the top right corner. A user may also search for a specific person or group by using the search bar.

2.2.6 Create Post Screen

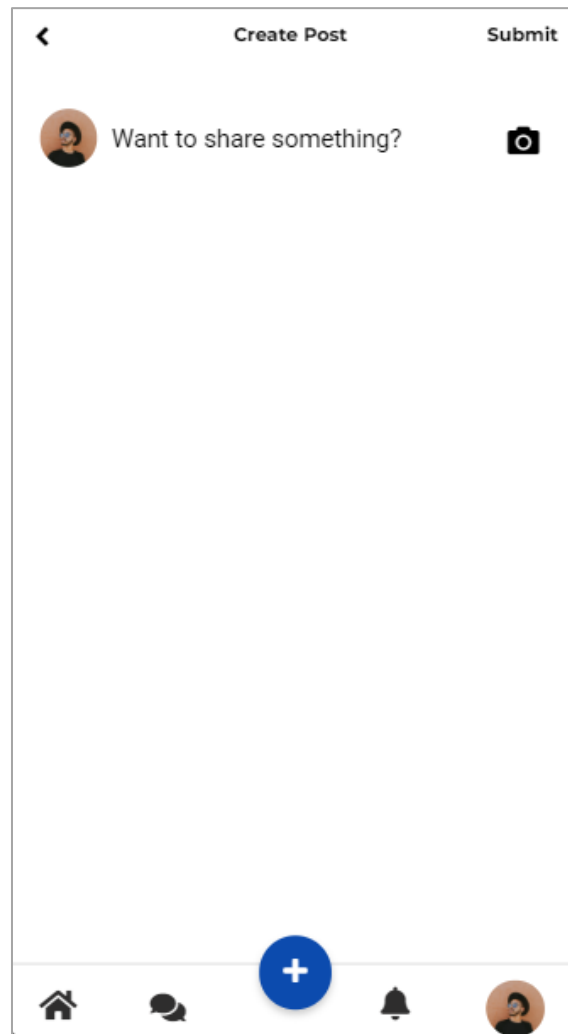


Figure 7. Create Post.

The user can navigate to the create post screen by tapping on the + icon within the bottom navigation bar. After doing so, the user can create a health-related post with an option to use plain text, an image, or both. When they user is satisfied with their post, they can use the submit button. Following the post submission, the user's post will be visible for other users to see on their own timeline.

2.2.7 Notifications Screen

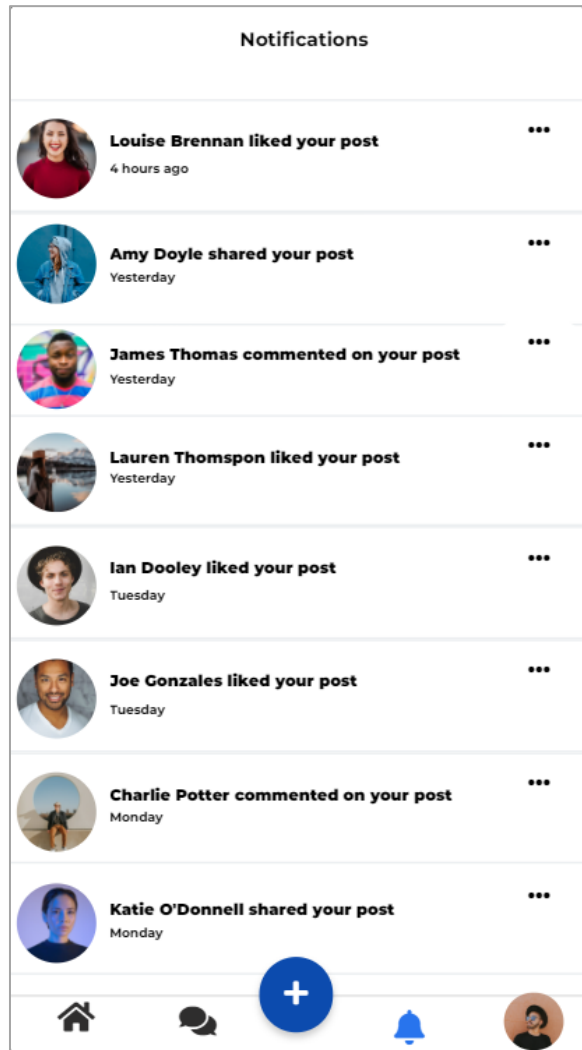


Figure 8. Notifications.

The notifications screen allows users to view their notifications. A user receives a notification if another user interacts with their post and the system displays their notifications in order of the most recent first.

2.2.8 Profile Screen

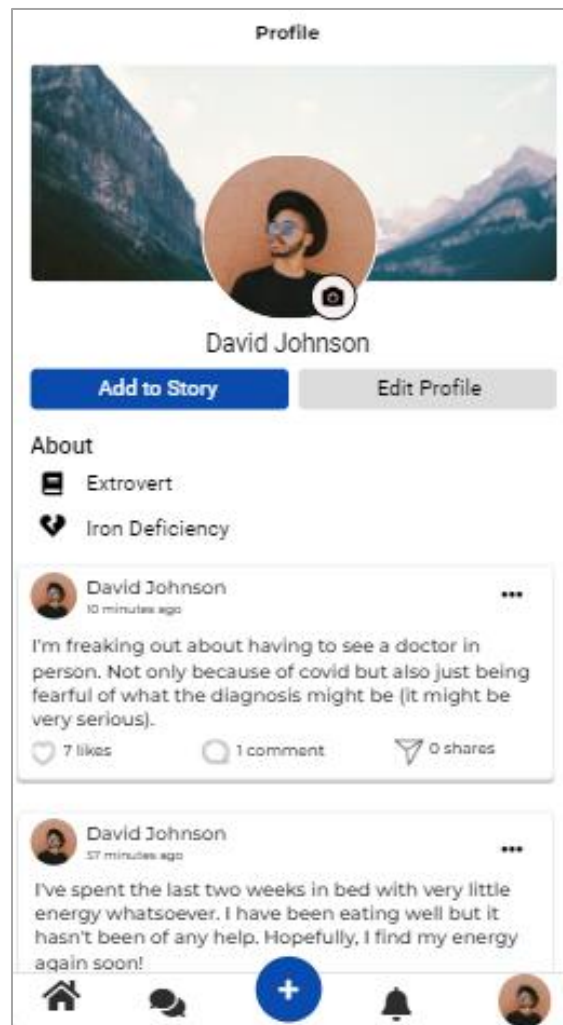


Figure 9. Profile Screen.

The profile screen is a personalised page for every individual user. A profile picture and a bio can be used to introduce yourself to other user's who may be viewing your page for the first time. A user may also register a health interest that may be of concern to connect with those who have shared similar experiences.

2.2.9 Edit Profile Screen

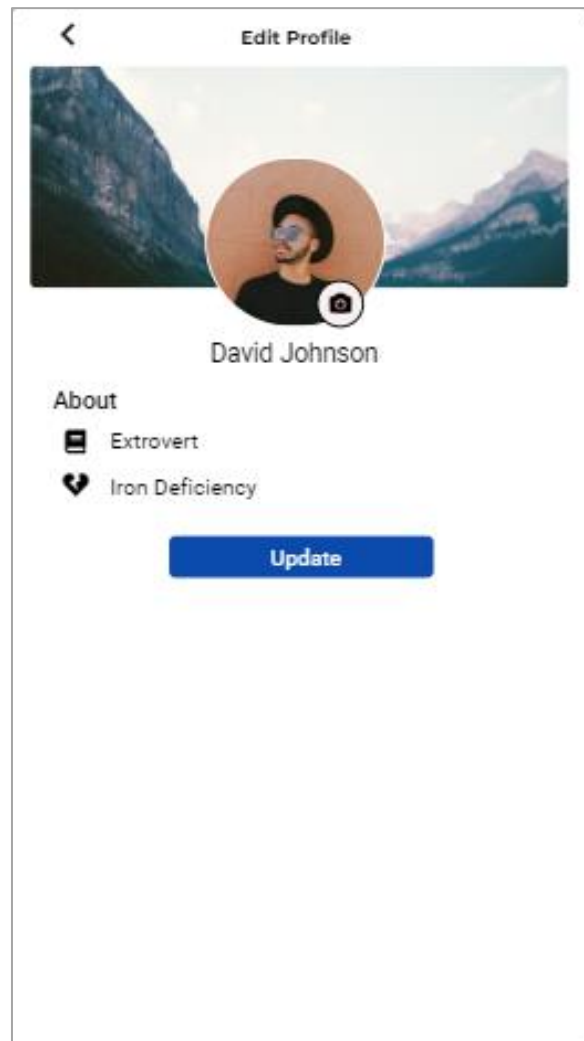


Figure 10. Edit Profile Screen.

A user can navigate to the edit profile screen from their own profile page. The edit profile screen enables users to change their bio, condition of interest and their profile picture. Once the user is satisfied, they can tap on the update button which will make the changes to their profile page.

2.2.10 Home Screen Sidebar

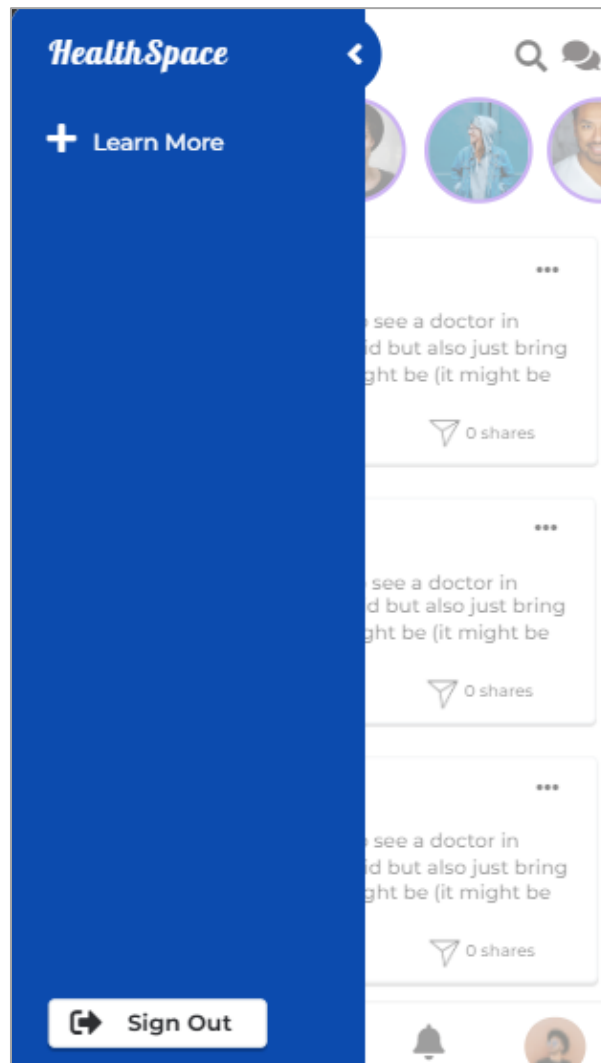


Figure 11. Sidebar.

The home screen contains a side bar which allows the user to navigate the application. The sidebar contains access to the learn more screen and opens up opportunity for the addition of new screens in the future. This allows the application to be both scalable and easily maintainable.

2.2.11 Learn More Screen

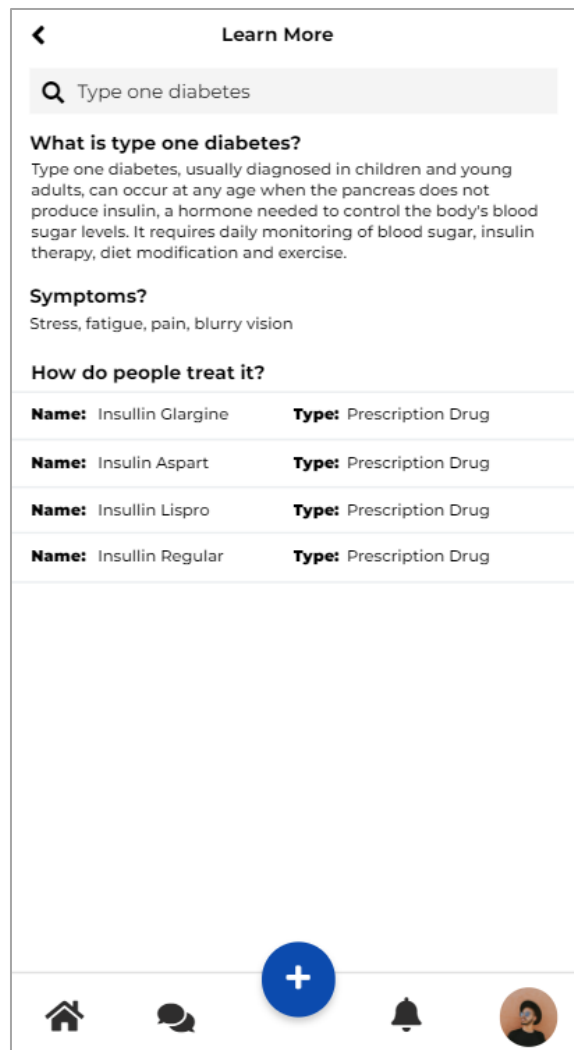


Figure 12. Learn More Screen.

The learn more screen allows users to learn more about a certain health condition. The user can use the search bar to search for an existing condition. If the condition exists, the system will return a brief description of the condition, the symptoms that you may experience as a result of having the condition and a list of ways to treat the condition.

2.3 Admin Site Screens

2.3.1 Users Screen

The screenshot shows the 'Users Screen' in the HealthSpace Admin Panel. On the left, there is a sidebar with the 'HealthSpace' logo and an 'Admin Panel' menu containing 'Users' and 'Posts'. The main area displays a table of users with columns for ID, Image, Name, Email, and Action. Each row includes a checkbox, a user profile picture, the user's name, email address, and 'Edit' and 'Delete' buttons.

<input type="checkbox"/>	ID	Image	Name	Email	Action
<input type="checkbox"/>	3nJhB0YyE0fo8A0pJLqDmFjx0653		Clara Townsend	ciara@gmail.com	Edit Delete
<input type="checkbox"/>	HRaxlXXiilMxd22xFE07UNZJeSF2		Jennifer Dee	dee@gmail.com	Edit Delete
<input type="checkbox"/>	h3lClKiifsd7xPsoa3cCKy3wV5A2		Brandon Fischer	bran@gmail.com	Edit Delete
<input type="checkbox"/>	smzvxqhr0Wbd0QvjmC6RcyEL3VD3		James Murphy	James@gmail.com	Edit Delete

Figure 13. Users Screen.

2.3.2 Posts Screen

ID	Image	Name	Post	Reported	Action
4jPMcEYTP56c1xq7wLW0		James Murphy	I've been diagnosed with anaemia and told to eat foods high in iron. What works for all of you?	0	Clear Delete
5usc8J3oRfRpWLTzbn1		Jennifer Dee	Antihistamine's do not seem to be making my hay fever any better. Is there anything else that migh...	0	Clear Delete
W7yQAviVUSE4QyEvzXo1		Ciara Townsend	I've been taking my iron supplements for 3 months now and feel a million times better!	0	Clear Delete
sRZFRkkkZ00JVtyRcxpD		Brandon Fischer	Has anyone else's hay fever been much worse this year?	0	Clear Delete

Figure 14. Posts Screen.

3 Use Case Diagrams

3.1 Mobile Application

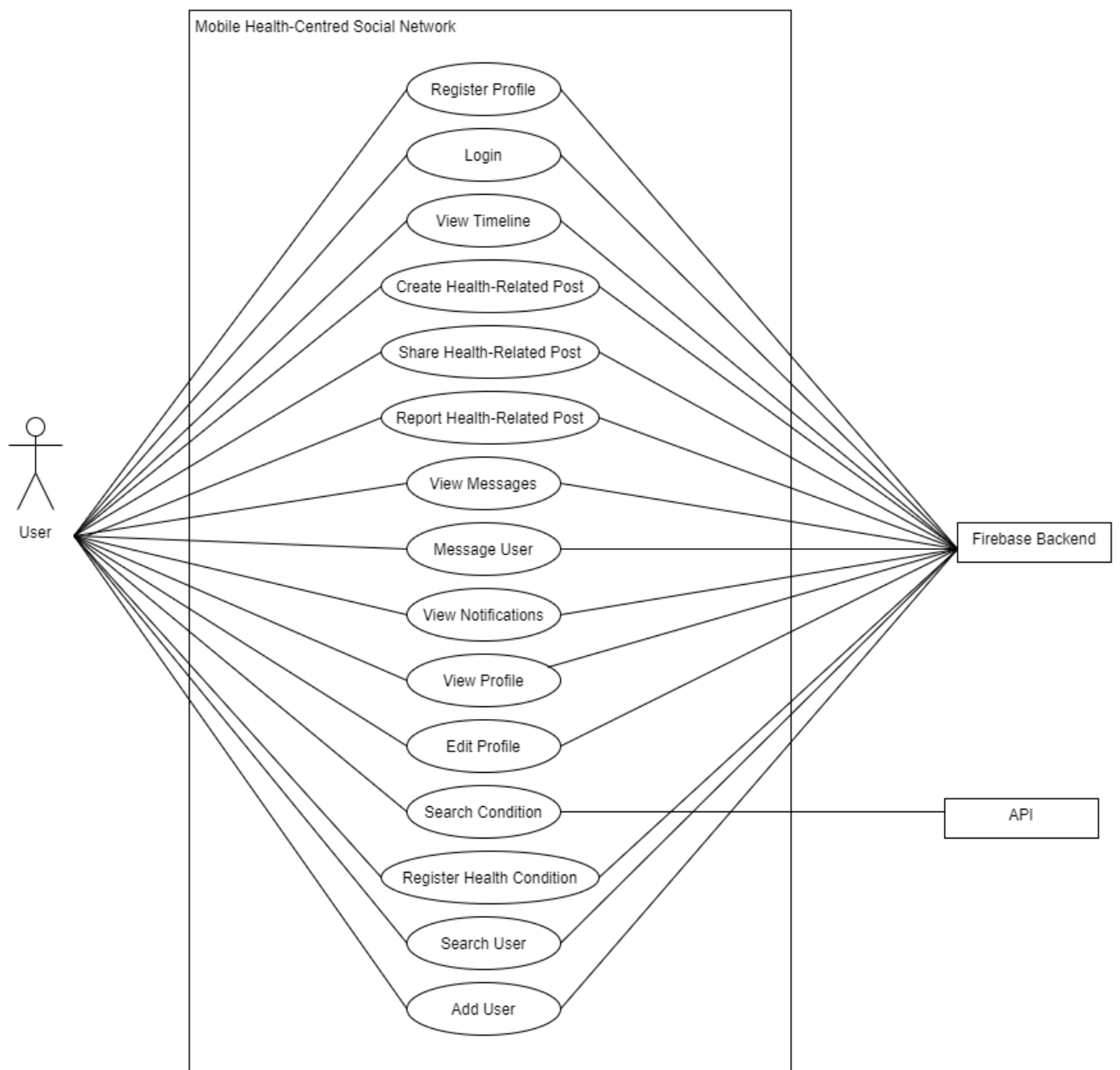


Figure 15. Mobile Application Use Case.

3.2 Admin Site

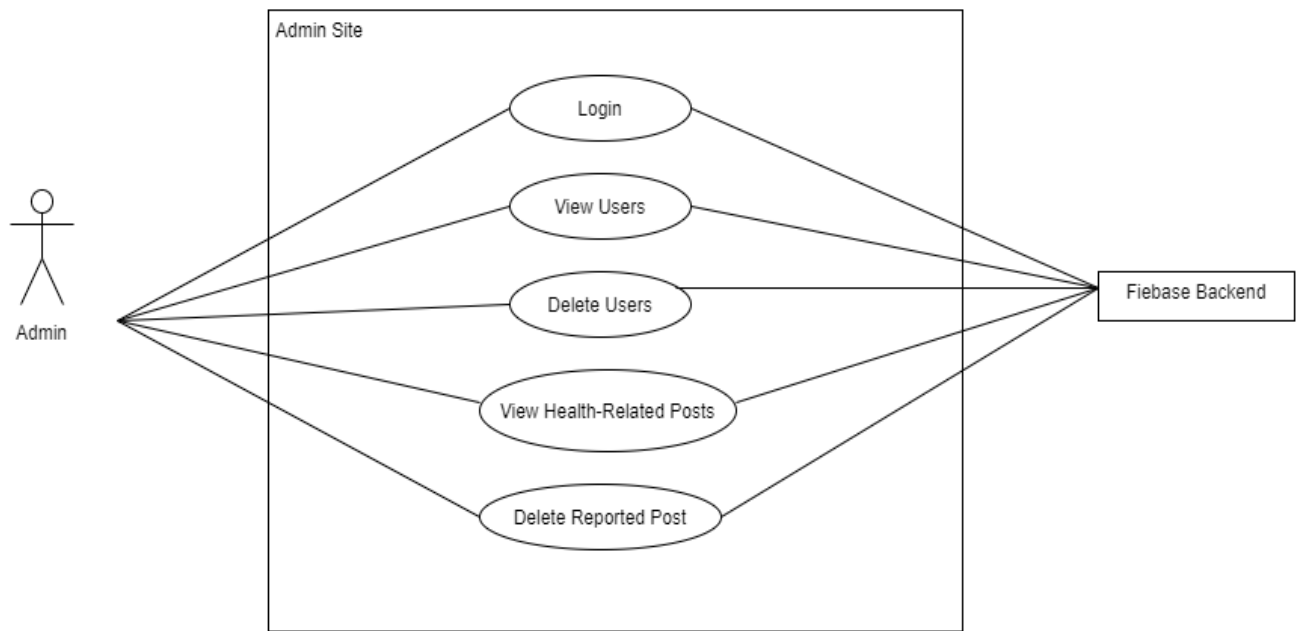


Figure 16. Admin Site Use Case.

4 Detailed Use Cases

4.1 Mobile Application

4.1.1 Register Profile

- Name:** Register Profile
- Actor(s):** User
- Main Success:** This use case begins when the user loads up the application and wishes to register a new account.
1. The user loads the application successfully.
 2. The user selects “Sign up” as they do not have an account registered.
 3. The registration page is opened.
 4. The user enters their information.
 5. The database stores their information.
 6. The user is redirected to the home page.
- Alternatives:**
- 5a. The user enters an invalid input.
 1. The app displays an error message.
 2. The user re-enters their details.

4.1.2 Login

- Name:** Login
- Actor(s):** User

Main Success: This use case begins when the actor loads up the application and wishes to login to an already registered account.

1. The actor loads the application successfully.
2. The actor selects “Sign in” as they already have a registered account.
3. The login page is opened.
4. The actor enters their information.
5. The database checks for an existing account.
6. The user successfully logs in and is redirected to the home page.

Alternatives: 5a. The email and password do not match a registered account.

1. The app displays an error message.
2. The actor re-enters their details.

4.1.3 View Timeline

Name: View Timeline

Actor(s): User

Main Success: This use case begins when the user wishes to view their timeline.

1. The user selects the timeline tab.
2. The system displays the timeline tab.

Alternatives: No alternatives.

4.1.4 Create Health-Related Post

Name: Create Health-Related Post

Actor(s): User

Main Success: This use case begins when the user wishes to create a health-related post and add it to their timeline.

1. The user navigates to the timeline tab.
2. The system displays the timeline tab.
3. The user creates a post using a format of their choice – text, image, video.
4. The user submits the post once they are satisfied with it.
5. The database stores the post.

Alternatives: No alternatives.

4.1.5 Share Health-Related Post

- Name:** Share Health-Related Post
- Actor(s):** User
- Main Success:** This use case begins when a user wishes to share a health-related post with other users or communities.
1. The user navigates to the timeline tab.
 2. The system displays the timeline consisting of health-related posts from other users and communities of interest.
 3. The user finds a post of interest and taps the share button.
 4. The system makes the post visible to others.
- Alternatives:** No alternatives.

4.1.6 Report Health-Related Post

- Name:** Report Health-Related Post
- Actor(s):** User
- Main Success:** This use case begins when a user views a post that does not follow the applications guidelines.
1. The user navigates to the timeline tab.
 2. The system displays the timeline consisting of health-related posts from other users and communities of interest.
 3. The user finds a post that is spreading misinformed health information.
 4. The user reports the post.
 5. The reported post is sent to the admin site.
- Alternatives:** No alternatives.

4.1.7 View Messages

- Use Case Name:** View Messages
- Actor(s):** User
- Main Success:** This use case begins when a user wishes to view their messages.
1. The user navigates to the messages tab.
 2. The system displays the user's conversations in order of the most recent first.
- Alternatives:** No alternatives.

4.1.8 Message User

- Use Case Name:** Message User
- Actor(s):** User
- Main Success:** This use case begins when a user wishes to message another user.
1. The user navigates to the messages tab.
 2. The system displays the user's conversations in order of the most recent first.
 3. The user finds the user they wish to message.
 4. The user creates a message and sends it.
- Alternatives:** No alternatives.

4.1.9 View Notifications

- Name:** View Notifications
- Actor(s):** User
- Main Success:** This use case begins a user wishes to view their notifications.
1. The user navigates to the notifications tab.
 2. The system displays the notifications tab consisting of alerts from friends and communities.
- Alternatives:** No alternatives.

4.1.10 View Profile

- Name:** View Profile
- Actor(s):** User
- Main Success:** This use case begins when the user wishes to view their profile information.
1. The user navigates to their profile page.
 2. The system displays the user's profile information including a personalised profile picture, bio and health condition of interest.
- Alternatives:** No alternatives.

4.1.11 Edit Profile

- Name:** Edit Profile
- Actor(s):** User

Main Success: This use case begins when the user wishes to change their profile information.

3. The user navigates to their profile page.
4. The system displays the user's profile.
5. The user selects "Edit profile."
6. The user changes their information and proceeds to update their profile.
7. The system validates the information entered by the user.
8. The system updates the user's profile and informs the user that the information was updated successfully.

Alternatives:

- 4a. The user enters an invalid input.
 1. The app displays an error message.
 2. The user re-enters new information.

4.1.12 Search Condition

Name: Search Condition

Actor(s): User

Main Success: This use case begins when a user wishes to search for a health condition.

1. The user navigates to the "learn more" screen.
2. The user uses the search bar to search for an existing condition.
3. The system will return a brief description of the condition, the symptoms that you may experience as a result of having the condition and a list of ways to treat the condition.

Alternatives:

- 2a. The condition does not exist.
 1. The app displays an error message.
 2. The user re-enters another health condition.

4.1.13 Register Health Condition

Name: Register Health Condition

Actor(s): User

Main Success: This use case begins when a user wishes to register a health condition of interest.

1. The user navigates to the profile tab.

2. The user selects the drop-down menu containing all common health concerns.
3. The user selects a health concern of interest.
4. The system records the selected health interest.

Alternatives: No alternatives.

4.1.14 Search User

Name: Search User

Actor(s): User

Main Success: This use case begins a user wishes to search for a user.

1. The user navigates to the timeline tab.
2. The user taps on the magnifying glass icon and searches for a user.
3. The system displays users that matches the entered name.
4. The user taps on the user of interest.
5. The system displays the user of interest's page.

Alternatives: 3a. No user with the entered name exists.

1. The app displays an error message.

4.1.15 Add User

Name: Add User

Actor(s): User

Main Success: This use case begins a user wishes to add another user.

1. The user navigates to the timeline tab.
2. The user taps the magnifying glass icon and searches for a user.
3. The system displays users with the entered name
4. The user taps on the add friend button.

Alternatives: 3a. No user with the entered name exists.

1. The app displays an error message.

4.2 Admin Site

4.2.1 Login

Name: Login

Actor(s): Admin

Main Success: This use case begins when the actor loads the admin site and wishes to login.

1. The actor loads the application successfully.
2. The login page is opened.
3. The admin enters their information.
4. The database checks for an existing account.
5. The admin successfully logs in and is redirected to the home page.

Alternatives:

- 5a. The email and password do not match a registered account.
 3. The app displays an error message.
 4. The actor re-enters their details.

4.2.2 View Users

Name: View Users

Actor(s): Admin

Main Success: This use case begins when the admin wishes to view all the application users.

1. The admin clicks on the view users tab.
2. The system displays all the applications users and their unqiue user id.

Alternatives: No alternatives.

4.2.3 Delete User

Name: Delete User

Actor(s): Admin

Main Success: This use case begins when the admin wishes to delete a user that is not following the applications guidelines.

1. The admin clicks on the view users tab.
2. The system displays all of the application's users and their unqiue user id.
3. The admin finds the user of interest.
4. The admin selects their name and clicks the delete button.
5. The system removes the user from the database.

Alternatives: No alternatives.

4.2.4 View Health-Related Posts

Name:	View Health-Related Posts
Actor(s):	Admin
Main Success:	This use case begins when the admin wishes to view all of the health-related posts. <ol style="list-style-type: none">1. The admin navigates to the posts tab.2. The system displays all of the application's health-related posts.
Alternatives:	No alternatives.

4.2.5 Deleted Reported Posts

Name:	Delete Reported Posts
Actor(s):	Admin
Main Success:	This use case begins when the admin wishes to delete posts that are not following the applications guidelines. <ol style="list-style-type: none">1. The admin navigates to the posts tab.2. The system displays all of the application's health-related posts.3. The admin sorts the posts by number of reports.4. The admin removes any posts that may be spreading misleading health information.
Alternatives:	No alternatives.

5 Database Structure

This section will display the database schema that is used by the HealthSpace application, as well as, the authentication system that is in place to store the user's information. The registration uses a combination of both the Firestore database and Firebase authentication technology provided by Google. The Firebase SDK authentication stores details such as the user id, email address, the account's creation date and the last time they signed in.

Identifier	Providers	Created ↓	Signed In	User UID
bran@gmail.com	✉	Apr 21, 2022	Apr 21, 2022	h3lClKiifsd7xPsoa3cCKy3wV5A2
ciara@gmail.com	✉	Apr 21, 2022	Apr 21, 2022	3nJhB0YyE0fo8A0pJLqDmFjx0653
james@gmail.com	✉	Apr 21, 2022	Apr 21, 2022	smzvxqhR0WbdOqyjmC6RcyEL3V...
dee@gmail.com	✉	Apr 21, 2022	Apr 21, 2022	HRaxlXXiilMxd22xFE07UNZJeSF2

Rows per page: 50 1 - 4 of 4

Figure 17. Firebase SDK Authentication.

The rest of the details we receive after login and other custom user information we collect from the app have to be saved in the Firestore database. Once authenticated, users can read and write to the Firestore database and cloud storage. You can control the access of those users by modifying your security rules seen in figure 16.

```

1 // Allow read/write access on all documents to any user signed in to the application
2 service cloud.firestore {
3   match /databases/{database}/documents {
4     match /{document=**} {
5       allow read, write: if request.auth != null;
6     }
7   }
8 }

```

Figure 18. Security Rules.

All of the application's images are stored in Firebase storage, including both the user's profile pictures and images that may be included in a health-related post. The photos are stored with a unique url, which is used to read them from the database and show them in the src attribute of an image tag.

The remainder of the data is stored in the Firestore database which stores data as a collection of documents. The following images will show the layout in a similar style. Each image will contain the collection name, document id and the fields within each document. It is important to note that for each collection, there can be multiple documents.

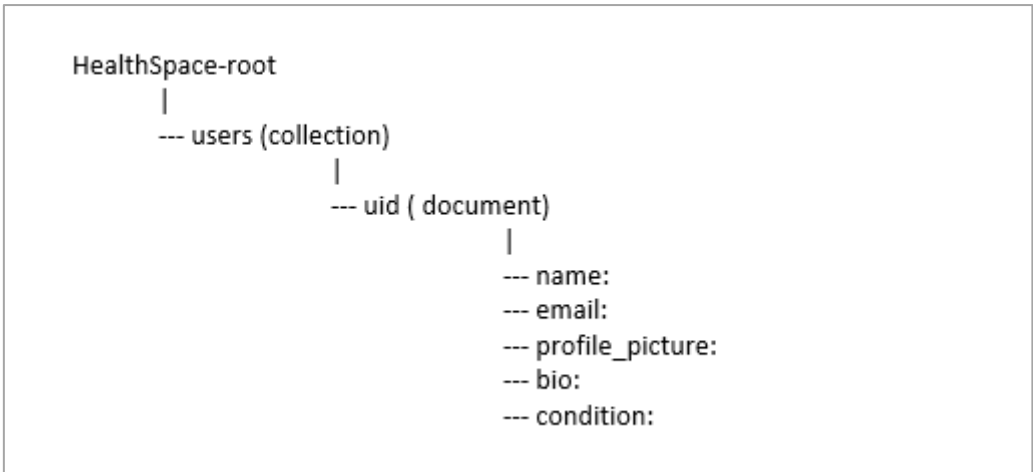


Figure 19. Users collection.

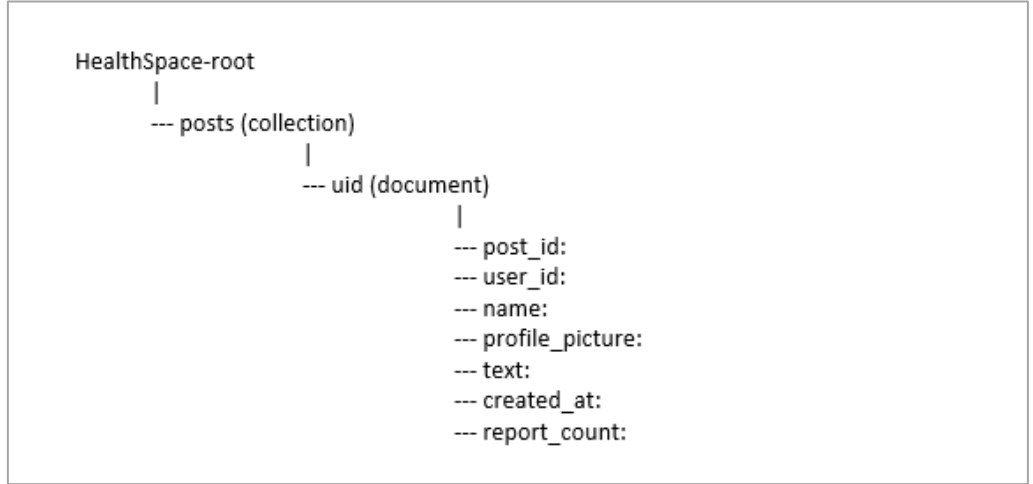


Figure 20. Posts collection.

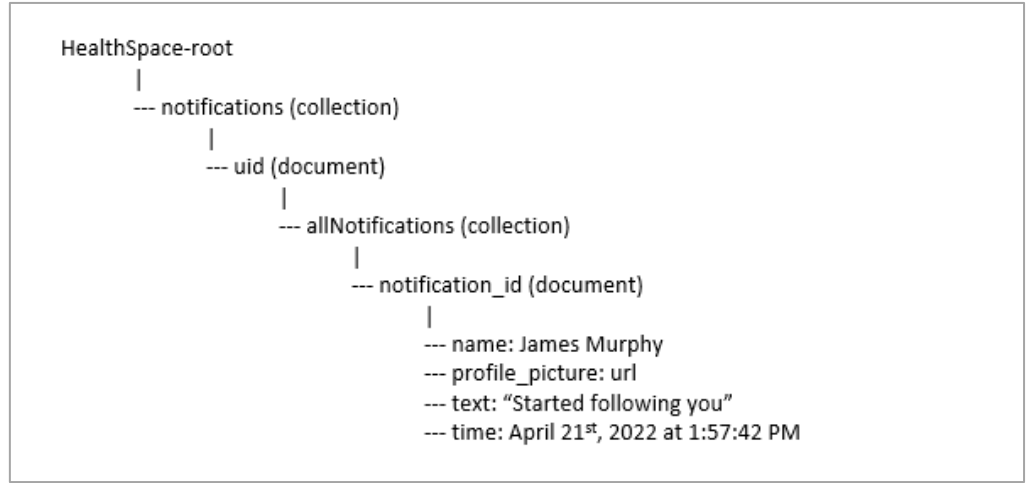


Figure 21. Notifications collection.

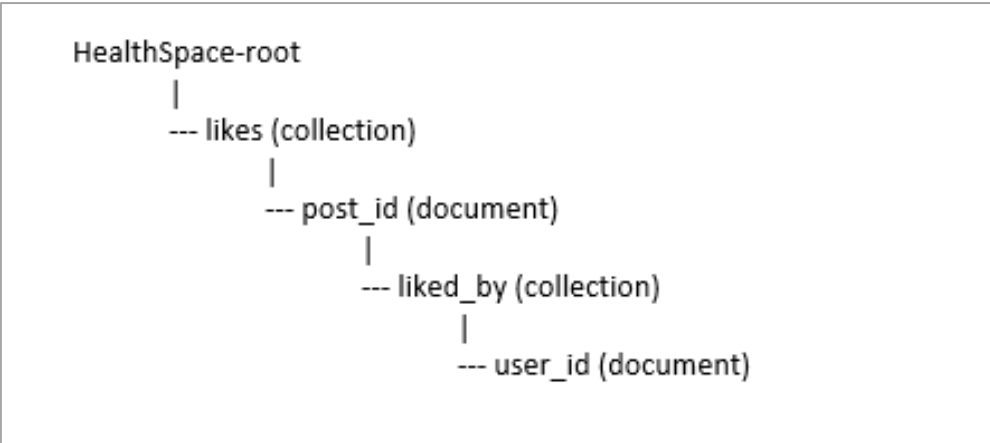


Figure 22. Likes collection.

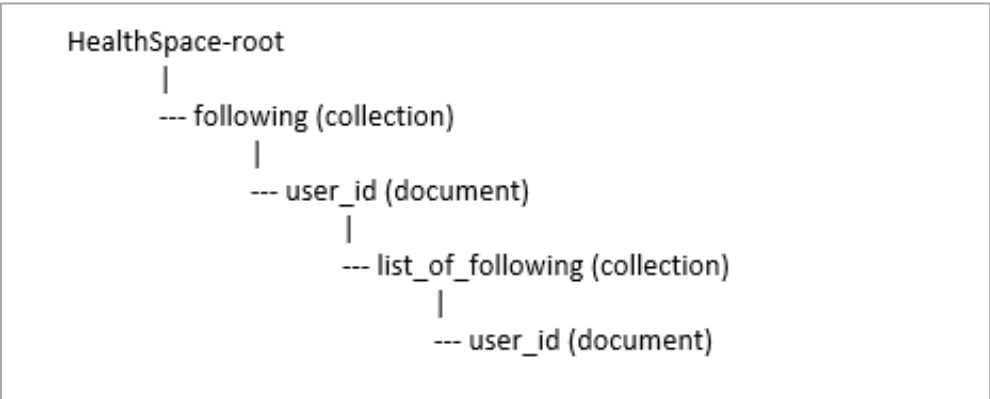


Figure 23. Following collection.

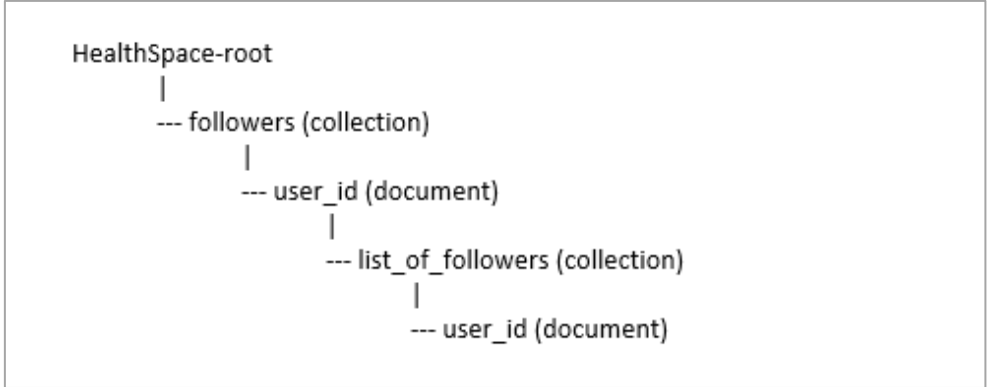


Figure 24. Followers collection.

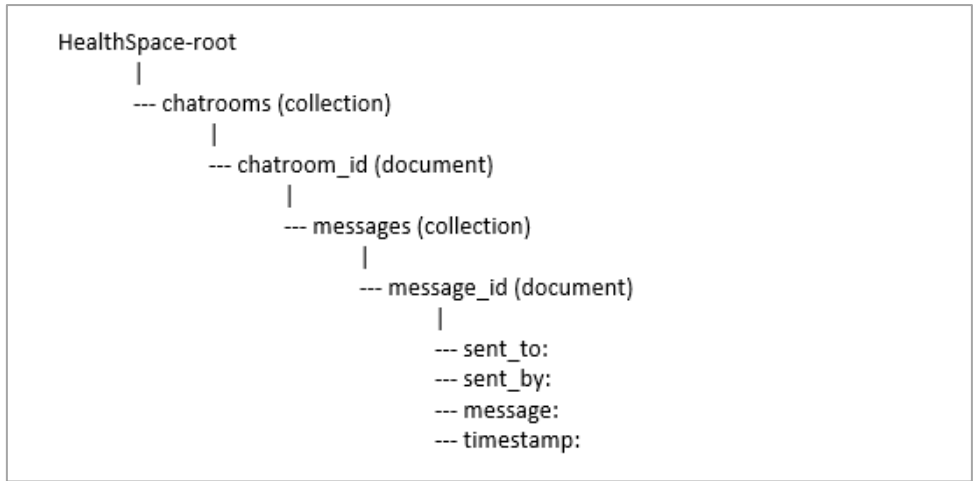


Figure 25. Chatroom collection.

6 Conditions API

All of the health-conditions available within the HealthSpace application will be stored in a JSON format. As of now, there are a total of 340 health conditions which includes all of the most common health conditions. The JSON format allows for all of the conditions to be easily human-readable, and will be stored as follows.

```

{
  id: 1,
  name: 'Abdominal Aortic Aneurysm',
  description: 'An abdominal aortic aneurysm (AAA) is a bulge or swelling in the aorta, the main blood vessel that runs from the heart down through the chest and tummy.'
  symptoms: 'Constant tummy pain and a pulsing sensation in the tummy and back.'
  treatment: 'Treatment is not always needed straight away if the risk of the AAA bursting is low. Surgery may be needed to stop it getting bigger.'
}

```

Figure 26. Conditions API.

The data can be fetched from the API and displayed on the screen for the user to see. The health conditions will be stored in a searchable dropdown menu, where the user can search for a specific condition. Once the user finds their health condition of interest, the user selects the condition which will display the conditions name, a short description, the symptoms you may be experiencing and the possible treatment. This process is demonstrated by figures 27 and 28 below.

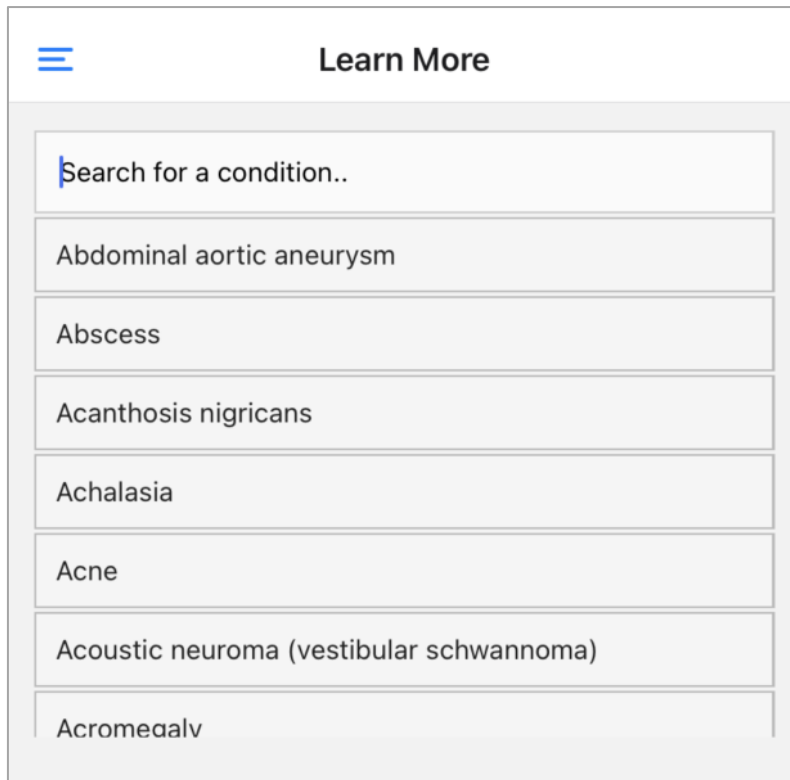


Figure 27. Condition Search.

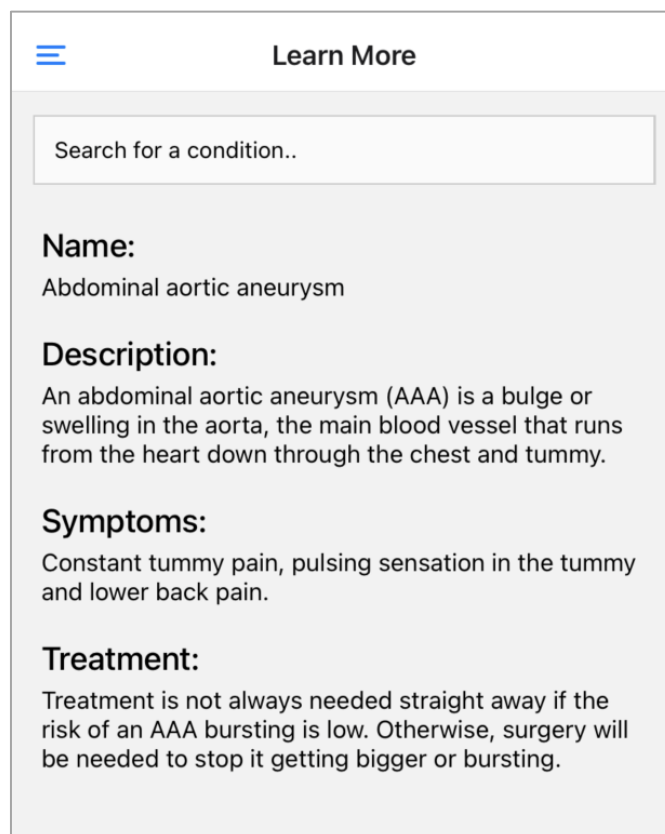


Figure 28. Condition Information.

7 Conclusion

The programmatic structure of the proposed mobile application and admin dashboard was detailed in the document using UML diagrams. The document also outlined the future design of the HealthSpace application through the use of the desired colour palette and user interface screens. The schema of the database was laid out and explained, as well as the process of storing and displaying each health condition's information.