MedRemind

Devayan Mandal

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Project Description

MedRemind will be a mobile device application which I would like to design. It will aim to remind the user to take their prescription medication and non-prescription supplements in a timely manner. The app will be designed for the iOS 7.0 version or later. The following features describe the mobile app's features and characteristics:

- The app will assist the user to organize a schedule for taking medications and/or supplements
- It will provide a reminder if any special form of administration is required (insulin, intravenous administration)
- It will remind the user about the medicine even if the mobile device is asleep
- A reminder will be provided if the medication requires a refill and produce a customizable sound reminder during the allotted time.
- The mobile device app will also provide the user the ability to add medication schedules for other members of the family. This will serve as a useful feature for parents and families.
- The mobile app will help the user share information regarding the medication with the health practitioner's office or the pharmacy through an email synchronization feature.
- The user will also be able to search for prices of generic medication by synchronizing the mobile app to the user's preferred pharmacy.

Existing applications and projects similar to MedRemind

Usage of smartphones and computer tablets are growing at a very rapid rate. According to a study published by Business Insider (Heggestuen J, 2013) almost 20% of the current population owns a smart phone. With the rapid increase in usage of smartphones, usage of mobile device apps is also growing proportionally (Heggestuen J, 2013). Many users use apps for entertainment purposes, but now it is become more

common for both users and healthcare professionals to use them for accessing and disseminating medical information.

A noteworthy example of an app in the medical category is the official app from the National Institute for Health and Care Excellence (NICE) which provided healthcare providers with up to date information regarding medical literature. According to Patel (2010), the app is used by healthcare professionals and medical students extensively.

Another noteworthy example of an app used for medical purposes is the iBGStar Blood Glucose Monitoring System (Drell, 2014). By connecting a portable meter directly to the iPhone smart phone, the user can measure and obtain blood sugar readings to assess a diabetic panel.

CellScope Oto (Drell, 2014), another iPhone geared app, allows the user to take pictures of the inner ear and send them through a secure server to their health practitioner.

Several mobile apps in the medical category, which serve the purpose of reminding the user about their medication, are available on the market. A few of the apps already available for free or premium download (Apple Inc. App Store, 2014) in this category of digital reminders include:

- Pill Monitor Free
- Meds Agenda
- Pill Prompter
- Med Tracker
- Dose organizer Lite

Novelty of the chosen mobile application:

Although many of the features of both the free and the paid apps are the same, a highly customizable, user-oriented app will remain as the goal of this project. The app will aim at making the mundane experience of taking one's medication more interactive and user-friendly.

For example, a head to head comparison with a few of the available iOS 7+ medical reminder apps allow us to observe which features are presently offered and which are lacking in providing a complete user experience.

- **Pill Prompter** (Apple Inc. App Store, 2014) allows for easy setup of a certain medication, complete with the functionality to set the time of the reminder within the same screen.
- But, it doesn't allow for changing the appearance of the medication & provides the same screen for every new entry.
- This would encourage the user to develop an image of the 'white pill' in long term memory, hence adding to the already mundane experience of taking medication.

Create pill taken schedule

Check due or upcoming reminders

- **Pill Monitor Free** (Apple Inc. App Store, 2014) is equipped with basic medical reminder features packaged in a modern design.
- However, the mobile application bombards the user with excessive visual stimuli, as observed in the above screenshots
- Similar to Pill Prompter, it encourages the user to develop a monotonous image of the medication pill, even though present pharmaceutical companies are increasingly using different mediums of drug administration.
- It provides no form of security to safeguard client sensitive health information
- It provides no option to synchronize prescription refills with the user(s) participating pharmacy.

The engagement component in a smartphone or mobile device app is what already lures both users and healthcare professionals to the software domain. Hence, by designing an app which would allow the user to remember to take medication in a timely

manner would assist healthcare professionals in maximizing the therapeutic efficacy of the medications.

Discussion of technical challenges and the technologies which the mobile application may be dependent on:

1. The mobile app will be geared towards *storing sensitive client information* regarding user health related records and prescription medications. Hence, the first window will be a *password lock* which will be required to prevent other persons to view and manipulate the user-entered information. Also, if the user were to *forget his or her password*, a *retrieval method has to be strategized* to allow the user to continue using the mobile app. A solution to this may suggest the capability of the mobile application to be synchronized with the user's primary address for delivery of a password retrieval mechanism.

2. The *primary language* of the app will be chosen as *English*. However, the *large Spanish speaking population* in the United States will be taken into consideration and ways to *effectively translate* instructions, reminder details and information has to be devised.

3. The mobile app will provide the user the ability to *search for the lowest prices* for a certain *medication* available on the marketplace. Hence, a way to effectively synchronize a *national pharmacy's* online search tool for *generic medication prices* has to be devised.

4. The mobile app will allow the user to *interact, share and alert the health practitioner's office* and/or *pharmacy* regarding a certain medication. Hence, synchronization with the user's choice of email with the mobile app has to be devised.

5. For the mobile app to effectively provide timely reminders would require the user to feed pertinent information regarding the medication. Hence, *user-made entries* about prescription medications and non-prescription supplements *will be required*.

6. As the geriatric population represent a larger percentage of prescription medication users, the integration of *screen magnification* options such as *tapping or pinching to zoom in or out* may pose as a requirement

User Analysis

Detailed Descriptions of users:

Identification of the mobile application's end users is crucial in allowing MedRemind to fully deliver its reminder responsibilities. Analysis of the following identification factors may assist the design process of the user interface:

- *Target user age group:* Will primarily range from early adulthood to late adulthood, although the criteria can be easily expanded to the adolescent age group and geriatric population too.
- *Expected user education level:* Usage of the mobile application will be delivered using basic instructional messages and hence a need for higher academic competence is not a necessity. MedRemind will be geared towards majority of the current population.
- *Physical limitations:* The geriatric population represents a larger percentage of prescription medication users. As discussed in the section of technical challenges, the integration of screen magnification technology such as tapping or pinching to zoom in or out will be incorporated.
- *Application experience:* Frequent usage of smartphones coupled with a fair use of mobile applications will provide an easy transition into using the MedRemind app.
- *Environment:* It would be expected to use MedRemind in a fairly quiet environ such as at one's home, pharmacy or the physician's office.

In addition to all of the above criteria, an environment which offers the opportunity to correctly input the medication reminder information is crucial, as remembering to take the medication is the only way of achieving maximum therapeutic efficacy.

User Analysis based on role:

MedRemind will support two classes of users within its design interface:

Primary user class: *Administrator*

- Client sensitive information pertaining to medical records will be stored in the administrator profile. These may include unique identification information assigned by the participating pharmacy and/or health care records & identification PINS assigned by the client's physician's network.
- Administrative information pertaining to security will be stored in the administrator profile. This may include the entry password and information to synchronize the client's email address for password retrieval.

Hence, the administrator profile will be created on the assumption that the owner of the smartphone will be the primary user of the mobile application.

Secondary user class: *User*

As discussed previously, MedRemind will also allow the user to add medication schedules for other members of the family. This serves as a useful feature for parents and families.

The user is granted access to the mobile application by the administrator only. Access is granted using a dual step process:

1. The administrator enters the required mobile application entry password.

2. On doing so and on the same device, the user enters their profile password as the following security step.

"Persona" for user classes:

Creating personas for the administrator and the user will provide a convenient handle for talking about the user classes.

Administrator:

Steve is a 35-year old man who is married and has two children. He lives in Los Angeles and works as a microbiologist in a private research facility. Steve and his significant other, Martha are very health conscious and wish to inculcate healthful habits into their two children: Josh who is 9 years old & Alicia, who is 7 years old. Both parents are very tech savvy & greatly rely on their cell phones, tablets and personal computers to communicate, stay organized and maintain a healthy social life.

Steve owns the smartphone in which MedRemind is installed and hence assumes the role of the administrator. He entrusts the mobile application to hold certain client sensitive information about himself.

User:

Martha is a 32-year old woman and is married to Steve. She is a Pilates instructor and is plenty busy with the kids. She uses the MedRemind mobile application occasionally to store information about a few medications she takes. Recently, Steve logged her in and she set a reminder to take both their children to receive the flu vaccines.

Task Analysis

The task analysis will provide detailed descriptions for each task performed by the MedRemind mobile application.

Task 1: Log In

- *Goal*: To allow the client entry into MedRemind
- *Preconditions:* Required knowledge - Administrator password
- *Subtasks:* None

Figure 1

Figure 1: Password requirement for entry into the MedRemind mobile app

Task 2: Patient Information

- *Goal:* To input information which will identify the client as a unique patient
- *Preconditions:* Patient's name, reminder tune desired
- *Subtasks:*
    1. Options: (to make desired selections in subcategories)

a. Reminder Alert:

- Choose from mobile application sound gallery
- Select tune from user's multimedia gallery

b. Send Medical Documents: Redirects to administrator's email account
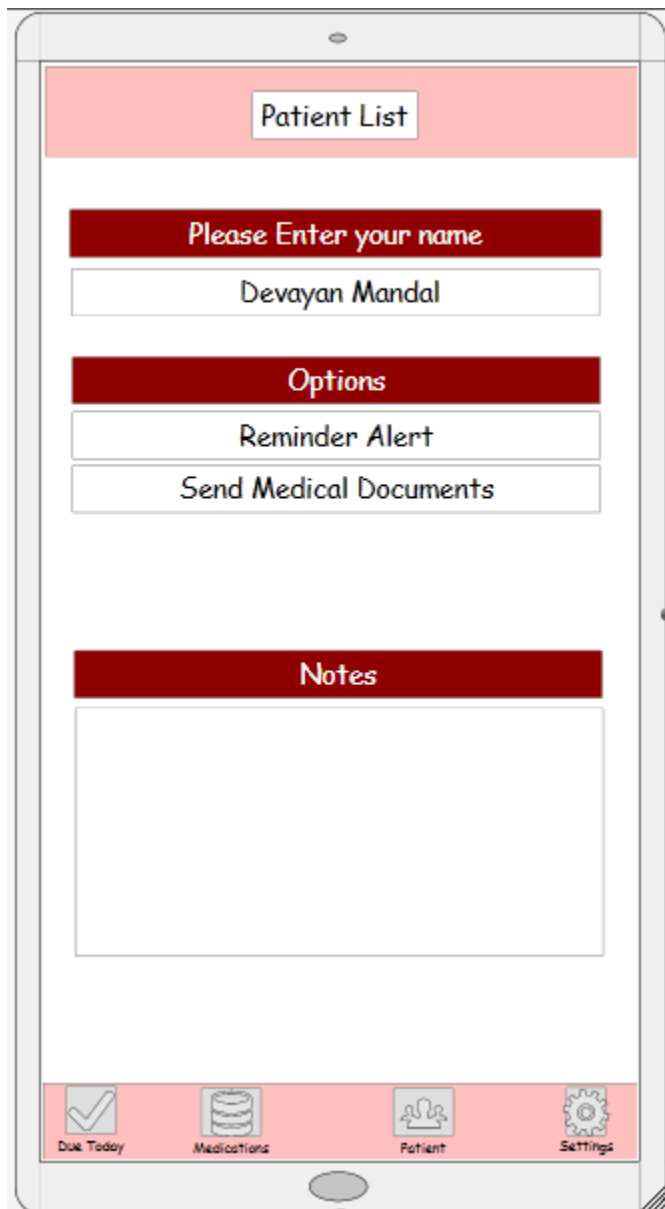
Figure 2   Figure 3
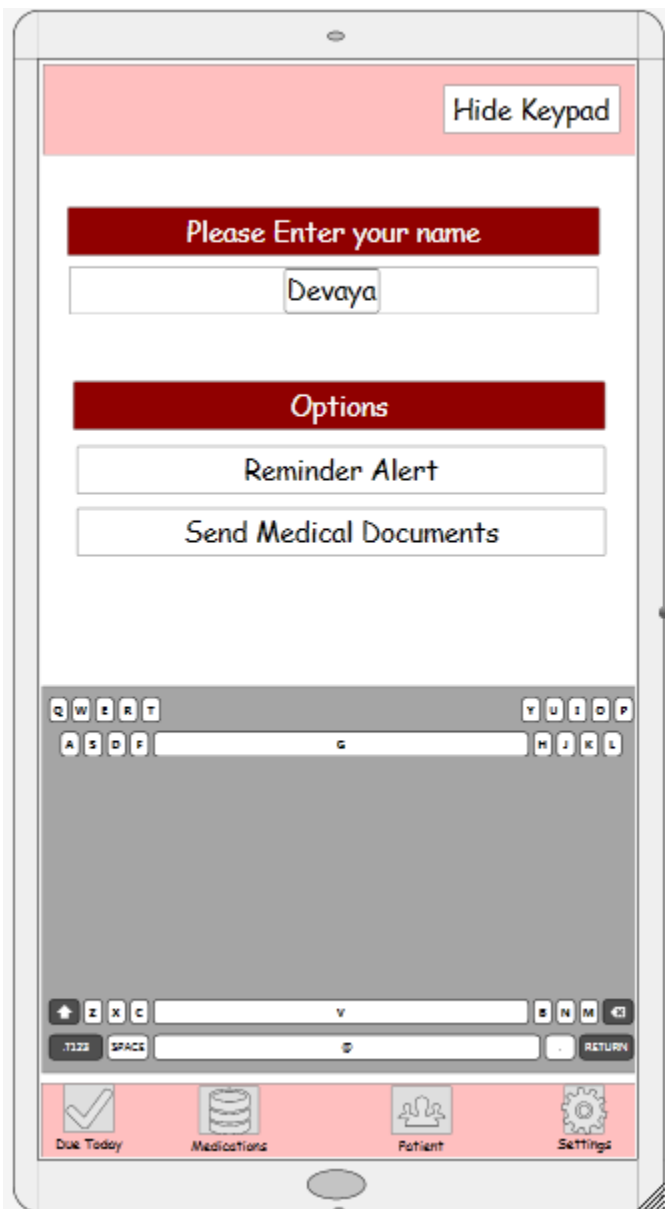
Figure 2: Displays main patient screen with patient information

Figure 3: Capability to add or edit patient information

Figure 4: Capability to choose reminder alert
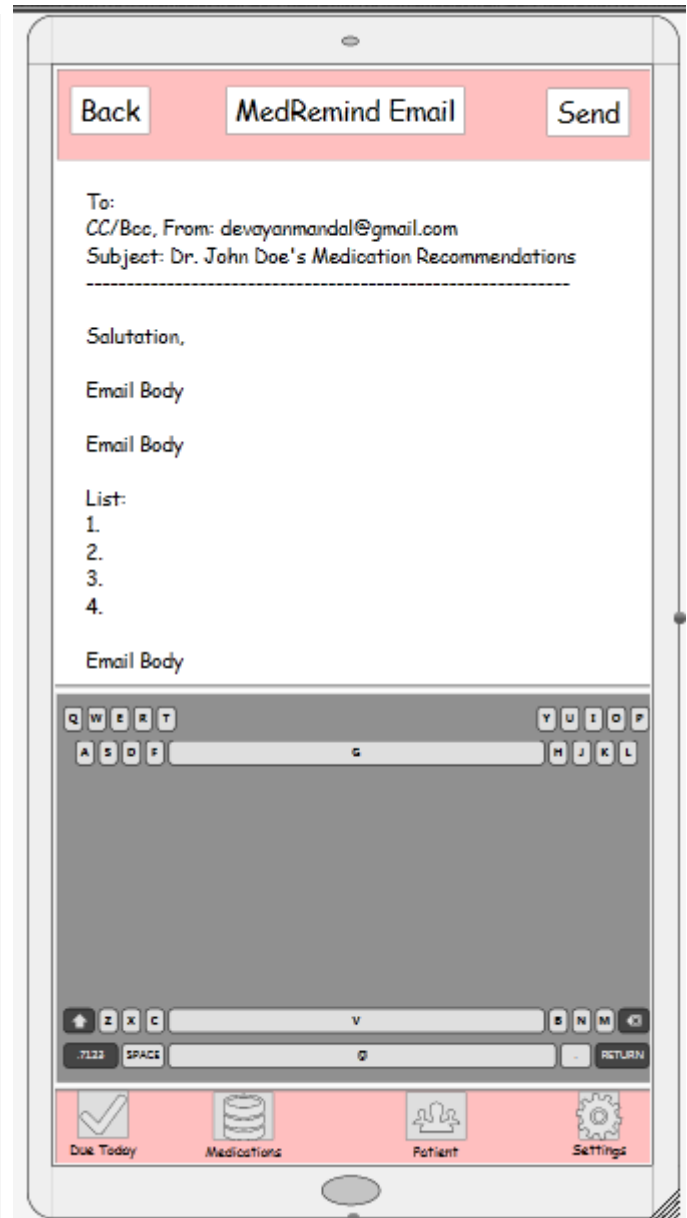
Figure 5: Capability to email healthcare provider through the mobile app
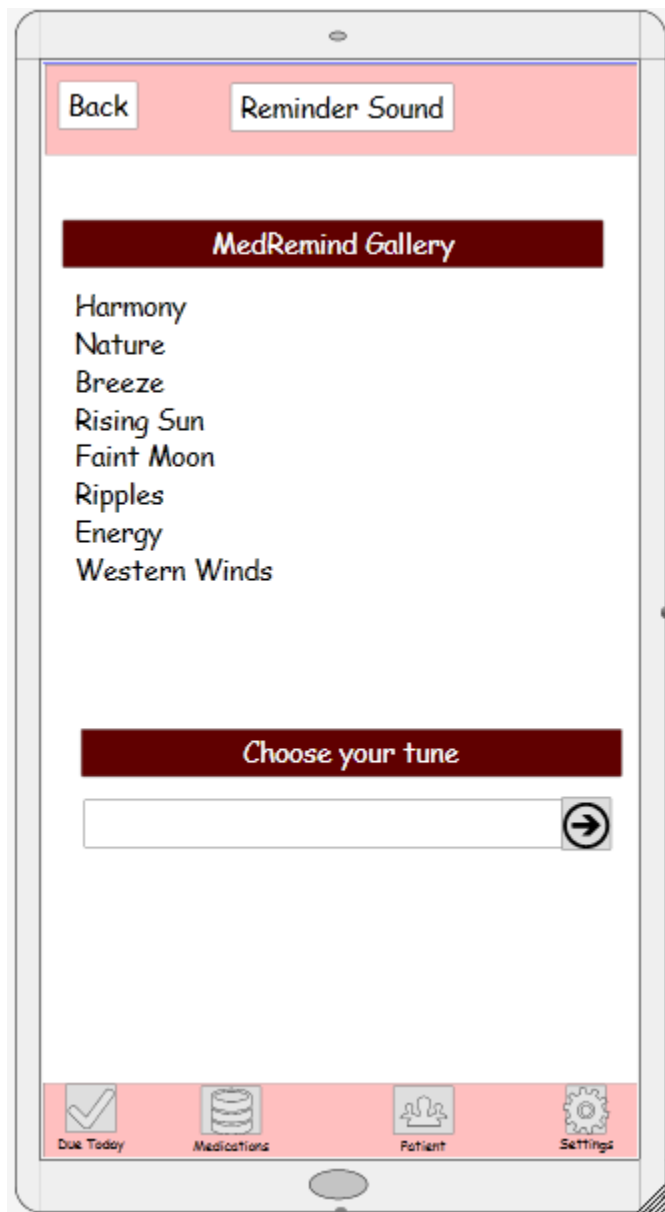
| Figure 4 | Figure 5 |

Task 3: Medication Information

- *Goal:* To input information specific to a medication

- *Preconditions:* Detailed information regarding the medication which may include name, purpose for taking, drug interactions and others.
- *Subtasks:*
  1. Details:
     a. Medication: Enter the name
     b. Appearance: Select from different size, color, administration medium options
     c. Purpose: Can enter the purpose for taking
     d. Instructions: Any special method needed for administration
     e. Drug Interactions: Pertinent information provided by healthcare provider or medication leaflet
        Remove: Will delete the medication
  2. Schedule:
     a. Times: Choose what time of the day
     b. Days:
        i. Schedule type: Choose how many days a week it is administered
        ii. Frequency: Choose how many times a day it is administered
  3. History: Past dosage for the particular medication
  4. Cost: Automatic synchronization with participated pharmacy to provide current generic medication prices

Task 4: Settings

- *Goal:* To allow the client to adjust and/or choose different features of the mobile application
- *Preconditions:* Knowledge of the feature(s) which the client wants to adjust and/or change
- *Subtasks:*
  1. Change password(administrator):
     i. Enter current password
     ii. Change to new password
  2. Change password(user):

      iii. Enter current password

      iv. Change to new password

3. Password Retrieval:

    i.   Enter current password

    ii.   Change/choose which email address to sync with in the event of forgetting the password

4. Welcome Screen: Provide quick tour of MedRemind

5. Disclaimer

Task 5: For Today

- *Goal:* To show what medication is due today
- *Preconditions:* None
- *Subtasks:*
  1. View: which medication has been already had and which medication is left

Domain Analysis

A detailed description of each of the mobile app components is essential in creating a domain analysis. In this phase, we will identify the different entities and their relationships:

Entities:

- **People (user classes):**
  1. Administrator
  2. Users
- **Physical Objects:**
  1. iPhone (iOS 7+)
  2. iPad (iOS 7+)
  3. iPhone SDK simulator for MAC OSX system
- **Information Objects:**

1. Patient Account
2. Medication Information
3. Schedule

Figure 6
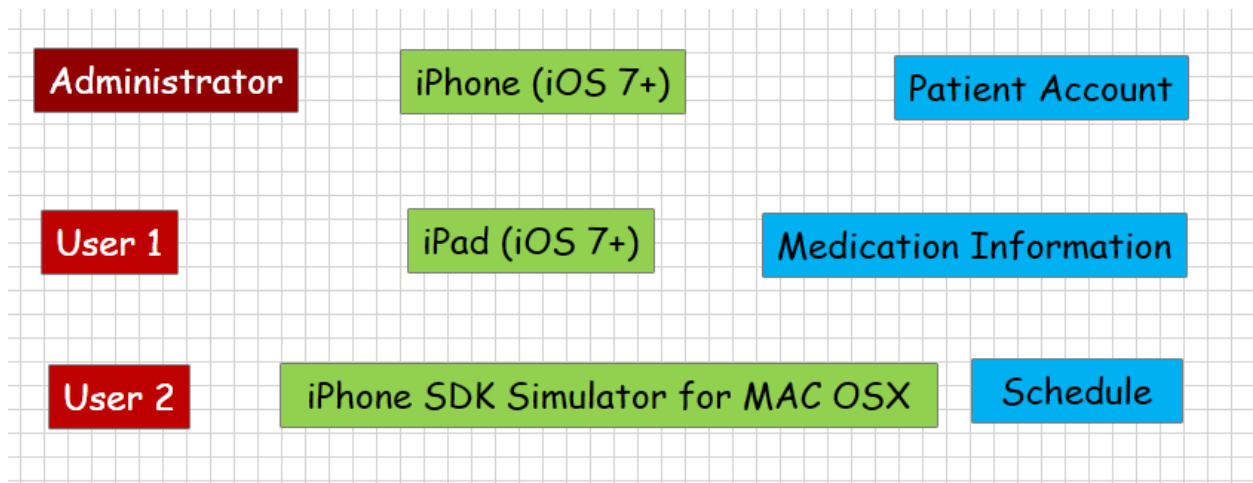
Figure 6: Identifying Entities pictorial depiction

Identifying Relationships:

- The administrator logs in from the iOS 7+ device to MedRemind. Similarly, a user can log in from the iOS 7+ device to MedRemind through the Administrator
- The administrator creates a patient account for himself or herself. Similarly, a user can create a patient account for himself or herself
- The administrator can create zero to many reminders for a certain medication. Same applied for the user.
- The administrator can add medication one or more times into a schedule, depending upon frequency of consumption or administration

Figure 7: Domain Analysis Identifying Relationships
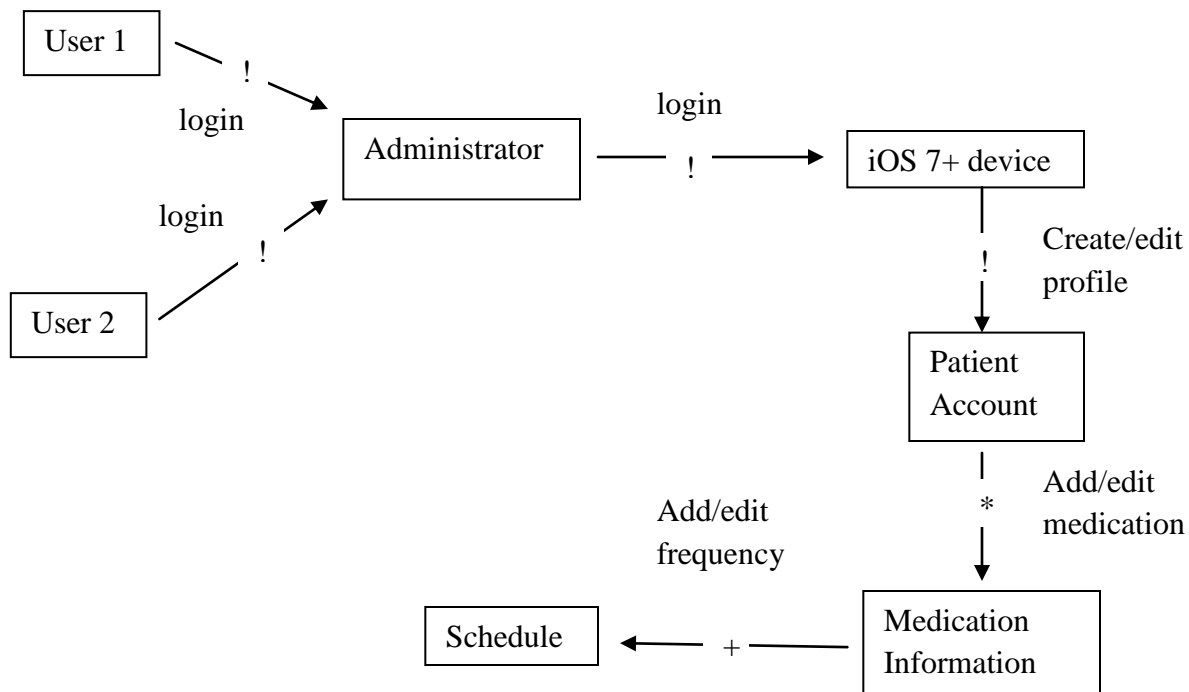
Multiplicity symbols used:

1. "!" means exactly 1
2. "?" means 0 or 1
3. "+" means 1 or more
4. "*" means 0 or more
5.

Scenario Definitions

The following is a realistic portrayal of the implementation of the MedRemind mobile app. Steve presents a series of situations which involve both him and his wife, Martha, as they use the app to achieve certain medical reminder goals.
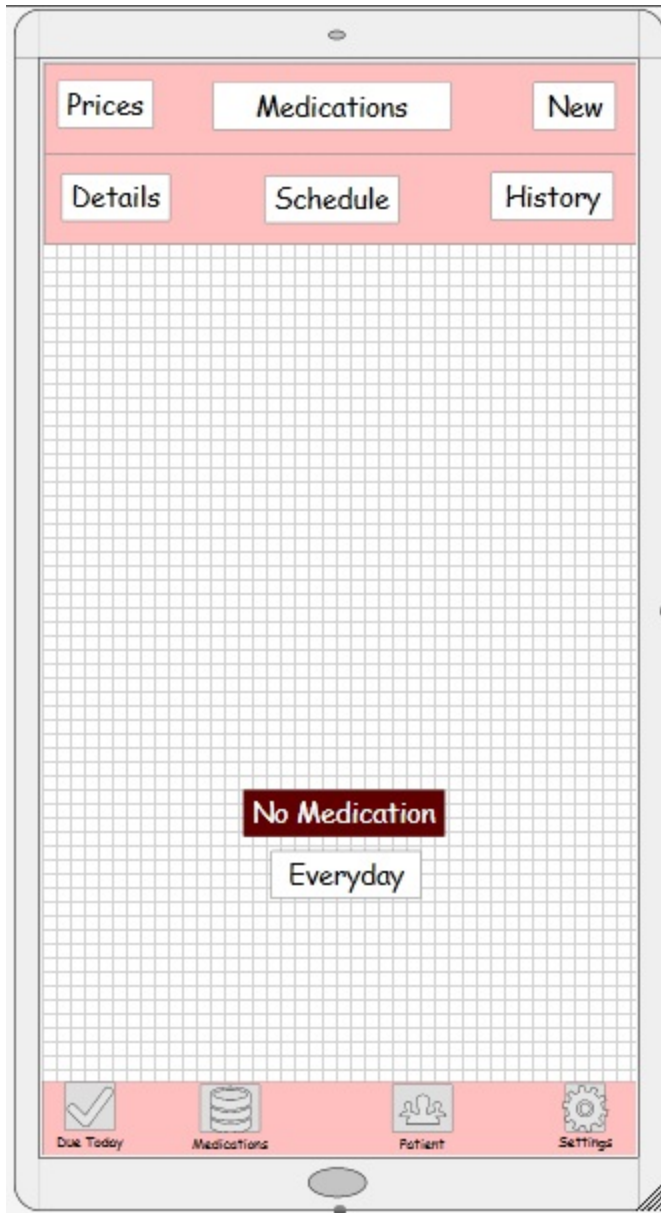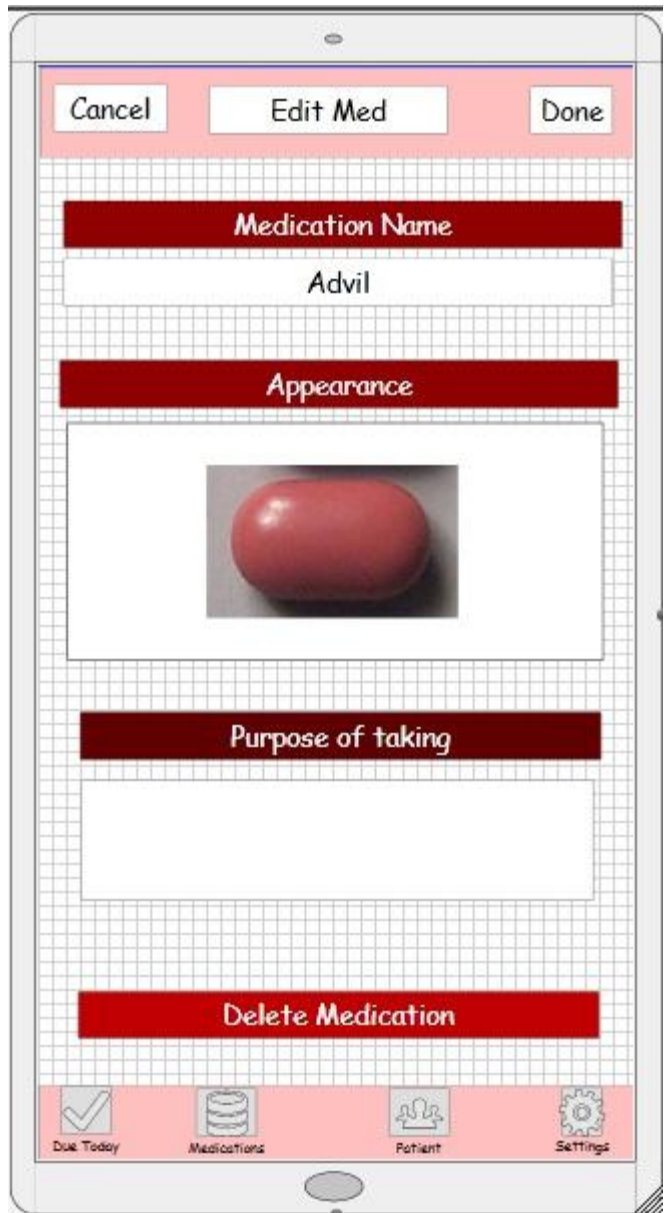
Scenario 1:

Goal: Steve adds a new prescription

Figure 8

Figure 9
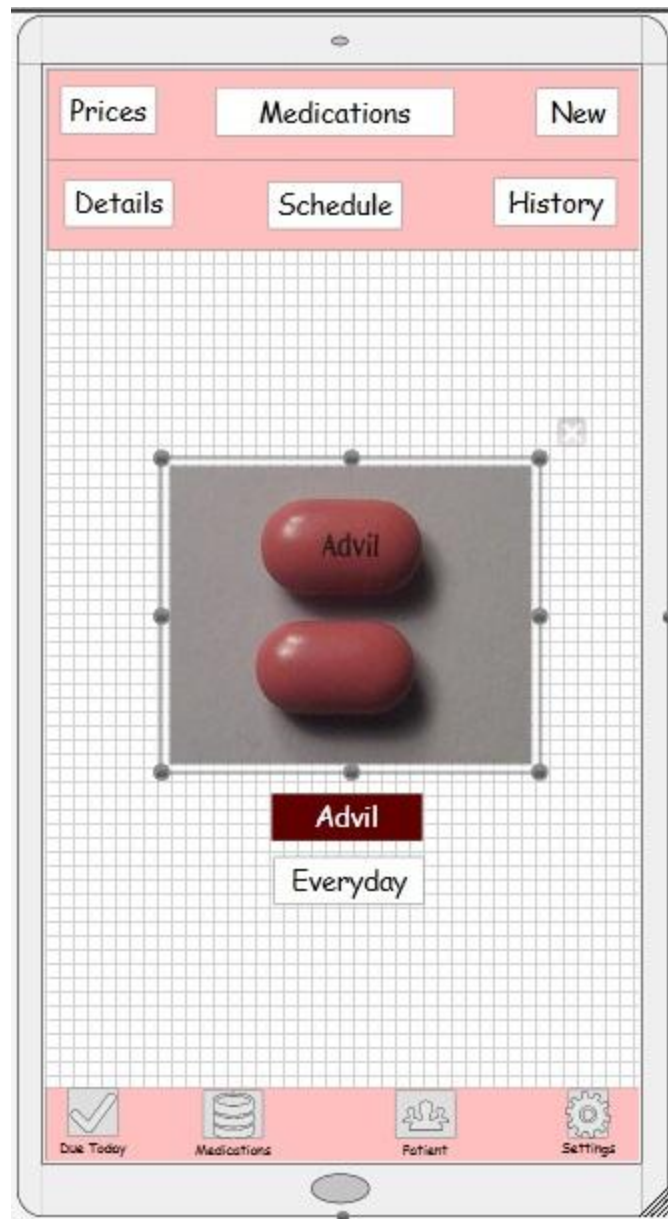
Figure 10

Figure 8: No medication added by Steve yet

Figure 9: Steve changed the name of the medication to Advil, selected the appearance and will make a note of why he is taking it

Figure 10: Final Medication screen after adding Advil

Scenario 2:
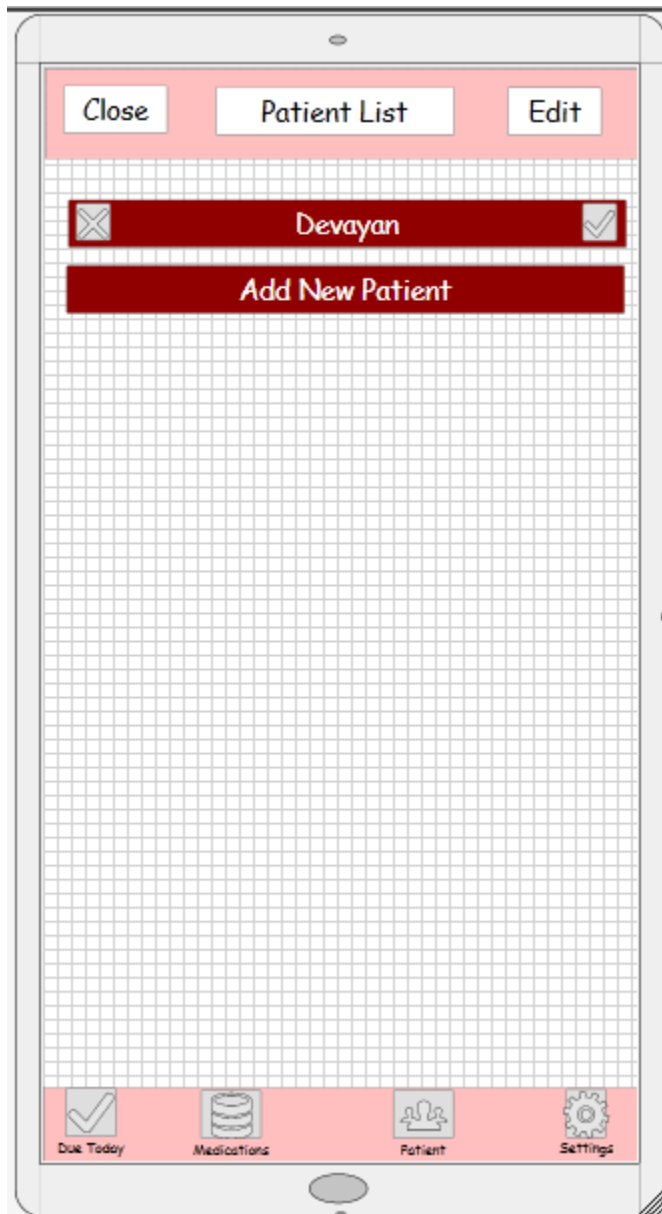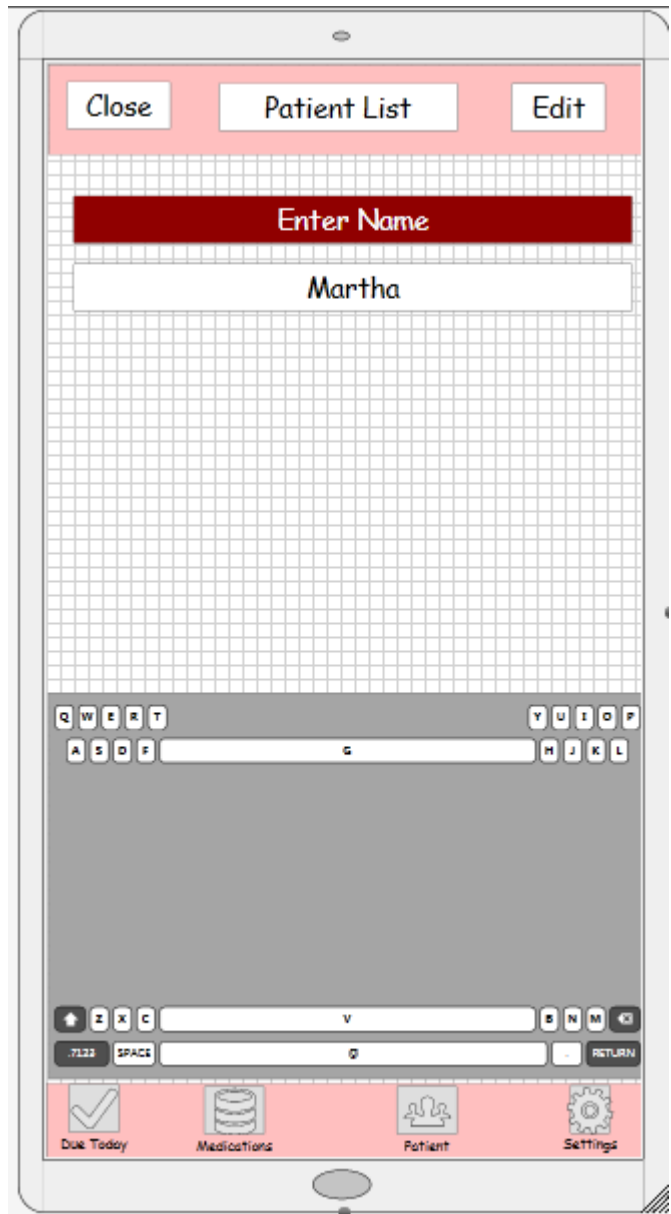
Goal: Steve adds Martha as a new user

Figure 11   **Figure 12**

Figure 11: The administrator navigates to the Patient tab, clicks on Patient List, clicks edit, and then selects, 'Add New Patient'

Figure 12: The administrator adds the name of the user, saves and exits. Martha's profile has been created.

Scenario 3:

Goal: Steve emails his pharmacy after noticing that the price checker reflects a lower cost for his prescription medication.
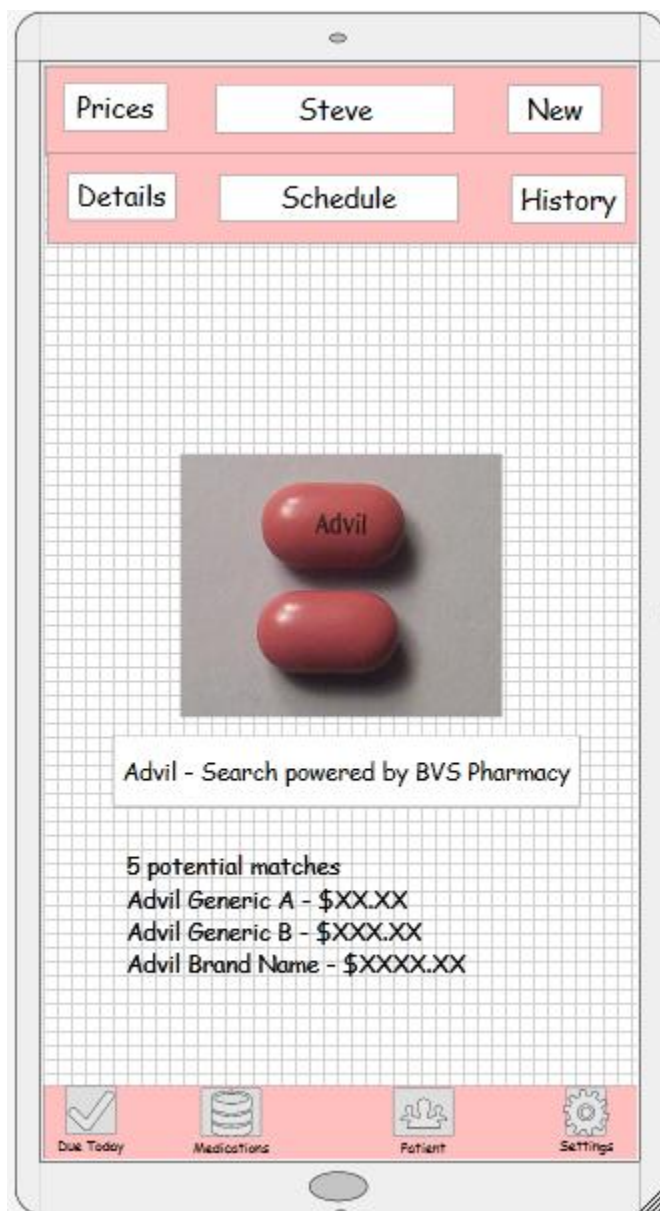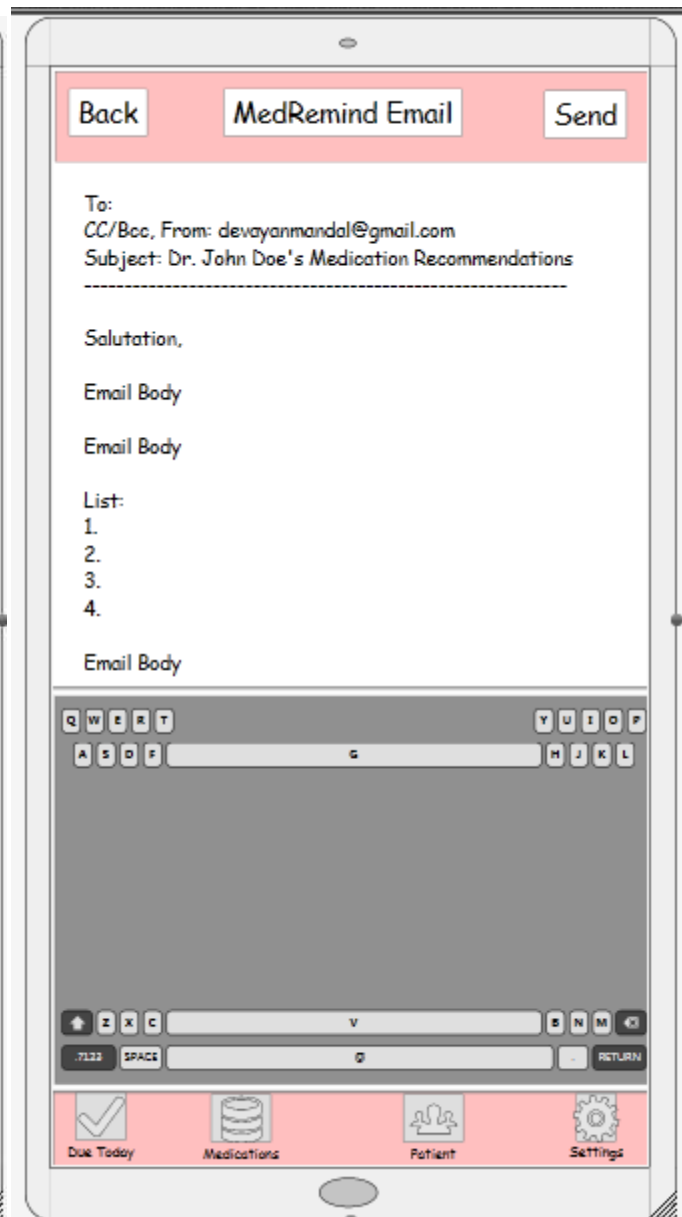

Figure 13

Figure 14

Figure 13: Using the integrated medication price search, Steve realizes that the generic version costs lesser

Figure 14: He emails his pharmacy to refill his upcoming prescription with the generic kind.

Scenario 4:

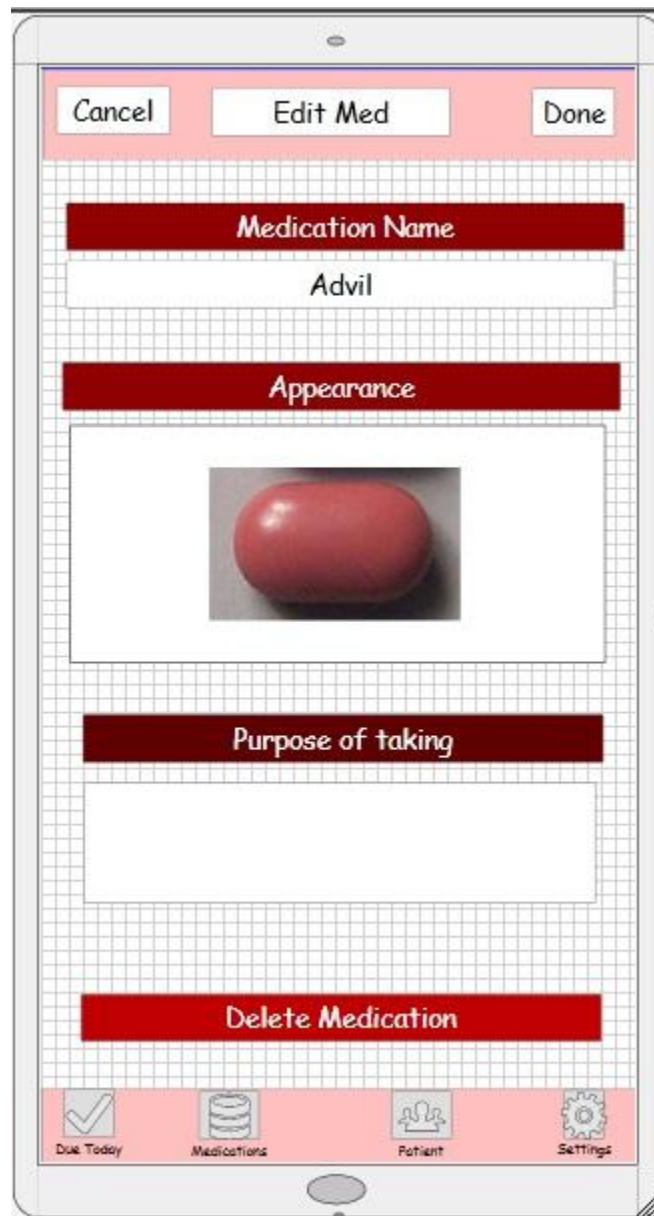*Goal:* Steve deletes the prescription

Figure 14

Figure 14: Steve selects the 'Delete Medication' button in the 'Edit med' section in Medications and removes it

Scenario 5:

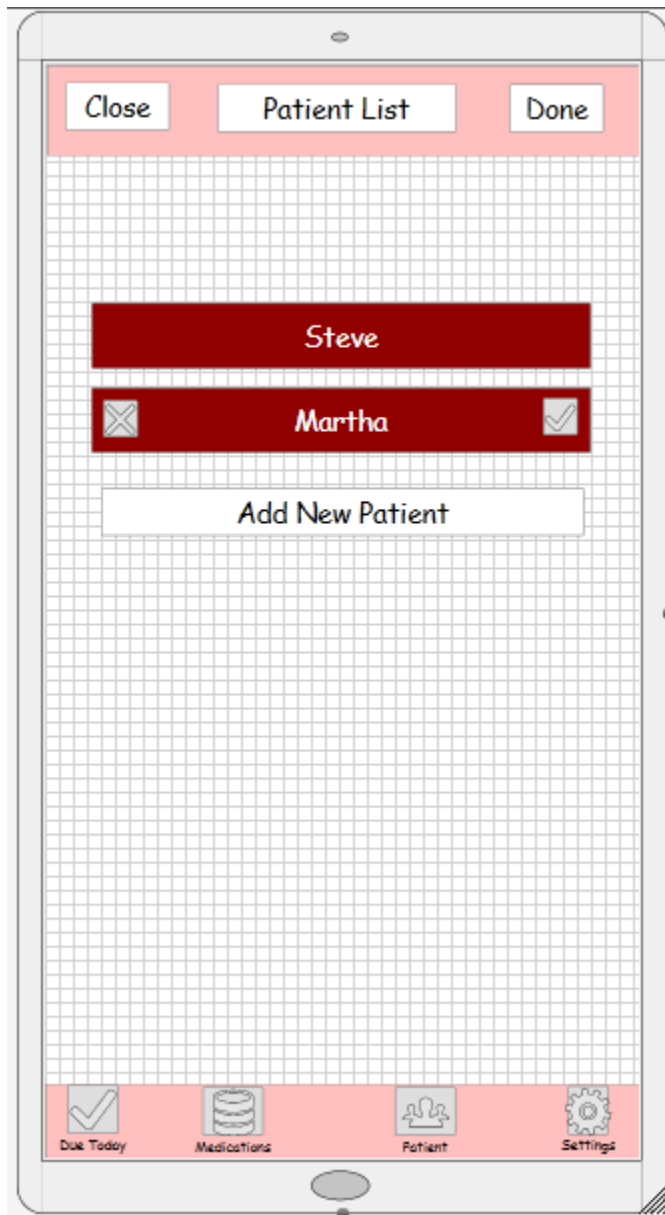*Goal:* Steve deletes Martha's patient profile as she downloaded the app on her iPad too.

| Figure 15 | Figure 16 |

Figure 15: Steve selects Martha's profile from the Patient List and removes it.

Figure 16: After deletion, only the administrator remains and he has the option to add a new patient profile

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