MEDGENIUS

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Project Overview

Being chronically ill and taking multiple medications can be a difficult and disorienting experience. We wanted to find out if technology has the potential to simplify home medication management and help chronically ill people live safer lives. As a team, we designed an app to make the lives of the chronically ill easier by taking the cognitive burden off of medication management.

Half of adult Canadians take one or more prescription medication. Among patients with chronic disease, 37% take four or more prescription medications. 10% of patients with two or more chronic diseases report experiencing a medication error.

These medication errors include taking the wrong dose, mixing incompatible medications, taking medications at the wrong time, confusing one medication for another, and misunderstanding or forgetting the instructions provided by the pharmacy.

Problem Summary

Eight participants who were taking multiple medications per day were interviewed individually to uncover common pain points in medication management. Interview transcripts were analyzed and filtered through an affinity mapping exercise to determine which would become our areas of focus.

Four common threads emerged:
Confusing or Forgetting
Being unable to remember whether medication was taken on a given day.

Medication Interaction Issues
Not knowing whether their medications would interact well with their other prescriptions or over the counter meds they may have to take.

Technology Concerns
Older participants were not confident in their ability to learn a new system.

Current Work-Around Methods
Participants used make-shift low-tech methods in order to try to keep track of their meications every day.

"I need to feel confident that I'm taking my medications correctly and safely."

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Participants

Participant 1 Female, 55

Takes 9 medications daily, some twice daily, for several chronic illnesses.

Participant 2 Female, 55

Has taken the same 3 medications daily for years.

Participant 3 Male, 70

Takes 6 medications, 3 times a day.

Participant 4 Female, 35

Takes 4 medications daily for chronic conditions.

Participant 5 Female, 63

Takes 9 medications daily for multiple chronic health conditions.

Participant 6 Female, 50

Takes 2 medications daily for chronic metabolic syndrome, blood pressure and cholesterol.

Participant 7 Male, 55

Takes 3 medications daily chronic illness.

Participant 8 Female, 85

Takes 7 prescription medications daily and several over-the-counter medications, as necessary.

Primary Research

Eight participants who were taking multiple medications per day were interviewed individually to uncover common pain points in medication management. Interview transcripts were analyzed and filtered through affinity and empathy mapping exercises to determine which would become our areas of focus.

Affinity Mapping

Our participants are concerned about forgetting their medication intake time and some are concerned with taking the wrong dosage by mistake. Their current reminder methods are unreliable and fail to meet their needs. They often have additional medication requirements that their alarms do not remind them of.

Common Pain Points

After taking our notes and separating them into common groupings we determined there were four main commonalities:

- Confusing or Forgetting
- Medication Interaction Issues
- Technology Concerns
- Current Work-Around Methods

Empathy Mapping

From interview transcripts we were able to create empathy maps for each participant. Synthesizing the interview data in this method further magnified the common threads throughout the participants experiences. This ultimately led to our finalized working personas and the main feature focuses of our future prototype; interaction warnings and detailed medication schedules with notes for special ingestion requirements.

Secondary Research

The World Health Organization estimates that one in every five people will be elderly (60 or over) by 2050. The percentage of the population that is considered elderly will drop from 12% to 22%.

Globally on average, elderly people take 2 to 9 medications. The prevalence of inappropriate medication management ranges between 11.5% to 62.5%.

Mobile apps offer patients and health consumers medication management solutions because mobile phones are already an integral part of people's lives. Apps can provide on-the-go medication assistance as needed.

Out of 328 mobile medication management apps available on the Apple App Store and Google Play Store, 227 had multiple dynamic features. Apps with multiple dynamic features are generally more complex. The average user rating for these apps is 3.84/5.

The global medical apps market was estimated at $ 1.40 billion, in 2016, and is anticipated to reach $11.22 billion by the end of 2025.

Goals

Confusing or Forgetting
Give our users the ability to track what medications they have taken each day.

Medication Interaction Issues
Creating a system to automatically notify users of interaction warnings.

Technology Concerns
Design the app for our most technology-averse potential users.

Current Work-Around Methods
Make the app as simple to use as possible so it can be easily adopted as a replacement to the low-tech work-arounds participants currently use.

Iterations and Testing

First Iteration

Before our first hi-fi wireframe, we went through several iterations of sketching and lo-fi wireframing. These stages were kept internal as we organized our thoughts as a group and laid out what we thought would be ideal user paths through the app.

When we stepped into the initial hi-fi stage MedGenius had grown to an easy-to-use medication reminder app that helps users take their medication on time while avoiding harmful interactions.

Test
Moderated remote user testing was completed in Adobe XD. This test aimed to evaluate the application's core usability from the perspective of a new user.

The findings from this round of testing informed the design decisions of the interactive prototype.

The goal of this test was to ensure that users can enter their medication information and correctly respond to notifications, including reminders and warnings. User tasks included mock entering a medication, snoozing a reminder and responding to an interaction warning.

Feedback
Users liked the overall look and feel of the first design. Items mentioned to be particularly interesting to participants were the photo entry option, intuitive flow for onboarding, and appropriate icons.

However there were major issues with the layout of the 'Add Medication' page, the sentence structure fill-in-the-blank style of input was confusing to every participant. The pre-determined snooze intervals were perceived as too rigid and a critical function was pushed onto the second screen of a warning.
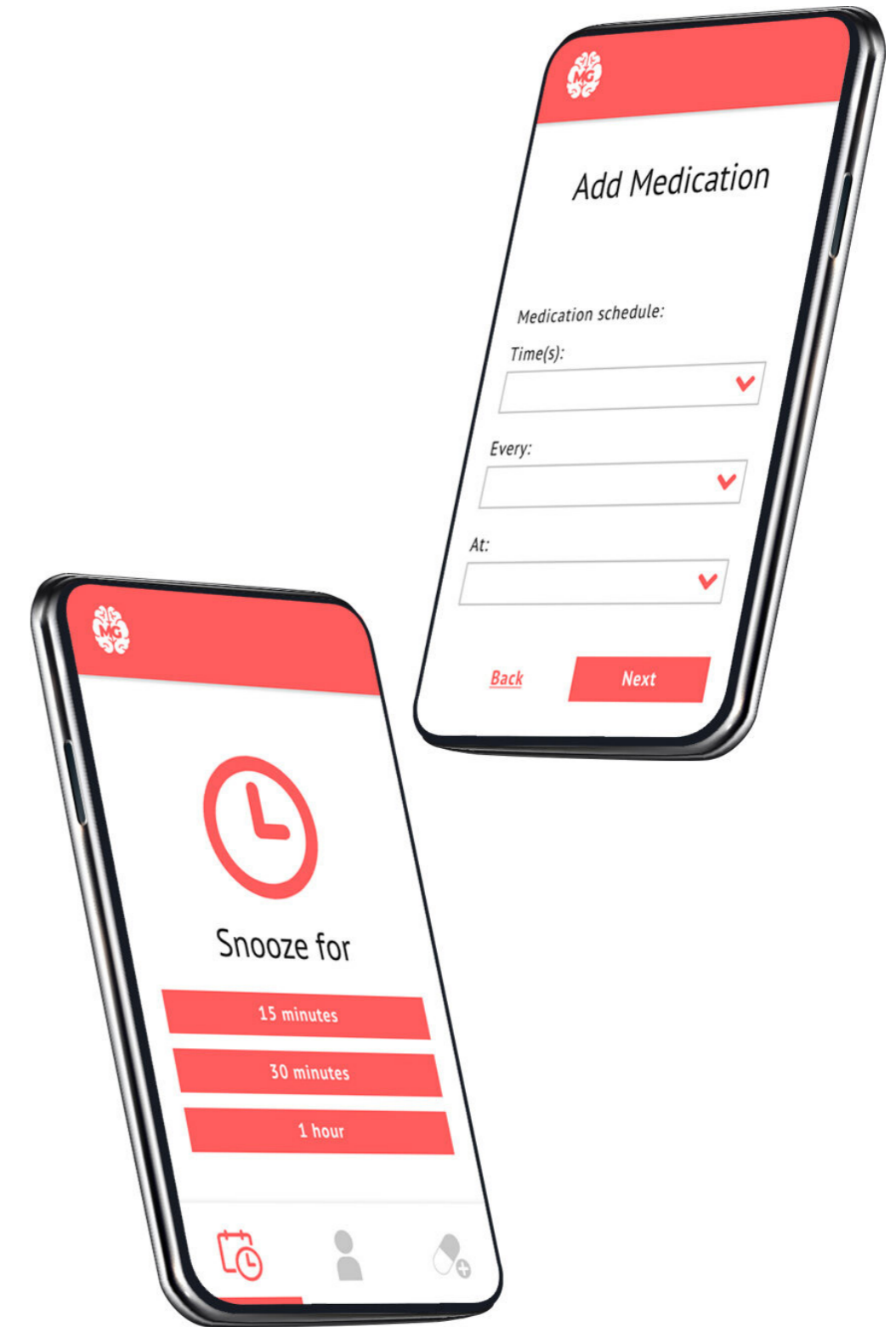
Iteration 1

Second Iteration

For the second iteration, we improved on the medications scheduling interface and made the snooze interval customizable. Pharmacist information was added to the user profile for easy access later on in the user lifecycle.

The critical function was also moved to the first screen of an interaction warning. Additionally, interaction warnings now came with an option to learn more about both medications involved in the interaction.

Test

Testing for this iteration was conducted in the same method as the previous.

Feedback

After seeing updates to the medication scheduling page, users wanted to see similar features on other pages as well. They thought the medication dose page could be modelled after it with scroll options for amounts and units of measurement. Several ideas for the day selections were mentioned as well with one in particular standing out - a 'select all' option for those with dexterity issues.

In the interaction warning screen, users wondered if they could have the "call 911" option above the fold so they didn't have to scroll to reach something so important in a potential emergency.

Users praised several aspects of the design saying the colours were welcoming, the app was easy to navigate, and steps were straight forward an uncomplicated. They liked that the system gave feedback so they knew where to click next or how to go back or cancel the process.
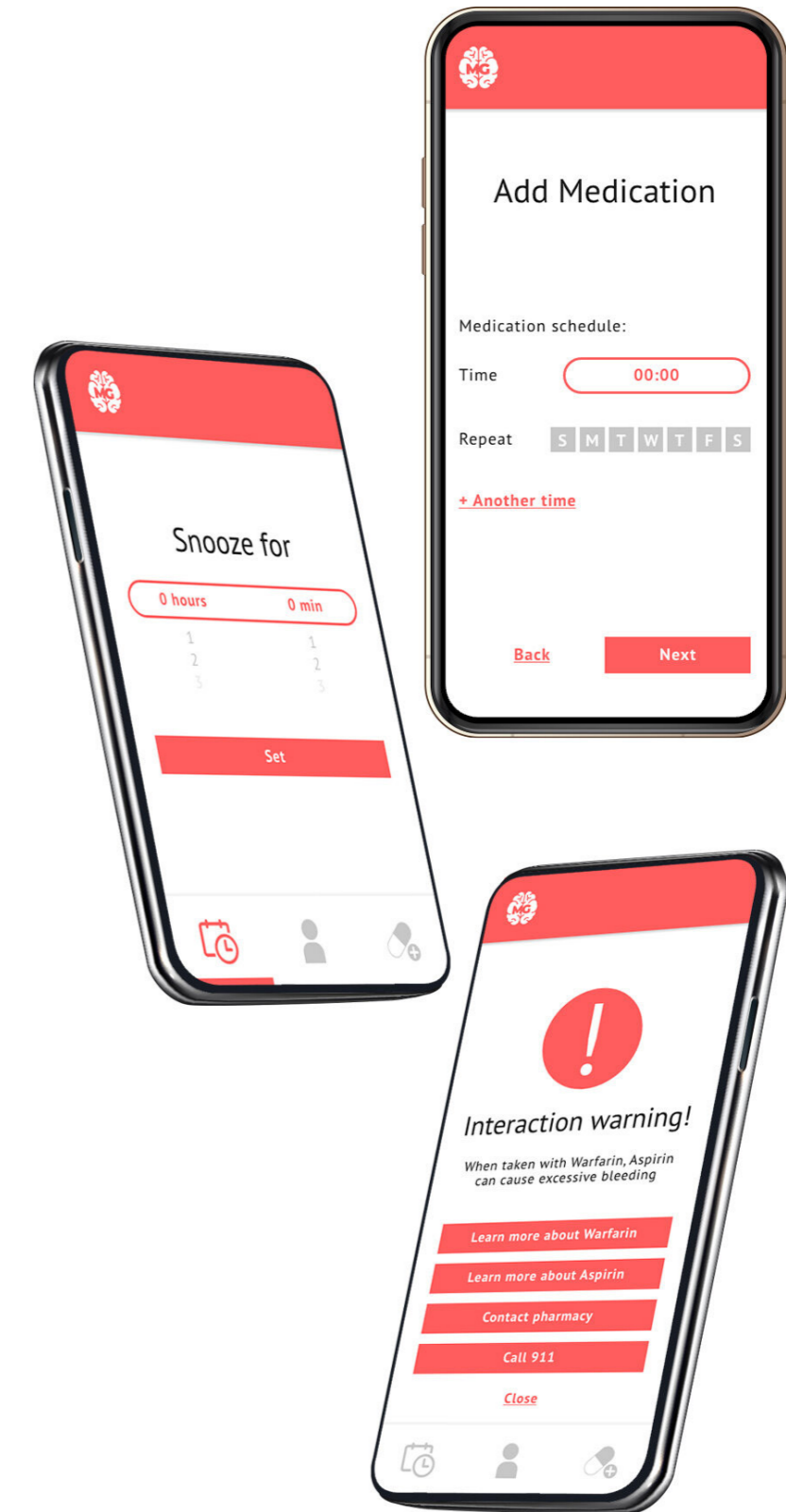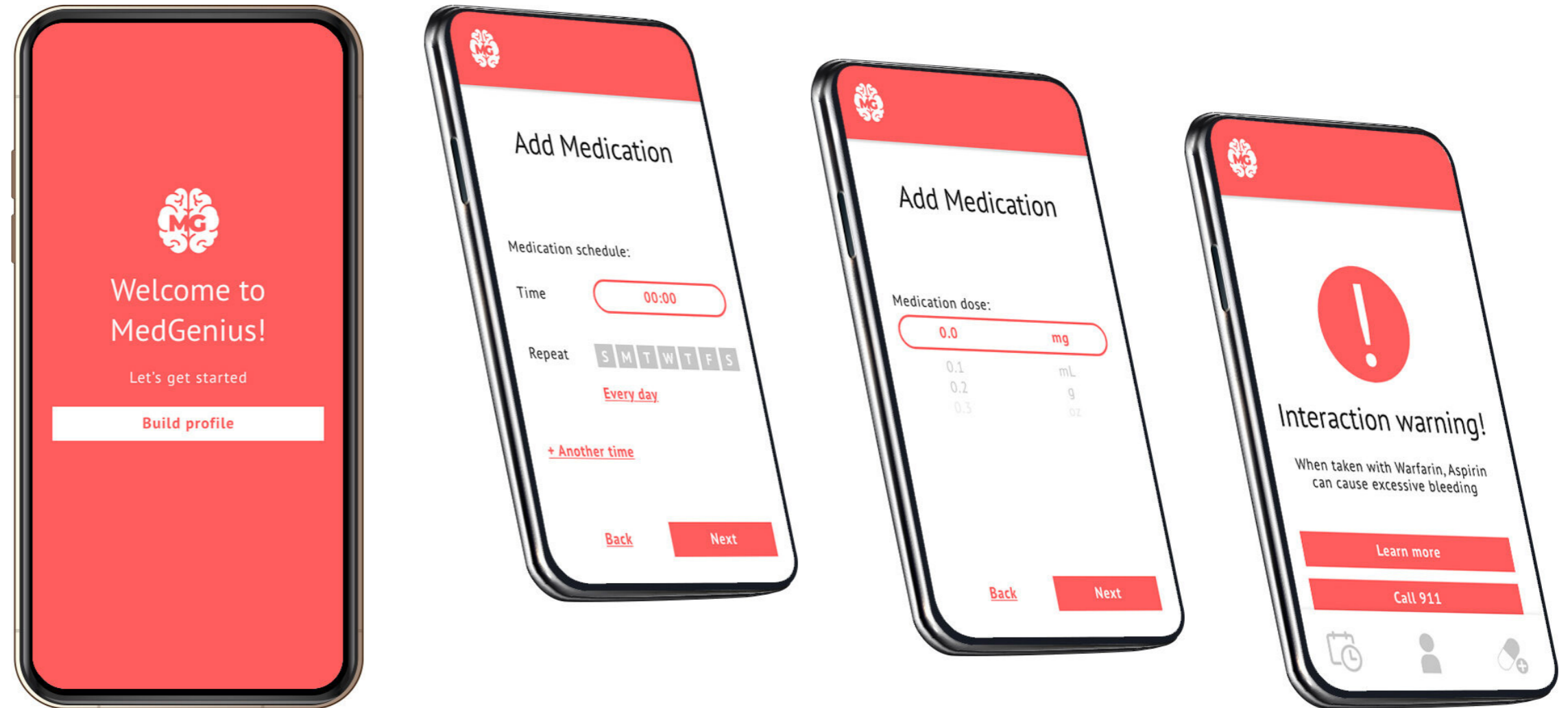
Iteration 2

Third Iteration

Taking the user feedback to heart we made all requested changes that didn't conflict. The final product encompassed all the aspects they loved across the board; colour, easy navigation, intuitive icons and easy error recovery. As well as improved upon the pain points that several users touched on; complicated entry methods, important information above the fold, matching input stylings across multiple pages.

Third Iteration

"Being chronically ill and taking multiple medications can be a difficult and disorienting experience"

During our design and research process, participants told us time and time again that they find correctly taking their meds emotionally and mentally cumbersome. MedGenius has the potential to simplify home medication and help chronically ill people live safer lives by taking on the cognitive burden of medication management.

Beyond its core functions, MedGenius has affection and respect for its users baked into every interaction. Featuring a simple, friendly interface, legible copy, and intuitive architecture, the app was designed to empower users of all ages and technical abilities.

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