51-264 Product Design Fundamentals
Spring 2020

Pill Case Project

Boomers

Charles Wang, Emily Wang, Jasmine Shen, Julia Salerno, Juliane O'Day, Yoo Jin Shin

Background Research

- 25% of the population
- Generally affluent, approaching retirement
- Very broad spectrum of ages and needs (born between 1945-1961)
- Common medical needs:
  - Blood Pressure Regulation
  - Diabetes
  - Blood Thinners
  - High Cholesterol
  - Pain
  - Vitamins & Supplements
- 75% taking at least 1 medication
- Average of around 2-4 pills

- Some use cases, some don't
- Would like cheap, convenient, easily accessible case
- Use phones for reminders

Competitive Analysis

Gold standard

+ cheap ($2-10)
+ straightforward system
+ no setup required

- no reminder system
- hard to open
- frequent refilling required

+ preprogrammed alarms, max 6 doses/day
+ up to 60 cups of medicine
+ several phone alert notifications: missed doses, dispenser errors, refills, etc.

- costly monthly subscription ($60/month)
- large, not easily portable

+ preprogrammed alarms, 1-6 alarms/day, both audio (beep) + visual (flashing red light) alerts
+ easy interaction upon setup: wait for alarm then flip case to get pills

- slightly complex setup
- once pills are in slots, not identifiable
- battery-operated

Problem & Need Statements

Problem Statement	Need Statement
Boomers have **difficulty sorting medicine due to arthritis** and other age related complications and have **issues remembering** when to take their medications.	A way for an older Boomer to manage an assortment of pills and take them in a convenient, easy, and timely manner so they can continue to live independently and comfortably despite somewhat deteriorating capabilities.
It's easy to fumble with the (market rate) gold standard for cases on the market. They are either **too hard or easy to open** and it can be difficult to **differentiate between the days** of the week.	A way to make pills easily accessible and differentiable for visually impaired boomers.
Current pill cases can be **bulky and unattractive**.Having a sleek, small, and portable case that can remind them to take their medications can make them feel more comfortable and younger.	A convenient and portable way for busy and active younger Boomers to remember their minimal but important medications, prescription renewals, and overall stay on top of their health to maximize time with their families

Personas

Mr. John Smith
Age: 59
Consultant

Younger, travels for work

Mrs. Susan Miller
Age: 72
Retired Accountant

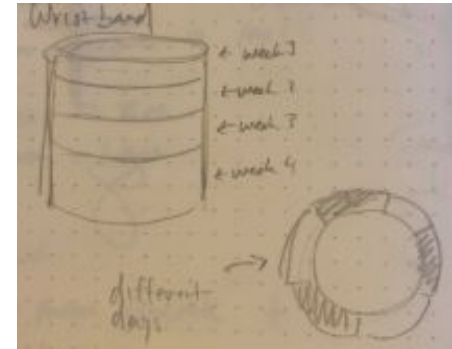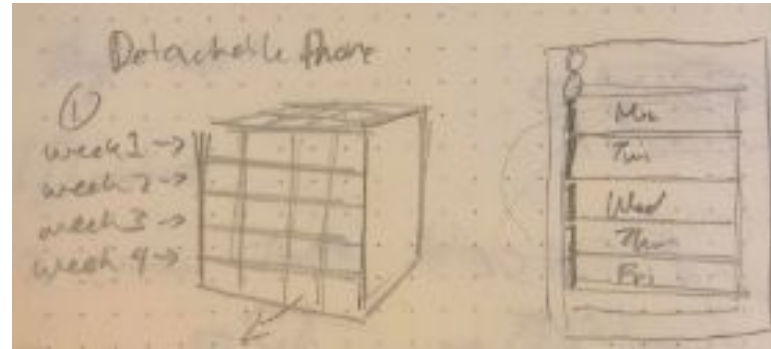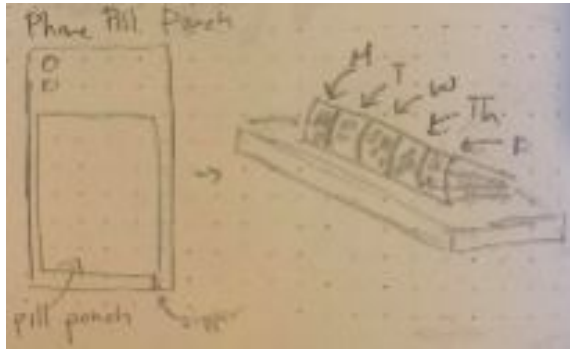Older, less mobile, still independent

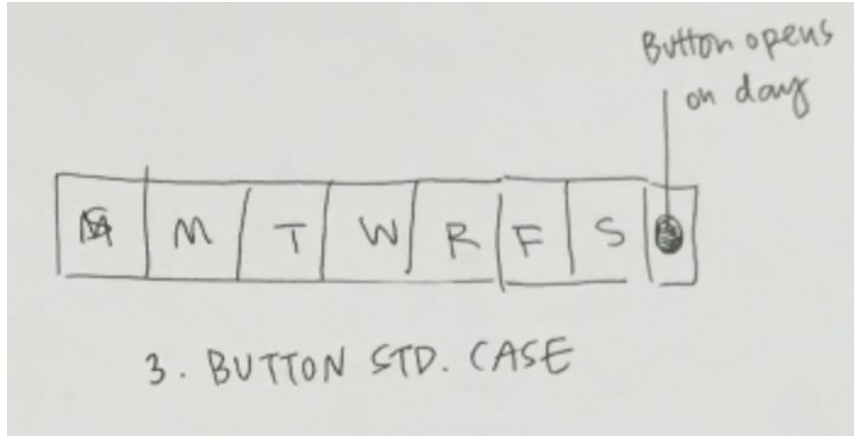**Mr. Matthew Johnson**
Age: 62
Retired Accountant

Blind, wife is caretaker, still mobile

Napkin Sketches: Persona 1
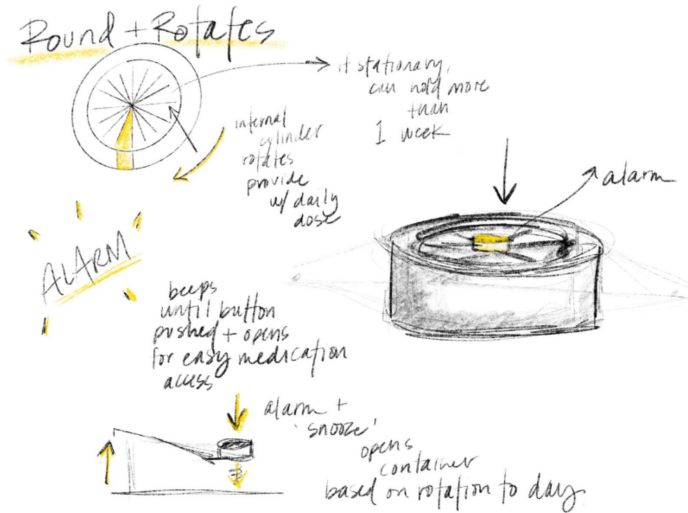
Napkin Sketches: Persona 2
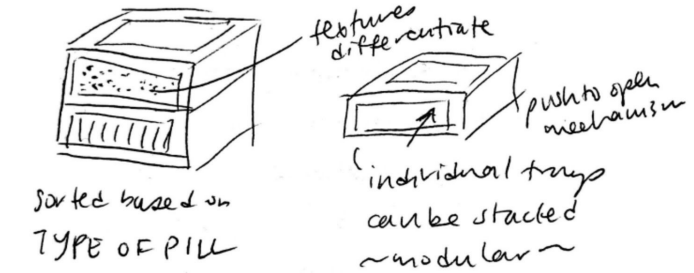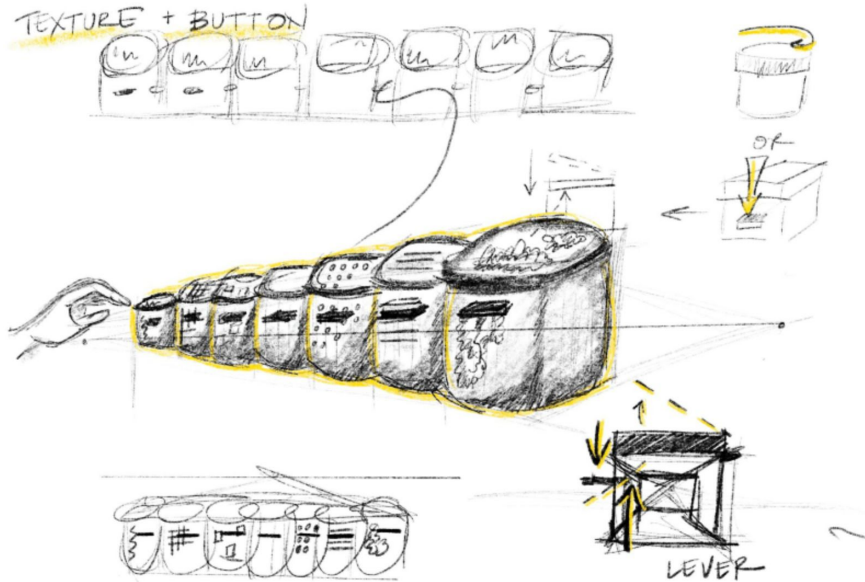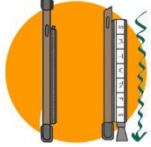
Napkin Sketches: Persona 3

Filtering Ideas

Description	Filtering (1–5 scale)					Total
	Impact	Technology	Manufacturability	Competitors	Cost of manufacturing + End product	
Button Case	3	2	5	3	2	15
Orange (Circle)	3	2	4	4	3	16
Techie	5	5	1	3	1	15
App (can add to any)	3	4	5	4	2	18
Texture & Lever	3	1	5	3	5	17
Textured, modular trays	2	2	3	3	3	13
Stationary round pill case with alarm	2	3	3	3	3	14
Detachable Phone Case	4	2	4	4	1	15
Wristband Pill Case	2	1	3	3	3	12
Phone Pill Pouch	4	1	3	5	3	16

Refined Concept 1

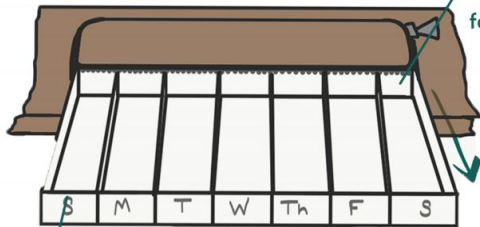

Easy Unzip

Easy Refill

Easy Access

Easy to Slide
Sliding motion for easier access

Daily Containers
A container for each day of the week for easy organization

EZ Clean
All containers can slide out for easier filling and cleaning
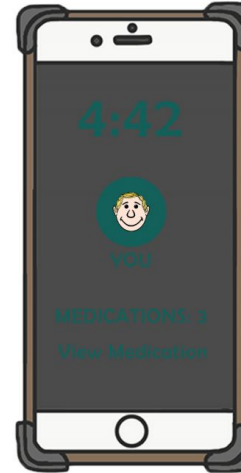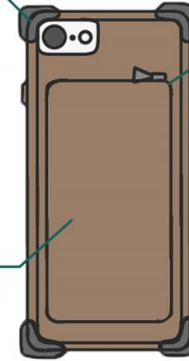
Shock Absorbers
In case phone fumbles while using pill case.

Zipper
To ensure medication stays in pill case

Leather Pouch
For easier handling and a bomer aesthetic
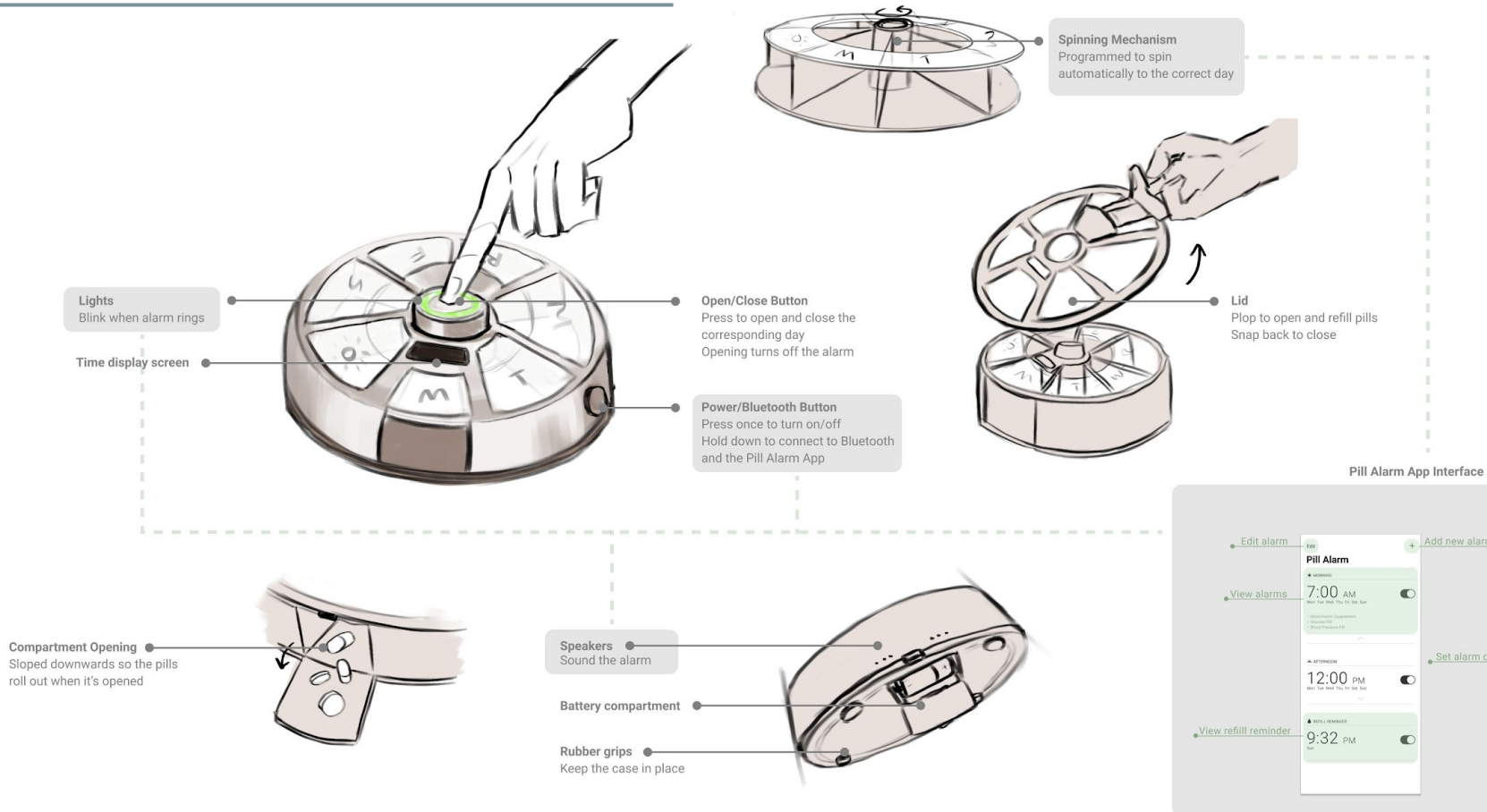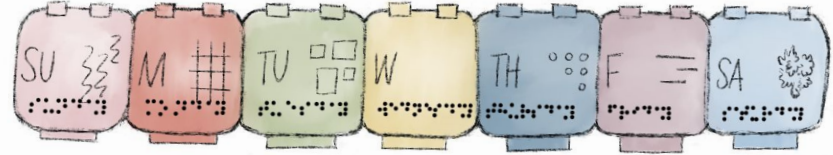
4:42

YOU

MEDICATIONS

View Medication

4:42

Simple home screen and notifications

View and schedule other people's medications

Refined Concept 2

Spinning Mechanism
Programmed to spin automatically to the correct day

Lights
Blink when alarm rings

Time display screen

Open/Close Button
Press to open and close the corresponding day
Opening turns off the alarm

Power/Bluetooth Button
Press once to turn on/off
Hold down to connect to Bluetooth and the Pill Alarm App

Lid
Plop to open and refill pills
Snap back to close

Compartment Opening
Sloped downwards so the pills roll out when it's opened

Speakers
Sound the alarm

Battery compartment

Rubber grips
Keep the case in place

Pill Alarm App Interface

Edit alarm

Add new alarm

View alarms

Set alarm details
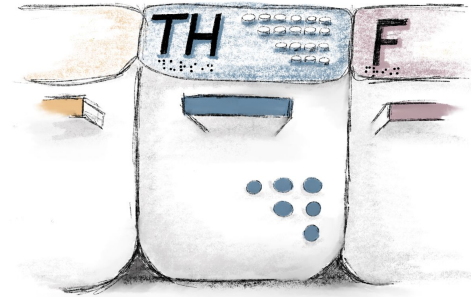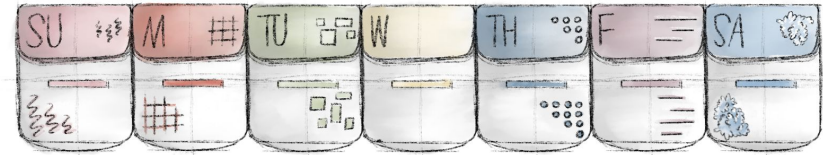
View refill reminder

Refined Concept 3

Braille and varying textures help visually impaired people differentiate days of the week

Colors and letters help visually unimpaired caretakers differentiate days of the week

Filleted corners prevent pills from getting stuck

Lever mechanism allows for easy access and refilling while avoiding spillage

SWOT Analysis

Concept 1: Traveling Boomer Phone Case

Strengths	Weaknesses
- Unique, novel concept - (if removable from case) easy to adapt to multiple users' phones - Easily implementable with existing technology and software	- Requires smartphone - Non-removable from phone case(?) - Not great for someone who takes a lot of pills (because of its size) avg 4 *What is the avg no. of pills a boomer needs to take? - Heat from the phone (~100F) can cause the pills to deteriorate - Will need to manufacture different kinds for different types of phones (if not removable)
Opportunities	**Threats**
- Marketable to younger audiences - Fewer competitors - Can open a space for pill taking software (either our own proprietary software or integrated with an existing one)	- Potentially high cost if designed for each phone or as new phone models come out

Concept 2: Retired Boomer Orange Case

Strengths	Weaknesses
- Very low effort to use, good for those with joint problems (how can we integrate this into the first concept?) - Able to store more pills - Alarm + App, "smart"	- Requires smartphone - Non-portable
Opportunities	**Threats**
- Arthritis is very common among older people: generalizable - Stackable - Potentially less costly to manufacture (Injection mold existing)	- Higher cost may be less appealing (compared to current gold standard) - Material: medical-grade plastic + coating

Concept 3: Blind Boomer Sensory Case

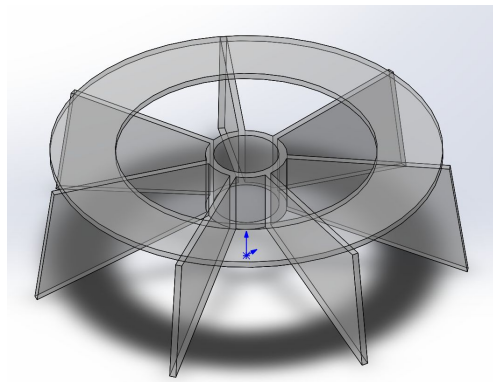| Strengths	Weaknesses
- Universal design Considers Dexterity and Vision issues - Colorful & eye catching - portable	- Only minor improvements to a standard pill case - Requires weekly refilling
Opportunities	**Threats**
- Emerging awareness of accessibility/universal design	- Similarity to existing products, lots of competitors - More costly to manufacture than similar existing products

Final Concept - CAD & Interactions
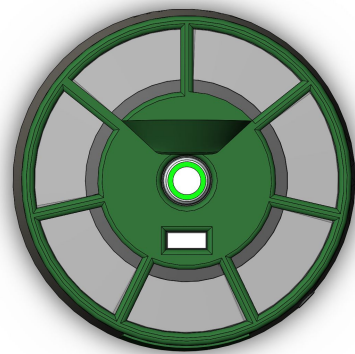

Silence the alarm and open the door for your medications

Door opens, alarm silenced, and medication is available once button is pushed

Internal Rotating Mechanism
Used to rotate to the day of the week and aid in distributing medication. Internal slope allows pills to easily fall out
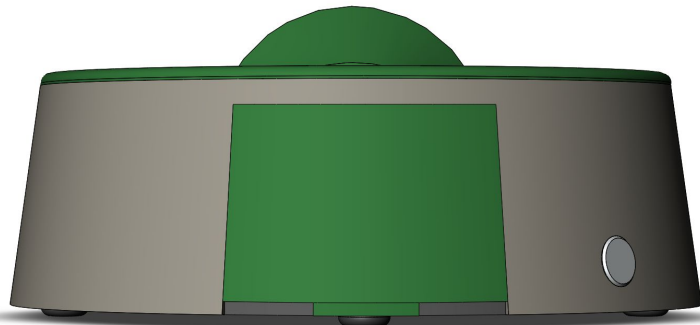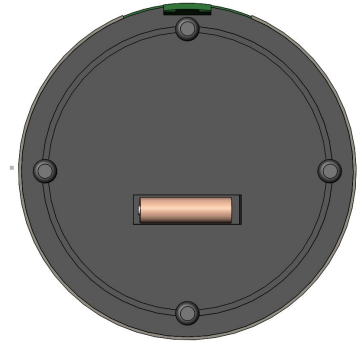
Top
Features alarm which is silenced with push button used to open door and release medication as well as small clock display

Bottom
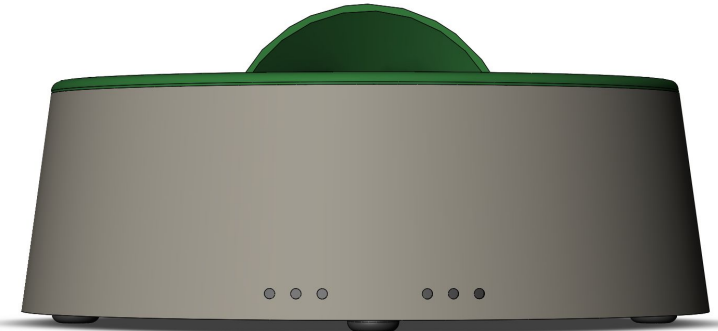Rubber feet to stabilize the pill box when alarm sounds and during use
Access to battery used to power alarm and rotating mechanism

Not Represented
Upper ring of internal rotating mechanism is detachable and labeled with days of the week and braille. (Can be felt through the windows of the lid)

Front | Door to release medication, Power/BT button

Back | Alarm Speakers

Materials

Functionality & Specs	Material
Sturdy Dust Proof Exterior	ABS
App compatible with multiple alarms	S6E1C12 Microcontroller
Rubber accents	Nitrile rubber
Speakers	8ohm 2watt speakers

Multiple Alarm Reminders

Medication Record Log

Safety Lock

Dust & Moisture Resistant

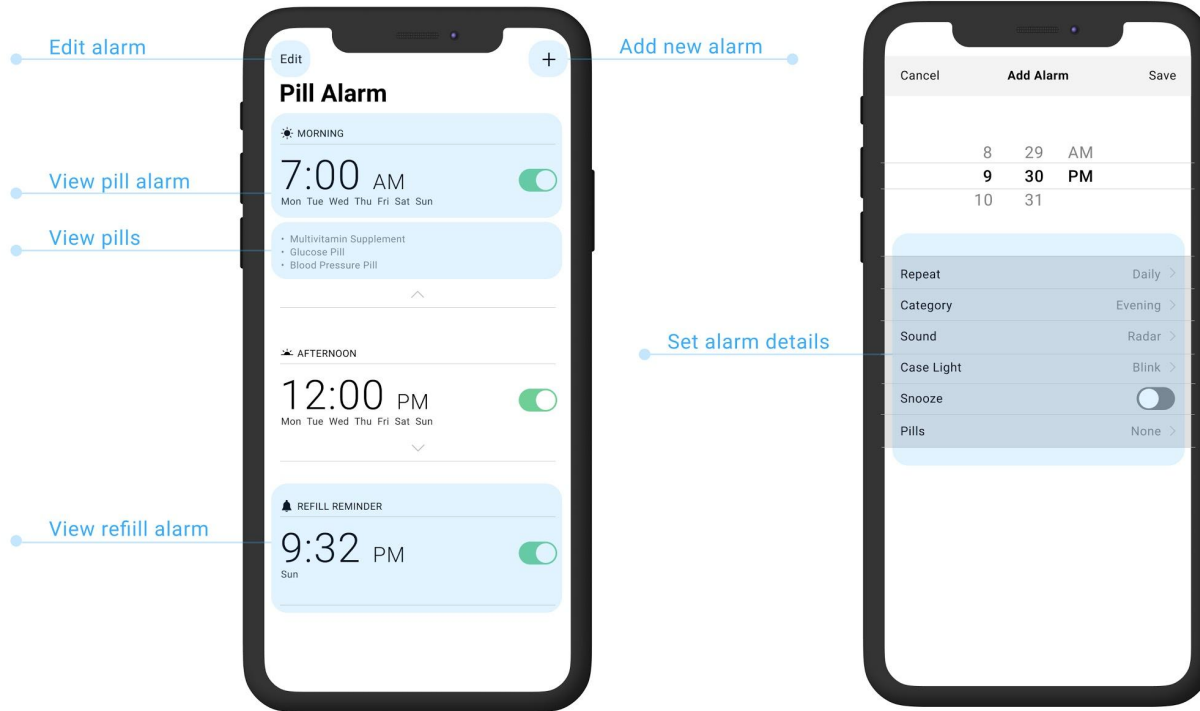Integrated App Technology

Bluetooth Enabled

Manufacturing and Costs

Quantity	Price
Sample/ MVP	$150/ piece
500-1,000 Units	$49.95/ piece
1,001 - 5,000 Units	$39.99/ piece
5,001 - 10,000 Units	$34.99/ piece

Final Concept - Pill Alarm App

Edit alarm

Add new alarm

View pill alarm

View pills

Set alarm details

View refiill alarm

Pill Alarm

Edit

☀ MORNING

7:00 AM

Mon Tue Wed Thu Fri Sat Sun

• Multivitamin Supplement
• Glucose Pill
• Blood Pressure Pill

🌙 AFTERNOON

12:00 PM

Mon Tue Wed Thu Fri Sat Sun

🔔 REFILL REMINDER

9:32 PM

Sun

Cancel | **Add Alarm** | Save

8   29   AM
9   30   PM
10   31

Repeat	Daily >
Category	Evening >
Sound	Radar >
Case Light	Blink >
Snooze	
Pills	None >

Final Concept - Outcome Evaluation

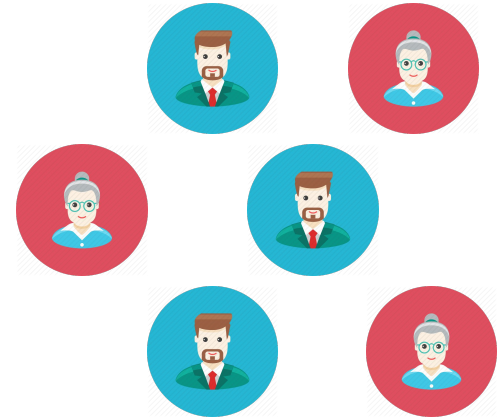| Intervention	Quantifiable Outcomes
Decrease forgetfulness	Decrease number of pills forgotten to take
Increase efficiency	Decrease amount of time to refill pill case
Increase accessibility	Decrease amount of time to acquire pills

Final Concept - Outcome Evaluation

"I might have to ask you to help connect the case with the alarm app"

"This is definitely an upgrade from my current flip case"

We went back to our boomer networks, grandparents/parents, and received feedback on our concept

Thank you!