The report committee for Ajinkya S. Barve
Certifies that this is the approved version of the following report

Byheart: a personalized heart-health companion

Approved by

Supervising committee:

Supervisor:
Carma Gorman

Gilberto Lopez

Byheart: a personalized heart-health companion

By

Ajinkya S. Barve

Report

Presented to the faculty of the graduate school of

The University of Texas at Austin

In partial fulfillment

Of the requirements

For the degree of

Master of Fine Arts

The University of Texas at Austin
May 2018

Dedication

I dedicate this report to my beloved family, who have always supported me through various decisions in my life and career.

Acknowledgements

Abstract

Byheart: a personalized heart-health companion

Ajinkya S. Barve, MFA

The University of Texas at Austin, 2018

Supervisor: Carma Gorman

The number of people living with some form of chronic cardiovascular disease is growing worldwide. Studies have shown that people often lack sufficient information about their heart condition. This issue can be addressed by improving heart health literacy and by helping those with a chronic heart disease to understand and manage their condition so that they are empowered to make informed decisions regarding their health.

Although many existing online resources provide heart-health-related information, most fall short on providing actionable content—namely, nudges, prompts, reminders, and tracking features—that would help heart patients and their families make that information actionable in ways that would improve health outcomes. Byheart is a personalized heart health web and mobile companion that helps heart patients and their caregivers understand, track, and more effectively manage chronic heart conditions.

Table of contents

List of Figures

BACKGROUND

HEART DISEASE IN THE USA

According to a study published by the World Health Organization in 2015, heart-related diseases are the number one cause of death worldwide.[1] Worldwide, more than 40% of deaths are due to heart-related diseases, and that sums up to about 30 million deaths per year. In the United States, that number is around 600,000 deaths per year.[2] Currently in the United States, around 85 million people are living with some type of cardiovascular disease, which equates to about 25% of the total US population.[3]

If we look at health from a broader perspective and consider the social factors that affect an individual's access to quality and quantity of health care services—such as level of health care coverage, proximity to providers, access to transportation, income, and education level, etc.—surprisingly, experts suggest that they together account for less than 15% of someone's health outcomes.[4] It turns out other factors, such as individual behavior, heredity, social/support networks, etc., have a far more significant impact on an individual's health, which is why focusing on improving Americans' health literacy can play a significant role in improving their health outcomes.[5]

THE IMPORTANCE OF HEALTH LITERACY

Health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.[6] Studies have proven that low health literacy is associated with increased risk of hospitalizations and deaths for heart patients, i.e., poor health outcomes.[7] In a study cohort of 588 patients with a heart condition, 78% of patients lacked adequate knowledge of their condition.[8]

1

Increasing health literacy benefits patients, providers, and society, because:

1. Patients can make better informed decisions about the level and type of care they need (e.g., when to visit an emergency room vs. urgent care vs. waiting for a regular appointment).

2. When patients make targeted use of the system, it reduces excess burdens on the system, which can result in patients, insurers, and government agencies getting better outcomes with reduced costs.

3. Patients can make better informed choices about diet and exercise, which can help them avoid or reduce the onset of comorbidities and unnecessary healthcare visits.

4. Patients can make healthcare appointments more productive by asking informed questions and tracking and reporting relevant symptoms.

ROLE OF FAMILY AND FRIENDS

It is becoming evident that family and friends provide an important role in the daily routine of a person with a chronic condition, such as with self-care and management of a heart condition. Self-care is considered a primary form of care for patients with chronic conditions, who must make many day-to-day decisions to self-manage their illness.[9] Self-care can have a major impact on a patient's health, and family members can have a powerful influence on the quality of a patient's self-care by actively participating in the patient's daily routine: they are uniquely situated to encourage and track patients' medication adherence, diet, exercise, sleep, and work/leisure activities, and to understand cultural barriers and observe and track patients' symptoms and moods. Thus, for chronic conditions like heart disease, support from family members and close friends can

significantly affect healthcare outcomes and help improve communication with healthcare providers.

VALUE BASED CARE: A NEW MODEL OF CARE

Traditionally in the United States, health care has operated on a fee-for-service (FFS) model, in which patients pay for each discrete service provided by their healthcare provider—whether it helps or not—as opposed to paying only for treatments that improve their health. In the FFS model, there is little economic incentive for healthcare providers to reduce costs and improve health outcomes, because fewer doctor's visits and tests mean less revenue for them and the businesses that support them.

An increasingly popular alternative to the FFS model is a value-based care model (VBC), where a provider must share responsibility with the patient to improve their health outcome against a reasonable cost of services to address their condition.[10] As the US begins to adopt alternatives, such as a value-based care (VBC) model, there is a growing effort to shift the balance from a physician-led healthcare delivery model to a patient-centered one. Unlike the FFS model, in which the focus is on the services rendered, regardless of the results, in a VBC model, providers and insurers would both have an economic incentive to encourage patients to engage in better self-care, and to take a more active role in managing their health. VBC re-focuses healthcare on creating better health outcomes for the patient.

Understanding users

Understanding users is always a crucial step in the design process. The primary things I wanted to learn from potential users of a heart app were – what are the current information sources people act on, (apps or website), what is it that people need, what are the preferred mediums to interact with, what knowledge barriers and issues do people face while understanding & managing chronic heart conditions, what topics do people want to know more about and other needs and pain points, etc. I referred to online discussion boards, data available to gather insights.

TARGET USERS

Although anybody without a medical background should be able to use, access, and understand the information that is provided to them regarding their chronic heart condition, the potential users would include

1. **Person diagnosed with a heart condition** (primary users)

   Need: to find information about their own condition and how to manage it

2. **Family member or close friend of a patient** (secondary users)

   Need: to find information about how to help care for and support someone with a heart condition

3. **Information seeker** (tertiary users)

   Need: to explore heart disease information, to understand whether they or someone they know may be at risk for it and how to prevent it

Health discussion boards

Patient.info message boards

This is a web health discussion platform, established for 20 years. According to their website, it has more than 18 million visits a month. It is a trusted source of information for both patients and health professionals across the globe.

https://patient.info/forums/discuss/browse/cardiovascular-disorders-1070

WebMD message boards

https://messageboards.webmd.com/health-conditions/f/heart-health/

WebMD Message Boards is a health information community where people and experts share information, provide, and receive support, and connect with other people like them. It provides content for a wide range of topics including heart health.

Medhelp forum

This forum is for questions and support regarding heart issues such as: Angina, Angioplasty, Arrhythmia, Bypass Surgery, Cardiomyopathy, Coronary Artery Disease, Defibrillator, Heart Attack, Heart Disease, High Blood Pressure, Mitral Valve Prolapse, Pacemaker, PAD, Stenosis, Stress Tests.

https://www.medhelp.org/forums/Heart-Disease/show/114

Health boards

https://www.healthboards.com/boards/heart-disorders/

HealthBoards provides a unique one-stop support group community offering multiple message boards on various diseases, conditions, and health topics. It connects people who are going through the same thing.

USER INSIGHTS

From my analysis and synthesis of the user information I was able to pull from the discussion boards, I derived the following insights.

1. People routinely use online tools to search health information to know more about their health on their own.
2. People need help with tracking medication and managing medical records, currently it is challenging for people since they often have fragmented pieces of health records.
3. The window of opportunity for patient activation happens soon after a condition is diagnosed.
4. Patient inaction stems from a mindset that heart disease is inevitable and not preventable.
5. Accepting the condition is a critical, and often overlooked part, to managing it.
6. It's not enough to get the information and understand it, people must know how to act on it.

Understanding patient journey

From the data I had collected about my target audiences' needs, I started thinking about and mapping out patients' needs during different phases of their journey from pre-discovery to recovery. This helped me identify various touch points for design intervention in their journey. I mapped out the patient's journey considering these four phases for a patient.

1. **Pre-discovery**

   When a person has not yet been diagnosed with a condition, but has worrisome symptoms, they want to assess if they are at risk, find out how to prevent their symptoms from worsening, and learn what to expect if they do have heart disease.

2. **Discovery**

   After the person is diagnosed with a condition, they need help understanding their condition better, identifying suitable caregivers, making, and keeping appointments, talking to their doctor, taking tests (EKG, lipids, stress test etc.), looking up words and terms, tracking symptoms, and preparing mentally and financially for treatment.

3. **Treatment**

   During this phase, the patient needs information about the potential risks and benefits of different treatments, with scheduling procedures, filling prescriptions, taking medication, tracking side effects, modifying diet and exercise, organizing health records, taking tests, paying bills, etc.

4. **Recovery/Maintenance**

   After the treatment, patient need to know what happens during recovery, schedule follow ups, make lifestyle changes, prepare exercise plan, financial, insurance, make dietary changes, take medication, pay bills etc.

Existing products and services

As the number of people living with chronic cardiovascular diseases rises, the number of people who use web-based resources to learn about and manage their health conditions is also increasing. Although there are many existing credible online resources focused on providing heart health information, that information is often expository rather than actionable in nature. Moreover, sifting through the information that is available online about heart disease can be confusing, time consuming, and overwhelming for many patients.

Web MD, American Heart Association, Mayo Clinic, and other websites are available through a quick internet search. All these resources have a thorough set of information, covering a wide range of topics and conditions. Many people turn to these resources as trusted/reliable sources of health information. However, they often fall short in the sense that searching for and finding the right information is not as intuitive as it could be. The hierarchy and navigation of existing heart-health websites is often cluttered and confusing; in many cases, it is difficult to discern between content and advertisements; few existing apps provide condition-related information that is actionable; and even fewer provide integrated tools to track and manage medication, appointments, behavior, daily health, tests, insurance, expenses etc.
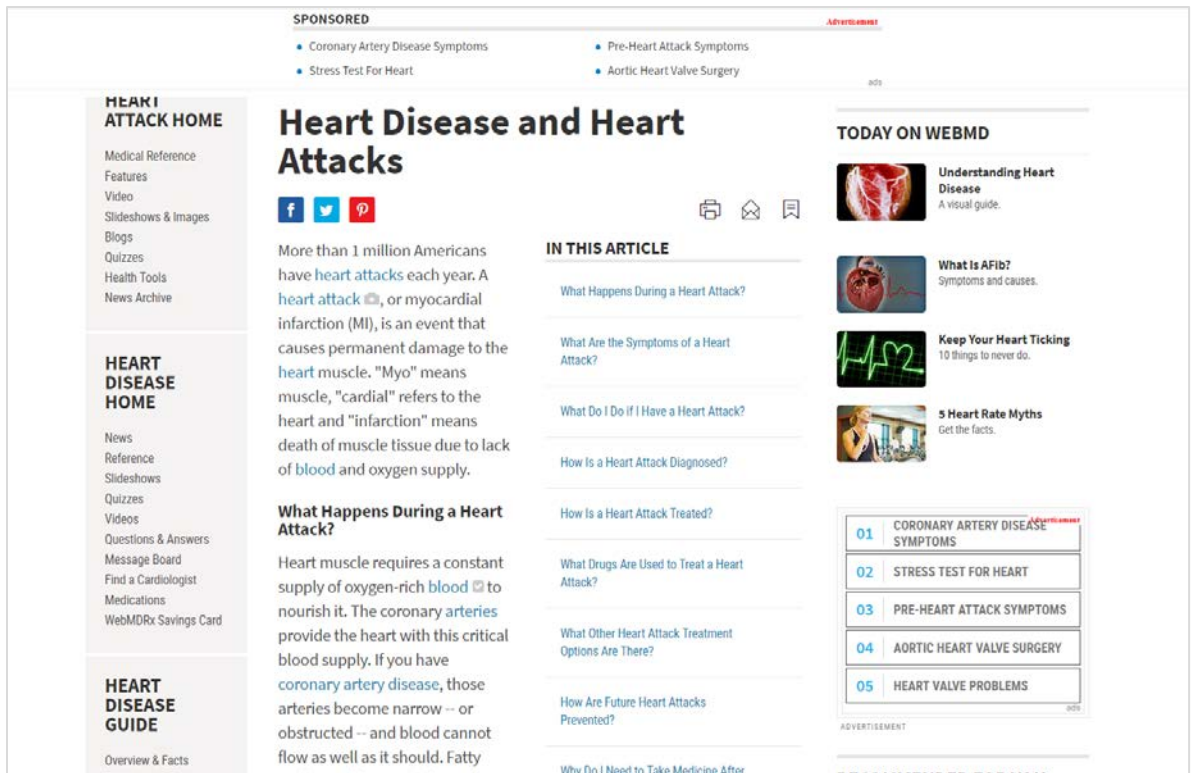
Figure 1. Screenshot of WebMD "Heart Disease and Heart Attacks" page (https://www.webmd.com/heart-disease/guide/heart-disease-heart-attacks#1, accessed May 2, 2018).

For example, although the content of WebMD's "Heart Disease and Heart Attacks" page is accurate, the layout of the page is busy, a bit overwhelming, and difficult to navigate: it is hard to tell which parts of the page are most important, or what the relationship of the content in the gray bar at the left of the page is to the content that appears in the middle of the page.
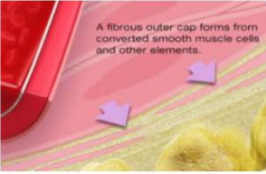
Figure 2. Screenshot of American heart association "Coronary Artery Disease" page (http://www.heart.org/HEARTORG/Conditions/More/MyHeartandStrokeNews/Coronary-Artery-Disease---Coronary-Heart-Disease_UCM_436416_Article.jsp#.WuoGbYgvyHs,, accessed May 2, 2018)

The AHA's site is also overwhelming, but in a different way. The content looks dauntingly dense and lengthy; there is no short summary of the condition provided in larger or differently colored text to help people get oriented. There are no tracking and managing tools, which makes it difficult for patients to save information and refer to it later.

Figure 3. Screenshot of Mayo clinic "Coronary artery disease" page (https://www.mayoclinic.org/diseases-conditions/coronary-artery-disease/symptoms-causes/syc-20350613, accessed May 2, 2018).

Although the information on the Mayo Clinic's "Coronary artery disease" page is accurate, and the layout is much cleaner, the text is still quite long, the reading level is arguably too advanced, and there is no obvious way to bookmark or "favorite" the page for future reference or any way to quickly jump to a section of interest (e.g. symptoms section versus a therapy section).
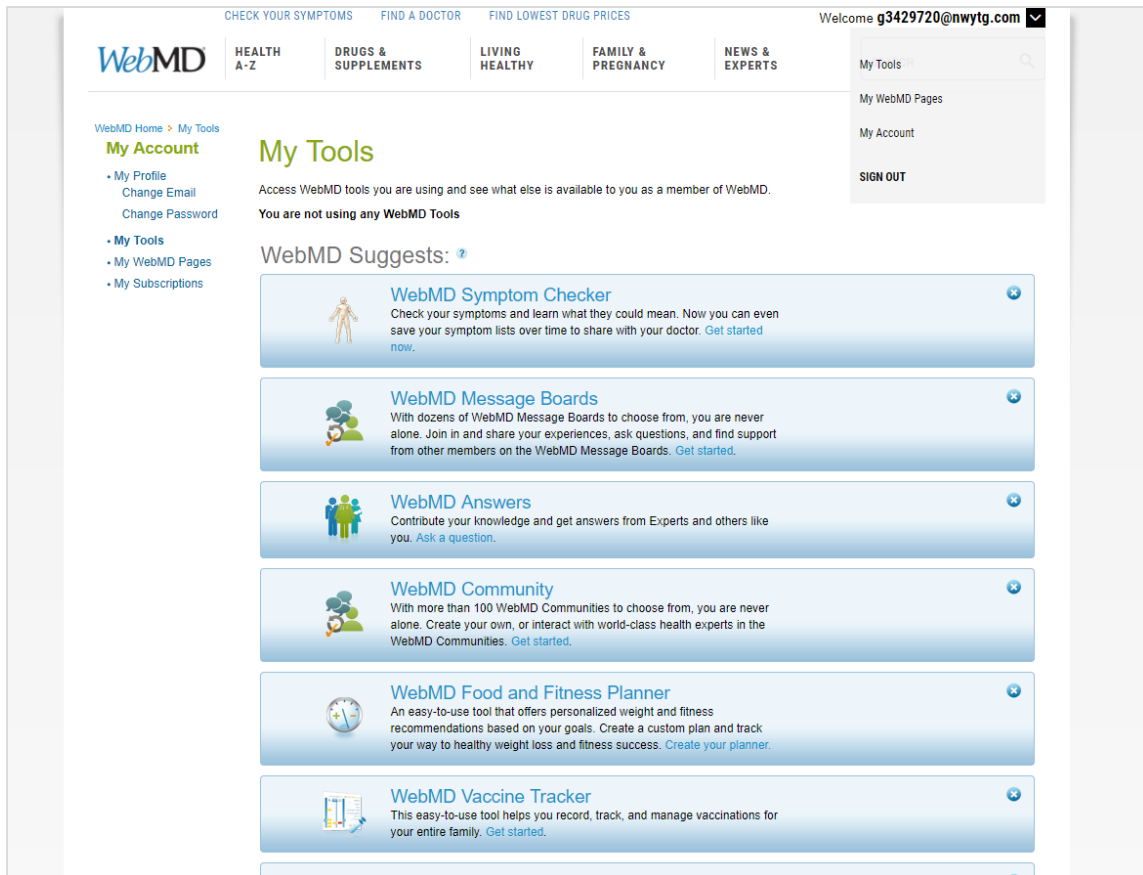
Figure 4. Screenshot of WebMD "My Profile" page
(https://member.webmd.com/profile.aspx, accessed May 2, 2018).

Although some websites allow users to create accounts, creating an account rarely allows users to personalize or customize the information they receive from the site. In the case of WebMD, for example, if the user has signed in, the website mostly points to different tools that are available, but not to health information that is personalized to the user's condition. Moreover, there is no way to track health information pertinent to the patient's circumstances.

Mobile app
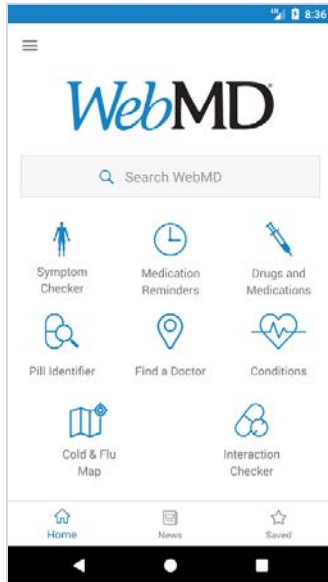
Figure 5. Screenshot of WebMD mobile app home screen (accessed April 23, 2018).

In the mobile versions of these apps, features that track symptoms, provide medication reminders, etc., are isolated, not integrated. The primary purpose of the current mobile app is not to help manage a specific condition, rather it is simply to make WebMD's content available on a mobile platform. Thus, the app is not designed to help people individualize their information gathering experience.
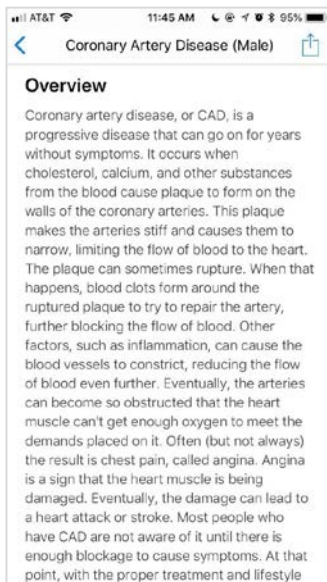
Figure 6. Screenshot of WebMD mobile app "Coronary Artery Disease" screen (accessed April 23, 2018).

The content of information screens is also very text heavy and difficult to read, because paragraphs are too long, and there is not enough white space between paragraphs. The hierarchy of the information is poor, making the content harder to digest.

For dense and heavy health information, readability of the content is an important factor in information delivery. Readability tests evaluate the readability of text,[11] i.e., the degree to which users can easily and accurately read information. These tests define a formula for evaluating the readability of text, usually by counting syllables, words, and sentences.

There are multiple services available that can help with evaluating the reading level of texts. I used readable.io to assess the reading level of heart-health websites' texts.
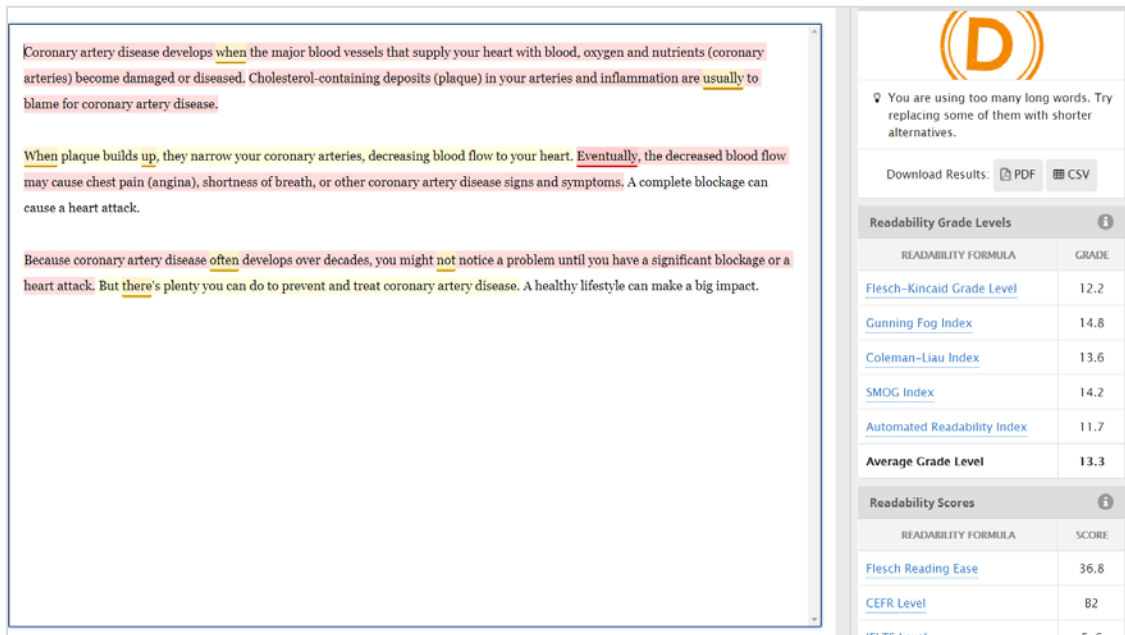
Figure 7. Screenshot of readable.io evaluation report of Mayo clinic "Coronary artery disease" page (https://www.mayoclinic.org/diseases-conditions/coronary-artery-disease/symptoms-causes/syc-20350613, accessed May 2, 2018).

Readable.io rated the text on the Mayo Clinic page on coronary artery disease a D: not failing, but almost. The sentences were too long and used too much medical jargon.

In this phase, I started looking for brands, products, and services offering solutions in different domains to get a fresh perspective on how to serve patients' needs better than existing websites and apps. I was looking for products outside of the heart-health domain that might serve as models for an improved heart-health website and mobile app.

Credit Carma: A financial management and credit reporting platform. Financial information regarding credit score was an always confusing for me. What I like about this service is how they group, categorize, and visualize information in a way that is easier for me to digest.
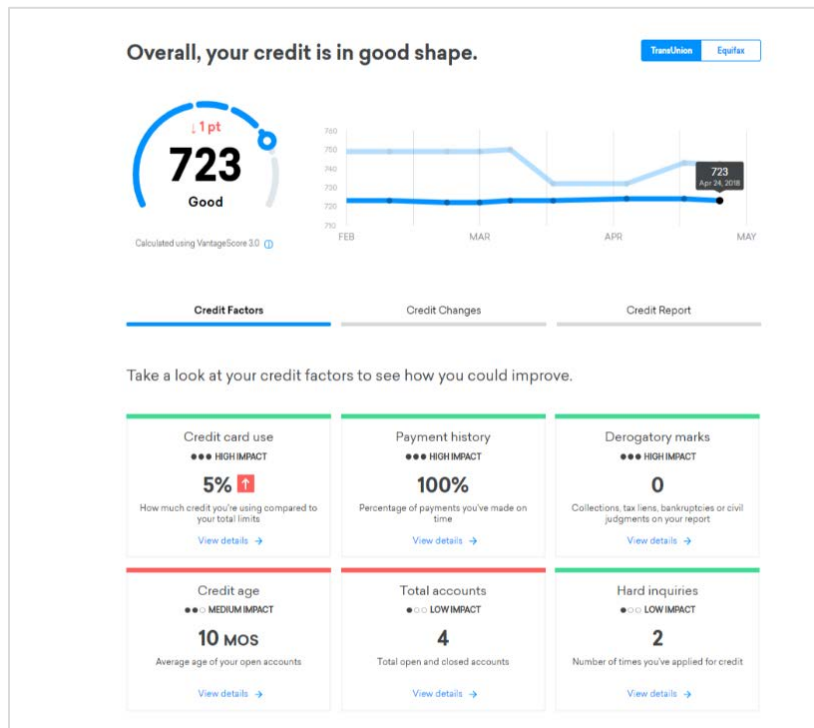
Figure 8. Screenshot of Credit Carma "Dashboard" page
(https://www.creditkarma.com/dashboard, accessed May 2, 2018).

Society of Grownups: A tool to help young adults make smart money decisions. They are trying to educate young adults on financial management. They provide educational resources and tools.
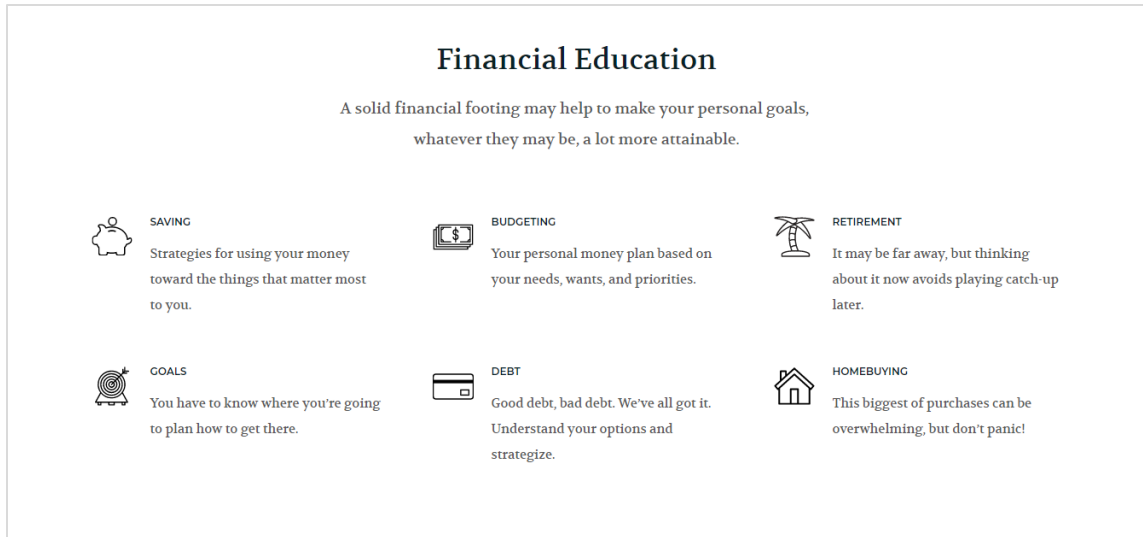
Figure 9. Screenshot of Society of Grownups home page (https://www.societyofgrownups.com, accessed May 2, 2018).

Livestrong: Livestrong provides a journal, guidebook for cancer patients to help them navigate through the physical, emotional, and practical concerns they may have during their cancer journey.

NerdWallet: It empower users to navigate all types of financial products. A personal finance website that helps people make and manage financial decisions by comparing various products available from various banks and insurance companies. The use simple language and try to visualize the information by putting some interactive tools.

Apple store Genius: It's a tech support station located inside apple's retail stores that simplifies and explains technical information to their customer by avoiding jargon and using easier layperson words.

Areas of opportunity

Make it easy to understand

Help people understand heart health information in a better way by simplifying and visualizing the relevant information in order to make it less overwhelming and easier to understand, e.g., writing short paragraphs, managing white space between paragraphs, using short line lengths, etc. (i.e., good practices for writing for web)

The idea is that people can get basic information about a chronic heart condition on this web platform, which would also enable them to understand their condition, take informed decisions, and have better interactions with their doctor.

Make it personalizable

Make the interface personalizable to the individual's condition(s), so they are not overwhelmed with/confused by information about different conditions.

Make it actionable

Make information actionable: provide nudges, reminders, and prompts to patients and family to track meds, moods, activities, and symptoms.

Adapt to user preferences

Provide an intuitive and customizable interface that responds to different stages in the patient journey and that learns/adapts to individual preferences.

Empower family & caregivers

Empower family and friends to track information about the patient, to provide a fuller picture of diet, symptoms, etc. for care providers. Help people besides the patient play an active role in their family member's or friend's health journey. Since most family members of heart patients have little to no knowledge about chronic heart conditions or how best to support people who have them, it is important for family members to understand the patient's condition, too, in order to provide active support. They need tools and a structure to play an active role.

Integrate with other services

Integrate app with other services and data to create a rich experience for the user. It can be something as simple as integrating the appointment schedule with the user's existing phonebook or calendar to make it easier to manage appointments, prompt people to prepare in advance of appointments by printing out symptom and medication adherence histories, suggesting questions to ask, etc.

Make it accessible

Make the pages screen-reader accessible and design them with high text/background contrast to be accessible for people with impaired vision.

Provide contextual information

Provide only context-relevant information: not everything about the disease all at once. Reinforce how a doctor shares information with a patient. When a patient visits a doctor, the doctor, ideally, won't tell him/her all the information they know about a specific

condition, but rather try to simplify their message and provide contextually relevant information.

Help patients and their friends and family understand track and manage condition

Make it easy for patients and/or family members and friends to understand the condition, treatment options, side effects, and test results, and to manage healthcare appointments, track symptoms and medications, etc. In the mobile app, there is an opportunity to integrate these features. Users might benefit from a dashboard to track all health-related information in one place.

Improve interaction with healthcare system and providers

This would mean enabling patients to have a better and more informed communication with their healthcare providers. It could include helping patients with their healthcare appointments or prompting them to ask questions etc. Also, people's relevant healthcare history or past health records could be aggregated, and then printed out or shared with the provider.

Crucial aspects of a health resource

1. **Content**:

   The content needs to be reliable and trustworthy. Since I do not have a medical background, I would be using health information available from NIH (national institute of health and national library of medicines). Information on NIH is in the public domain.

2. **Medium/channel**:

   The content needs to be delivered through a medium people are comfortable with, e.g.,

a website or mobile app (it is not possible to create personalized, interactive content in print, unfortunately).

3. **Experience**:

   The overall experience should be designed in a user-friendly and intuitive manner, which will differentiate it from other tools.

DESIGN

Proposed solution

Byheart is a personal health companion—available as a website and mobile app—that provides guidance and nudges—not just information—tailored to each user's needs. It empowers both patients and their family and friends to understand and better manage chronic heart conditions. It is available as both web and mobile platforms because screen-based interfaces can offer interactive experiences that print cannot, and can deliver personalized content and be accessed from anywhere. This service can be delivered directly to users and can be set up to meet their condition-specific needs. It can incorporate their personal preferences and provide tailored content relevant to their stage in the patient-journey. It can also provide users with tools to track and manage their treatment/therapy and medical history.

Design process for branding

Before proceeding to design a website and mobile app, it was important to think about this service as a whole and create a brand for it. Establishing the identity is also helpful to create a more cohesive experience across different product channels, such as website, print, and mobile app. Defining and setting up the brand attributes also helped in getting the direction for mobile and web strategy.

NAME

I chose the name 'byheart' not only because it suggests heart health, but also because it references a common English idiom – by heart, to denote a service that helps patients and their families *remember* all the information and actions they need to take to improve health outcomes.

BRAND PERSONALITY

To define a personality for a brand, the brand attributes that best describe the characteristics needed to be defined. I wanted byheart to be mature, helpful, friendly, flexible, adaptable, warm, and inviting.

Defining these attributes helped inform the choice of color, typeface, and logo construction. To clearly indicate the association with heart health, and to induce a feeling of companionship and guidance, I planned to use warm colors as a part of the brand language. Primary colors were red and white, along with secondary colors like deep blue and turquoise blue. I decided to use sans serif typeface Roboto for an informal and modern feel.

LOGO AND IDENTITY
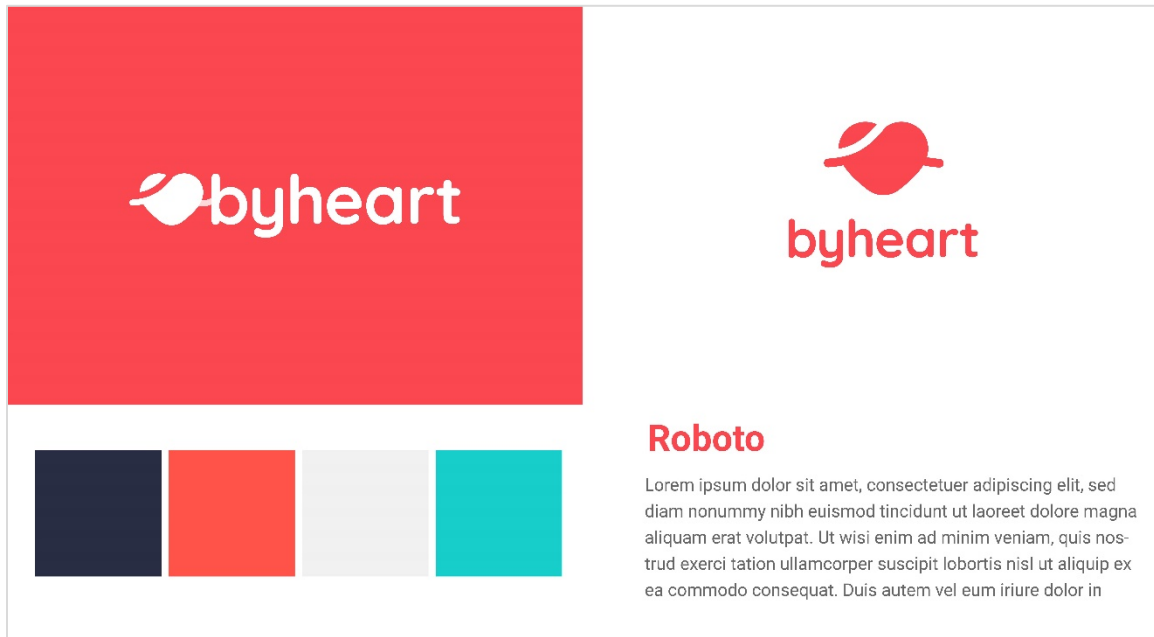
Figure 10. Byheart brand and logo

Design process for the mobile application and website

DESIGN BRIEF

To empower patients and their family members to manage and track their condition.

Byheart is intended to help people understand heart health information in a less overwhelming and consumable format by simplifying and visualizing the relevant information. Furthermore, byheart helps people get basic information about their chronic heart condition from this web platform enabling a deeper understanding of their health, preparing them to make informed decisions and have better interactions with their doctor.

INSPIRATION

Byheart is designed to be like a friend or a family member that has a medical background, someone who can guide the patient through different stages of their healthcare journey.

Byheart was also inspired by the way in which a doctor interacts with patients through more intimate house-calls. In these encounters, the familiar doctor won't tell their patient all the information they know about a specific condition, but rather meets the patient where they are with the contextually relevant information that's appropriate for the moment and at a pace that a non-professional can digest.

USE CASES

Defining use-cases was the primary step towards structuring and designing the information for the mobile app and the website. A use-case is a written description of how users will perform tasks on the application. It outlines a system's behavior as it responds to a request from a user.[12] Considering the different stakeholders and their needs, I defined a list of use-cases which are actions people might take while using byheart. Use-cases also

helped me define the overall scope of the mobile application and website. After defining an extensive list of use-cases, I started prioritizing them based on user needs, which further helped towards building task-flows and information architecture.

Pre Discovery	
Prevention	Find out how much I am likely to be at risk
Am I at risk?	Learn about the regular check-ups as a part of preventive care
	I want to get additional information regarding lifestyle changes to avoid the risks
Discovery	
Find Doctor	How to choose my healthcare provider
Doctor's appointment	I want to know how I can prepare for doctor's appointment
	I want to understand what questions I should ask my doctor
	I want to take notes during my doctor's appointment
	I want to be reminded about my doctor's appointment
Glossary of terms	I want to undnerstand the Medical terms medical systems are using
Conditions	I want to know more about my specific health condition
	I want to know how serious this condition is
Symptoms	I want to know about the other possible symptoms & understand their urgency
	I want to know about the red flags I need to watchout for
Financials, Insurance	I want to know whether my insurance cover the treatment
	I want to understand how much I will have to pay out-of-pocket
	I want to carry or save my insurance details
Treatment	
Diagnosis	I want to understand my diagnosis
	How can I explain this to my relatives/ friends
Tests	I want to understand how this test would help me
	I want to know the available options for taking the test
	I want to learn about prescribed tests
	I want to understand what I can expect from a test
	I want to know how to prepare for a test
	I want to know about the average cost of the test
	I want to understand what would be covered by my insurance
Treatments	I want to know more about the available options for treatment
	I want to know about the average cost of the treatment
	I want to know about the additional care that I need to take along with my treatme
Medication	I want to know what are the possible side effects of the medication
	What are these prescribed medications and what do they do
	I need to track my medication
	I want to remember to take medicines
	I want to know where can I buy the medicines from
Side Effects	I want to know the possible side effects
	I want to know who do I contact when I exprience side effects
Recovery	
What to expect	I want to know whether I am recovering
	I want to understand how the treatment and medication is helping me
	I want to keep a record of my treatment so far
	I want to understand what's next in the treatment
	I want to know how much I have spent on my treatment
	I want to know what the upcoming expenses are
	I need help to organise medication
	I want to know and track the life style chhanges recommended by my doctor
After Treatment	
Manage condition	I want to understand the difference in my health before and after the treatment
	I want to understand how I can maintain my health at current condition / improve
Stay healthy	I want to track my eating habbits
	I want to track my fitness
	Help me remind to do regular doctor's visit

Figure 11. Byheart use-cases

INFORMATION ARCHITECTURE

In this phase, I started grouping and categorizing the information considering the use-cases I had defined earlier. This was an iterative process with multiple changes and modifications along the way. Good information architecture helps people find and use different information and sections on the platform efficiently. In other words, it is a way for navigating through the structure of information of a mobile app or a website. I created the initial versions using paper and post-it notes as it allowed me to have a flexibility of tweaking and re-grouping the content.

Profile

Diary
List of notes
Note title
Date & Time
— Search
— Organize
  by Date & time
  by Label

Note 01
Note content
Date & Time
Picture
Location
Label
— Save
— Delete
— Share
— Print
— Export

Enter Note

Tests
List of previous tests
Test Name
Date & Time
— Search
— Organize
  by Date & time
  by Label

Test 01
Test Name
Date & Time
Test details
Results
— Save
— Delete
— Share
— Print
— Export

Book a test
Location
Type/ Purpose
Date
— Search
— Reset

List of tests
Date & Time
Insurance
Expenses
map view
— Reset
— Book

Profile details for test
Name
Age
Gender
Contact detail
Comments
Instructions for patient
Address

Medication
List of Medications
Title
— Search
— Organize
  by Date & time
  by Label

Note 01
Name
Purpose
Rx ID
Dosage
Who Prescribed
Date & Time
Picture
— Save
— Delete
— Share
— Print
— Export

Enter New Medication

Calender
Calender view
List of events
Upcoming appointment
Expiring medication
Treatment timeline
— Edit
— Sort by Week/ month

Events - 01
Name
Category
Additional info
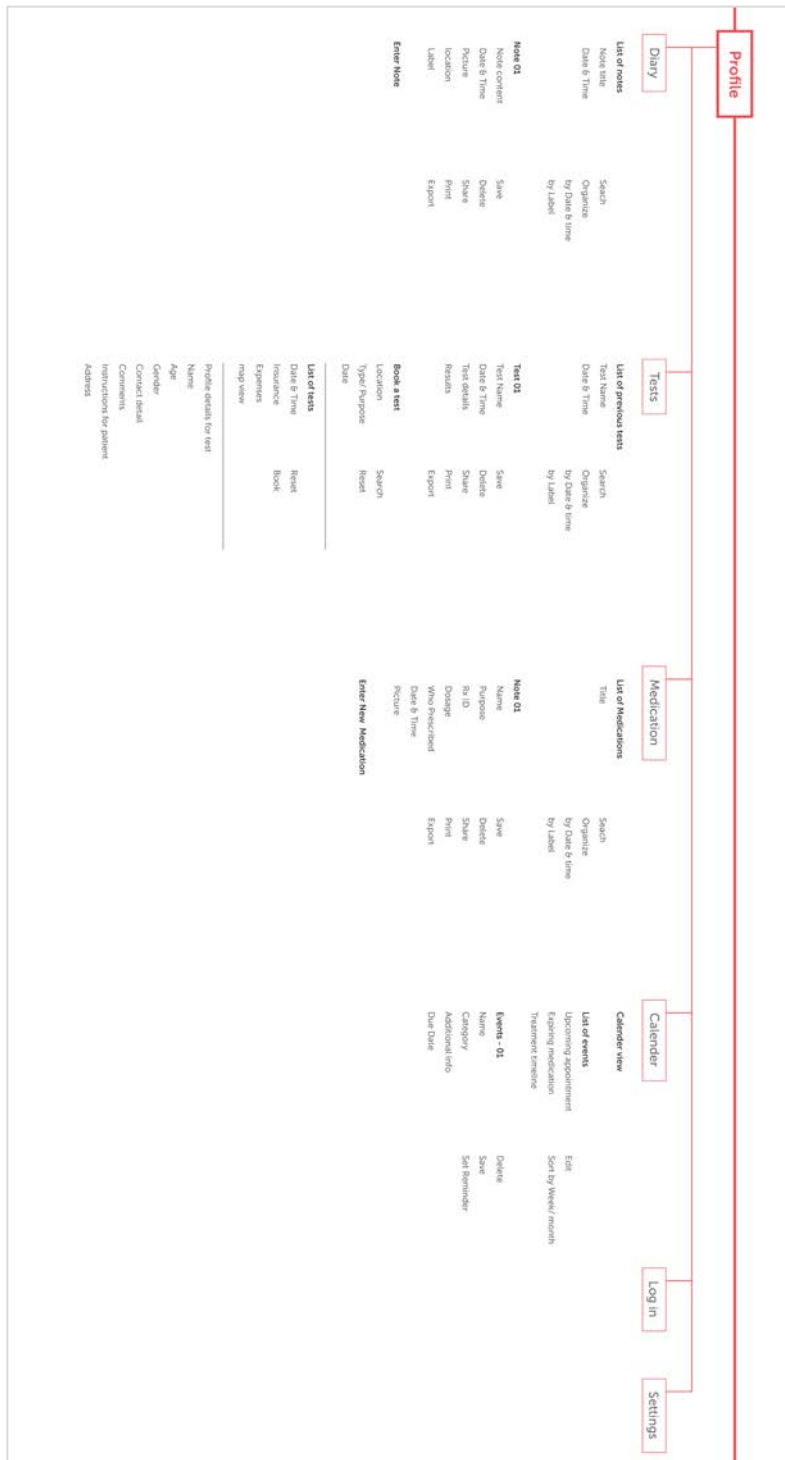Due Date
— Delete
— Save
— Set Reminder

Log in

Settings

Figure 12. Byheart information architecture, a zoomed in section

SCREEN-FLOW

Screen-flow is a path a user travels through while completing a task or finding some information on the platform. It also captures all the steps a user might take to reach their goal while interacting with the mobile app or website. This exercise also helped me evaluate the information architecture and make the necessary changes. Screen-flows also helped in defining the content required on the different pages of the mobile app and website, which further helped with the next step, i.e., wireframing.

WIREFRAMES

A working definition for wireframes is an illustration of dynamic digital interactions with simple and low fidelity static outlines of the product and/or service with corresponding descriptions of actions and functionality. I started wireframing as a first step towards visualizing the information I had previously grouped and categorized. Wireframes were a great tool for me to get feedback on the design before investing significant amounts of time on the visual design of all the screens. This process made it easier to make changes as required, before moving to the final visual design phase.
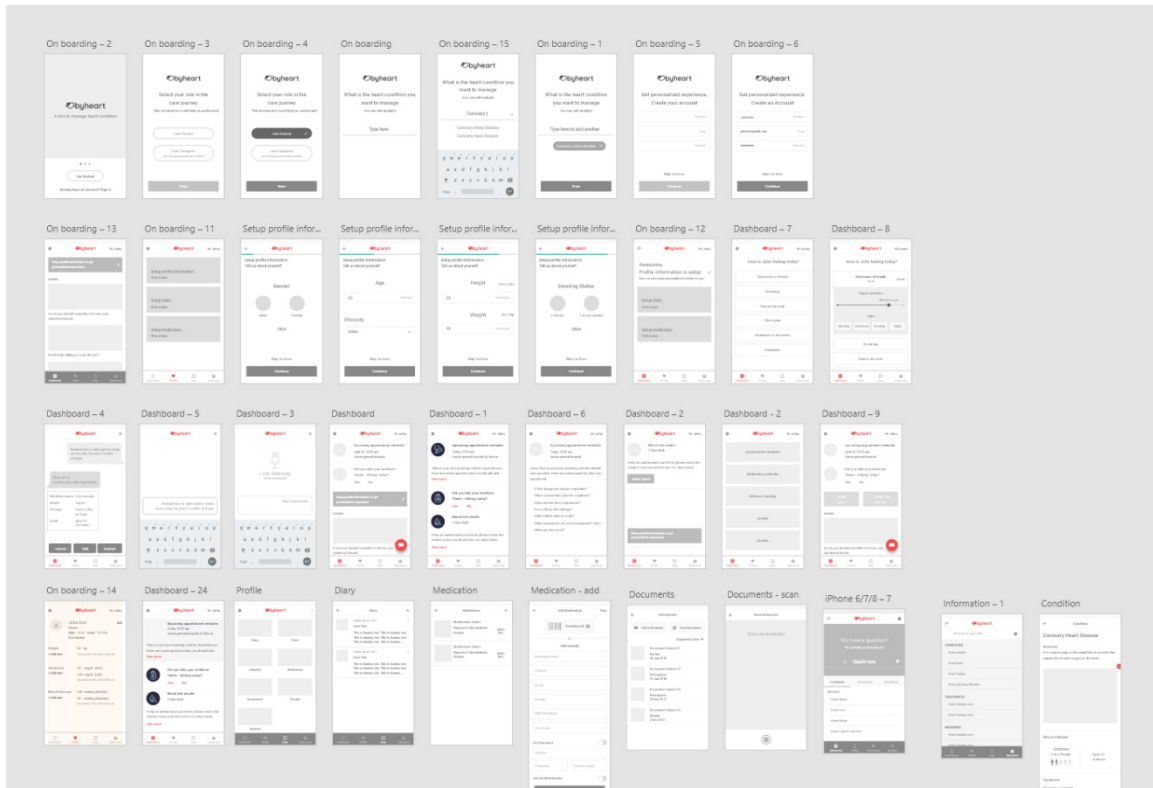
Figure 13. Byheart wireframes

VISUAL DESIGN

With wireframes at hand, I had a better understanding of the evolving structure of the website and mobile app. I used wireframes as a starting place for creating the visual design.
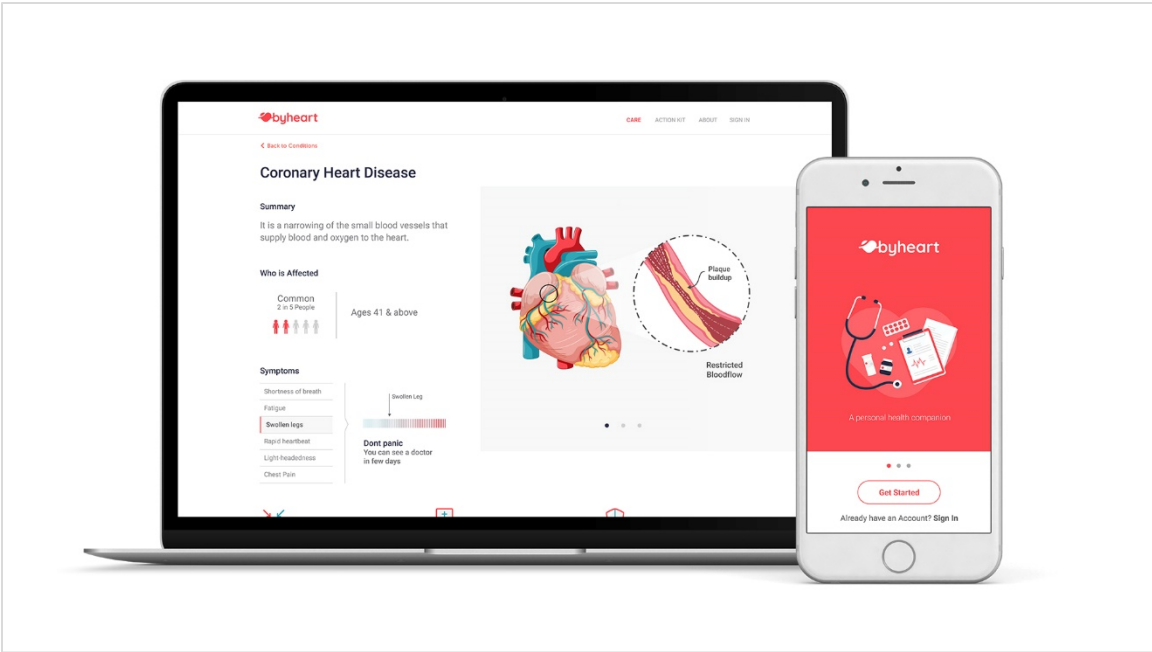
Figure 14. Byheart visual design

Feature highlights
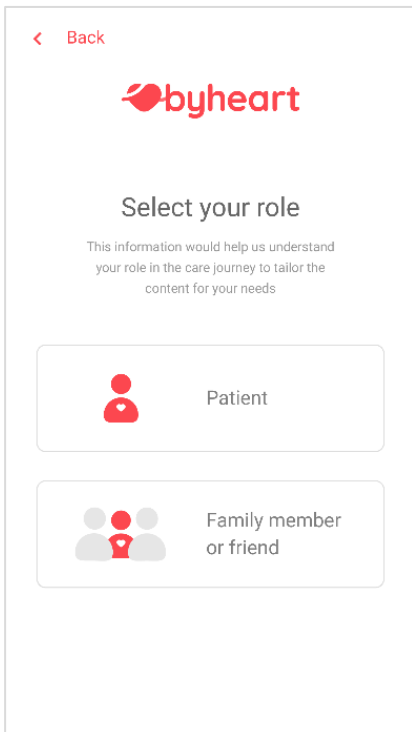
Figure 15. Byheart mobile app "choose role" screen

Designed for patients and family members

During onboarding, users would specify their role they would be playing in this care-journey. This would help the app to provide personalized content for a patient or a family member.

Figure 16. Byheart mobile app "Select condition" screen

Manage specific condition

During the initial setup, the patients or family members would input the condition(s) they wish to track. The app experience and information would be tailored to the specific condition. This would help create a personalized experience.

Figure 17. Byheart mobile app dashboard screen

Personalized dashboard

Dashboard provides a personalized feed of contextual information that is important for the user. It adapts to user's needs and curates the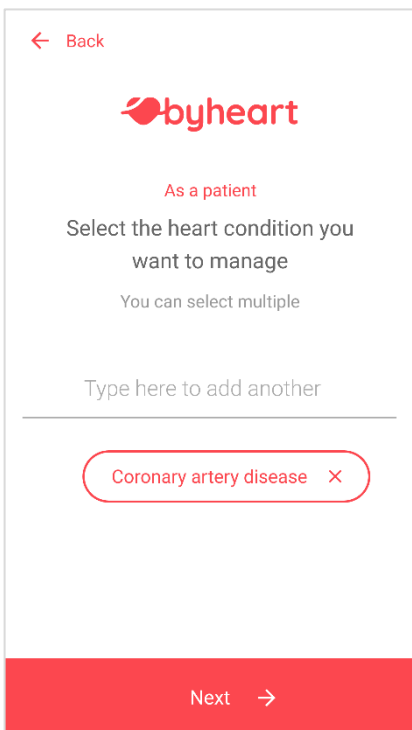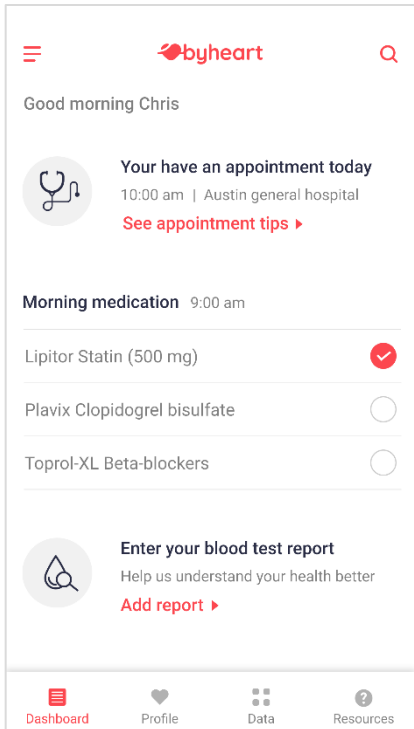 content that is needed for them at any point of time. E.g. If a user has an upcoming appointment, it would provide information and tips about that appointment. It can remind them to take routine blood tests to monitor their condition more effectively. Another opportunity is integrating it with existing tools like their phone calendars or other health related apps like Fitbit, etc.
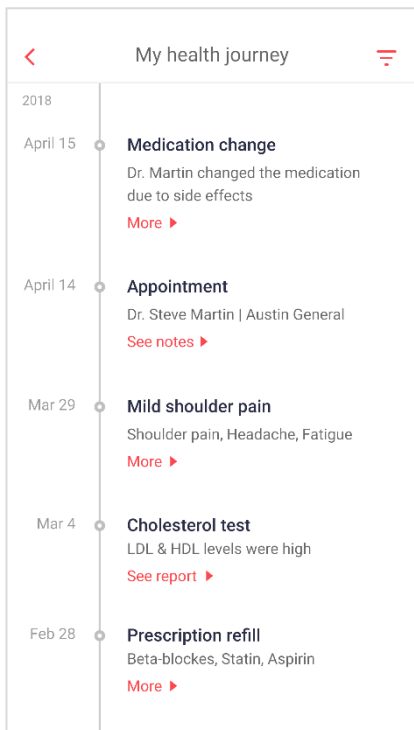
Figure 18. Byheart mobile app health journey screen

Building a care journey

Documentation is an issue patients commonly face while managing their health. Typically, while managing a chronic condition, patients have do deal with a lot of paperwork. Patients are often forgetful. When they change doctors or consult with different physicians, it is important for them to tell a story.

The Building Care Journey feature would enable them to track their care journey and present it in a format that can be easily communicated with their providers or family members.
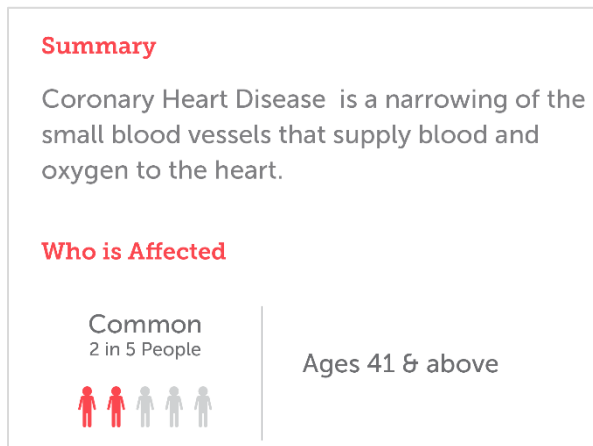
Figure 19: Byheart website summary section in condition page

Understanding condition

Information would be presented in smaller, digestible chunks, and in writing that avoids medical jargon so that people can understand it better. Another factor is assuring people that they are not alone and there are other people living with similar conditions.
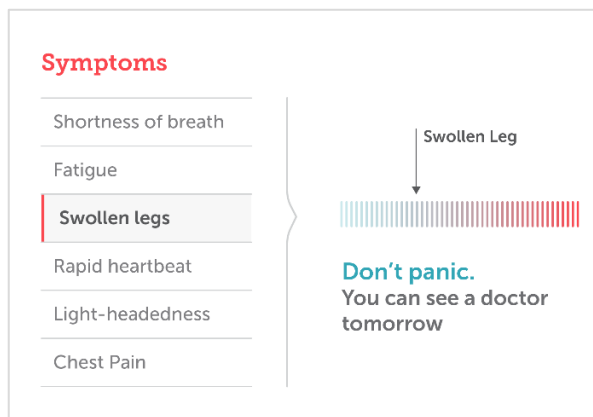
Figure 20: Byheart website symptoms section in condition page

Understanding symptoms

Along with the symptoms, specifying the intensity of the symptoms is also important. This would not only help patients assess the severity of their symptoms, but also help them make informed decisions regarding when to seek help.

Next steps

Beyond what I created for this initial version of byheart, I identified other areas of opportunity to explore. My next interest is to expand the scope of the app to help patients and their families navigate through the insurance and financial complexities of the US healthcare system, since inability to effectively navigate through the healthcare system is one of the major hurdles faced by patients. The opportunity areas for design intervention might include helping people understand how the healthcare system works, how insurance and benefits work, how to determine their eligibility for government healthcare programs, and how to sign up for and benefit from them.

Potential technologies

Artificial intelligence: The use of artificial intelligence (AI) and machine learning is increasing in various areas including healthcare. There is an opportunity here to apply AI based tools in this domain. They would help in capturing the specific requirements of a patient's condition and their individual needs, to personalize the information and deliver it in a format that works best for the patient.

Conversational, smart or robot assistants: In order to make the experience more human, it would be interesting to explore the application of chat-bot in this domain. A chat bot is a piece of software that conducts a conversation with users. Chat-bots simulate how a human would behave as a conversational partner and can be used to provide customer service or deliver other informational services.[13]

CONCLUSION

To conclude, as the number of people living with chronic heart conditions is increasing, so is the need to empower patients and their family members to take charge of their health. Byheart outlines an approach that can help people not only to understand, but also to *act on* available heart health information for making better and more informed decisions regarding their heart health. These small actions can have a surprisingly big impact on health outcomes.

In the future, I see an opportunity to commercialize this idea. Moreover, while the work I have done focuses on heart health, I believe that byheart provides a model for how to design apps that assist patients and their families in managing other chronic conditions, such as diabetes and mental health conditions.

References

1 World Health Organization. (2017, January 12). The top 10 causes of death. Retrieved August 30, 2017, from World Health Organization: http://www.who.int/en/news-room/fact-sheets/detail/the-top-10-causes-of-death

2 Centers for Disease Control and Prevention, & National Center for Health Statistics. (1999). Underlying cause of death 1999-2013 on CDC WONDER online database, released 2015. Data are from the multiple cause of death files, 2013.

3 Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., ... & Huffman, M. D. (2015). Heart disease and stroke statistics—2015 update: a report from the American Heart Association. Circulation, 131(4), e29-e322.

4 Kaiser Family Foundation. (2015, November 4). Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity. Retrieved September 15, 2017, from Kaiser Family Foundation: https://www.kff.org/disparities-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/

5 Fabbri, M., Yost, K., Rutten, L. F., Manemann, S., Weston, S., Jiang, R., & Roger, V. L. (2017). Abstract P169: Health Literacy and Outcomes in Heart Failure: a Prospective Community Study.

6 CDC, Centers for Disease Control and Prevention. (2016, December 13). Health Literacy. Retrieved September 20, 2017, from Centers for Disease Control and Prevention: https://www.cdc.gov/healthliteracy/learn/index.html

7 Alm-Roijer, C., Stagmo, M., Udén, G., & Erhardt, L. (2004). Better knowledge improves adherence to lifestyle changes and medication in patients with coronary heart disease. European Journal of Cardiovascular Nursing, 3(4), 321-330.

8 Safeer, R. S., Cooke, C. E., & Keenan, J. (2006). The impact of health literacy on cardiovascular disease. Vascular health and risk management, 2(4), 457.

9 Holman, H., & Lorig, K. (2004). Patient self-management: a key to effectiveness and efficiency in care of chronic disease. Public health reports, 119(3), 239-243.

10 Porter, M. E., & Teisberg, E. O. (2006). Redefining health care: creating value-based competition on results. Harvard Business Press.

11 usability.gov. (n.d.). Readability. Retrieved August 20, 2017, from usability.gov: https://www.usability.gov/what-and-why/glossary/readability.html

12 Use Cases. (n.d.). Retrieved January 20, 2018, from usability.gov: https://www.usability.gov/how-to-and-tools/methods/use-cases.html

13 Google. (n.d.). Hangout chats API. Retrieved April 15, 2018, from Chat bot concepts: https://developers.google.com/hangouts/chat/concepts/bots