WebClinic

Contextual Inquiry Report
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Problem and Solution Overview

Forty-nine million Americans lack health insurance [4]. Every year, there are about 45,000 deaths from lack of health insurance [3], which is an estimate of about two and a half times higher than in 2002 [6]. The eroding health care “safety net” is largely to blame for this substantial increase in deaths [6] [1]. The health care “safety net” is a loosely organized collection of hospitals and clinics that provide charity care [1]. Eight-six percent of those in “safety net” settings are low income, and sixty-four percent are ethnic minorities [2]. This project aims to increase the quality level of health care among the poor and ethnic minorities by designing a web application that allows patients to communicate their illness to a volunteer medical professional and receive an accurate diagnosis and treatment plan at no cost.

Contextual Inquiry Participants

To better learn about potential users of our web application, we interviewed an uninsured person, a doctor, an emergency medical technician (EMT), an immigrant with incomplete medical coverage, and an insured immigrant. Due to concerns over patient privacy, we were unable to observe our users in a hospital setting unless we waited about two weeks for hospital approval. Additionally, we could not do a proper contextual inquiry interview because it is difficult to “catch” people needing medical care. However, we did adopt humility and inquisitiveness while having discussions with our participants, leaving our questions open-ended to aim for better, more data-rich responses. We spoke with the uninsured person and immigrants in their home and a doctor and EMT in a local café.

Sarah, our first interviewee, is 29 years old and works as a dental assistant. She is married and has two kids, Brian (age five) and Caylee (age seven). Her husband Mike works as an electrician, but was laid off when the housing market collapsed in 2008 and now is working intermittently. After Mike was laid off, the family no longer had health insurance. We interviewed Sarah in her home because that was the most convenient

place to meet her. When we arrived at her place, she seemed stressed and said that her workday was long. Sarah and her husband are a part of the uninsured non-elderly adults who are 20-50 percent more likely to die than those with health coverage [5].

Karen and Mike, our second interviewees, are 38 and 26 years old, respectively. Karen is a medical doctor at Harborview Medical Center and Mike works as an EMT and is currently applying to medical school. Both Karen and Mike are technology aficionados, and are enthusiastic to talk with us about the web application. They are also passionate about helping people with low socioeconomic status and have been a part of information and communication technologies for development (ICTD) projects at the University of Washington. Karen and Mike are good examples of medical professionals we want to target to help volunteer for our application, because although they are busy with their jobs, they are also excited about technology and helping the poor. We interviewed Karen and Mike in a busy café on Capitol Hill in Seattle, since a health care setting was not allowed due to privacy concerns.

Lei Cao and Guiling Sun, our third interviewees, are 27 and 60 years old, respectively. They both immigrated to United States from China in 2004. Lei is now a dealer at a casino and has full insurance coverage. Even though she doesn't have problems going to see a doctor, she still hesitates because of her problems with the English language. Guiling is a cook at the same casino that Lei works at; however, she doesn't have complete health insurance due to her part-time status. In addition to being unable to communicate with doctors or nurses because of the language barrier, she is also worried about the health care cost because her health insurance is only partially covered. She doesn't have any coverage on dental and has a very limited amount of money she can spend per month. Both Lei and Guiling are examples of low income, non-English speaking patients who may benefit from a way to communicate with doctors through a web application. Both Lei and Guiling were interviewed at their home.

Contextual Inquiry Results

Simplified Design

We observed both that both the uninsured and medical professional participants were extremely busy. Our UI should provide the patients only the functionality necessary to quickly create a profile of their conditions, and provide a quick and easy way for medical professionals to access these profiles and provide an accurate diagnosis and treatment. Making a UI more efficient will make it more likely that people will regularly use the web application. Although we aim for a simplified design, there may be socio-technical issues, such as some older people not knowing how to use a keyboard. These socio-technical issues may be out of our scope during this initial design phase.

Here are the observations for a simplified design:

· Sarah was stressed from work when we met her and it seemed unlikely that she would want to interact with a difficult technology. In addition, Sarah and her husband have two kids that they must care for and a complex UI would most likely only add to their stress as parents.
· Sarah told us that she has looked at websites such as WebMD.com to look up symptoms, and found the website confusing because "you get a million suggestions and following e-mails about things that do not concern you."
· Lei Cao said that she looked at WebMD.com, but only if a friend helped her with navigating the website.
· Guiling Sun said that she wasn't good with using technologies, so she would be apprehensive about using a website rather than seeing a doctor in person.
· Karen agreed that medical websites are helpful to some people that she treats, but not beyond just gathering "general information" about an illness. Creating a profile must be simple enough so that people elect to seek care through our design rather than just looking up their symptoms on a medical informational website such as familydoctor.org.
· Both Mike and Karen said that it "seems likely" for doctors and nurses to be able to volunteer their time to help people with diagnoses and providing treatment plans, but any website must be simplified for medical professionals to help on an ongoing basis.

Privacy and Security

The medical professionals mentioned repeatedly that the website would have to be concerned with privacy and security. None of the other participants mentioned privacy or security in the interviews, they were just concerned with the ability to receive accurate help from the website. However, because the medical professionals stressed privacy and security so highly, we are making these issues an integrated part throughout our design process by ensuring that we implement security features.

Here are the discussions that emphasized privacy and security from the medical professionals:

· Karen said that any medical website offering a diagnoses and treatment plans must be very secure.
· Both Karen and Mike discussed how websites such as WebMD.com and familydoctor.org have "huge disclaimers" that the websites were for informational purposes only. Any website that offers a diagnosis and treatment plan falls under Health Insurance Portability and Accountability Act (HIPAA), a law signed by President Clinton that regulates the disclosure and use of health information.
· Karen and Mike mentioned a huge privacy breach that recently occurred in California when 20,000 patient records were publicly posted online.

Accuracy and Liability

With the exception of Sarah, all of our participants mentioned the possibility of misdiagnosis and liability in their interviews. The main concern was that a doctor or nurse would accidentally misdiagnose a patient's illness, which would lead to lawsuits.

The designers of the web application must carefully design a website where doctors and nurses are taking great care to accurately diagnosis a patient.

Here are the highlights of our discussions that involved accuracy and liability:

· Mike mentioned that it would be very easy for someone to mistake one illness for another. For example, angina can be confused with a first-time myocardial infarction (heart attack), because the symptoms are quite similar. However, both angina and myocardial infraction require urgent medical attention, so the patient should be referred to a hospital right away.
· Mike said that he worried some people he helped assume they have a serious illness, while others assume that their illness is not so serious when in fact it really is. Getting an accurate diagnosis from a doctor is very important; otherwise there will be multiple lawsuits.
· Both Mike and Karen agreed that pre-diagnosis steps (such as taking a temperature, et cetera) are extremely important to diagnosis. Karen said: “vitals are key” to an accurate diagnosis. They said that they probably would not trust a patient to take their own vitals, because taking your own blood pressure or even your own temperature is usually inaccurate, but the patient may be able to these vitals at a drug store or fire station if necessary.
· Mike and Karen stressed that e-medicine cannot replace a physical exam. Karen said that e-medicine is used in a lot of remote areas now, but is not completely trustworthy. She told us this story:
    o “There was a patient who had a huge red leg, that caused her no pain. She didn’t mention it, but I pulled up her leg. Thank goodness I did that, because if I hadn’t then I couldn’t have diagnosed a clot that had a 50% chance of going to her lung, and once there, a 30% chance of killing her.”

User Tasks:

During our contextual inquiry, we discovered that existing tasks included "bearing the pain" (Sarah) and going to the doctor and receiving an enormously expensive bill. Sarah described how she waited seven hours in a publicly funded hospital, only to see a doctor for 10 minutes and receiving a $700 bill. We also discovered while speaking to Karen that getting a physical exam is very, very important sometimes (for example, when her patient had a blood clot in her leg).

Through our contextual inquiry, we found that our current task for the uninsured, the poor, and non-English speaking immigrants is to go to simply bear their pain, go to a hospital or clinic, or consult online health references. For instance, a common approach for people at the first sign of illness is to look up their symptoms on WebMD, a free and widely accessible health information resource. Patients can select appropriate categories matching their symptoms, or enter search phrases. Based on their combination of symptoms, WebMD returns a filtered list of possible health conditions. However, this current task is lacking in many qualities that typifies a normal physical

exam: it does not know nor use the specific symptom characteristics of the patient, and lacks capabilities to provide a personalized treatment plan. In some cases, online resources like WebMD provide the patients no further accurate nor specific information for determining their illnesses than when they started.

Our web application does not directly replace informational websites such as WebMD or visiting a doctor, but enables them to seek care from a website, allowing them to receive a diagnosis and treatment plan from a medical professional. Instead of seeing a medical professional directly in-person, they have the ability to seek a preliminary diagnosis and receive medical advice online with which they are able to make a well-informed decision on whether or not their ailment requires a visit to a hospital or clinic.

For our web application, we propose three new tasks. Our new tasks are split into two categories: one for the volunteer medical professionals who select user profiles and offer medical advice and another category for the target users, who will create a new user profile that includes their basic information such as age, sex, and ethnicity, and provide a list of their current symptoms in order to receive medical advice.

Taking into account our primary target users, the tasks need to be simple and easy to understand. From our contextual inquiry results, not all of our users are going to be technology experts thus our new tasks simply provide the testers with their current scenario and a motivation for using the WebClinic application. The new tasks are the following:

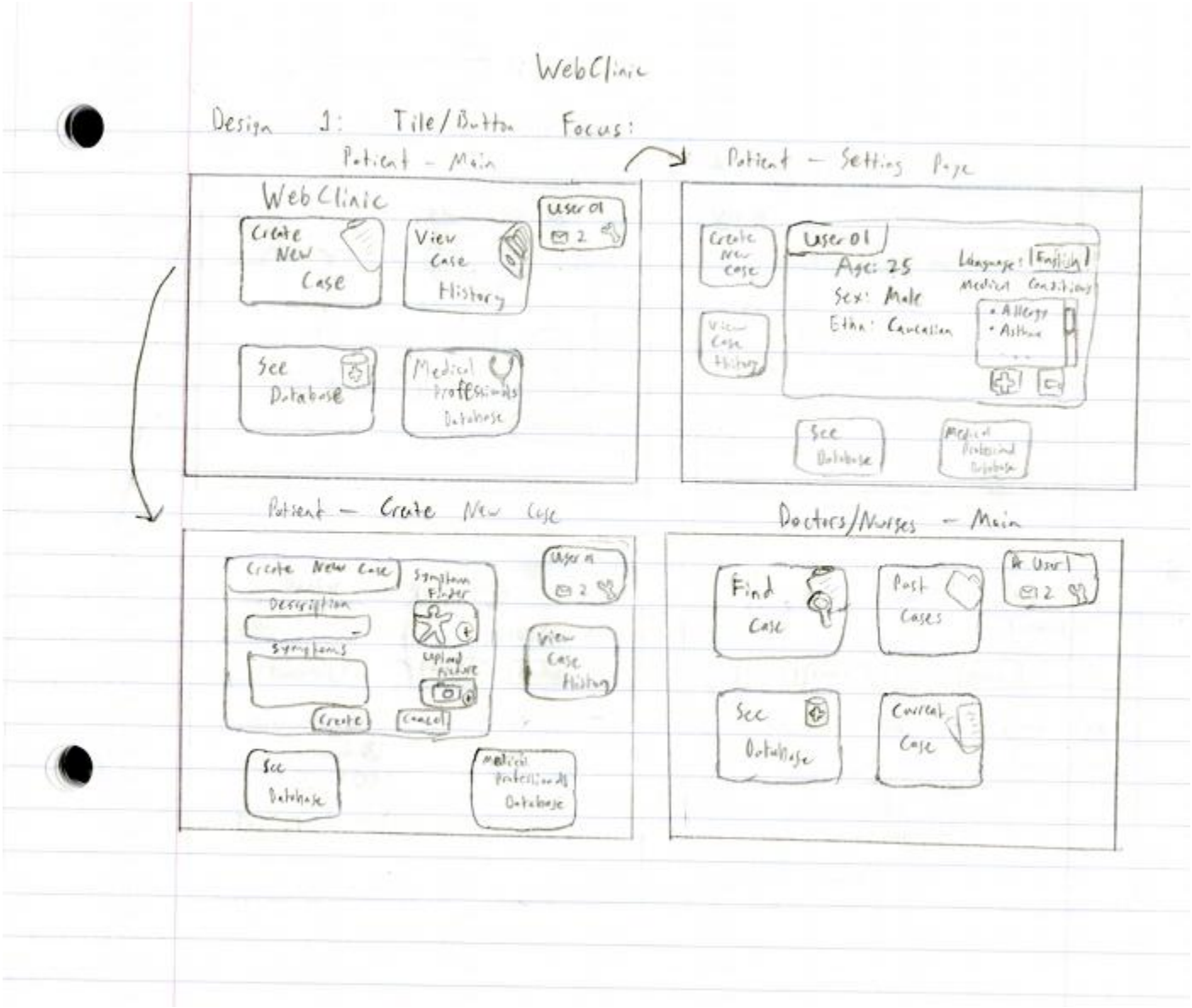
- **Easy (Patient):** You are an immigrant resident and do not speak much English. Your first language is Spanish and you would prefer to speak with a Spanish speaking medical professional. You have been suffering from a cough and a headache for a few days now and are worried for your health. You are reluctant to visit a doctor, despite having insurance because the condition doesn't seem severe enough. However, your symptoms are interfering with your ability to work and perform your daily activities. Use WebClinic to upload a case of your symptoms to better understand the severity of your symptoms.

- **Medium (Doctor):** You are a medical nurse specializing in cardiovascular health. You like to help people and decide to contribute extra time and your extensive medical knowledge to help the uninsured and non-English speaking population who seek online medical assistance. Use WebClinic to create a medical professional profile (submitting all necessary license credentials) and find a case that involves someone who is ill. Read their symptoms and try to diagnose their illness. Then, create a treatment plan for them.

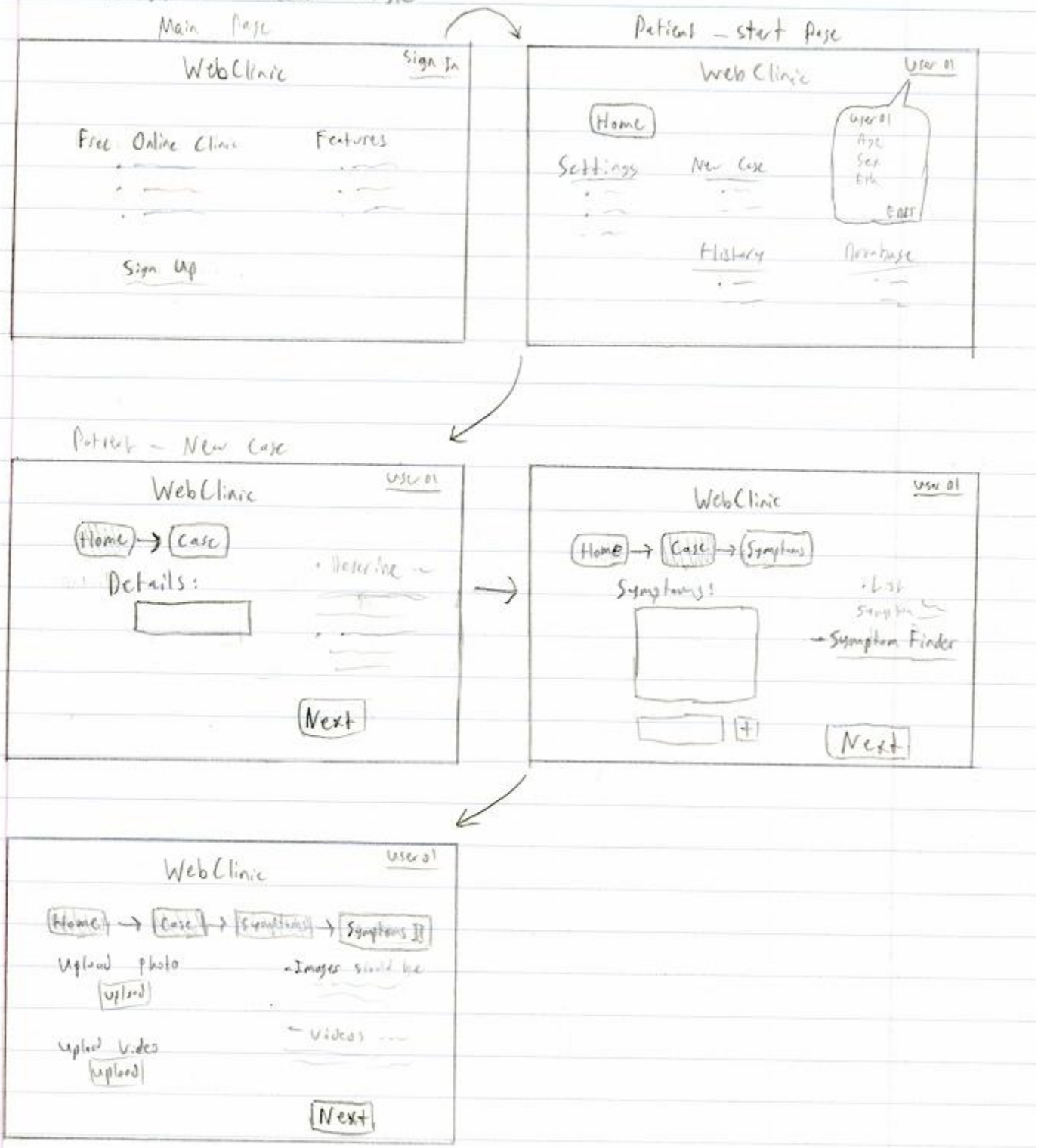
- **Hard (Patient):** You are a middle-class citizen of modest income. You were injured a few months ago on a rock climbing trip and sprained your ankle. Today,

you noticed that same foot is discolored, swelling, and in pain. You are unable to put any pressure on this foot and it is hampering your ability to move or do work. However, you have no health insurance and have no way to pay the medical bill, if you were to visit a doctor. You have already used WebClinic to receive advice for your sprain and have this case in your history. Use WebClinic to create a user profile, including a photo from your computer of your ailment along with the listed symptoms: discoloration (yellow), swelling, pain, inability to walk on it in order to confirm the need to visit a hospital. Also, you think your previous profile (sprained ankle) would be helpful additional information regarding with this current case.

Sketches:



Design 3: Flow - Style



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