Group Assignment: Contextual Inquiry

- Medical Information Management Group
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SyncMed

Problem and Solution Overview

In the present day and age, many people track their own health using mobile apps and doctors keep records of their patients from yearly checkups. However, there is never any interaction between these two. Currently, there are a decent number of medical facilities that have some sort of online access to medical records that patients can view, but there is no big, overarching system yet. The other main issue that modern healthcare faces is the transfer of information between healthcare workers. When a first responder reaches an accident scene, he must obtain information about the patient quickly, and then he passes that information as well as information about any treatment performed along to the second responders. They then must pass that information on to the ER, then the ER to the operating room, then on to the Intensive Care Unit. This can lead to communication errors that have dire consequences for a patient. Our solution is a mobile app that allows a patient to enter in their information and have their doctor verify it and sync their full medical history. In the event of an emergency, an emergency worker can use their version of the app to pull up this medical history and record procedures done on the patient, thus preventing communication errors while simultaneously giving the paramedic all of the information they need for treatment.

Contextual Inquiry Participants:

Alannah Bjur

Alannah Bjur earned a bachelor's degree in nursing and a master's degree in Clinical Information Management. She works in the Ninth and Jefferson building, a building that houses specialty services and is located across the street from Harborview Medical Center. Our contextual inquiry with Alannah had two parts. In the morning, Jun and Chris attended a design session that was being led by Alannah. During this session, a

large group of about 30 people, with diverse connections to the UW health care system (many attendees were from neighborhood clinics far from campus or downtown) were discussing planned design changes to the bedside computer system. It was most useful to hear about problems that are surprisingly simple but widespread. An example of this is how it is difficult to scan patient wristbands during surgery as their wrists are typically under a sterile sheet. Our role at this stage was to observe, and get a feel for the types of problems we could expect when designing our application. The second part of the inquiry occurred at her desk, and Chris's role as apprentice was to witness Alannah's typical work activities, asking her questions about problems she frequently faced in the course of her daily work.

Thomas Payne

Dr. Thomas Payne was an excellent choice for our second contextual inquiry. His academic interests align closely with our project: he studies clinical computing systems, and works to make the use of electronic patient data more efficient. Dr. Payne is a medical doctor educated here at the University of Washington. Payne is also active in AMIA, a group that is dedicated to the effective leveraging of informatics towards revolutionizing health care. We spoke to Dr. Payne at the UWMC, near a computer terminal where he showed us the flaws of the current software used to track medical information. Our role as an apprentice was to view the difficulties Dr. Payne faced when trying to complete very simple tasks on the software.

Michael Durkin

Our third contextual inquiry participant was Michael Durkin, a safety coordinator and flight nurse for Airlift Northwest. He is a certified critical care nurse, a flight nurse, and an emergency medical technician. He has worked in a burn unit at the Virginia Commonwealth University, at a burn unit in Harborview Medical Center, as an EMT for AMR, and has been a flight nurse for Airlift Northwest for the past 10 years. He is an excellent candidate for our contextual inquiry because he represents the emergency side of medical professionals as he has worked both as a first responder on the ground in an ambulance and as a flight nurse, who are typically second responders. Kevin was the only one present for this contextual inquiry, which involved a short discussion and a tour of the facility at which Airlift Northwest is based. Because the work that is done at Airlift Northwest is emergency response, Kevin unfortunately could not get a firsthand experience of a job being done, though Michael did walk him through a typical scenario. Kevin's role as an apprentice was to understand the information needed in a typical scenario for emergency responders.

Contextual Inquiry Results:

The main high level theme that our contextual inquiries illuminated for us is that communication breakdowns in the healthcare industry are common, difficult to alleviate, and potentially dangerous. Both Alannah (inquiry participant 1) and Thomas Payne (participant 2) dedicate large portions of their time trying to make medical information management faster, less error-prone, and more uniform between health care sites. The 1996 HIPPA law, which outlawed the creation of a unique ID for health care providers to keep track of patients, and cost tradeoffs were the primary factors in the creation of a fractured health care infrastructure in the United States. Dr. Payne told us that watching the evolution of health care systems over the decades had been painful at times. While most professionals in his field understood the need for a less decentralized health care system, it was hard to persuade others that re-engineering the systems was worth the gargantuan cost. Specifically, Payne told us that some hospitals were faced with a choice: spend tens of millions of dollars on an unproven system that we can only hope that other hospitals adopt, or build an entire new wing to the medical center.
Any two given hospitals have a very low chance of using the same system for maintaining health care information, and many hospitals (UWMC included, as Dr. Payne informed us) have different systems for different departments within the same building. The contextual inquiry with Thomas Payne was unique in that, despite being deeply involved with medical information management at UWMC, he was not afraid to be frank with us about the problems faced in his field. He was able to show us the interface of Epic, one of the types of systems that is used by the UWMC. We immediately noticed that the interface did not appear to be user-friendly, and Payne confirmed this to us when he said that even people who have been using the system for a long time have frequent difficulties with Epic. The contextual inquiry with Alannah was unique in that we were able to witness a meeting in which the topic at hand was design. The implication of this was that along with hearing about problems, as we did with Dr. Payne, we were able to hear about potential improvements. This also meant that we were able to hear about design concerns from a large group of people, all professionals who, by using the current flawed systems, have first-hand knowledge about what needs to be fixed. Their opinions were crucial to hear because we were able to learn about problems that, to an outsider trying to design a health care information system, are not obvious. We also witnessed what seems to be a theme in human-centered design: that what is a fix to one subset of people is a detriment to the needs of another faction. The third contextual inquiry with Michael Durkin was unique in that Kevin got to see the systems where first and second responders work in person. From the information he gathered in his discussion with Michael and his subsequent tour in the facility, Kevin learned that the second responders try to limit their time at a scene to roughly 10 minutes. Naturally, this is because they need to get their patient to a hospital as soon as they possibly can, but this also limits the amount of information they can feasibly gather about a patient to

begin their treatment en route to the hospital. He also learned about the crucial information that first responders need about a patient, such as any allergies the patient has and any current medications they are taking.

Existing and New Tasks

A current task that people typically want to perform is to track their blood sugar over time, to determine when/if it spikes, and by how much. This information can be used to make improved dietary and medical choices. Therefore, an existing task is to track blood sugar in relation to meal times. Presently, a diabetic may simply use a paper chart or an excel spreadsheet to track this information, and then visually look for any patterns. Also, people currently want to ensure that, in the case of a medical emergency, medical technicians are aware of any severe allergies (usually medical, but sometimes food) that, if unaccounted for, could result in a misdiagnosis or the administration of medication that will cause an adverse reaction. A common present-day solution to this problem is the use of medical alert bracelets (see photo below).

This solution is obviously very limited due to a lack of space on the bracelet (there is nothing electronic involved -- text is simply engraved on the interior of the bracelet). We plan to improve this situation by helping users communicate much larger quantities of information to emergency healthcare technicians. We do realize that more information is not necessarily better. We also strive to ensure that all of the information we present to emergency workers is useful with a high probability. Being flooded with (mostly useless) information when trying to administer emergency care is not a solution to having too little information.

This application also is concerned with aiding medical professionals in non-emergency situations. An existing task (more of a chore for today's healthcare workers) is getting the medical charts of new patients transferred to their doctor's office or hospital. Even patients sometimes have to get involved -- by advocating for themselves and trying to hasten the transfer process.

Our application addresses all of these issues. Next, we describe three new tasks that our application enables.

The easiest new task for a user to do with our app is entering in data to track some sort of medical condition or situation, such as blood sugar (for diabetics) or even caloric intake (for those watching their weight). This task is very important to many people, especially those who have a serious medical condition like diabetes. They would be able to use our app to enter in data to track any data they are normally looking at for their condition, as well as get reminders for any medicine they need to take to treat the condition. User safety is thus improved by empowering them with knowledge and preventing lapses in their memory.

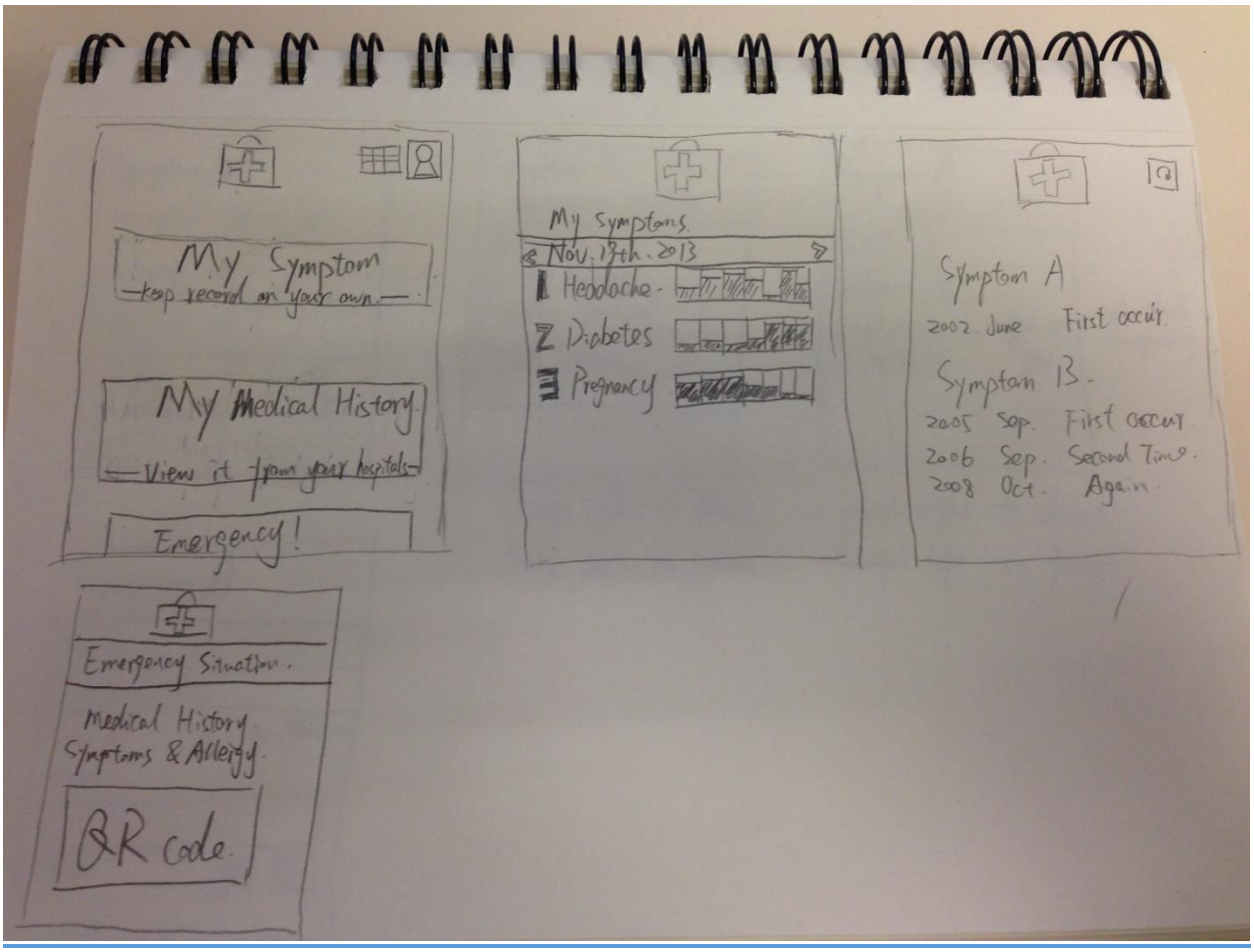
A slightly more difficult task is for a first responder to pull up a patient's medical information. This would involve some sort of code for identification that would allow a first responder access to the information of the patient in question. Since the patient's medical history is synced to his device, the first responder would be able to view a full medical history, and an abridged version designed for emergencies. This would be a huge improvement over current systems because it saves a large portion of time that would be spent acquiring this information. It would allow paramedics to see what current medications the patient is taking, as well as any allergies to chemicals commonly found in medicine, as these are the most important pieces of information to any first responder. It would also allow the first responder to enter in treatments they performed on the patient, so the next person to treat the patient has a record of those treatments, thus eliminating the possibility of communication error. The first task we described also interacts with this scenario. Say that a first responder notices an unhandled reminder to take a medicine. Then, just seconds after arriving on scene, the paramedics already have an idea of what may be causing the medical problem.

Finally, the most difficult task would most likely be working with a doctor located at a new office/hospital. At a new patient's first appointment, the doctor would now have easy and immediate access to the patient's previous medical history. This would allow the doctor to make comparisons to previous years and see what data the patient has collected in between. Both of these would allow the doctor to make better judgments about the patient's general health. In addition to this, if a patient moves between different areas (for work, college, or anything really), there is no need for the existing

slow transfer of files back and forth between doctors' offices. Instead, the new doctor just needs to pull out SyncMed and view the patient's full medical history from there, which will have been synced from the patient's previous visit (regardless of who was the doctor for that appointment). The doctor would also record any measurements and data taken for the user, and input them into SyncMed, allowing the user quick access to this new information whenever they need it. In the case of any lab tests that must be performed, the user can just get an alert from their doctor when those new results are available for viewing on SyncMed.

Initial Sketches and Design

Sketch A



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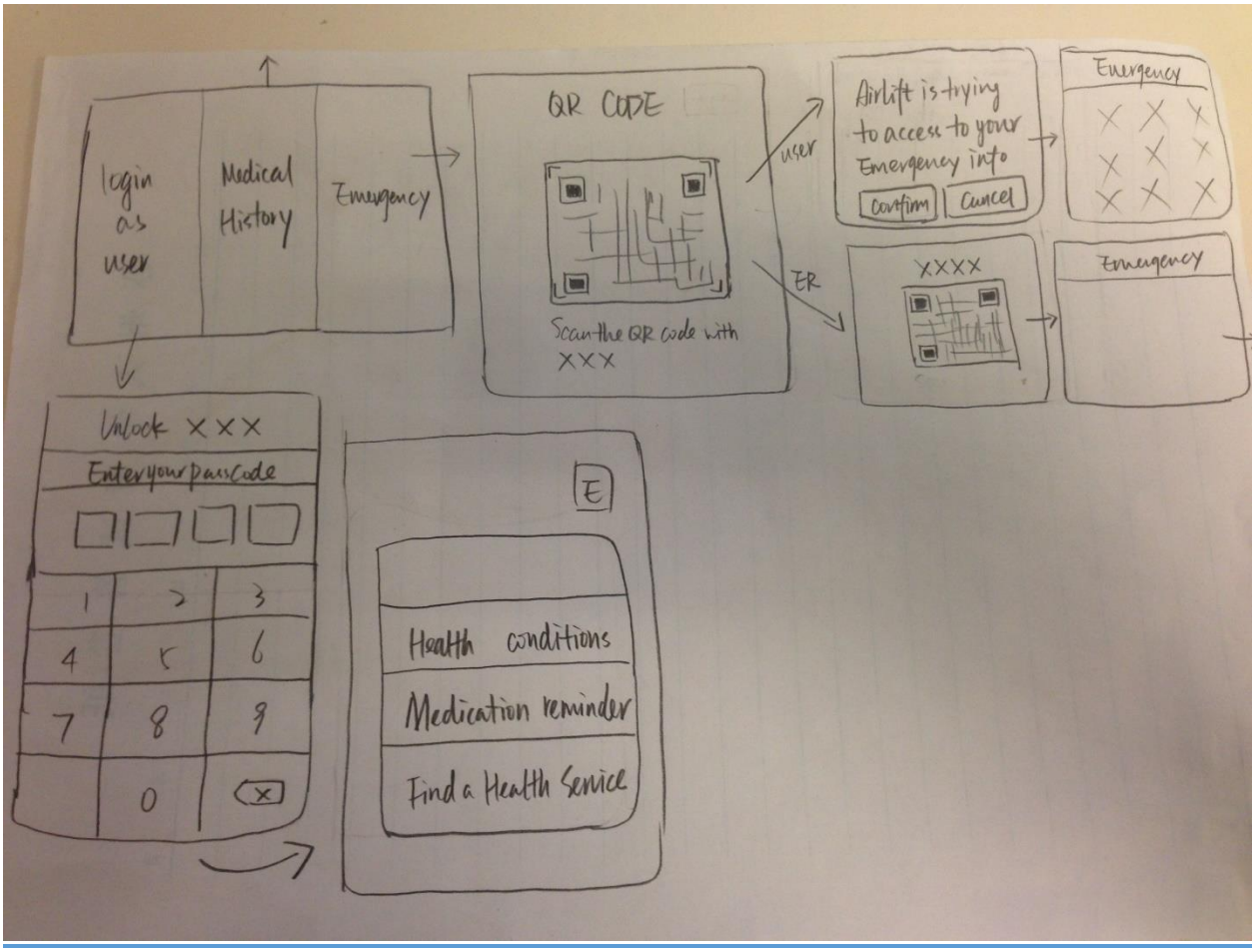
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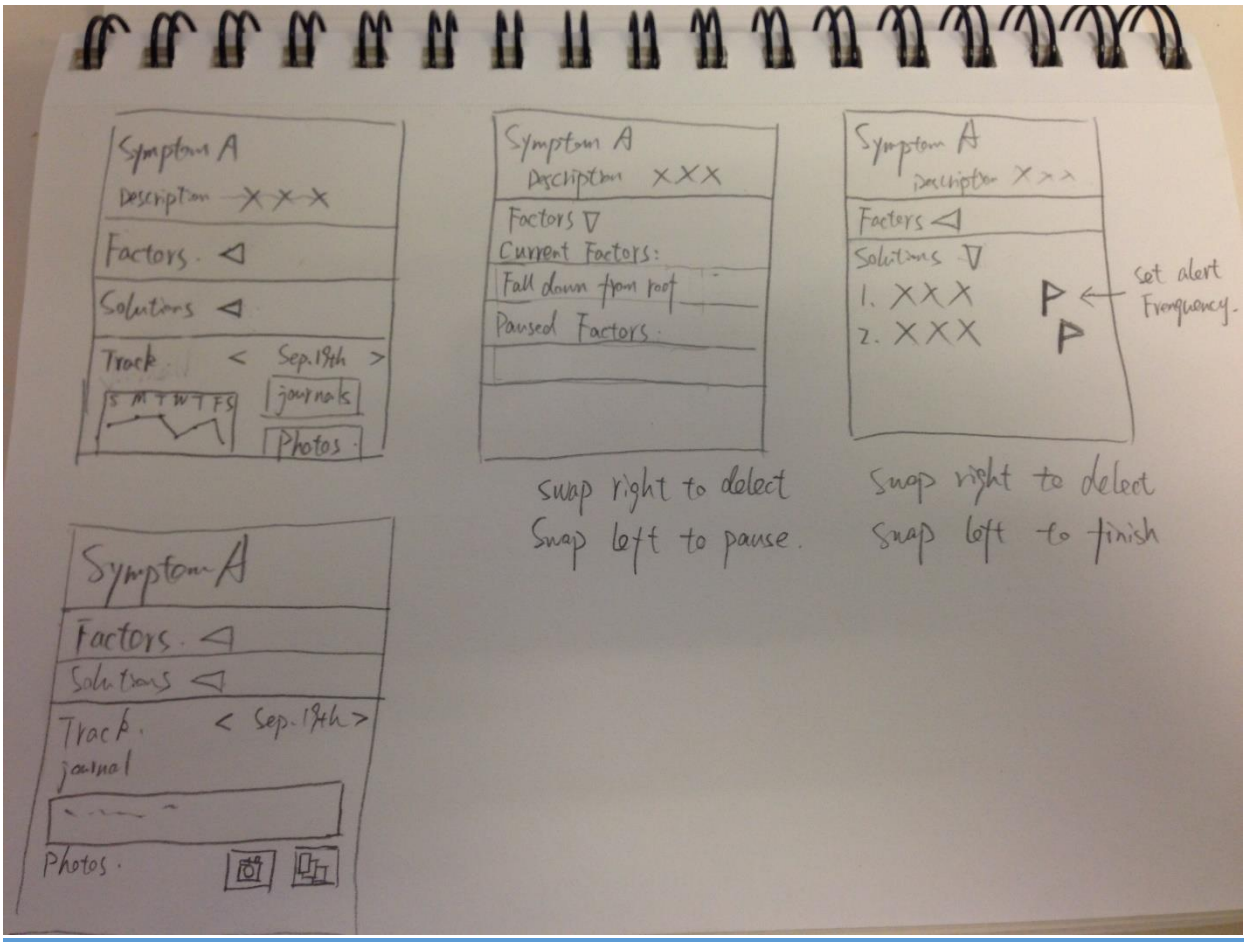
Emergency
QR CODE
Scan the QR code with XXX
user
ER
Airlift is trying to access to your Emergency info
confirm
cancel
Emergency
XXXX
Emergency
Unlock XXX
Enter your passcode
Health conditions
Medication reminder
Find a Health Service

Sketch C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Fall down from roof
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Swap left to pause.
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Solutions
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Symptom A
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