

HealthHawk



Usability Report

Researcher

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Client

Dell Medical School

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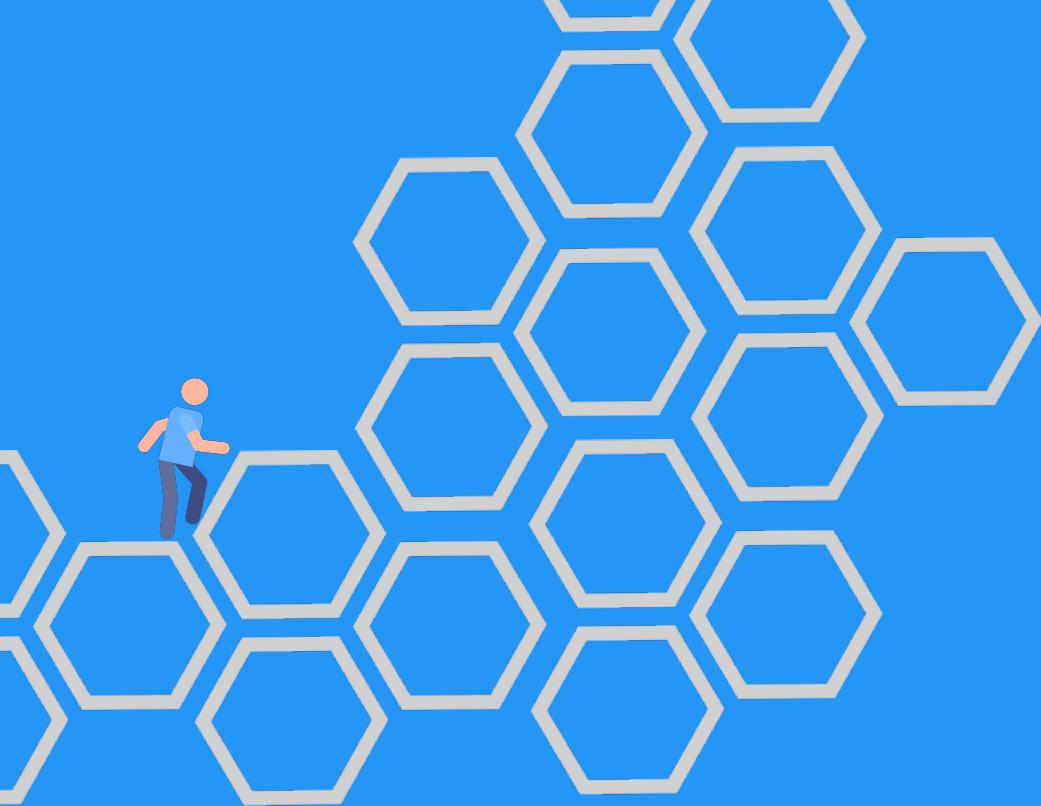
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Background

To get acquainted with the complexity of medical field, after the client kickoff meeting, I performed extensive secondary research and a competitive analysis.

CLIENT KICKOFF

Client kickoff meeting is used to determine what needs to be built and, more importantly, why. From this meeting, it helps me to identify targeted users, their needs and problems they have for medical experience.

Problem Space

There are always challenges with finding ways to share meaningful data between physical health and behavioral health providers. Because of limited EHR interoperability, it results poor interaction between patients and doctors. It opens a discussion of how to find a way to improve the experience between patients and doctors, patients and health providers, doctors and providers.

Direct User

Patients

Main Characteristics

- I go to multiple providers for my care
- I have many medicines
- I have many doctors
- I don't have too much time
- I don't have too much money

Pain Points

- I don't understand the diagnoses they give me
- I don't know what each medicine is for
- I have a hard time to keep track of my medicine
- Doctors ask me the same questions every time they see me
- I don't understand my result or report
- When I am sick, I do not know what to do
- Doctors spend a few minutes with me
- When I change my healthcare provider, they do not hold my record.
- I don't have time to go to multiple visits

Indirect User

Family

Main Characteristics

- I have to take care of my family
- I have appointment to track
- I have to know my family's medical conditions
- I have to communicate with doctors

Pain Points

- I miss out on the information of my family's medical conditions
- I have a hard time to describe the symptom for doctors.
- I have a hard time to keep track of my medicine
- I have to bring my family's medical history for doctors.
- I have difficulty to access information

Doctor

Main Characteristics

- I see new patients all time
- I rely on the patients memory
- I spend time on discharge paperwork
- I have to track medical data
- I have to access information from clinic
- I look for what insurance patients have

Pain Points

- Often patients don't know what medicines they are taking or what diseases they have
- I waste time to track down information
- The paperwork does not get to the next provider
- I waste time to access information from clinics
- I spend most of my time doing paperwork
- I hard to see the important mail in my mailbox
- I don't know what insurance patients have

LITERATURE REVIEW

In an attempt to understand the what the problems are in patient and doctor, I have conducted secondary research in the following three areas, patients, doctor and paperwork, to aid in the creation of a design research question.

Doctor

Physicians perform surgeries, prescribe drugs, and give patients tests that are not backed by sound evidence because most **doctors are not trained to analyze scientific data**, says Michael Wilkes, vice dean of education at U.C. Davis.

Source: The Problem With Medicine: We Don't Know If Most of It Works, Discover Magazine

Communication among healthcare team members influences profound impacts patient safety

Source: AHRQ

Doctors and other health professionals **lack adequate training in providing high quality healthcare to patients**

Source: Health Professions and Training, Institute of Medicine

Patients

Twenty-one percent of Americans say they have personally experienced a **medical error** and 31 percent have been personally involved with the care of someone who has experienced an error.

Fifty-six percent of those who did not report the error say they didn't think it would do any good. Four in 10 say they didn't know how to report the error

Source: Americans' Experiences with Medical Errors and Views on Patient Safety, representative sample of 2,536 adults age 18 and over, National Patient Safety Foundation

It is estimated that one-third of adults with chronic illnesses **underused their prescription medication due to cost concerns.**

Source: Cost-related medication underuse among chronically ill adults, Piette JD, Heisler M

When **interruptions** occur during patient visits, **the patient may perceive that what they are saying is not important** and leads to patients being reticent to offer additional information.

Source: Cost-related medication underuse among chronically ill adults, Piette JD, Heisler M

More than half of hospitalized patients **could not identify their diagnoses or the names of their medication(s) at discharge**, an indication of ineffective communication with their physicians

Source: Patients' understanding of their treatment plans and diagnosis at discharge, Makaryus AN, Friedman EA.

Based on Health Care Quality Survey, 25% of Americans report **they did not follow their clinician's advice**. The reasons is stated as following:

1. 39% **disagreed** with what the clinician wanted to do
2. 27% were concerned about **cost**
3. 25% found the **instructions too difficult to follow**

Source: The Commonwealth Fund

Studies of clinician-patient visits reveal that patients are often not provided the opportunity or time to tell their story / history, often due to interruptions, which compromise diagnostic accuracy.

Incomplete stories /history leads to incomplete data upon which clinical decisions are made

Source: Contributions of the history, physical examination, and laboratory investigation in making medical diagnoses, Peterson MC

Paperwork

57 percent of doctors said **EHR use limited their face-time with patients** and 50 percent said it limited the total number of patients they could see per day.

Source: Top Physician EHR Issues Disrupting Clinical Workflows, Sara Heath

Using the phone as a medium to communicate that information back to the physician office is especially valuable for patients who have chronic conditions, as **timely patient action is very important to effectively managing the patient's health**.

Source: mHealthIntelligence

During the office day, physicians spent 27.0% of their total time on direct clinical face time with patients and **49.2% of their time on EHR and desk work**.

Source: Allocation of Physician Time in Ambulatory Practice: A Time and Motion Study in 4 Specialties, Christine Sinsky

Whereas EHR adoption continues to increase among healthcare organizations and providers, **EHR usability remains a problem for end-users trying to enter and access data efficiently**

Source: Frost & Sullivan

The researchers found that while 81 percent of patients in a **low EHR use session reported high patient satisfaction**, only 48 percent in a high EHR use session could report the same.

Source: Association Between Clinician Computer Use and Communication With Patients in Safety-Net Clinics, Neda Ratanawongsa, MD, MPH

Researchers found that 65 percent of **patient satisfaction was correlated with physician empathy**.

Source: Massachusetts General Hospital

While EHRs all have a similar purpose, there are no real standards. Each provider has developed its own language.

Source: The Challenges of Sharing Data Between Separate EHRs, Afia

Even with the opportunity of Health Information Exchanges, most organizations were unable to reap the benefits of shared data because they simply could not agree on terms of sharing the data

Source: The Challenges of Sharing Data Between Separate EHRs, Afia

Key Takeaways

- Literature Review

- Patients' perceptions of the quality of the healthcare they received are highly dependent on the quality of their interactions with their healthcare clinician and team.
- The connection that a patient feels with his or her clinician can ultimately improve their health mediated through participation in their care.
- Due to cost concerns, most of the patients underused their prescription medications and did not follow clinician's advice.
- Clinician's ability to explain, listen and empathize can have a profound effect on biological and functional health outcomes as well as patient satisfaction and experience of care.
- Due to complicated instructions, most of the patients refuse to follow their clinician's advice.
- Patients in a low EHR session revealed high patient satisfaction
- Due to EHR usability issue, doctor has to spend more time on EHR system

COMPETITIVE ANALYSIS

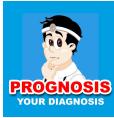
What I did

In order to understand the current landscape, I conducted a competitive analysis on a few of the best current designs to allow us to learn from the examples.

Objective

Identify common trends of how competitors solve the problem of the patients have.

Competitors

						
Dr on Demand	Prognosis	WebMD	Zocdoc	SmartBP	Kinsa	Medisafe
Visit board-certified physicians over live video	Increase doctor's medical skills by practicing interactive clinical cases	Physician-reviewed healthy living information and interactive tools	Provide a better healthcare experience by finding doctors you love	Blood pressure management app	Guide you from the first sign of sickness through recovery and beyond	Pill reminder app

What I want to learn



Improve communication between patients and doctors



Show reliability between patients and doctors



Implement tracking system for medical items



Improve communication between patients and doctors

Identify a way to improve communication between patients and doctors

What did competitors do?

Visiting a Doctor

1:08

SETUP

< Back Next >

Who is the patient?

- Jason Lin ✓
- My Child
- Someone Else

dr on Demand

1:09

Medical

< Back

See a Medical Doctor Now

Schedule an Appointment

What is a Video Visit?

What Do We Treat?

Meet Our Doctors

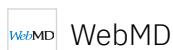
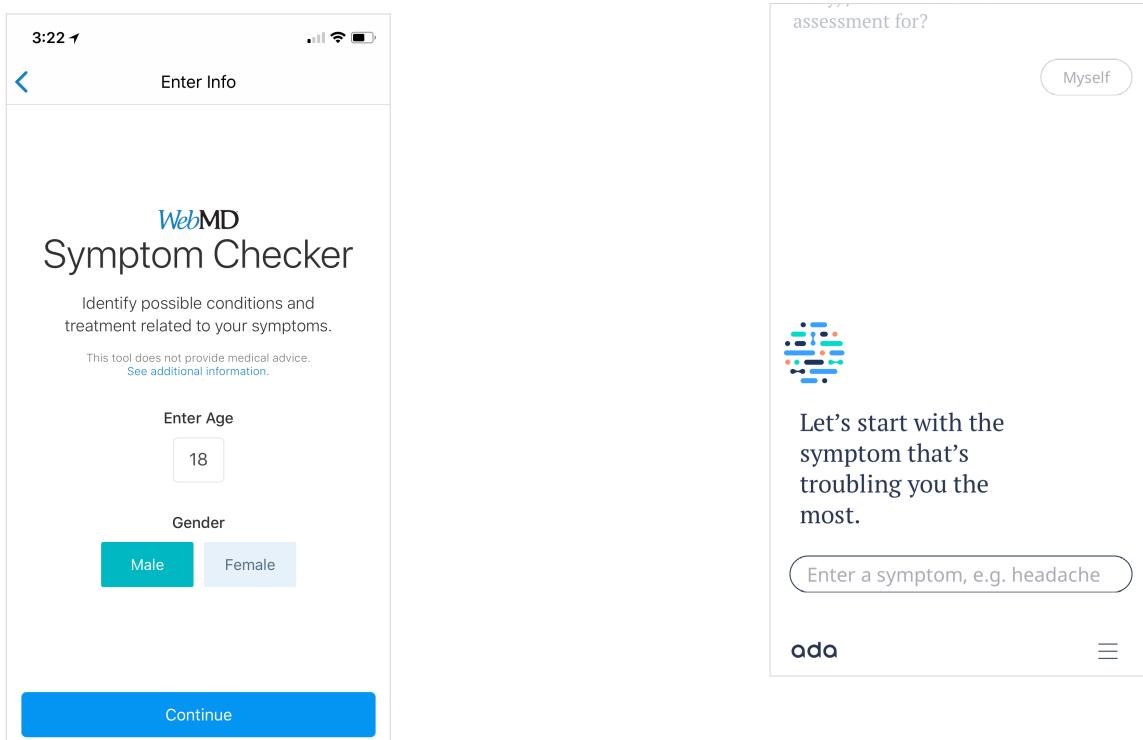
Pricing

dr on Demand

Before making an appointment, patients are required to fill the pre-test on mobile. Linear user flow design allows patients to estimate how much time it's required to complete a task.

Patient that has a busy schedule can schedule a video visit with doctor.

Pre-diagnosis



Pre-diagnosis system helps patients to better understand their medical conditions.



The pre-diagnosis system is designed to provide advices for patient like a native human.

Key Takeaways

- Improve communication between patients and doctors
- A simple pre-test on mobile helps doctor understand your problem well.
- Video visit is beneficial for people who have a tight schedule.
- Pre-diagnosis system helps patients to easily describe their symptom for doctor.
- By pre-diagnosis system, patient has a clue of what to do next for this medical condition.

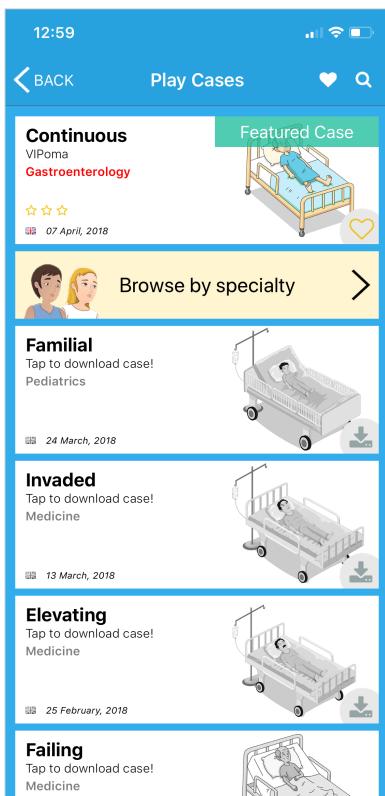


Show reliability between patients and doctors

Deliver trust when patients are interacting with the application

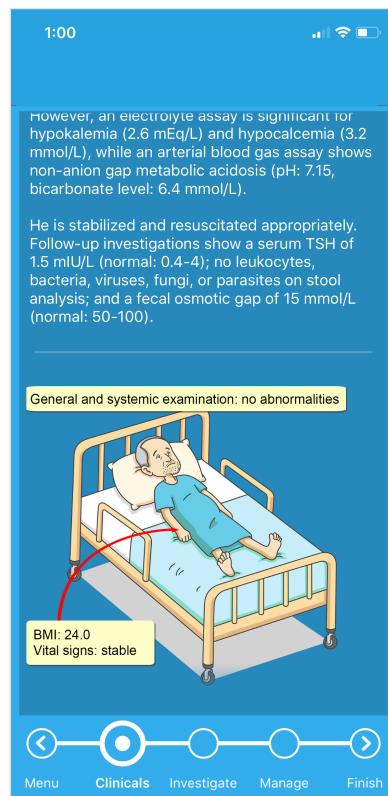
What did competitors do?

Training



Prognosis

Based on different kind of medical conditions, doctors do simple medical training before diagnosing the patients.



Prognosis

Setting a scenario for doctor to practice.

Doctor Information

1:32

Back Share

Dr. Craig Berent, MD
Internist
★★★★★ (379)

Book an appointment

Today, Apr 14

Next available: Mon, Apr 16

4301 Burnet Rd., A, Austin, TX 78756

Patient reviews

Overall	Wait Time
★★★★★	★★★★★

Search Appointments Medical team Well guide Sign in / Join

Zocdoc

A doctor information page gives patients more information about this doctor.

1:32

Back **Dr. Craig Berent, MD** Share

Patient reviews

Overall	Bedside Manner	Wait Time
4.5	★★★★★	★★★★★

Overall Bedside Manner Wait Time

★★★★★ ★★★★★ ★★★★★

Dr Berent is a very good physician. If you are looking for a good doctor he is the one to choose.

Apr 11, 2018 by Gayla F.

Overall	Bedside Manner	Wait Time
★★★★★	★★★★★	★★★★★

Went for a check up, they were suppose to get my records still haven't heard from them. That was 2 months ago.

Apr 11, 2018 by a verified patient

Overall	Bedside Manner	Wait Time
★★★★★	★★★★★	★★★★★

I haven't seen a primary care Doctor in years, but after having a few symptoms I went in to see Dr. Berent. He was very friendly and easy to talk to. I'm a bit of a hypochondriac, but he was able to ease my mind and give me suggestions

Search Appointments Medical team Well guide Sign in / Join

Zocdoc

The satisfaction of a doctor is shown by rating.

Key Takeaways

- Show reliability between patients and doctors
- By including a training system for doctor, it helps doctor to give proper advice and diagnose for the patient.
- A doctor profile is important for patient to know more about their doctor.
- By rating, it increases trust between patient and doctor.

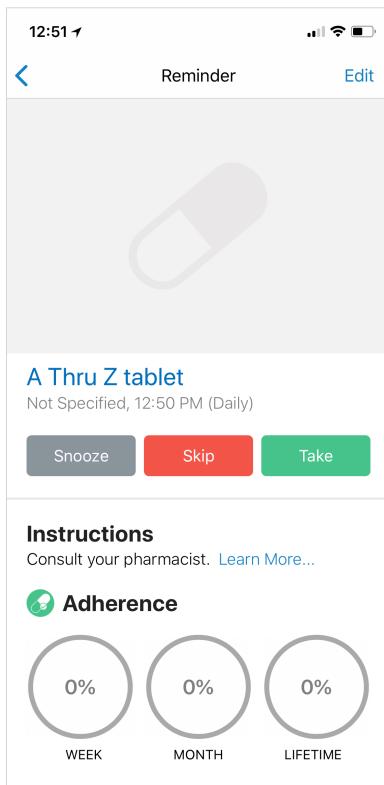


Implement tracking system for medical items

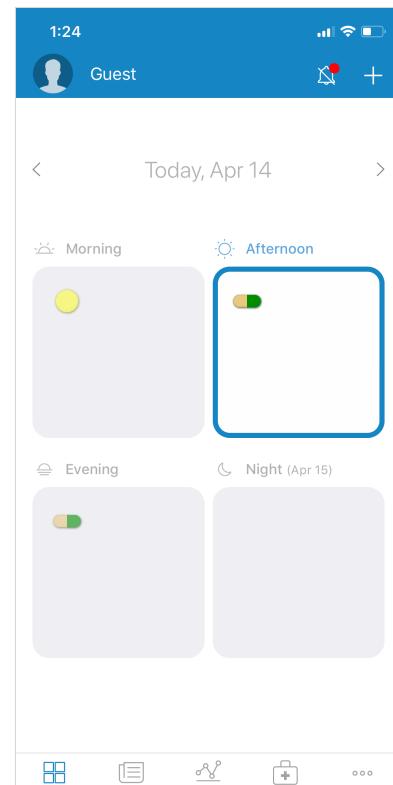
Executing an interaction that helps patients to track and remind their medicine

What did competitors do?

Medicine Tracking



 WebMD

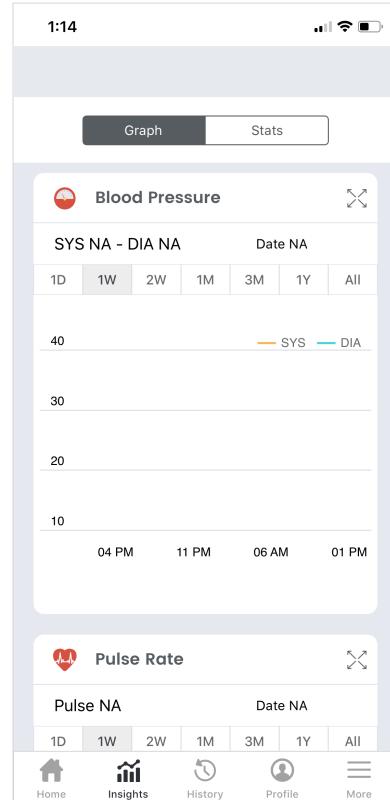
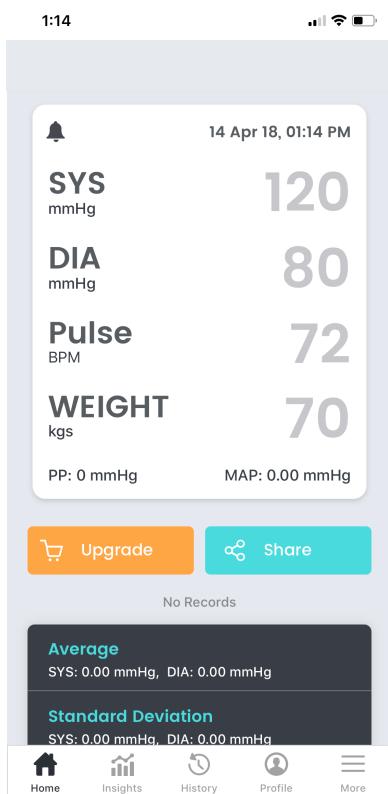


 Medisafe

The three button below the title helps patients easily know what actions they want to take. Instruction teaches patients how to take this medicine.

Home page shows the medicine a patient need to take in a day visually.

Statistic

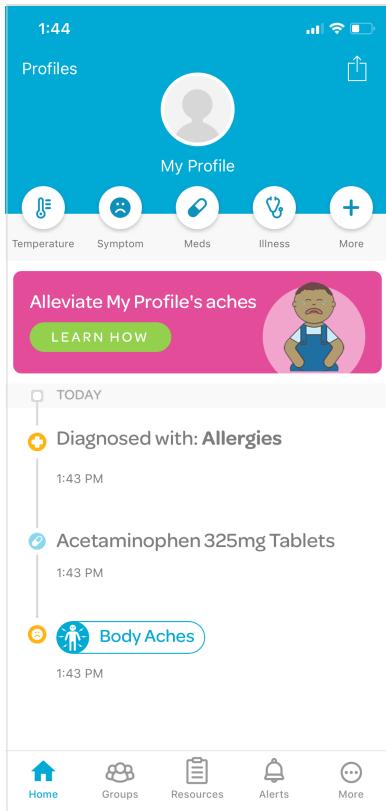


Medical record is designed as a card design. Patient can easily edit the data.

Every test results is organized vertically.



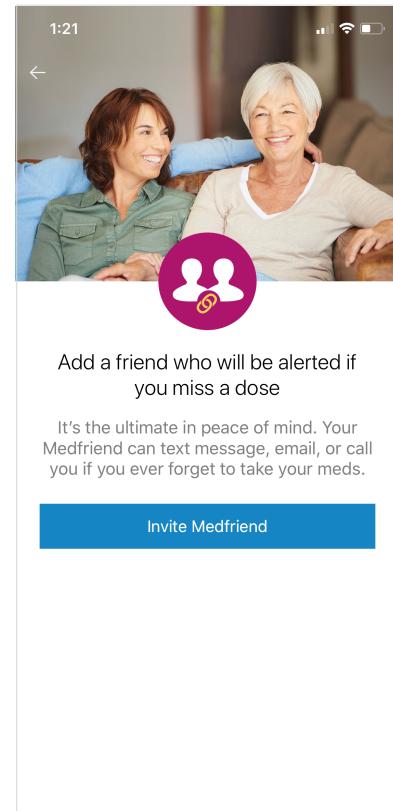
Symptom Tracking



Kinsa

A timeline shows the experience the patient has from getting sick to recovery.

Family



Medisafe

Patient's family and friends will be alerted if the patient miss a dose by text and email.

Key Takeaways

- Implement tracking system for medical items
- It is easy to convey what kind of medicine do I need to eat today by presenting real medicine at home page.
- A timeline design helps patient to track their symptoms from first sign of symptom to recovery.
- By including an alert reminder for patient's family and friends, it intensifies the connection between family and friends.

KEY TAKEAWAYS SUMMARY

Literature Review

Key Takeaways

- Patients' perceptions of the quality of the healthcare they received are highly dependent on the quality of their interactions with their healthcare clinician and team.
- The connection that a patient feels with his or her clinician can ultimately improve their health mediated through participation in their care.
- Due to cost concerns, most of the patients underused their prescription medications and did not follow clinician's advice.
- Clinician's ability to explain, listen and empathize can have a profound effect on biological and functional health outcomes as well as patient satisfaction and experience of care.
- Due to complicated instructions, most of the patients refuse to follow their clinician's advice.
- Patients in a low EHR session revealed high patient satisfaction
- Due to EHR usability issue, doctor has to spend more time on EHR system rather than patient.

Competitive Analysis

Key Takeaways

- A simple pre-test on mobile helps doctor understand your problem well.
- Video visit is beneficial for people who have a tight schedule.
- Pre-diagnosis system helps patients to easily describe their symptom for doctor.
- By pre-diagnosis system, patient has a clue of what to do next for this medical condition.
- By including a training system for doctor, it helps doctor to give proper advice and diagnose for the patient.
- A doctor profile is important for patient to know more about their doctor.
- By rating, it increases trust between patient and doctor.
- It is easy to convey what kind of medicine do I need to eat today by presenting real medicine at home page.
- A timeline design helps patient to track their symptoms from first sign of symptom to recovery.
- By including an alert reminder for patient's family and friends, it intensifies the connection between family and friends.



Research

To build empathy and a better understanding of the experience the patient has, as a team, we set a screener and recruit 8 patients for our user interview.

RESEARCH QUESTION

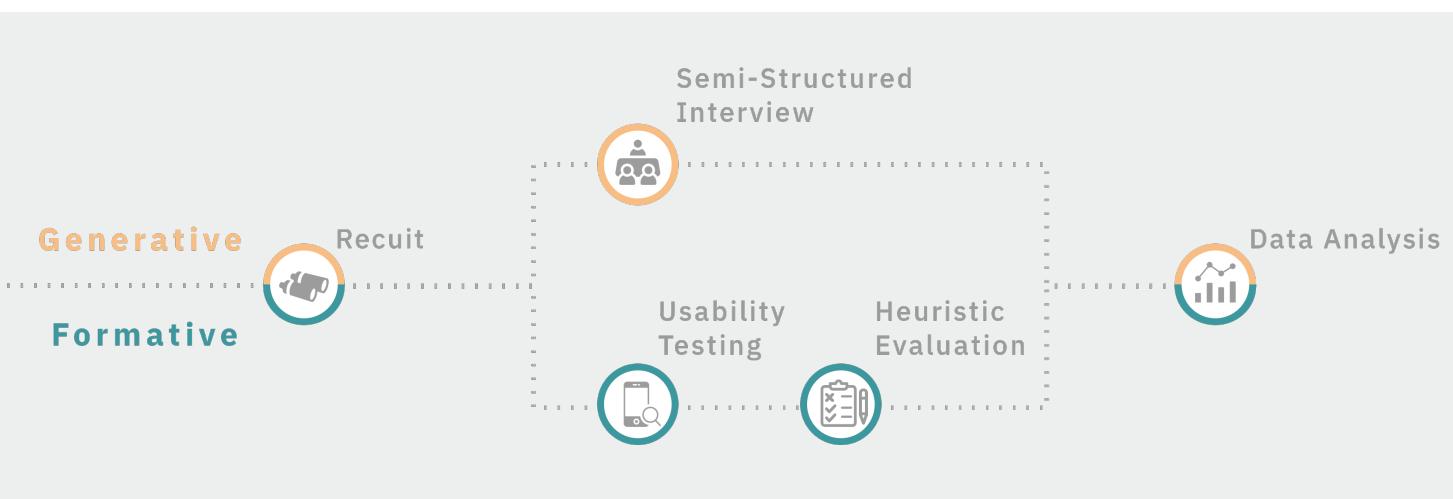
How might we effectively design an application for patients and doctors to aid in rise of satisfaction for clinician-patient visits?

GOALS

To answer our research question, we created a set of research goals to help us craft our design research activities. These goals also helped us stay focused on our research question.

- *To uncover the experience of clinician-patient visits from both patients and doctors's perspectives*
- *To understand how patients prioritize concerns when they got sick*
- *To learn about all the painful point the patients have throughout the experience of clinician-patient visits*
- *Identify the thought process behind clinician-patient visits and how it influences patients' behavior*

METHODS



Recruit

— Generative / Formative

Target

- You have been to the hospital and clinic for the last two years.
- You suffer two chronic medical conditions.
- You have been to multiple hospital and clinic with in last two years.

Method

- Online Survey
- Asking anyone passing by to participate
- E-mail requests

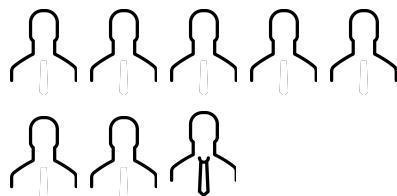




Semi-Structured interview

— Generative

A semi-structured interview let us gather insights and experiences from those who have knowledge on a variety of sections related to medical . For this interview, we interviewed with 8 patients and 1 expert.



8 patients and 1 expert



2 in-person



7 video call

Several key question we asked

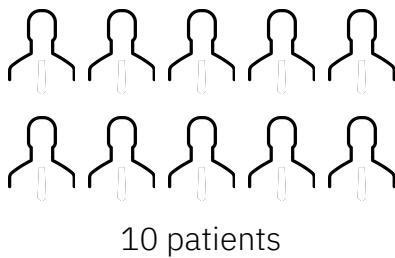
- Can you talk about your experience with medicine after or without consulting a doctor?
- How is the experience when you visit a doctor?
- How do you think EHR was used in this process of visiting a doctor?
- How do you think that you have to fill in new patient forms when you visit a new health provider?



Usability Testing

Formative

Usability testing is an evaluative method that allows us to observe a patient's experience with a digital application as he or she walks through the steps of a given task (or set of tasks). For this testing, we interviewed with 10 patients.



10 patients



6 in-person



4 video call

Several key tasks we set

- You have noticed you have to refill your metroprolol tartrate prescription. Please refill the prescription.
- You have been diagnosing by the doctor. He said that you have COPD. How do you look for more info about your COPD? And who is your doctor for COPD?
- Today you will do a blood pressure test. Please enter your result and ask doctor for advice.
- Now you need to take the medicine for Metoprolol. However, you forgot how many pills you need to take. Show me how many pills you need to take and set a reminder.



Heuristic Evaluation

Formative

An agreed-upon set of usability best practices help to detect usability problems before actual users are brought in to further evaluate an wireframe. We include 4 evaluators and evaluate the wireframe based on Nielsen's 10 usability heuristics for user interface design.

<i>Principle 01</i>	<i>Visibility of system status</i>	<i>06</i>	<i>Recognition rather than recall</i>
<i>02</i>	<i>Match between system and the real world</i>	<i>07</i>	<i>Flexibility and efficiency of use</i>
<i>03</i>	<i>User control and freedom</i>	<i>08</i>	<i>Aesthetic and minimalist design</i>
<i>04</i>	<i>Consistency and standards</i>	<i>09</i>	<i>Help users recognize from errors</i>
<i>05</i>	<i>Error prevention</i>	<i>10</i>	<i>Help and documentation</i>



Data Analysis

— Generative / Formative

It's now time to put all that information that's in our head down on paper, and pull it all together into a complete picture. The results will be much easier to understand and convey to others if they are ordered into a clear narration. Affinity Diagram and Empathy Mapping are two techniques used in our data analysis. We went through several rounds of affinity diagramming to find out patterns in the data that we collected from 8 participants and 1 subject matter expert interviews.

Affinity Diagram

We discussed the affinity diagramming in four phases which are first sign of symptoms, pre-diagnosis, diagnosis and post-diagnosis. For each phases, we wrote down direct quotes that we got from the user interview with sticker, and different color of sticker represents different users. From affinity diagram, we group similar user quotes to get a whole journey of a patient and understand what user's thought, difficulty and action are at different phases?

Empathy Mapping

Empathy Mapping help us understand our users and prioritize their needs. It extract knowledge about users in order to create a shared understanding of user needs, and aid in decision making.



Results

To build empathy and a better understanding of the experience the patient has, as a team, we set a screener and recruit 8 patients for our user interview.

GENERATIVE INSIGHTS

From affinity diagramming 9 interviews and usability testing, I organized the data to map out the situations patients faced during visiting a doctor. This allowed me to see a more holistic and detailed view of the patients experience, and visualize the patients needs and pain points. I will discuss the finding in four stages.

Stage 01 First Sign of Symptoms

My symptoms first happen.

02 Pre-Diagnosis

What am I going to do before visiting a doctor?

03 Diagnosis

The doctor is diagnosing my symptoms.

04 Post-Diagnosis

The time after visiting a doctor

First Sign of Symptoms

When patients got sick, they first look for health providers that are associated with their health insurance. However, they always have a hard time to find the health providers and understand their own health insurance policy.

Explanation

From our interview, we noticed that 4 of 9 interviewers have the problem of understanding their insurance policy. All of them knew that they need to find a health provider that their health insurance can be used. However, they have a hard time to locate the information about their health insurance, and they do not know whether their health insurance covers their medical conditions.

Evidence

“I called the insurance company to ask about the coverage of my medical conditions. After the call, I don’t know what they are talking about.”

“When I got sick, the disaster starts to happen. I read through whole of my health insurance policy. I still do not know where I need to go.”

Patients want to know the payment of visiting a doctor before the visit. However, in many situations, they are informed after the visit.

Explanation

From our interview, we noticed that 3 of 9 interviewers have the problem of understanding the cost of visiting a doctor. All of them are informed after the visit. This is the main reason why they do not like to visit a doctor. The cost is unpredictable.

Evidence

“I called the health provider to ask about the cost of my medical conditions. They said it has to depend on mine health insurance.”

“I feel troubled and uneasy when I visit a doctor. I feel like have to pay a lot of money even I have a health insurance.”

**For patients who are working, they do not have time to visit a doctor.
The office hours of those health providers are too short.**

Explanation

From our interview, we noticed that 3 of 9 interviewers have the problem of finding a proper time to visit a doctor. Many health providers are closed at 5pm. Many patients end their work at 4 or 5pm. It is not possible for them to visit a doctor on time.

Evidence

“Are you kidding me? I have work from 8am to 5pm. How do I have time to visit a doctor? The only way is to take a day off.”

“Many doctors are available at specific time. I need to take a day off to visit them”

Pre-Diagnosis

When the patients visit a doctor, they spend half of time on filling the form. They often forget their health information. It is a time-consuming process. They think it is annoying. However, they know the reasons why they need to fill the form.

Explanation

From our interview, we noticed that 7 of 9 interviewers think that the process of filling the form is bothersome. But they all think in a positive way. They know it is necessary to fill the form when they visit a new health provider.

Evidence

“I think it is necessary to fill the form since the doctor has to know mine medical condition before diagnosing.”

“I have a hard time to fill the form since I always forgot my medical condition.”

It takes a long time for a patient to visit a doctor. The waiting time for making an appointment with doctor is too long.

Explanation

From our interview, we noticed that 2 of 9 interviewers think that they have to wait a long time to visit a doctor. They are forced to wait since the doctor they are waiting for knows their medical condition well.

Evidence

“Because I have a special medical condition, I have to visit a specific doctor. The waiting time to visit is about 1 month.”

“When I got sick, I cannot make an appointment immediately with the doctor I want.”

Diagnosis

The diagnosis from the doctor is not helpful. The doctor does not carefully listen to patient's medical condition.

Explanation

From our interview, we noticed that 5 of 9 interviewers think that the advice from the doctor is not helpful. The main reason is because they think the doctor does not spend most of time on diagnosing them. The only thing they received just a piece of prescription.

Evidence

“I spend money to visit a doctor. However, the service I receive does not meets my expectation.”

“The prescription I got does not make any sense for me. The medicine is too expensive.”

The doctors always ask the same question that the nurse just asked me.

Explanation

From our interview, we noticed that 4 of 9 interviewers experience the irritation of asking the same questions from the doctors and nurses. Before visiting, the nurses ask some simple question related to patient's medical condition. However, when visiting the doctors, they ask the same questions again.

Evidence

“Multiple people ask me about my medical condition. I feel annoying. This makes me wonder why I need to fill the form before visit.”

“I store my medical condition in my phone. If every people in the hospital ask the same questions again and again, I need to take out my phone every time.”

Patients have difficulty to describe their symptom to doctor.

Explanation

From our interview, we noticed that 3 of 9 interviewers have problem of describing their medical condition. When patients want to describe their symptom, it often involves complicated medical term. Patients do not have those background knowledge.

Evidence

“When I sat beside the doctor, I do not know how to explain my symptom. It causes the reason why I always say yes or no to doctor.”

“As an international student, it is too hard for me to say my medical condition.”

Post-Diagnosis

The medicine from the prescription is not useful. Most of the patients thinks that the result and purpose of taking the medicine is not clear. They do not want to follow doctor's advice for the next time.

Explanation

From our interview, we noticed that 4 of 9 interviewers do not why they need to take those medicines. Those patients have to look for information of those medicines by their own.

Evidence

“Those medicines are expensive, and I bought it. However, I do not get better after taking the medicines.”

“My doctor talks nothing about my medicines. I am worried about the side-effect of my medicines.”

Some of the patients do not have health insurance. The cost of visiting a doctor is high. They cannot afford the cost.

Explanation

From our interview, we noticed that 2 of 9 interviewers do not have their own health insurance. When they visit a doctor, they have to pay a lot of money. Therefore, they won't visit a doc if it is necessary.

Evidence

“I do not have too much money. After I visited a doctor, I have a hard time to pay the fee.”

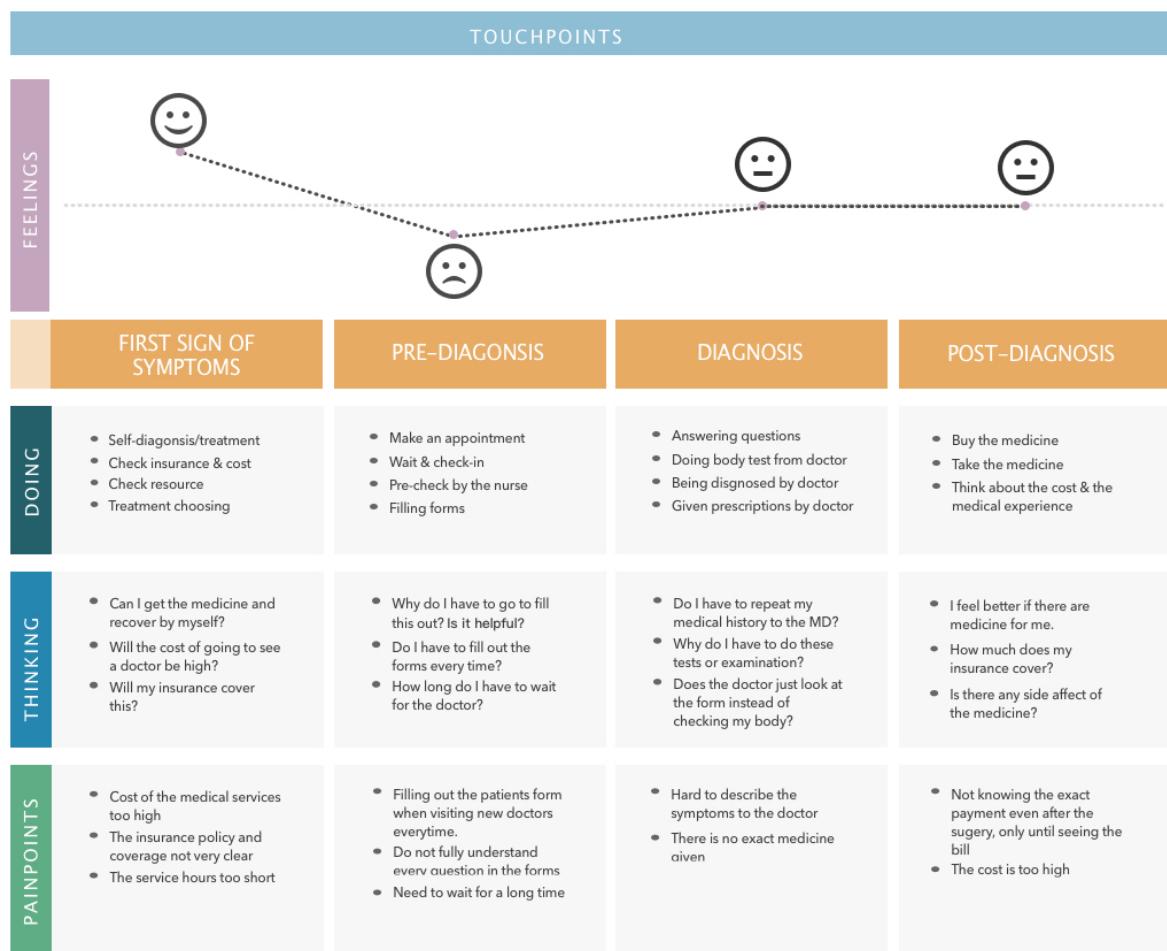
“I wish there is some help for those like me who cannot pay the medical fee.”

GENERATIVE ARTIFACTS

As a part of our synthesis process, our team generated research artifact to help create meaningful visualizations of the data we collected from our research activities.

Journey Map

Journey mapping helps better understand the overall story from a patient's perspective of their relationship with an organization, service, over time and across channels.



FORMATIVE INSIGHTS

From usability testing, we find out that participants have a hard time to complete the most of the task due to unclear icon and interaction. From heuristic evaluation, In total, we found over 130 issues which focused on consistency, readability, redundancy, clarity and visibility. In the following pages, the issues from usability testing and heuristic evolution are identified in screenshots along with a description of the problem, their severity, the primary heuristic broken and recommendations on how to solve the issue.

Usability Testing

Highest Average Difficulty Rate

Remembering Medications

Rate: 4.4 | 1: very easy; 5: very difficult

Heuristic Evaluation

Identified Issue

130

Most Issue

Consistency and standards

80 issues

Usability Testing

- | | | |
|-------------|-----------|--|
| Task | 01 | <i>Find out when your appointment is</i> |
| | 02 | <i>Emergency</i> |
| | 03 | <i>Refill Medicines</i> |
| | 04 | <i>Notes</i> |
| | 05 | <i>Changing Information</i> |
| | 06 | <i>Reporting Blood Pressure</i> |
| | 07 | <i>New Symptoms</i> |
| | 08 | <i>Doctor Information</i> |
| | 09 | <i>Remembering Medications</i> |
| | 10 | <i>Sharing</i> |

Scenario 01: Find out when your appointment is

Find out when your appointment is.

Let's start off with a simple scenario. You've scheduled a meeting with Dr. Paul, but don't remember exactly what day and location is.

Success Rate

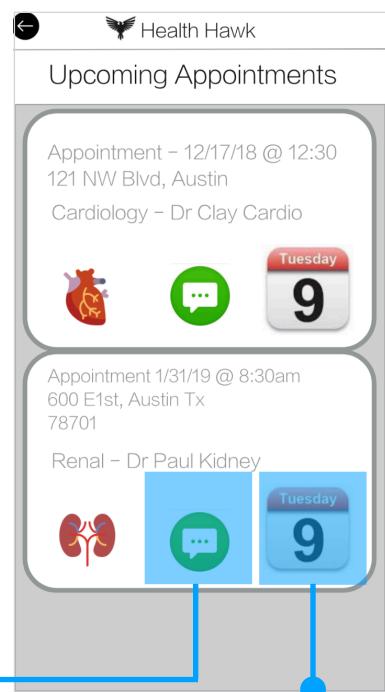
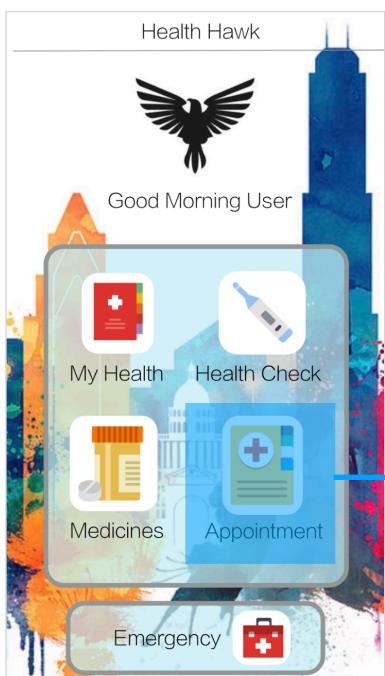
10 / 10

10 of 10 participant success

Average difficulty

1.2 / 5

1: very easy; 5: very difficult



Appointment icon is straightforward.

10 of 10 participants have a hard time to insert the number of their doctor. They recommend send it directly after press

5 of 10 participants thinks this icon visually presented my the date of my appointment.

Scenario 02: Emergency

You will feel uncomfortable. You need to go to the hospital immediately.

Find the transportation. Go ahead and show me, and talk me through the steps you'd follow.

Success Rate

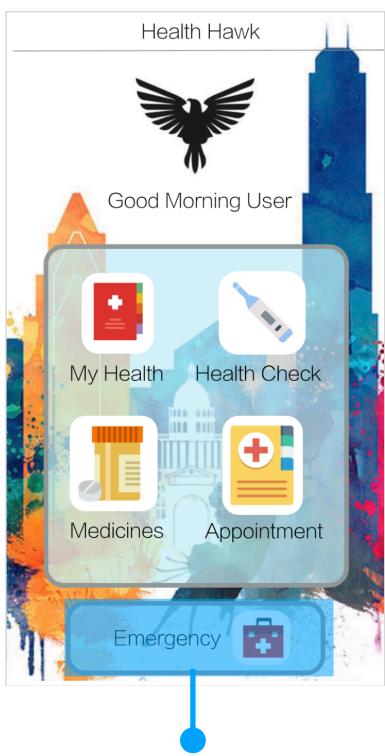
10 / 10

10 of 10 participant success

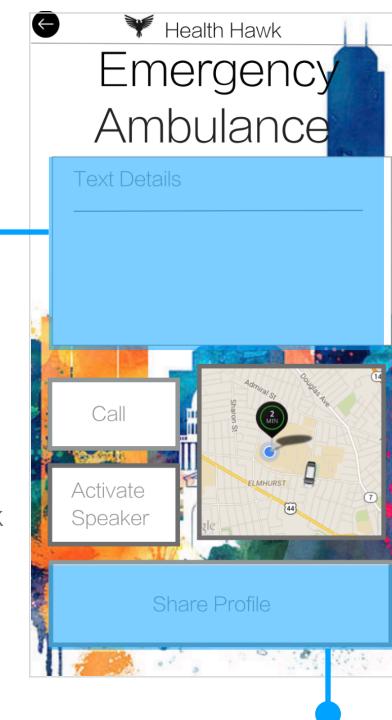
Average difficulty

2.2 / 5

1: very easy; 5: very difficult



7 of 10 participants think they will call the hospital immediately if I press this button.



4 of 10 participants think this is the place enter their medical condition.

4 of 10 participants do not know where they are going to share their data with.

Scenario 03: Refill Medicines

For the next scenario, you've noticed you have to refill your metroprolol tartrate prescription. Please refill the prescription.

Success Rate

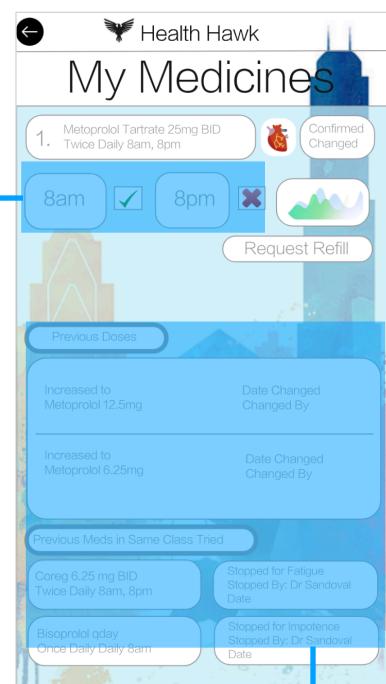
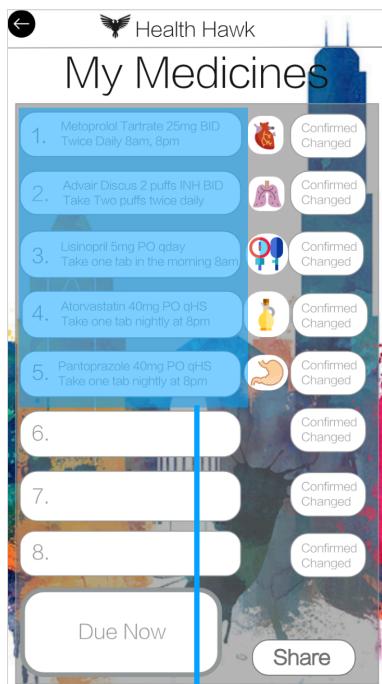
9 / 10

9 of 10 participant success

Average difficulty

2.4 / 5

1: very easy; 5: very difficult



7 of 10 participants think the screen is too text heavy. It provides too much unnecessary information.

10 of 10 participants do not know what X and √ are talking about.

9 of 10 participants think it is hard to differentiate if all of the title and picture are presented as rounded square.

Scenario 04: Notes

You have been diagnosing by the doctor before. He said that you have COPD. How do you look for more info about your COPD? And Show me your doctor for COPD.

Success Rate

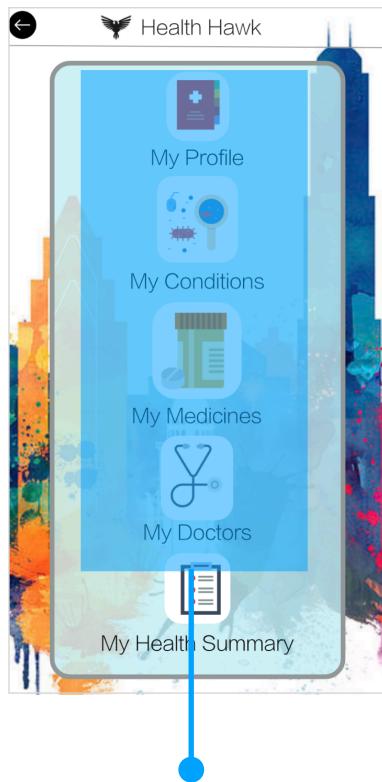
10 / 10

9 of 10 participant success

Average difficulty

3 / 5

1: very easy; 5: very difficult



10 of 10 participants are confused at my profile, my condition and my doctors. They look similar.

Scenario 05: Changing Information

You currently change your name. How do you change your name at this app?

Success Rate

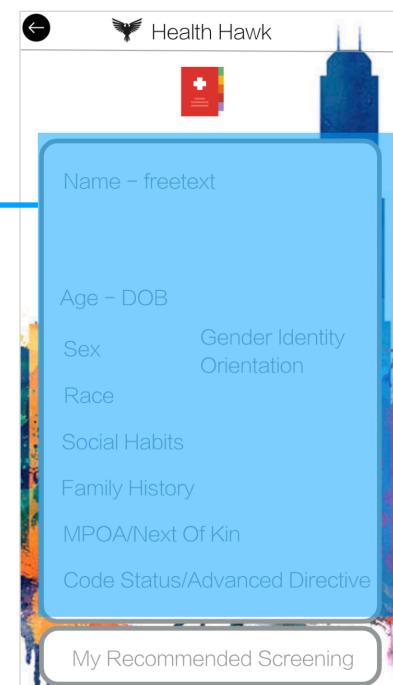
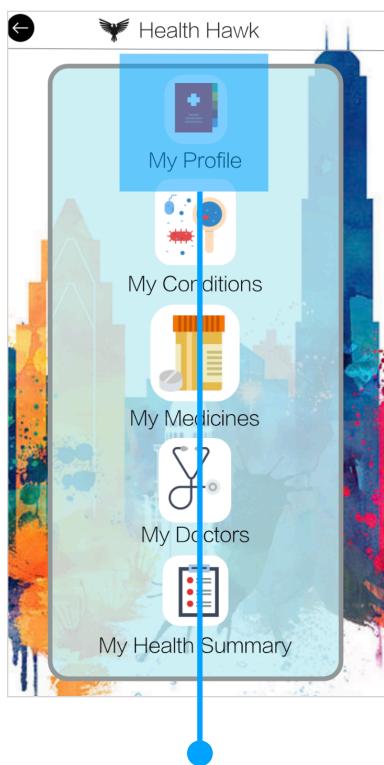
10 / 10

10 of 10 participant success

Average difficulty

1.4 / 5

1: very easy; 5: very difficult



7 of 10 participants think my profile should at the first page.

10 of 10 participants cannot edit their profile due to lack of edit icon.

Scenario 06: Reporting Blood Pressure

Today you will do a blood pressure test. Please enter your result and ask doctor for advice.

Success Rate

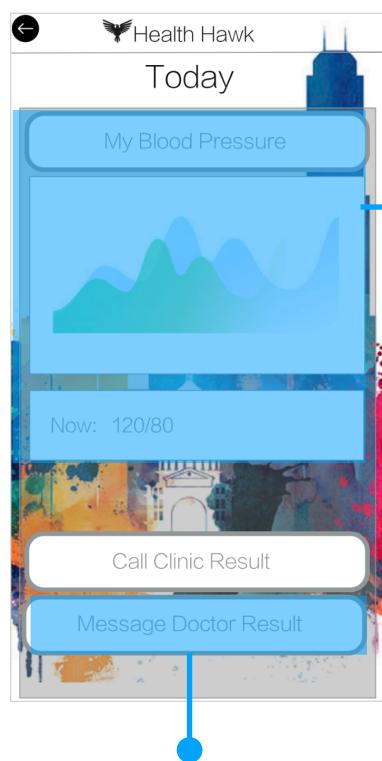
10 / 10

10 of 10 participant success

Average difficulty

2.1 / 5

1: very easy; 5: very difficult



10 of 10 participants cannot insert the result of their blood pressure test due to unclear visual design, and they expect to fill the result automatically.

7 of 10 participants have to remember doctor's phone number when messaging with doctor.

Scenario 07: New Symptoms

You woke up in the morning and noticed that you are coughing.
Please insert this information at this app.

Success Rate

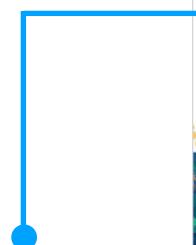
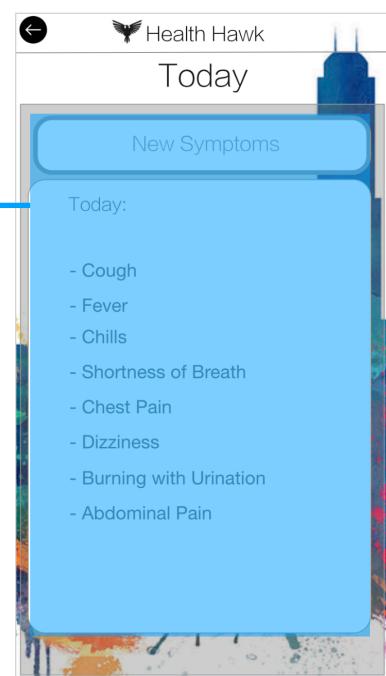
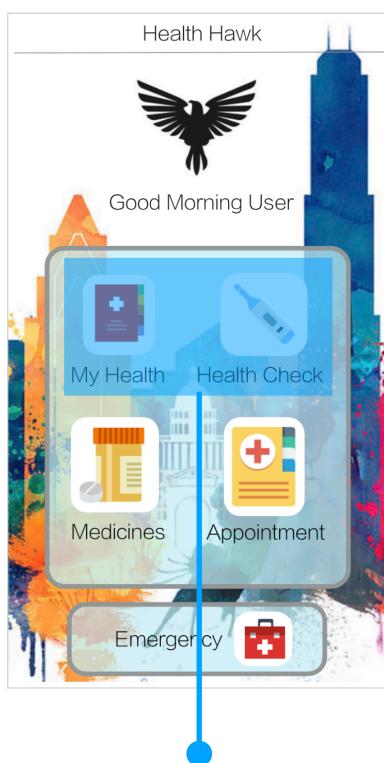
5 / 10

5 of 10 participant success

Average difficulty

3.6 / 5

1: very easy; 5: very difficult



10 of 10 participants
cannot edit and insert
their symptoms due to
lack of edit and add icon.

9 of 10 participants think it should
be inside my health if you want to
insert your symptoms. It doesn't
make sense in health check.

Scenario 08: Doctor Information

You have a cardiology, and you go to visit a doc before. Now, you forgot the name of your doc, please find it and contact with the doc.

Success Rate

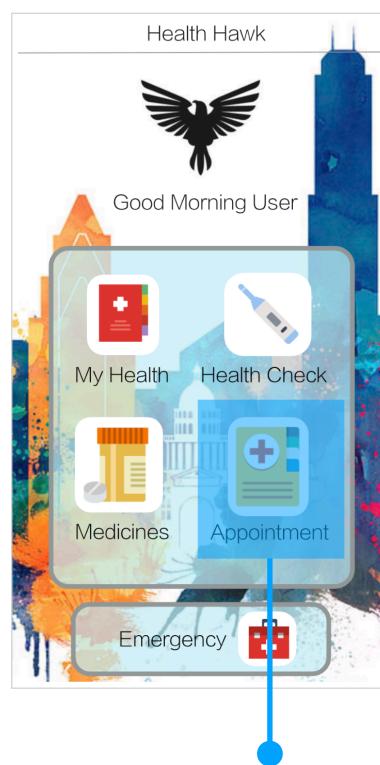
10 / 10

10 of 10 participant success

Average difficulty

2.6 / 5

1: very easy; 5: very difficult



6 of 10 participants first click appointment for looking for their doctor.

Scenario 09: Remembering Medications

Now you need to take the medicine for Metoprolol. However, you forgot how many pills you need to take. Show me how many pills you need to take and set a reminder.

Success Rate

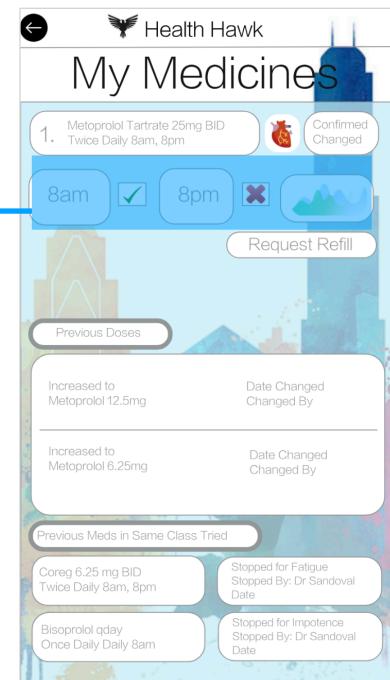
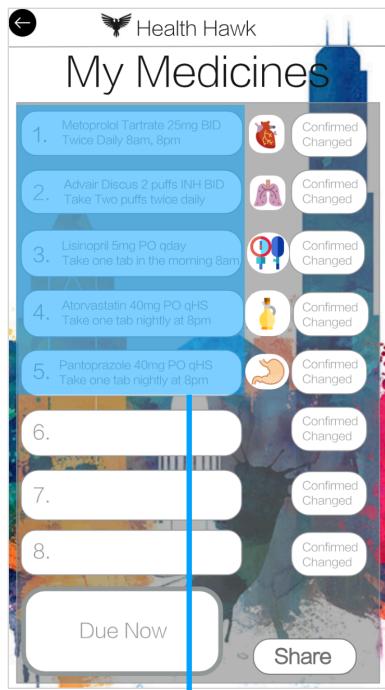
4 / 10

4 of 10 participant success

Average difficulty

4.4 / 5

1: very easy; 5: very difficult



10 of 10 participants do not know what 8am and 8pm are talking about.

9 of 10 participants think it provides too many information. It is hard to locate the information for the number of pills they need to eat.

Scenario 10: Sharing

Now you are visiting a doc, and you want to share your symptom to the doctor. What will you do?

Success Rate

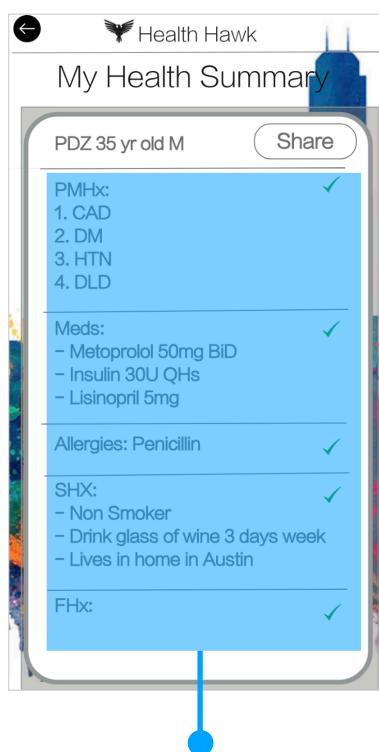
10 / 10

10 of 10 participant success

Average difficulty

2 / 5

1: very easy; 5: very difficult



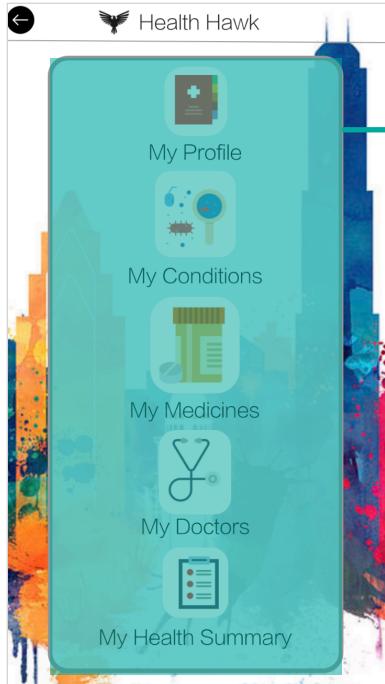
9 of 10 participants cannot understand those term and ✓.

Heuristic Evaluation

- Principle 01 Visibility of system status*
- 02 Match between system and the real world*
- 03 User control and freedom*
- 04 Consistency and standards*
- 05 Error prevention*
- 06 Recognition rather than recall*
- 08 Aesthetic and minimalist design*
- 10 Help and documentation*

Principle 01: Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.



4

1: not a problem; 4: major problem

Problem:

The page does not provide any hint to tell the user where you are.

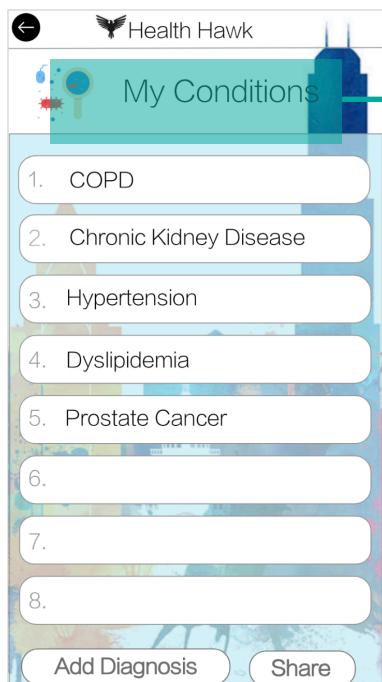
Recommendation:

A clear title or consistent color inform user where you are.

Principle 02: Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.

Follow real-world conventions, making information appear in a natural and logical order.



4

1: not a problem; 4: major problem

Problem:

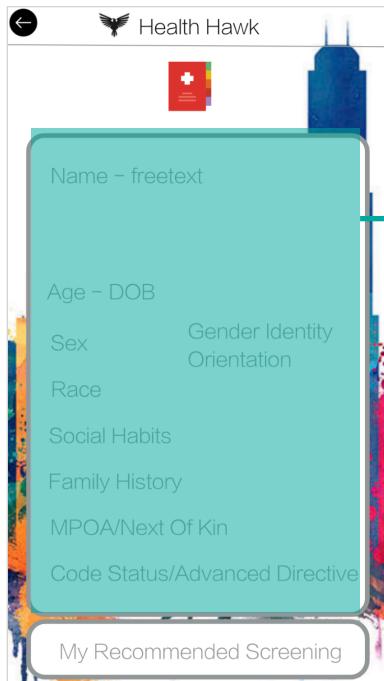
Does this title mean my current condition or past condition?

Recommendation:

Match the word that the user's language. For example, we can replace the tile by My history condition.

Principle 03: User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.



4

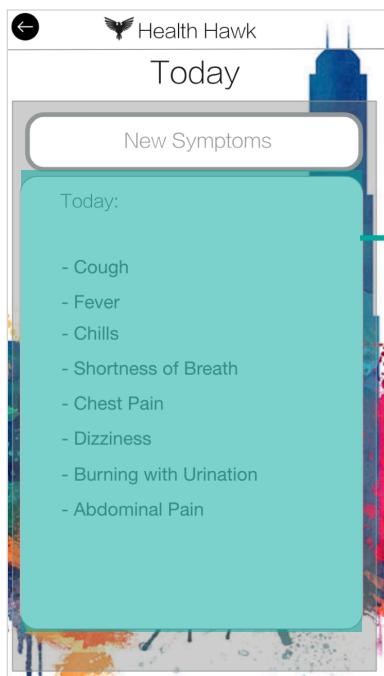
1: not a problem; 4: major problem

Problem:

It does not have an edit for insert or edit my profile.

Recommendation:

Include an edit button at top right.



4

1: not a problem; 4: major problem

Problem:

It does not have an edit for insert or edit my symptoms.

Recommendation:

Include an edit button at top right.



4

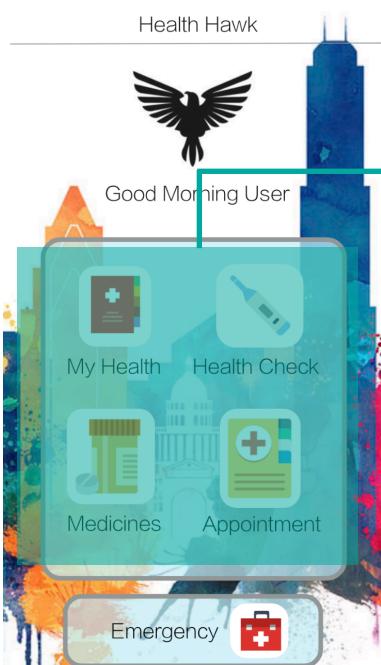
1: not a problem; 4: major problem

Problem:

There is no place for users to logout.

Recommendation:

Include a button like "logout". This help users to know they can logout this app by this button



4

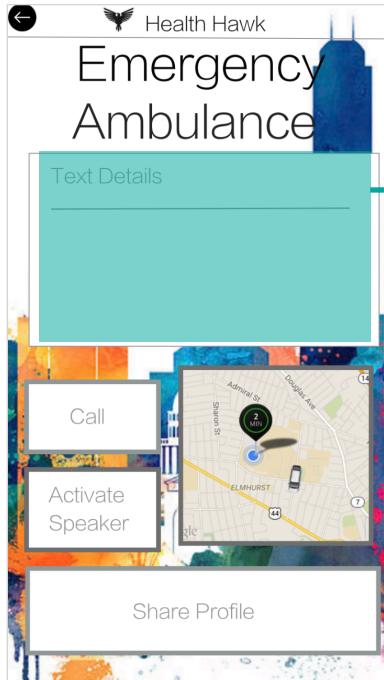
1: not a problem; 4: major problem

Problem:

If I click the background of those 4 icons, it goes to somewhere which is really strange.

Recommendation:

Fix the navigation and interaction problems.



4

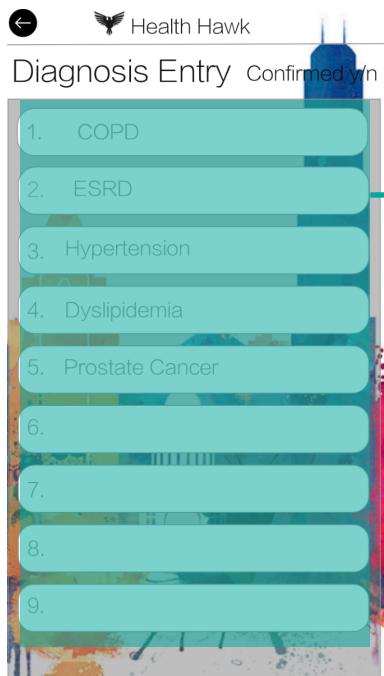
1: not a problem; 4: major problem

Problem:

There is no place for users to insert their medical condition.

Recommendation:

Include a button like “insert”. This help users to know they can insert their medical condition.



4

1: not a problem; 4: major problem

Problem:

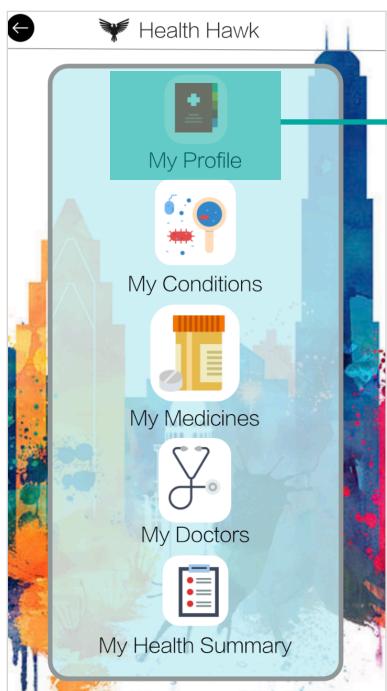
It does not have a button for finishing or inserting my diagnosis

Recommendation:

Include a button like “insert”. This help users to know they can insert their medical condition.

Principle 04: Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing.



4

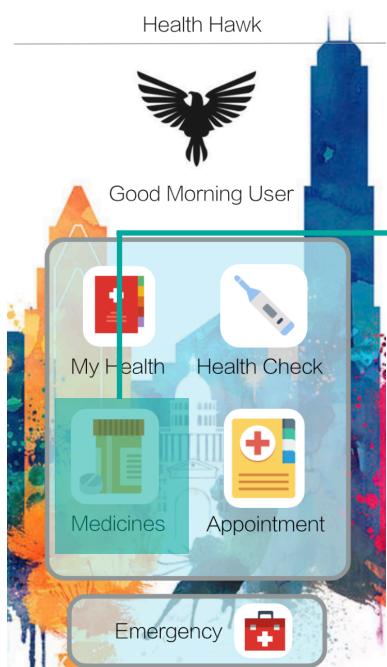
1: not a problem; 4: major problem

Problem:

My profile icon is same as my health.

Recommendation:

Change an icon to represent my profile



4

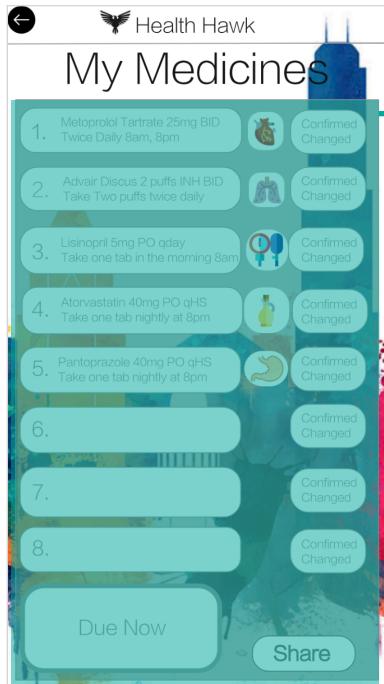
1: not a problem; 4: major problem

Problem:

The home page says “Medicines”. However, when you click inside, it says “My Medicines”.

Recommendation:

Consistency between each titles



4

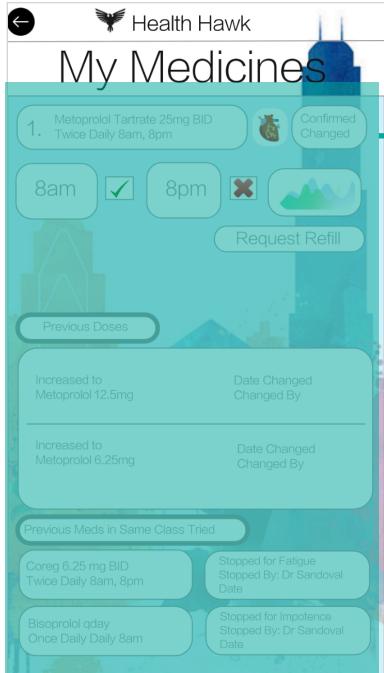
1: not a problem; 4: major problem

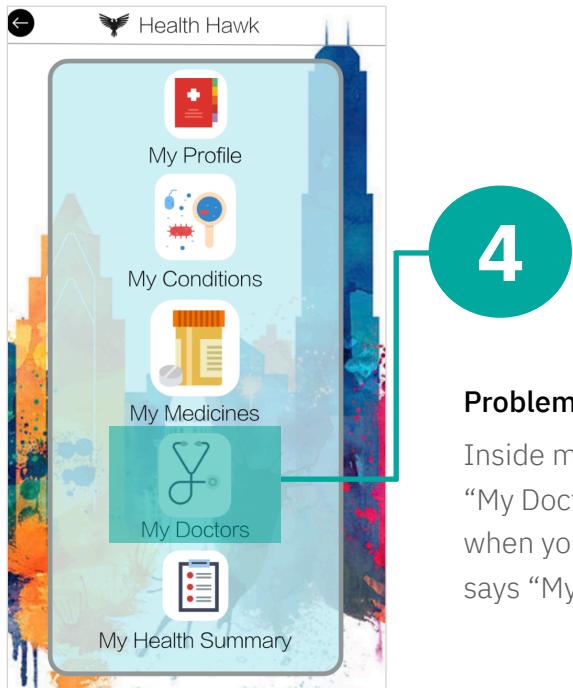
Problem:

The shape of the title and button look the same. It is really confusing.

Recommendation:

Remove the shape of the title.





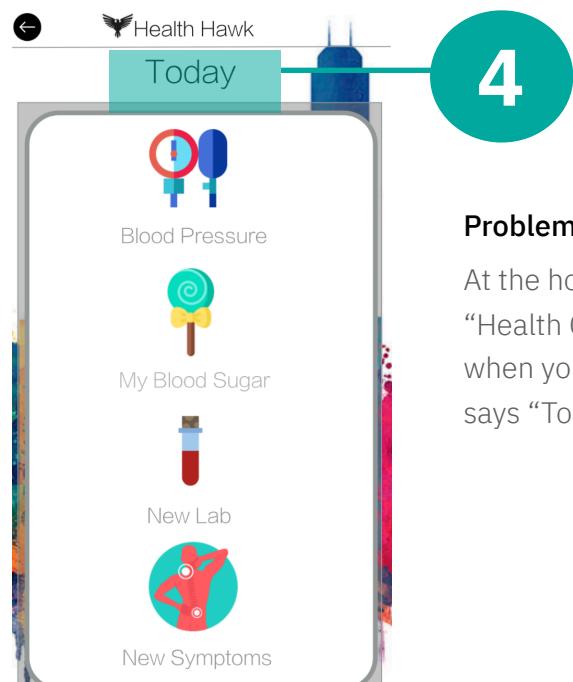
1: not a problem; 4: major problem

Problem:

Inside my health, it says "My Doctors". However, when you click inside, it says "My Specialists".

Recommendation:

Ensure the consistency issue



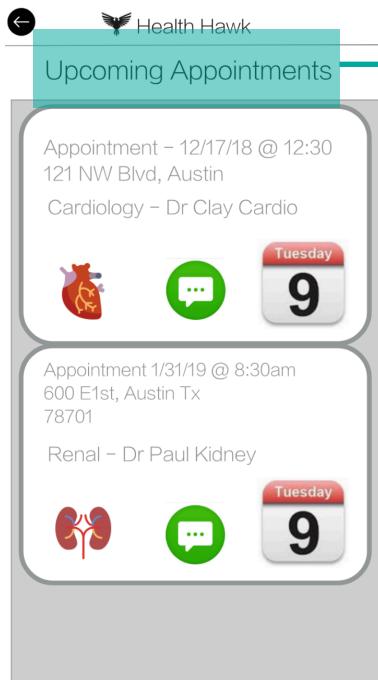
1: not a problem; 4: major problem

Problem:

At the home page, it says "Health Check". However, when you click inside, it says "Today".

Recommendation:

Ensure the consistency issue



4

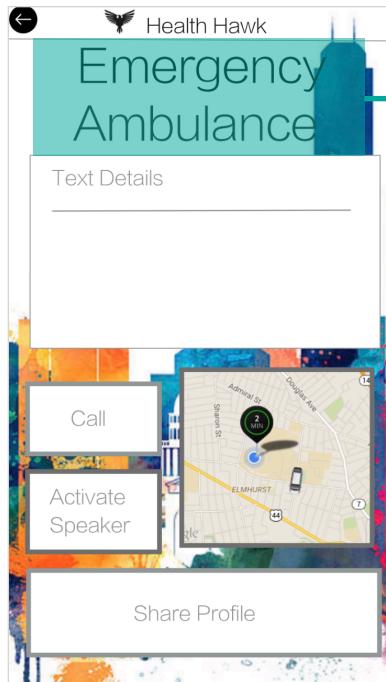
1: not a problem; 4: major problem

Problem:

At the home page, it said “Appointment”. However, when you click inside, it said “Upcoming Appointments”.

Recommendation:

Ensure the consistency issue



4

1: not a problem; 4: major problem

Problem:

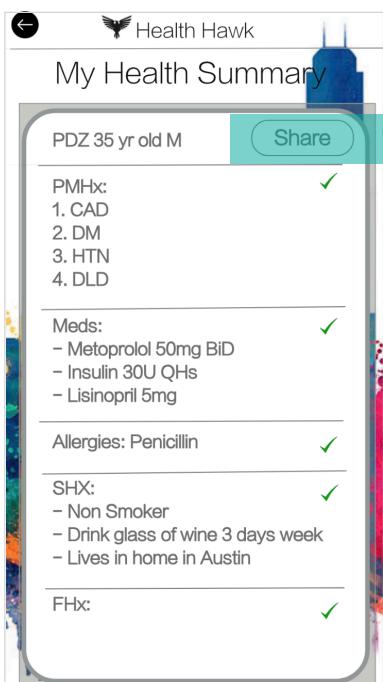
Inside the Emergency, it said “Contact Ambulance”. However, when you click inside, it said “Emergency Ambulance”.

Recommendation:

Ensure the consistency issue

Principle 05: Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place.



4

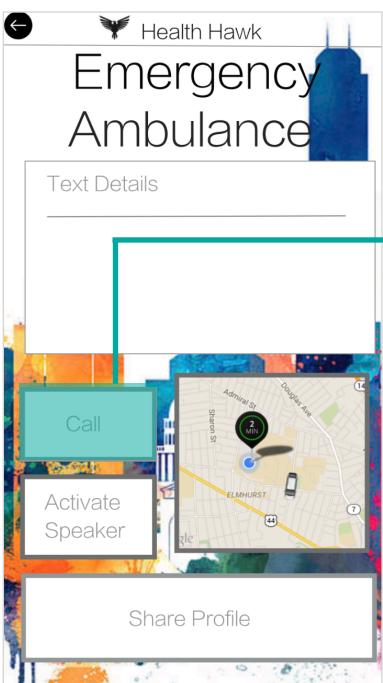
1: not a problem; 4: major problem

Problem:

If I click share, it just shares my record immediately.

Recommendation:

A popup message asks user to confirm.



4

1: not a problem; 4: major problem

Problem:

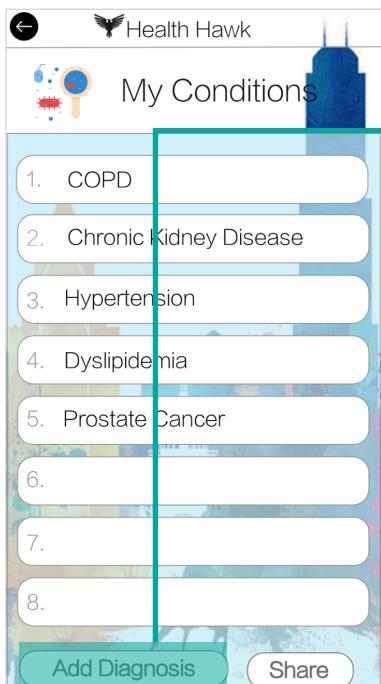
If I click call, it calls the ambulance immediately.

Recommendation:

A popup message asks user to confirm.

Principle 06: Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another.



1: not a problem; 4: major problem

Problem:

Users have to remember my symptoms when they add diagnosis.

Recommendation:

A drop down list helps users to remember.



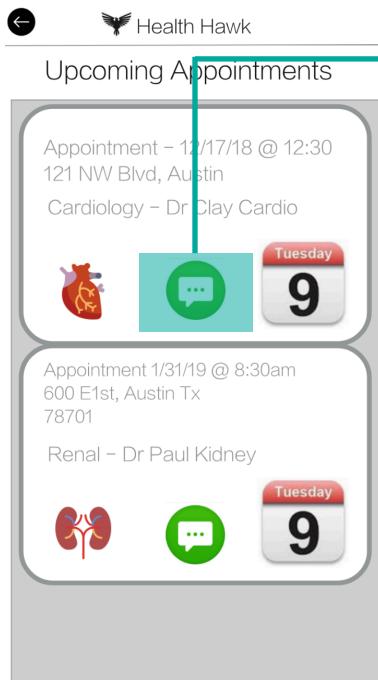
1: not a problem; 4: major problem

Problem:

Users have to remember their own medical condition when they edit their profile.

Recommendation:

Automatically insert for the users by scanning QR code



4

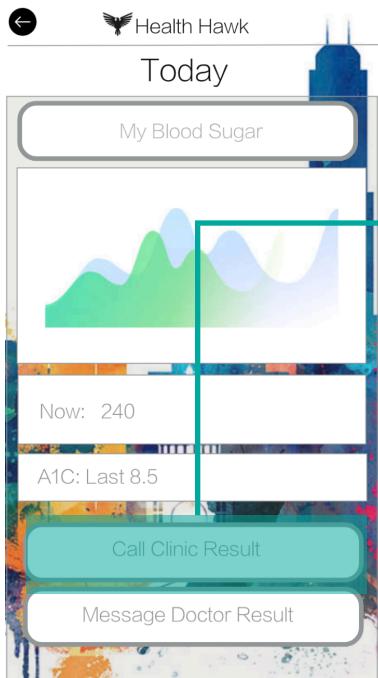
1: not a problem; 4: major problem

Problem:

Users have to remember their doctor's phone number.

Recommendation:

After clicking the message icon, users can send the message directly without typing the doctor's phone.



4

1: not a problem; 4: major problem

Problem:

Users have to remember their clinic's phone number.

Recommendation:

After clicking the calling button, users can call without typing the clinic's phone.

Principle 08: Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed.



4

1: not a problem; 4: major problem

Problem:

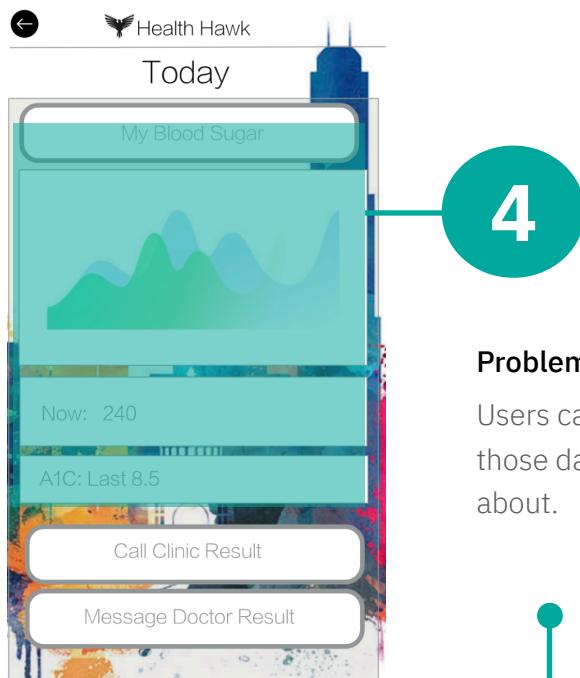
Users do not need to know their prescription in detail.

Recommendation:

A drop down list helps users to look for their past prescription if they are looking.

Principle 10: Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation.



4

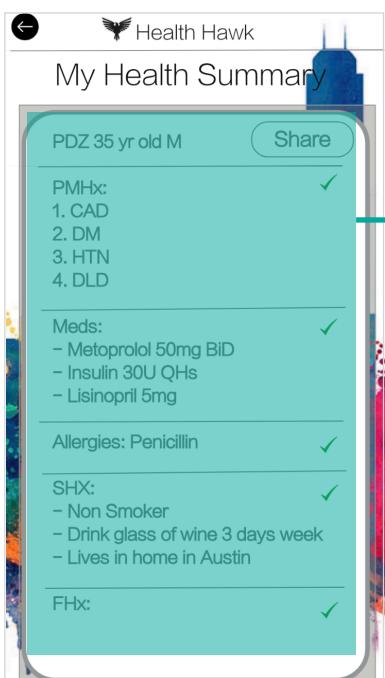
1: not a problem; 4: major problem

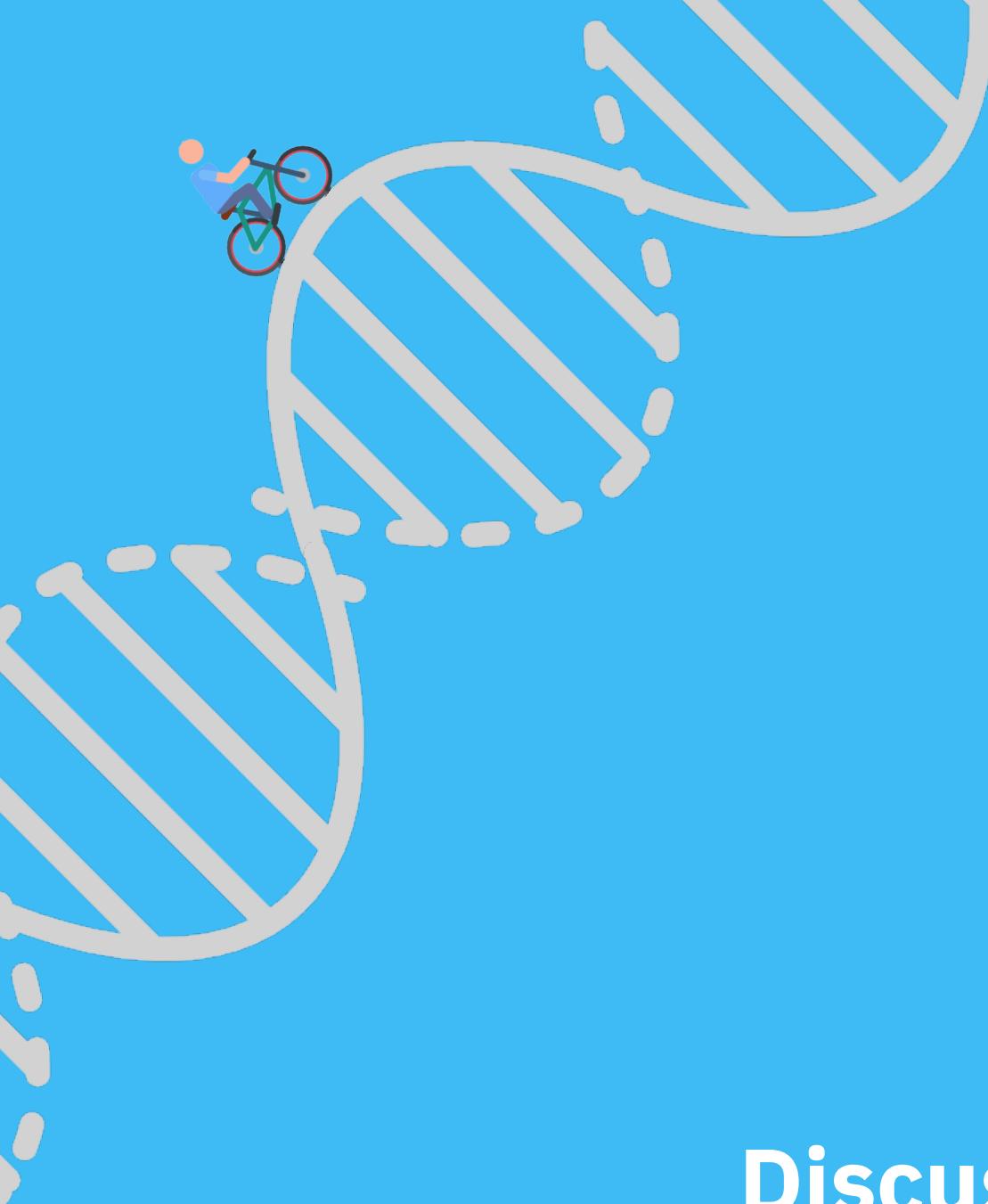
Problem:

Users cannot know what those data are talking about.

Recommendation:

Provide a popup pages talking about what those value mean for the users





Discussion

Using my insights, I created a set of design principles and identified three focus areas in which can be beneficial for designing a medical application for patients.

DESIGN IMPLICATIONS

From my insights, I crafted a set of design principles that are representative of the finding. They will be used to inform the direction of the design going forward in the future.

PRINCIPLE 01

Enhance patient's satisfaction and trust by increasing doctor's participation

From our research, we knew that patients' perceptions of the quality of the healthcare they received are highly dependent on the quality of their interactions with their healthcare clinician and team. Moreover, doctors often spend half of their time on dealing with paperwork instead with patients. To enhance patient's satisfaction, we have to decrease the workload the doctors have to do and to increase the time on patients.

POSSIBLE SOLUTIONS

Design a pre-diagnosis system in an application. By pre-diagnosis system, patients have to insert their symptoms before making an appointment with doctors, and doctors can review patients's medical condition before the appointment. The doctors can spend more time on the patients instead on paperwork.

PRINCIPLE 02

Consider health insurance during design

From our research, we knew that many patient's behaviors are related to their health insurance. They look for health providers that are associated with their insurance. They look for information about their coverage.

POSSIBLE SOLUTIONS

Collaborated with health insurance providers to design a system that provide a list of collaborated health providers and calculate the money a patient has to pay for visiting a doctor based on their medical conditions.

PRINCIPLE 03

Educate medical background knowledge for patients

From our research, we knew some patients have a hard time to figure out what to do next when they got sick. They want to know their symptom first. By educating medical background knowledge for patients, they can easily know whether they need to visit a doctor or not and describe their symptom well when they visit a doctor.

POSSIBLE SOLUTIONS

Design a self-diagnosis system that patients can easily know their symptom. This system includes the information and suggestion of this symptom.

PRINCIPLE 04

Instruction for taking the medicine

From our research, we knew that patients often cannot remember the time and purpose for taking the medicine. Because of those reasons, they do not want to follow the advice from the doctors. We have to deliver trust for patients.

POSSIBLE SOLUTIONS

Design an information page for every medicine that the patients take. The information page includes the details, purpose, side-effect of this medicine, and those information are certified by a doctor.

PRINCIPLE 05

Strengthen the communication between healthcare clinician and their team

Many patients got irritated when both the doctors and nurses ask the same questions again and again. From the literature review, we knew that communication among healthcare team members influences profound impacts patient safety. To provide trust and safety for patients, we have to increase the communication between healthcare clinician and their team.

POSSIBLE SOLUTIONS

Design a medical intake system that doctors and nurses can share patient's data with each others.

User Interview Script

Before the interview:

- 1. Record Session**
- 2. Have slide deck open for Journey portion**
- 3. The note-taker should mute their mic if remote or be quiet if in-person.**
- 4. The person moderating should call on the note-taker at certain points to ask if they have any follow-up questions, or need to clarify a note they may not have fully heard**

Section 1: Introduction

1-1 Video Record

- I want to point out that we would like to record this session.
- The video, and any information you provide, will only be used internally for research on a class project, not for marketing or other types of activities.
- Do I have your consent to record the audio and video of this session?

1-2 Who am I

Thanks, I'm a researcher at UT working with the UT Dell Medical School on some ideas for a product for the healthcare space. To do that, of course, the first step is to understand the goals, pain points, and desires of those who would be possible users of the product. That's where you come in!

1-3 Do you participate in anything like this before

- We are not evaluating you, only trying to better understand your job and your experiences.
- Please be as candid as possible, both positive or negative.
- Also, this is a completely voluntary activity. You do not have to answer any questions that you do not want to and can stop at any time.

1-4 What are we going to do for this interview

- Understand a patient's experience as they go through the medical system
- We're still in the research phase, so I do not have anything type of product or service to show you.
- We'll spend the time today discussing various topics.

Sound good, do you have any questions for me before we begin?

Section 2: Personal Work (5 mins)

I would like to start by talking about your background and previous personal experience in medical field.

2-1 Can you share yourself? including name, age, job title, roles and various responsibilities?

- a. **[Probe]** What is your income?

2-2 Do you have a health insurance?

- a. **[Probe]** Will you use your insurance when you get sick? Why not?
- b. **[Probe]** How do you find your health providers?

2-3 Do you go to the hospital in the past 2 years?

- a. **[Probe]** How many doc did you visit?

2-3 How often do you get sick?

- a. **[Probe]** What do you do when you get sick? Visit Doc or buy just medicine

Section 3: State of Medicine (5 mins)

3-1 How do you think about the medical system in US?

- a. **[Probe]** Costs, Availability/Access, Insurance, Insurance Companies, EMR/EHR, Expectations

3-2 Can you talk about your experience with medicine after consulting a doctor?

- a. **[Probe]** For example, Hard to keep track of taking my medicines, Do not know the purpose of each medicine,
- b. **[Probe]** How do you solve those problem?

3-3 Can you talk about your experience with medicine without consulting a doctor?

- a. **[Probe]** For example, hard to keep track of taking my medicines, do not know the purpose of each medicine
- b. **[Probe]** What will you do if you do not consult a doctor before buying medicine?
- c. **[Probe]** How do you solve those problem?

Section 4: State of Doctor (5 mins)

4-1 How is the experience when you visit a doctor?

- a. **[Probe]** For example, Attitude, Do not explain the symptom well, Always ask the same questions when your visit different clinic
- b. **[Probe]** Does doctor explain the purpose of those medicine? Why?
- c. **[Probe]** If doctor does explain the purpose of the medicine and your symptom, what do you do to memorize it?
- d. **[Probe]** How do you solve those problem?

4-2 Is there any different between visiting a doctor between clinic and hospitals?

- a. **[Probe]** For example, Attitude, Do not explain the symptom well, Always ask the same questions when your visit different clinic

Section 5: Discussing the Journey (10 mins)

I'd like to share my screen with you now. (Show Slide 1 and walk participant through sample journey using a car accident).

I would like to have you walk us through, what we'll call, the journey of a patient.

The journey includes the period from the some medical event happened, and what you are going to do then to the end when you are healthy. If there are different journey, we can discuss each journey case by case. For example, you get sick with or without visiting a doctor.

I'm wondering if we can discuss this journey by using some type of 'steps' or 'stages'. I've used a couple placeholders, but they are rough, and the number of stages and names are all placeholders to give you something to talk to visually.

KeyPoint to ask

- *What do you like? or What do you don't like?*
- *Probe "Why", when time is available.*
- *How many time did you spend for those pain point?*
- *Rank the pain point*

(Show Slide 2) Can you talk to me about this idea I have of stages and the names, I'll update this document as you go and we can change it however many times as you think it through? (**MAKE CHANGES BASED ON PARTICIPANT FEEDBACK**)

Section 6: State of EHR (5 mins)

6-1 How do you think EHR was used in this process of visiting a doctor?

- a. **[Probe]** Do something make you mad? For example, Negative:EHR can not be shared by hospitals. Positive: If you goes to the same health provider, EHR is useful
- b. Is there any different between visiting a hospital and clinic?
- c. **[Probe]** How can it be improved?

6-2 How do you think that you have to fill in new patient forms when you visit a new health provider? 1 is extremely mad, 5 is extremely good

- a. **[Probe]** How do medical professional think about it this process?

Section 7: Conclusion (5 mins)

7-2 What is a experience you would like to see in the near future?

- a. **[Probe]** the experience with doc, medicine and all medical system

7-2 If there is a app that you can share your health data with doc, would you use it?

- a. **[Probe]** Will you consider about private issue?

Health Hawk Usability Testing Script

April 10, 2018 | Jeremy Chen

Preparing for the sessions

To get ready for the sessions, I will

- Distribute copies of the session script, participant characteristics, and session schedule to web site team
- Rehearse with the team and adjust the script
- Set up bookmarks and links for participants to use

Before each session

- Make sure the browser is set up properly
- Gather forms for the participant
- Set up the starting point

After each session

- Close browser sessions
- Clear the history and cache in the browser
- Note particular issues and surprises
- Debrief with observers

Measure

Rating Scale

1: User are unable to continue with a task

2: User have considerable difficulty completing a task, but are eventually able to continue.

3: User have minor difficulty completing a task

4: Recommendation

Introductions

First, thanks so much for allowing us to spend time with you today. We are working with the User Experience Team to help design a app that help patients.

Today we want to do two things: first we want to better understand your job and, second, we want to get your feedback about some of the ideas the designers have created for patient. Our overall goal is to build a search tool that is most helpful to you in your job.

Have you ever participated in anything like this before...? I have a few other things I'd like to share with you so that you can get a better picture of what to expect.

- One the most important things to keep in mind is that we are not evaluating you, only trying to better understand your job and your experience using the prototype.
- Also I'd like it if you could "think aloud" as you work through the hypothetical scenarios. That helps us understand what you are thinking and feeling. I'll also ask you a few questions as we go, but it isn't to question what you are doing, only to better understand your experience.
- Also, I've had nothing to do with the design of these prototypes, so you don't have to worry about hurting my feelings.
- Please be as candid as possible, both positive or negative.
- Also, this is a completely voluntary activity. You do not have to answer any questions that you do not want to and can stop at any time.
- The information you provide will be used internally for the purposes of designing the search tool, not for marketing or other types of activities.

I would like to take notes while I listen and watch you. That's only so that I can document what I'm seeing. All notes will be anonymized. Although, we will not share your name, unless you give us permission to of course, we can't guarantee anonymity because we are in an open space right now, but we won't associate your name with anything that we share in our reporting.

Are you still willing to participate? Great! Do you have any questions for me before we begin?

Instruction to Moderator

For every observation or scenario:

- When a user makes a decision or action, ask them "why did you choose to do that?"
- When something new comes available on the screen, ask them to "describe what you are looking at."
- After they explain what they see, ask them "is there anything that you would like to see here but that you don't?" and "what else do you think could be here to help you achieve your goals?" and "can you think of a scenario similar to this one where you might want information that you do not see here?"

Routinely ask participants what they are thinking and feeling, doing, and why they are doing it? If they look puzzled or like they are looking for something, ask them "what are you doing right now?" (Give plenty of time for a participant to respond though, after asking a question.)

Opening Questions

Name:

Could you introduce yourself?

Did you use any kind of medical app before?

[Probe] How often did you use it?

What is your experience as a patient?

We're going to ask you to perform a series of tasks. Please do your best to complete them. Remember, we're not testing you, just the app. Also, I did not personally create the app, so don't worry about hurting my feelings.

Introduction

For the purposes of today's tasks, you will interact with the app as a Paul D.

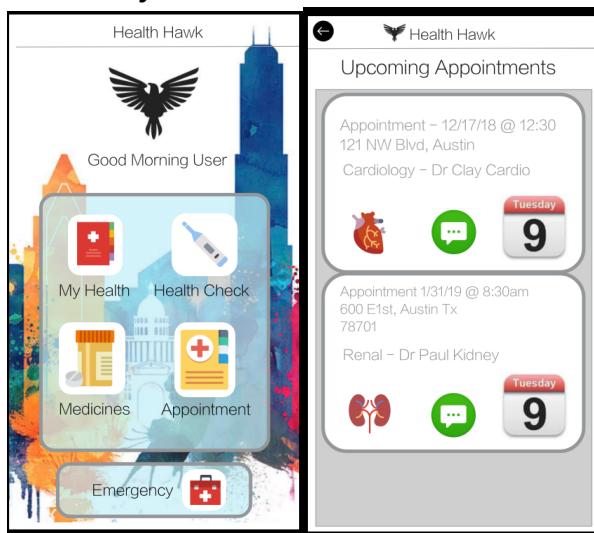
(open the wireframe link)

When you are doing specific tasks, please talk about the steps you're taking with each task in detail, what you find pleasant about the app, and what you do not like about the app.

Tasks

Scenario 1: Find out when your appointment is.

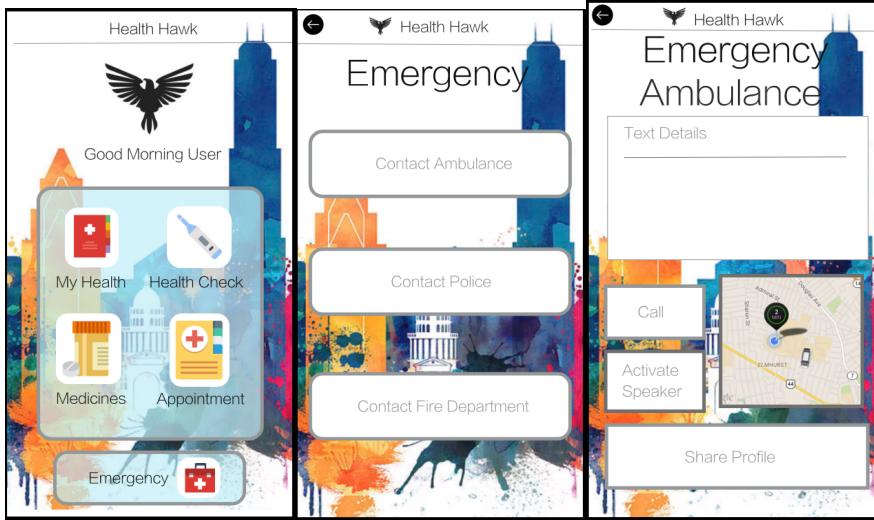
Let's start off with a simple scenario. You've scheduled a meeting with Dr. Kidne, but don't remember exactly what day and location is. Go ahead and show me, and talk me through the steps you'd follow. What did you do and How did you know?



Difficulty: _____

Scenario 2: Emergency

You will feel uncomfortable. You need to go to the hospital immediately. Find the transportation. Go ahead and show me, and talk me through the steps you'd follow. What did you do and How did you know?

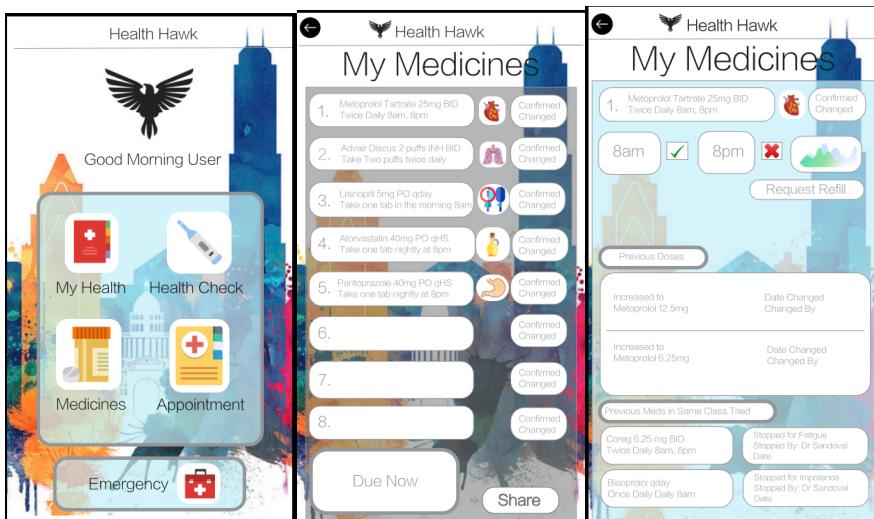


Difficulty: _____

Scenario 3: Medicines

For the next scenario, you've noticed you have to refill your metoprolol tartrate prescription. Please refill the prescription.

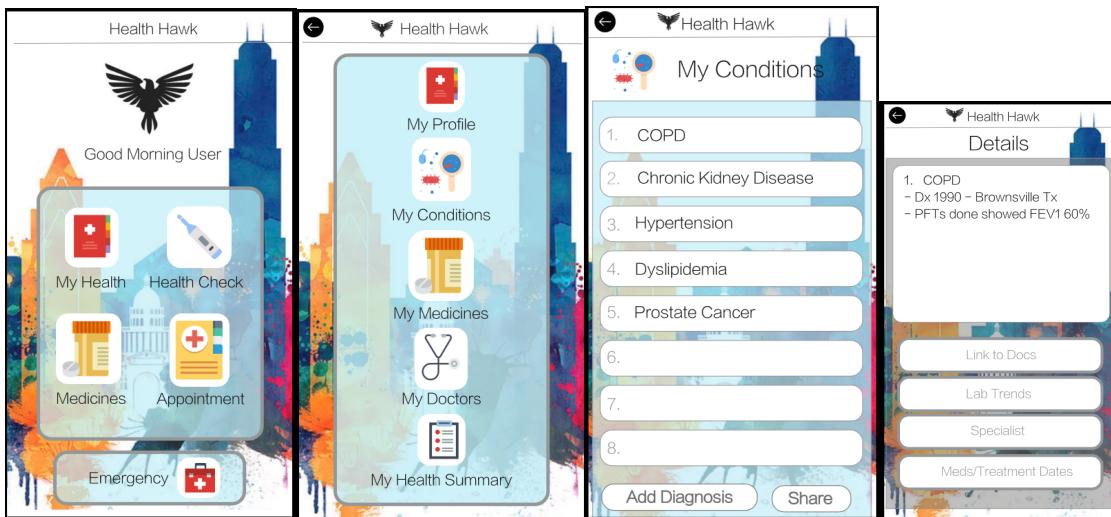
[Probe] Do you know what ✓ and ✗ is talking about?



Difficulty: _____

Scenario 4: Notes

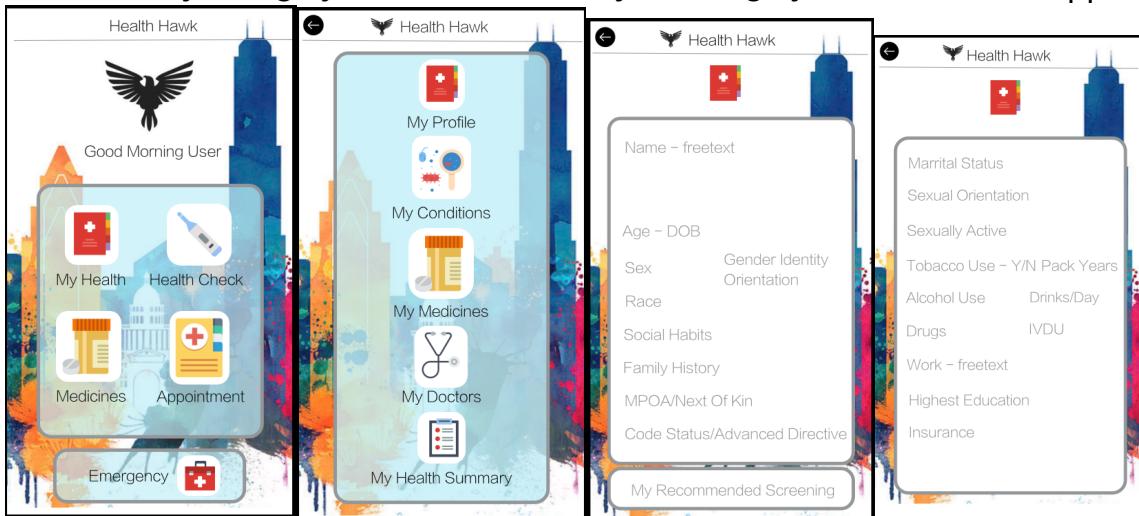
You have been diagnosing by the doctor. He said that you have COPD. How do you look for more info about your COPD? And Show me your doctor for COPD.



Difficulty: _____

Scenario 5: Changing Information

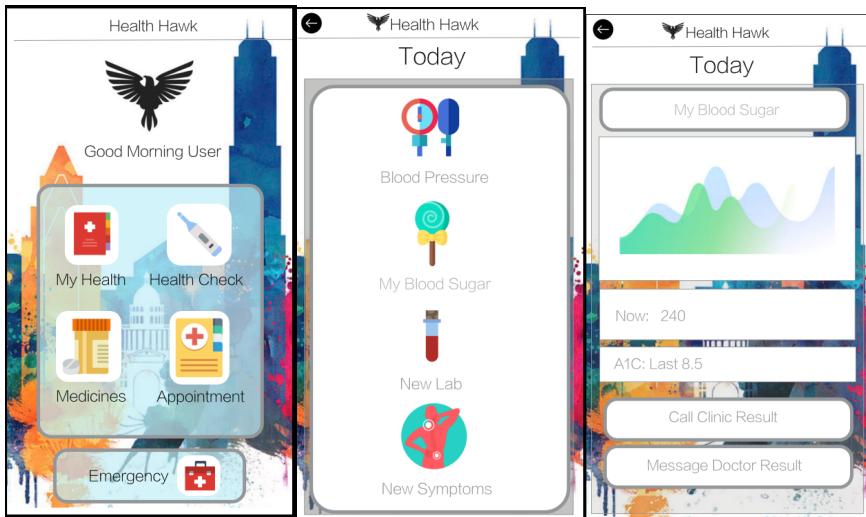
You currently change your name. How do you change your name at this app?



Scenario 6: Reporting Blood Pressure

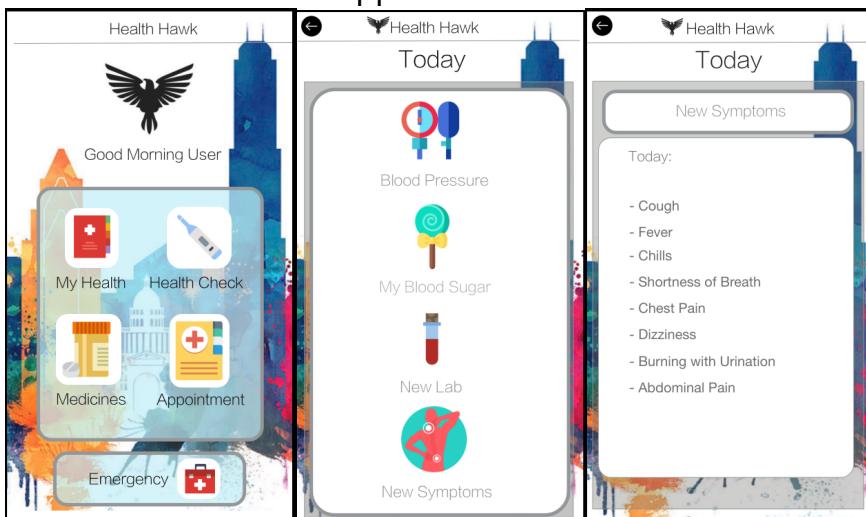
Today you will do a blood pressure test. Please enter your result and ask doctor for advice.

[Probe] How do you know the doctor's phone number?



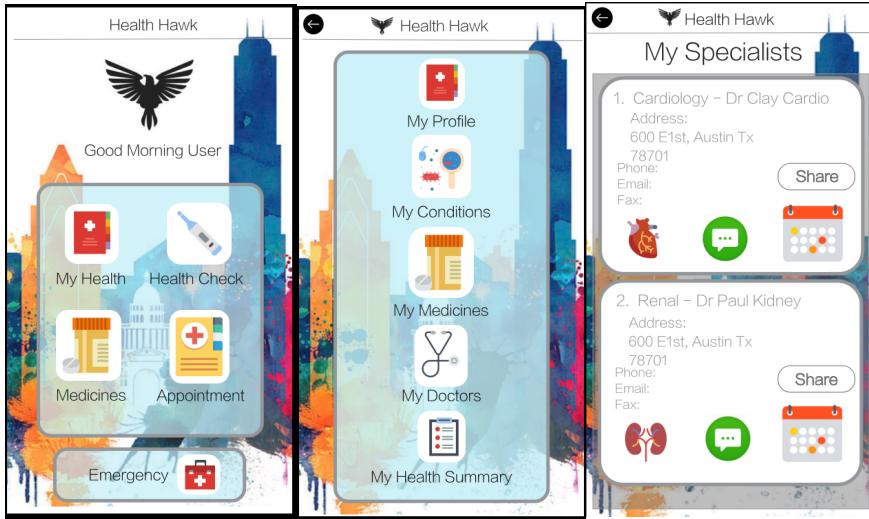
Scenario 7: New Symptoms

You woke up in the morning and noticed that you are coughing. Please insert this information at this app.



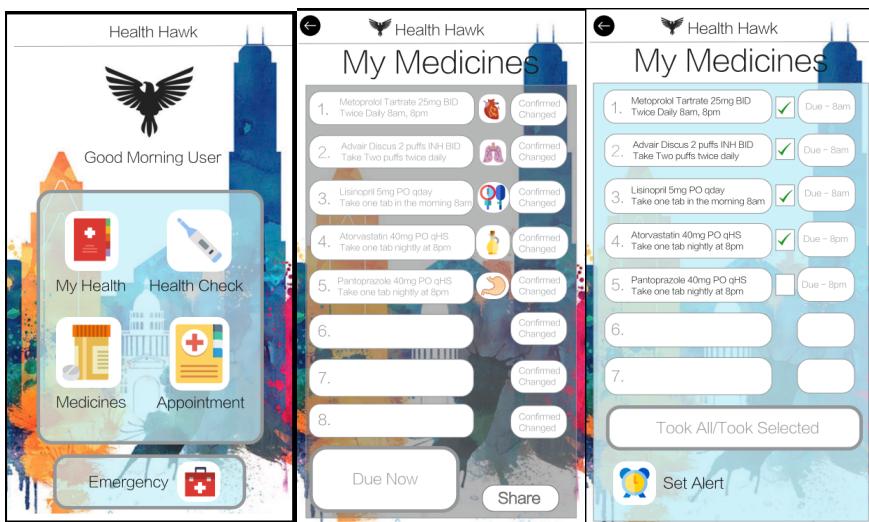
Scenario 8: Doctor Information

You have a cardiology, and you go to visit a doc before. Now, you forgot the name of your doc, please find it and contact with the doc.



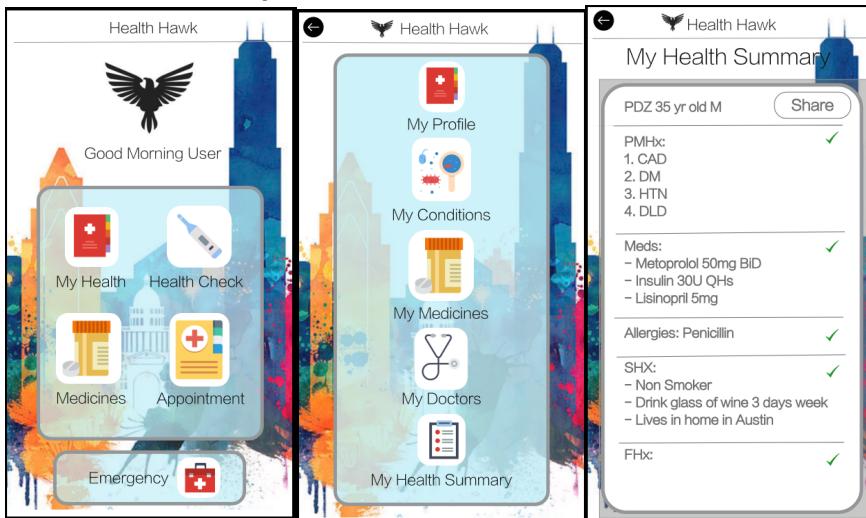
Scenario 9: Remembering Medications

Now you need to take the medicine for Metoprolol. However, you forgot how many pills you need to take. Show me how many pills you need to take and set a reminder.



Scenario 12: Sharing

Now you are visiting a doc, and you want to share your symptom to the doctor. What will you do?



Wrap Up Questions:

Thinking about this global search prototype that you just used, what are your general thoughts? When you think about your daily job and how you might use a global search, is there anything important that you think is left out of this prototype? Anything that you think is particularly important to keep? Do you feel that this tool will help you? How/in what ways?

I think that's about it for our session today. Thank you so much for participating. This was very helpful and we learned a lot. Do you have any questions for us?

Again, thanks so much. Have a great rest of the day!

Closing questions

Please rate these statements from 1, strongly disagree to 5, strongly agree by circling your choice.

1. I thought the information I got from this app was useful.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
----------------------	----------	-------------------------------	-------	----------------

Why or why not?

2. I can do everything I would expect to be able to do on an app for patient.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
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What is missing from the app?

3. Overall, the app was easy to use.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
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Why or why not?