**Doctor’sNote**

**Team 7 - Product Backlog**

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1. **Problem Statement**

Doctors frequently need a method to communicate with patients outside of the office to increase availability and promote patient follow-through, and patients often have questions for their doctor that can be quickly and conveniently answered through a messaging service rather than through a scheduled, in-person appointment. However, HIPAA adds restrictions to communication that prohibit using traditional messaging services such as email, SMS, or even WhatsApp. Doctor’sNote provides a secure, HIPAA compliant way for doctors and patients to communicate in a timely manner without fearing for a patient’s privacy.

1. **Background Information**

*Audience*

In the age of mobile applications, patients need a faster way to communicate with their doctors. Due to HIPAA regulations, text messages and emails are not suitable for doctor-patient communication. Our app provides a HIPAA-compliant messaging system to allow healthcare providers and patients to communicate quickly and conveniently in an instant messaging environment.

Our system will implement four distinct user roles, each providing different permissions and experiences within the service. For the purpose of clarity, these roles will also be used in the below stories. Patients are end users whose healthcare information is being discussed.Doctors are providers who may actively converse with patients. Both *doctors* and *patients* are considered to also be *conversers* for the sake of terseness and clarity in this document. Registrars are healthcare professionals who have the proper permissions to view sensitive information, but do not have permission to send messages. Finally, administrators are users who may see certain high level information about a subset of *doctors*, but not the messages themselves. A user refers to all of the above.

*Similar Applications*

There are similar messaging apps currently on the market. MyHealthOnline is an app created by SutterHealth that allows user to communicate with doctors in their care team and manage their health records. Based on the reviews for MyHealthOnline on the Apple App Store, this app has many features such as messaging and scheduling that we hope to implement in Doctor’sNote, but they were not executed well based on the negative feedback. OhMD is a mobile app that provides HIPAA-compliant messaging between patients and doctors. However, with Doctor’sNote we hope to improve this process by implementing features such as scheduling appointments, which this existing app does not have.

*Limitations*

Many health record apps do provide a way to find patient information such as records, medications, and appointments. However, most of these apps lack a convenient way to contact doctors about issues not related to a previous appointment. Our app seeks to remedy this by creating a platform for patients to initiate conversations with doctors that can then turn into appointments.

1. **Functional Requirements**

*Authentication*

1. As a patient or administrator, I would like to be able to create an account, with a unique username and password, if I do not already have one so that I can authenticate and use the service.
2. As an administrator, I would like to be able to create an account on behalf of a doctor or registrar, with a unique username and password, if they do not already have one so that they can authenticate and use the service within my group.
3. As a user, I would like to log in if I have not done so yet on the current device so that I can continue to use my account.
4. As a user, I would like to only have to enter my password, rather than both my username and password, if I have already authenticated at least once on the current device so that reauthenticating is as convenient as possible.
5. As a user, I would like to have native support for iOS devices so I can use the app on my Apple devices.
6. As a registrar, I would like to have a web portal to access conversation records on behalf of doctors so that I can record transcripts in a HIPAA compliant manner.
7. As a user, I would like to be automatically logged out after closing the app or after a period of inactivity so that no one unauthorized access sensitive information.
8. As an administrator, I would like to be able to lock doctors and registrars out of their accounts so that I can preserve information while revoking access.
9. As an administrator, I would like to be able to delete doctors’ and registrars’ accounts so that I can eliminate them from my group after proper information has been transcribed.
10. As a patient or administrator, I would like to be able to delete my own account so that my information is no longer stored.
11. As a user, I would like a way to log out of the app so that multiple people can log into one app or device if desired.

*Starting a conversation*

1. As a converser, I would like to be able to search another converser by username so that I can request to start a conversation with them.
2. As an administrator, I would like to be able to search up a patient and request to start a conversation with them on behalf of a doctor so that I have improved personnel management capabilities.
3. As a converser, I would like to receive a nondescript notification when another converser has requested to start a conversation with me and have the option to either accept or decline the conversation, so that the conversation is fully consensual.
4. As a patient, I would like to be able to scan a QR code in my doctor’s office that will automatically initiate a conversation with them, so that I don’t have to search their username manually (if time allows).
5. As a converser, I would like to be able to search among active conversations so that I can resume a conversation without having to scroll through all of them to find it.
6. As a doctor or administrator, I would like to be able to remotely log a patient out of their account upon a patient’s request, so that the app maintains HIPAA compliance.
7. (If time allows) As a patient, I would like to be able to match with a specialized doctor other than my primary physician based on my conditions and preferences.

*Messaging*

1. As a converser, I would like to be able to type messages into a text box and send them within the app so that I can communicate.
2. As a converser, I would like to be able to see past messages in the chat, as well as messages as they are sent, so that I can refer to past messages and see new ones.
3. As a converser, I would like to be able to see when a message has been read by the person I am conversing with so that I can anticipate incoming responses.
4. As a converser, I would like to know when a message fails to send so that I can attempt to resend it or otherwise handle the problem.
5. As a converser, I would like to be able to send images and videos to the person I am conversing with so that I can communicate more effectively.
6. As a converser, I would like to be able to have text to speech for my messages so that I can use the app even if I am visually impared.
7. As a converser, I would like to have voice dictation supported for messages so that I can use the app even if I am visually impared.
8. As a patient, I would like my private health information to be encrypted so that it cannot be accessed without proper authorization.
9. As a converser, I would like to receive discrete notifications about new messages so that I am aware when a new message has been received.
10. As a converser, I would like to be able to retract a sent message so that the person I am conversing with cannot see messages that were sent in error.
11. As a converser, I would like to be able to disconnect from a conversation so that I don’t have old conversations cluttering the app.
12. As a converser, I would like to be able to send additional file formats such as PDF and DICOM so that I can share relevant information in more formats (if time allows).
13. As a converser, I would like to be able to open the camera in-app and send photos immediately, so that the photo does not live outside of the app in an insecure environment.
14. As a developer, I would like a way to notify users if there has been a data breach so that they can be aware of when their information has been compromised.
15. As a developer, I would like messages to be automatically deleted after a certain time period so that I can maintain HIPAA compliance.

*Metrics*

1. As a developer, I would like to maintain a count of sent messages, as well as a count of messages that initially failed to send but were eventually sent, so that I can be aware of server side problems before users self report it.
2. As a user, I would like a way to send feedback to the developers to report issues so that they can be fixed.
3. As a developer, I would like a way to view submitted feedback so that I can fix the issues accordingly.
4. As a developer, I would like a way to purge inactive doctor accounts so that they do not clutter the service.

*Scheduling*

1. As a patient, I would like to request in-app or in-person appointments appointments with the doctor so that I can meet with them if necessary.
2. As a patient, I would like to export appointments to my calendar, so that I can easily keep track of my appointments.
3. As a patient, I would like to be able to conveniently find and connect with an anonymous support group, so I can get help dealing with my condition.
4. As a doctor, I would like the ability to schedule an appointment the patient with whom I am chatting so that an in-person appointment can be made if necessary.
5. As an administrator, I would like a way to initiate and terminate doctor-patient relationships so that the patients and doctors are not required to set them up.
6. As an administrator, I would like an interface to view summary data so that I can gauge the effectiveness of the service.
7. As an administrator, I would like to add and remove doctors to and from the network so that they can be paired with patients when available.
8. As a registrar, I would like to be able to export transcripts and other records so that my employer can maintain HIPAA compliance.
9. As a compliance coordinator, I would a way to view information access history so that I can enforce compliance controls.
10. As a patient, I would like to add, remove, and edit reminders to take medications.
11. As a doctor, I would like to create and remove reminders for patients to take medications.

*Other*

1. As a user, I would like UI elements to have accessibility tags so that services such as VoiceOver can help me navigate the app if I am visually impaired.
2. As a patient, I would like the ability to import data from Apple Health to share with doctors (if time permits).
3. As a patient, I would like a link in the app to take my to my healthcare provider’s website for more information.
4. As a patient, I would like the ability to see a profile of my doctor including their name, photo, and normal work hours.
5. As a doctor, I would like the ability to set up a profile with my name, photo, and normal work hours.
6. **Non-Functional Requirements**

*Performance*

The service should have a median uptime of 99.9%, and the user should be able to send messages at any time. Doctors will only be required to respond within normal business hours. This should have a latency within 500ms in order to ensure that the user experiences responsiveness inside of the app. Our service should be scalable up to 10,000 simultaneous requests since that is the number of requests we estimate are needed to serve the state of Indiana assuming each patient talks to their doctor for 30 minutes a month. It is important that we communicate with the database in a way that minimizes calls to reduce data for the user and requests that can quickly become enormous as our service reaches new customers.

*Security*

The app should be locked with TouchID, FaceID, or a PIN so that if someone has access to your device they cannot easily log into the app. The service should required Two-Factor Authentication on the first login to provide greater verification of the patient. Public key cryptography will be used to secure communications between doctors and patients so that others cannot view the conversation.

*Usability*

The app should be clear and easy to use for patients with diverse backgrounds and ages. The interface should be large enough to be readable for the elderly and should be easy to navigate for those with little experience with technology.

*Hosting/Development*

The backend will be hosted by Amazon Web Services (AWS) and the frontend will be hosted on the Apple App Store. Each can receive updates at different times in case of a bug that occurs in only one of the systems.

*Maintainability*

Our project should follow common software engineering patterns to maintain a readable and well-formatted codebase. Before deploying any code, we will conduct peer reviews and confirm that tests are in place to verify the robustness of the app and service.

*Reliability*

The code base should have at least 80% line coverage under unit tests to assert reasonable confidence that our system works as expected. The service will be tested with data size up to the specification.

*Extensibility*

The classes shall have an easily extensible structure where generic classes define interactions and are extended to add specific features.