



# MediTrack:

## Exploratory Phase Report

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In this report, we research important health-care issues in the U.S. and identify potential areas where mobile services can be part of the solution. The purpose of this report is to describe the process our team has followed as well as the results and insights came out of it. This report is organized into the following sections: Introduction, Methods, Social-Economic-Technological Factors (SET) and Product Opportunity Gap (POG), Hunt Statement, Competitive Analysis, Personas, User Scenario, Challenges, and Next Steps.



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# Introduction

Health-care has been one of the main challenges facing the world in general and the U.S. in specific. Whenever we discuss health-care issues in the 21st century, technology is always an important factor in providing solutions.

As part of the “Designing Mobile Services” course, our team decided to research a few of the health-care issues facing the U.S. identifying areas where mobile services can be part of the solution.

The purpose of this document is to describe the process our team followed to find out what technological, economical, or social factors have changed, and how we can use these factors to present a health-care solution. The results we concluded are documented in this report and are presented with a new hunt statement, a persona representing our users, and scenario explaining how our service will be used.

# Methods

This section describes two important Human-Computer Interaction methods we applied to organized ideas and set our foci, including Affinity Diagramming and Interviews.

## Affinity Diagramming

The team applied Affinity Diagramming as a method to organize the ideas and research areas that came out of the brainstorming session. We grouped and categorized all the ideas into three main categories - (i) Medical History; (ii) Medical Advice & (iii) Communication. Figure 1 demonstrates the Affinity Diagram of our brainstorming session.



Figure 1. Affinity Diagram of the brainstorming session.

Based on the ideas, we came up with a set of questions to explore more and gain insights into these areas. Guided by the set of questions we then interviewed professionals, patients and other health-care related personnel. The purpose of the interviews was to validate the ideas, which came up during brainstorming.

## Initial Interviews

### Details of people interviewed

#### Doctors

- Male Doctor, anesthetist, UPMC
- Male Doctor, Ophthalmologist, Choithram Netralaya
- Female Doctor, Ophthalmologist, Choithram Netralaya
- Male Doctor, Endocrinology, Union Memorial, MD
- Male Doctor, Otolaryngologist, NYC, MD
- Female Med Student, Emory University

#### Patients

- Female Student, 20 years old, treated at UPMC ER twice
- 3 Female Students, 20-25 years old
- Male Patient, 65 years old

#### Health-care Personnel

- Female Manager at Hospital, Children's Healthcare of Atlanta

## Interview Results

### Insights obtained from Doctors

- Family history is important.
- History of surgeries is important.
- History of medication is important.
- History of injuries are not usually recorded, but is of value.
- Patients do not declare medical history if it harm their career.
- Oral advice is important in addition to written to clear things.
- History of symptoms are not maintained by patients.
- Patients forget their appointments when disease is not important.
- A lot of hospitals have digitized medical records, but records are not compatible between different hospitals.

- Delay of results from lab tests due to the incompatibility between different hospitals.
- People miss their appointment (especially check-ups scheduled).
- Patients repeat medical tests unnecessarily.

### **Insights obtained from patients**

- Sometimes have allergic reaction to medication given.
- Couldn't remember previous medicine taken.
- Remember most of doctors advice, verbal delivered.
- Repeatedly asked about their medical history.
- Waiting time at ER ~30-40 min.
- Use phone alarm as reminder.
- Ask relatives to remind them about their medication.
- Don't like email notification.
- Medical history for vaccine is useful to have.
- Remembering advice depends on the severity of the problem.
- Cannot figure out insurance issue, e.g. money, documents needed.
- Prefer going to the same hospital so they don't have to remember and maintain history.
- Ask relatives to remember the advice the doctor gave them.
- Remember to take medication by feeling the pain/discomfort.
- Remember the advice but might not follow that.
- Renewal of prescription does not directly involve patients - contact between pharmacy and doctor.

### **Other insights**

- Doctors are as bad with utilizing medical history as patients providing them.
- Positive interaction is extremely important between patients and doctors.
- Many errors and mistakes come from not having sufficient medical history as well as poor first impression diagnostics.

## **Second Phase Interviews**

### **Details of people interviewed**

#### **Professionals**

- Paramedic, Patient Care Coordinator, Pittsburgh EMS
- ED Resident, NYUMC

## Interview Results

- Medical history of patients plays an essential role during emergency situations, despite the fact that it is usually difficult to retrieve it during these situations.
- Both conscious and unconscious patients have difficulty communicating during an emergency situation. They fail even at the simplest things such as providing names.
- 50% of the time no one is with the patients on site. However, even when someone is present with the patient, they usually are of very minimal help.

## SET and POG

We developed our first set of SET factors based on our brainstorming session and initial interviews with doctors, patients, and other health-care personnel.

### Initial SET factors

#### Social

- Apprehension for releasing complete medical history
- People are annoyed from being repeatedly asked about their medical history
- Patients prefer real-time notifications
- Patients remember but tend not to follow verbal advice
- People are more comfortable with digital content

#### Economic

- Unnecessarily repeated medical tests waste resources
- Patients purchase separate devices to help keep track of medication
- Patients are willing to pay for medicine even without insurance coverage
- Adult children buy aids for their aging parents
- Decreasing price of mobile devices
- Government investment in the health-care field

#### Technology

- Advancement of intuitive mobile technology
- Viability of Near Field Communication (NFC)
- No standard format for patient records

- Increasing amount of digitized medical records

## Initial Product Opportunity Gap (POG)

Based on these SET factors, we devised our first POG as follows:

*A secure, intuitive, and automated service that manages patients' medical information while maximizing compatibility and accessibility for both patients and doctors.*

However, despite the rich opportunity demonstrated by the SET factors, our team discovered during a competitive analysis (to be elaborated later) that other companies (such as Google and Microsoft) have recognized this gap and attempted to fill it with little success. In light of that, we refined our SET factors to be more conservative along with a more defined scope and target user:

## Final SET factors

### Social

- Parents concerned about children
- Grown children concerned about aging parents
- People are increasingly busy and are harder to contact by traditional means

### Economic

- Patients are willing to pay for medicine even without insurance coverage
- Adult children buy aids for their aging parents
- High cost of mistakes (improper treatment of someone could easily result in death and/or lawsuits)

### Technology

- Near ubiquitous nature of mobile phones (not smartphones)
- Massive mobile communication networks
- Each device connected to network is uniquely identified and individually owned

## Final POG

From the new SET factors, a refined POG was also identified:

*A secure and automated service that delivers patients' medical and contact information in an emergency.*

# Hunt statement

A mobile service that provides healthcare personnel with immediate medical and contact information for a patient in case of an emergency.

## Competitive Analysis

In addition to assessing the strength and weaknesses of potential competitors of our service, our group also used the analysis as an opportunity to evaluate the validity of our idea, mostly considering what has contributed to each products'/services' success or failure.

The following services/products were researched in response to of our initial SET factors and POG:



### Google Health

A service that allows users to manage, track, and monitor health information online, set and act on personal health goals, and share health information.

#### Strength

- Centralized service
- Allows both manual input from user and input from partnered health service providers
- Manages an extensive amount of information
- Multiple profiles
- Free of cost

#### Weakness

- Privacy concerns - HIPPA privacy laws do not apply
- Primarily web-based solution



### Microsoft HealthVault

A platform which allows users to manage their personal health records based on available applications that consumer can choose to match their needs.

#### Strength



- Addresses both professionals and individuals
- Authorization for multiple accounts can be configured for families...etc.
- Integration with medical devices (heart rate, blood pressure monitor...etc.)
- Integration with industry some standards (Continuity of Care Document and the Continuity of Care Record)
- Integration with Windows Live ID
- Free of cost

### **Weakness**

- Only available to US citizens
- Privacy concerns
- Primarily web-based solution
- Professional but unintuitive interface



### **Dossia**

System that empowers individuals to manage their own healthcare, improve communications with their doctors, and ensure more complete and accurate information for healthcare providers than the current fragmented, paper-based system

### **Strength**

- Based on Open Source software
- Ability to download full medical records in electronic form at any time.
- Differs from traditional tethered PHR services, by providing user access to health information regardless of health plan, employer or physician
- Allows insurers input into individual profiles

### **Weakness**

- Only available to employees of the partnered employers
- Privacy concerns

**Summary:** In general, while all available services offer ways to track, manage, and monitor health records, the lack of implementations especially for emergency situations is evident. Also, many of these products while under the development of large corporations showed very little success in being ubiquitous.

Our group then redefined our scope, focusing on a more conservative set of SET factors.

The following service/product was researched in response to our refined SET factors and POG:



## **MedicAlert**

A service that maintains medical records for its subscriber, which is made available in case of emergencies to medical personnel. A separate accessory usually in the form of jewelry is used as an identifier for membership, in which an ID is engraved on the accessory so that medical authorities can have access to the information when needed.

### **Strength**

- Available during emergencies
- Personal identification engraved right on accessory
- Internationally affiliated

### **Weakness**

- Cost of both the extra accessory and the subscription service

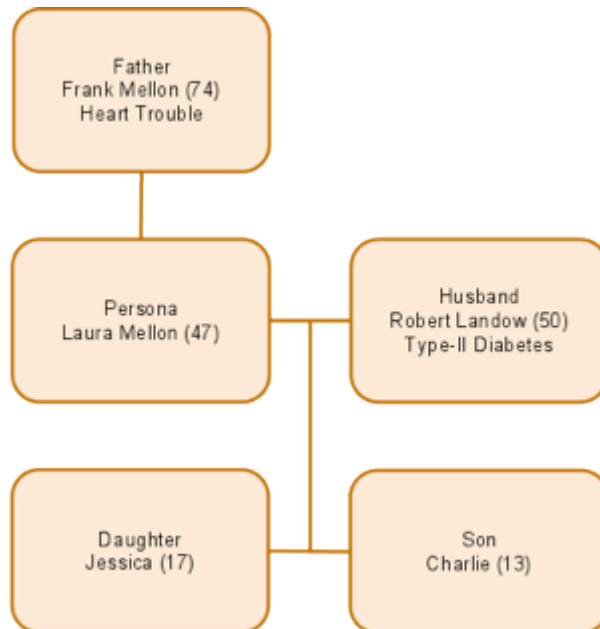
## **Persona Descriptions**

Our group developed two personas based on the likely users and potential customers of our products: 1) a mother who is in charge of the household, ensuring the safety of her family members; 2) a paramedic who performs life-saving tasks on a daily basis. Both of these personas are based on interviews and other researched information.

## Laura Mellon, 47



### Family Tree



### Background

Laura has lived in New York all her life, and is busy with a full time consulting job. Her husband, Robert, was originally from New Jersey. They have a 17-year-old girl, Jessica, and a 13-year-old boy, Charlie. Jessica plays soccer after school and drives home three times a week. Charlie usually carpool with his sister to school. Laura's father, Frank, was recently diagnosed with heart trouble.

## Goals

### Experience Goal

As a busy professional, Laura wants to avoid as much interaction with the service as possible, ideally using it in a “set and forget” manner.

### End Goal

Laura wants to feel confident allowing her children and father to be outside her immediate supervision while at work. Additionally, she wants to be able to immediately know of any emergencies in her family.

### Life Goal

As a mother, Laura wants to ensure the safety and health of her family while being able to maintain her career.

## Michael Chalkas, 31



### Background

Michael is a single paramedic who has been working with Pittsburgh EMS for 3 years now. He likes his job. His daily schedule makes him an early bird as opposed to his friends, but still, he has a good social life.

## Goals

### Experience Goal

Michael is well trained to provide first aid procedures and handles emergency with confidence. Michael can use the history of a patient to better aid him, but he thinks a slow service will not help in emergencies.

### End Goal

Michael wants to provide the best medical help to patients until they reach the hospital.

### Life Goal

Michael is working hard to save enough money to start his own company in selling medical supplies.

## User Scenario

It was a normal day for Michael, woke up at 5:00 AM in the morning. His programmed coffee maker already brewed his coffee; he grabbed his thermal cup and ran to start his ambulance vehicle.


Once he reached the hospital, he made sure it's filled with the required supplies. Later during the morning hours, he received a dispatcher order to head for an emergency at a high school. There was a young girl unconscious with the teachers panicked around here. Her name was Jessica and she was 17 years old. No one knows what happened, her friends said that after the lunch break while they were in the playground, she suddenly fell down to the ground. They tried to call her parents, but the number they called was not answered.

Michael started following first aid procedures and moved her into the ambulance, then asked the teachers if they saw her mobile phone. The teachers handed Micheal her mobile phone where he entered a code in Jessica's mobile phone and waited for something to appear on a screen hanged in the ambulance. A few seconds later, Michael asked the teachers what they were serving for lunch, the teachers told him they had lasagna and jelly with peanut butter for dessert. It turned out that Jessica is allergic to peanuts and Michael figured this out from the medical information appeared on his screen. Michael then injected Jessica with adrenaline (epinephrine) then followed by injection of antihistamines.

Michael announced the patient's condition through his radio and rushed to the hospital.

Laura was in her weekly meeting with a client she's providing him consulting on how to get compliant with a new financial standard. After the meeting she checks her emails on her blackberry and finds an email updating her about the status of her daughter, the location of the hospital and a phone number to call once she's available.

## Challenges

1. Scheduling appointments with health-care personnel takes time.
2. There exist wide range of health-care issues, which requires focused research to uncover. With limited time and resources, it is not feasible to research all opportunities.
3. Our competitive analysis showed that there has been lots of work in this field, but limited results.
4. Understand and comply with HIPAA  Privacy Rule

## Next steps

1. Refine our persona as we conduct more interviews.
2. Generate a business model.
3. Generate system architecture.
4. Iteratively refine the design of the service.
5. Pitching the service to health-care organization and venture capitalists.