

Elder Carennnection

Final Report - Getting the Right Design

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Problem Solution and Overview

Taking care of the elderly is a very difficult task. When in nursing homes or retirement homes, the elderly can be thought of as almost perpetual medical patients. However, the tools available to nurses in hospitals are not available to elder caretakers. Our product will cover this gap for the caretakers so they can focus on their main task, caring for the elderly. Communication is essential for caretakers, especially when the caretakers are dealing with multiple patients or even one patient who has a significant amount of information. Often over-looked is the mood and general well-being of the elder, our application focuses on these other factors to help provide a holistic picture of the elder for all of the caretakers involved in the care of the elder.

Contextual Inquiry Target, Stakeholders, Participants

Contextual Inquiry 1:

Youn (age 31) is a certified nursing assistant and an in-home caretaker of an elder. She has been a caretaker for just over 5 years, and chooses to work as a caretaker because of the fulfillment in honoring the elderly. She sees her patient seven days a week, for 20 hours.. Youn is attentive to her patient's physical, emotional and psychological needs, and asks how her patient is feeling and whether she is in any pain. She cares for her patient's health, comfort and mood. Youn uses a journal to jot down blood pressure and blood sugar readings. Unfortunately, although Youn has access to her patient's medical information, she does not have access to the medical records and doctors, and therefore cannot provide crucial information to doctors when needed or help refill prescriptions. Although she seems to want to mask stress or discomfort around her patient, she claims the most stressful part of her job is when my grandmother does not follow medical advice, eats poorly or doesn't take her medications. Youn was interviewed at the home of the elder, one of our teammate's grandmother.

Contextual Inquiry 2:

Hannah (age 21) is a certified nursing assistant and works as a volunteer at Evergreen Hospice. She has been volunteering for 11 months and volunteers 4 hours a week, the maximum for younger volunteers. The number of patients she sees during her shift is dependent on the number of fulls beds at the hospice and how much attention she thinks a patient needs. She spends her shift talking to elders, trying to brighten their days, and making sure they're comfortable. She reports pains and patient comments to certified nursing assistants on duty. Hannah also retrieves prescriptions for patients in the hospice when needed. She says that her day is always improved after volunteering because she loves talking to and caring for her patients. Hannah records her interactions with patients in a journal in the volunteer room to share updates about patients to other volunteers. This journal is also what she reads at the beginning of her shift to understand what to expect for the day, and who to pay more attention to. Like Youn, Hannah also cares for her patient's mood and comfort. She says that a bad mood is often the first source some type of discomfort, so she tries to immediately find out what's wrong. When she is stressed or overwhelmed she will take breaks by writing in the journal, and remind herself how great it is to connect with and help people. Hannah was interviewed at Suzzallo Cafe.

Contextual Inquiry 3:

Clariane is a certified nursing assistant and has been working at the University House Wallingford for 3 years. The University House is a senior living home where she works 5 days a week for 8 hours each day taking care of 20 residents, out of 40 residents. She sees the same 20 residents every day, which helps her and the residents get accustomed to each other. Her tasks include helping the residents when they wake up to get dressed, escort them to daily activities, help them use the bathroom/take showers, clean their laundry, give them medicine, check their vitals, and watch closely over residents that are on "alert". Residents on alert need to be given extra attention because they might be prone to spikes in blood pressure, unpredicted reactions to new medications, or falls. Clariane explains her busy days of taking care of 20 patients all the time. When something goes wrong, like an emergency cord is pulled, she has to drop everything she is doing for one patient, and run to make sure another one is OK. The nurses at the University House have a list of tasks they need to accomplish each day. In addition to that, they have a paper log they turn in each day. Clariane likes to write everything down, so she also writes little notes for herself, or writes notes to

leave on a head nurse's desk if she can't talk to her physically. She wishes that she was more efficient. Lately, CNA's have been understaffed, so when emergencies come up, she has to reschedule many tasks for other residents. When asked what she cares for most during her job, she replied, "I want to make sure that they are comfortable. That they are secure and knowing that I am there to help." Our interview with Clariane was conducted over the phone, after her 8 hour shift. We also received her consent to record the call.

Contextual Inquiry Results and Themes

Caretakers' direct attention to mood and comfort

When asking our three CI's, "what is most important to you during caregiving?", all responded with concerns toward mood and comfort. Despite any type of exhaustion, it was important to caretakers to put their patients first. This could be as little as asking a simple question like, "what can I get you?" or "tell me about your family". Our CI's mentioned how much happier elders would get by telling stories, talking about their accomplishments, getting a shower, or changing their current activity.

Conversation barriers between caretaker and elder

Hannah in our second CI noted that sometimes the elders would complain to her about pains or discomforts. When she notified certified nursing assistants, they were sometimes surprised and had no idea that any problems were going on. Often times patients might not let their caretakers know how they feel, especially if caretakers don't ask correctly, if they're not comfortable with the caretaker, language barriers or if the elder simply cannot speak due to sickness or old age. At the Evergreen Hospice, volunteers and nurses are unable to communicate with the patient in any language other than English due to concerns about information being mis-translated and liability issues. If a patient does not speak English then the volunteer or nurse must communicate through an official translator.

Limitations to doctor and prescription access

Prescription and medical access is very important for elders because taking the right medicine consistently or getting quick medical advice for current problems is crucial for maintaining their comfort levels and making sure they have well rounded care. We had different responses in each of our CI's as to how they handled doctors and prescriptions. Our first CI had trouble refilling prescriptions for her patient because she wasn't allowed to pick them up. She had to coordinate with family members on when to refill prescriptions. Our second CI was allowed to go to the pharmacy even though she was a volunteer. She simply had to sign responsibility for certain drugs and bring it back to the hospice. Finally, our third CI dealt little with prescriptions because it was the nurses' jobs to contact doctors and pharmacies. She did comment that sometimes doctors did not answer phone calls in timely manners, delaying her patients' access to necessary medications.

Journaling/sharing information with other caretakers

Keeping track of information about patients was a common practice found in both CI's. In the first, the journal was used as a personal memory tool to keep track of blood pressure readings throughout the day. In the second, the journal was used as a reflection and communication tool between volunteers. The volunteers use a journal log to note information of the moods and comfort level of the patients, as well as communicating miscellaneous tasks such as restocking the kitchen.

Caretaker stamina

Our CI's showed that caretakers are very concerned about their patients' well-beings. We asked them what stressed them out most and how they overcame exhaustion. We had a mixture of responses that directed attention back to their patient. Our first CI was concerned about her patient's stress and discomfort and was most stressed when she didn't take her medications/follow medical advice. She was also very empathetic and concerned when her patient reported pain. Our second CI thoroughly enjoyed being in the company of her patients. She said that it always brightened her day and wanted to spend quality time with each of them so doesn't take many breaks. Our third CI said that she gets stressed when she runs out of time with her patients, and overcomes exhaustion with a lot of coffee. She rarely gets any down time, except during lunch breaks.

Answers to Task Analysis Questions

Who is going to use the design?

Our users are caretakers of elders. These can be people of any age, usually between 20-60, and can be in-house caretakers, or caretakers who work at facilities like hospitals, care homes, and hospices. . The relationship between caretaker and elder can also be familial. Our primary stakeholders are caretakers who do various tasks daily to ensure comfortable living and health to their elderly patients. Other stakeholders might include nurses, family members, doctors, and even the patients themselves.

What tasks do they now perform?

Many of the tasks that caretakers perform are related to information retrieval and dispersal, and physical well-being. During a patient visit, a caretaker will ask about eating habits, mood, medication patterns, and comfort level. These questions are asked and recorded throughout the duration of their visit. They will also help provide care such as bathing, changing clothes, and toileting. In addition, the caretakers must be aware of the status of their patients prescriptions. Information from the visit is always recorded, officially or for personal reference, in some type of log or journal.

What tasks are desired?

The caretakers in the CI's we conducted didn't have general tasks they felt they really needed. Their goal is an overall smooth day, where they can give each of their patients enough attention, fulfill patient's needs, and avoid accidents. When asked what tasks the caretakers would want to take, they focused most on streamlining medical information tracking and communication. They wanted to be able to access and retrieve prescriptions and medications in a timely manner. We think that these goals can be received with better communication between caretakers and elders.

How are the tasks learned?

These tasks are learned through multiple means, both official trainings, online resources and through learning by doing. Caretakers who work in a nursing home, hospice center or through an in-home caretaking organization may have orientations and trainings that volunteers attend where they learn about record keeping that is specific to the organization. Also, there is a plethora of online resources that can teach these tools, and networks of caretakers that share their experiences for others to learn from.

Where are the tasks performed?

These tasks are often performed in a variety of spaces that are mostly contained within the home of the patient or within an elder's room in the hospice or nursing home. Many tasks are performed at the bedside of the elder, in the hallway outside their room or in a nursing station near by or a neighboring room, for example calling a doctor, inputting information, and physically sharing information with other nurses. The only task done outside of the home or room is refilling prescriptions, which can be done at a neighboring pharmacy or hospital.

What is the relationship between the person and data?

Since the caretakers are collecting data about the elders the data is always evolving and being collected. The data is not always in one place, especially if the caretakers record some data on a computer and others on paper. Although it is always an elder's caretaker collecting and analyzing the data, it is extremely important that the caretakers collect the data in a secure method. Some caretakers can have multiple patients they are caring for, therefore they can have multiple sets of data. Often it is also highly possible for different caretakers to be collecting data for the same patient, so data needs to be shared and updated in a timely manner.

What other tools does the person have?

The caretakers are constantly working on their feet, so the tools that they have are minimal and cannot detract from their main job of taking care of the elder patient. Information is often taken down on a notepad or computer when available. Caretakers can also take notes on a mobile device when times are busy in which case they may transfer these notes onto paper or a more secure format later.

How do people communicate with each other?

Within the caretaking profession, communication occurs between caretakers, volunteers, family members and patients. This communication can take many forms including SMS, email, written and verbal. One thing we found particularly interesting was that many important observations and key medical information was recorded on paper, which limits the accessibility of info to other people and increases risk of losing information. Many of our CI's mentioned spreading a lot of information verbally and through small notes left of tables.

How often are the tasks performed?

These tasks are performed daily and often multiple times throughout the day. The tasks that occur multiple times per day are those that relate to recording information about the patients: recording their eating habits, their medication patterns, their mood and comfort levels. Although the frequency of tasks differs based on setting and situation, tasks that may occur less frequently are refilling medications and household chores.

What are the time constraints on the tasks?

Since caretakers are working with elders in a medical relationship, it is important that data documentation is immediate as it is easy to forget numbers or forget to input important information. Another time constraint is that the caretakers' hours are flexible but they are limited to the times when the patient is awake for recording information or helping them. However, there are times when caretakers are working even if the patient is not conscious, such as in nursing homes or hospice centers.

What happens when things go wrong?

When an elder is in pain, moody or nearing their time of death, caretakers can only try their best to make them as comfortable as possible or try to cheer them up and take their mind off of bad situations. They can also ask for more or different types of medication to alleviate symptoms. When a caretaker knows little about a patient's situation, the best they can do is consult family members and other medical personnel that are easily in their reach. They have to try their best to understand and respond to situations with the little information they have.

Tasks

Task 1: Caretakers Track Mood, Comfort Levels & Well-Being of Elder

A common theme that emerged from our CI's is the importance of understanding and tracking an elder's mood, comfort levels, and overall emotional well-being. As the elder's mood changes, so do their needs. These mood changes can be tied to anything from sleep issues to medical complications. Additionally, certain moods may be red flags for bigger issues patients may be struggling with. The ability to track not only a patient's current mood but their mood over time helps caretakers understand their patient's mental state to perhaps uplift them and communicate most effectively, but also help them identify patterns that may indicate other connected issues in their patients.

Task 2: Caretakers Track Vital Signs and Effects of New Medications

A task that all caretakers provide is the tracking of vital signs and basic monitoring of health, especially when new medication is introduced. Although blood pressure, pulse, respiration, and temperature are all measured and recorded with high-tech sensors, most of the medical information that caretakers retrieve comes from asking questions of the elders that are being taken care of. This mostly includes daily questioning about how they are feeling, if anything hurts, if they are feeling more or less awake, etc. Answers to these questions, along with the occasional medical data is passed along to a registered nurse who will talk to the patient if she thinks anything is urgent.

Task 3: Identifying and Improving Caretaker-Elder Communication Barriers

Working with elders on a daily basis allows the caretakers to connect with the elder. Communication between the caregiver and the elder can sometimes be inhibited by a multitude of factors. For example, in some situations there is a language barrier between the caretaker and the patient, they have to either figure out another way to

communication or use a person who can translate their conversation. Also, there are the patients who are unable to communicate at all or clearly due to a stroke or dementia. In addition to the literal language communication issues there are the situations in which a caretaker is not able to get a clear and direct answer from the elder (perhaps due to the wrong questions being asked or the elder not wanting to confide in the caretaker).

Task 4: Restrictions with Administering Medications and Refilling Prescriptions

Since medical information is private, and caretakers aren't always familiar with elder patients and their families, prescriptions and medications are hard to access. In hospices/hospitals, volunteers are allowed to pick up prescriptions from pharmacies, but must sign forms to confirm that they understand their responsibilities of picking up and delivering the (often dangerous) medications. However, certified nursing assistants are the only ones who can actually administer medications to the patients. On the other hand, caregivers of in-home care patients are challenged to make sure they're providing the right medications to their patients, and filling medications when they run out. It is hard to fill medications without being a family member of the patient, although some pharmacies allow caretakers to pick up prescription if they know the name, birthdate, and address of a patient.

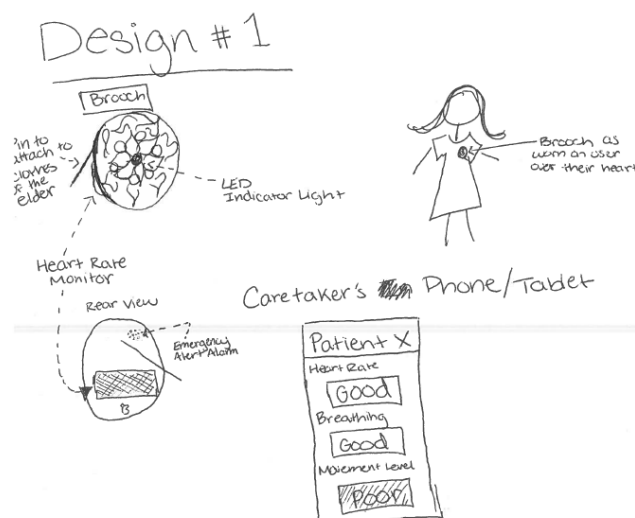
Task 5: Recording Elders' Stories and Accomplishments

Often elders feel a sense of isolation and loneliness and as such, caretakers who spend a lot of time with them are people they feel close to. Caretakers have expressed in all our CI's that developing a relationship with and really knowing their patients as people is important to them. They've all talked about strongly caring for and respecting their patients, especially when they're nearing the end of their lives. Thus, a task they currently perform is documenting conversations by remembering or journaling, patient's stories, anecdotes and accomplishments.

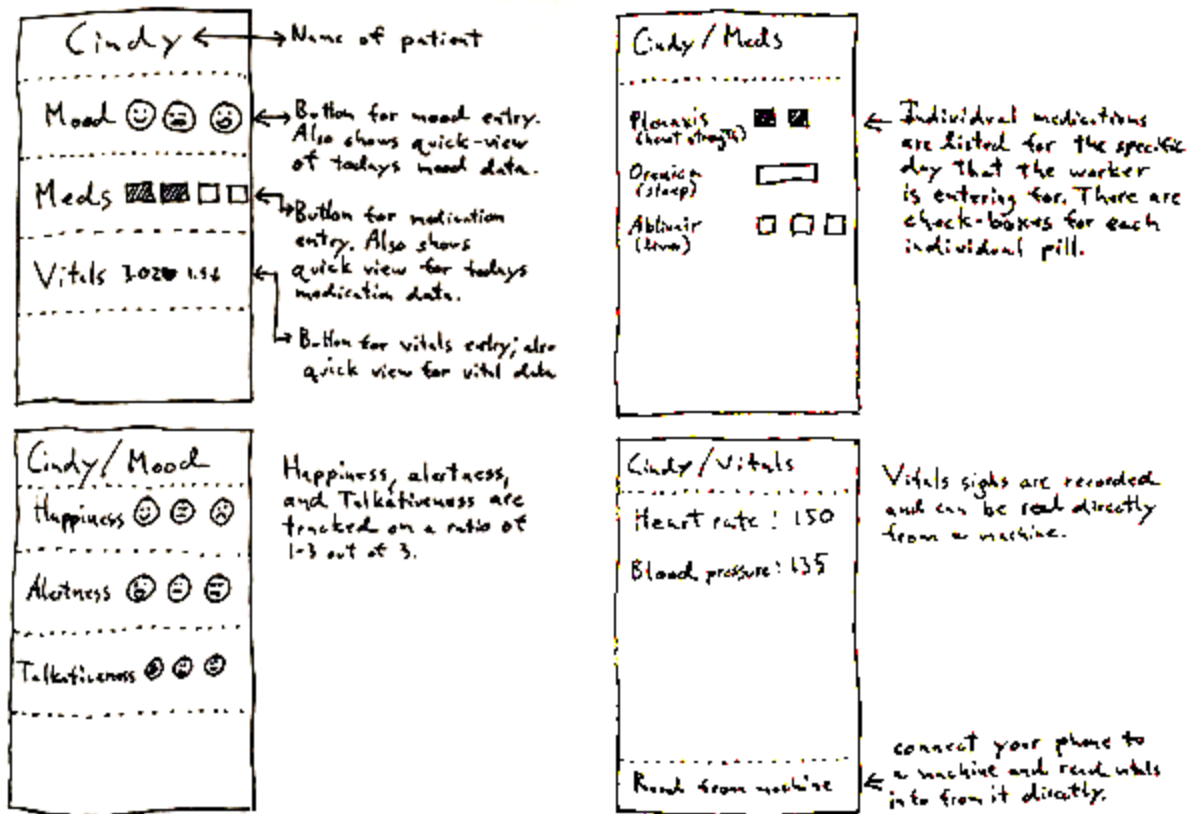
Task 6: Communicating with Other Caretakers

Caretakers are constantly keeping notes, logs, and journals about their patients. These journals and logs are currently only shared with those who care to read them. It would be helpful for caretakers to have easy access to these notes and make it a priority to at least skim them before helping out a patient. Other volunteers and certified nursing assistants of multiple patients need to communicate with nurses above them, or other CNA's that interact with the same patients later in the day. So journals and logs are the only ways of keeping track of this information, especially when people don't have time before and after shifts to exchange verbal information about patients.

Proposed Design Sketches



This **first design** is a smart brooch that the patient pins on their clothes over their heart and the brooch monitors heart rate, breathing patterns and also movement level of the patient. The brooch monitors this information, sends the information to a simple program on the caretaker's phone or tablet and pushes any alerts if there is one. The main tasks this design accomplishes is helping the caretakers monitor some of the vital signs of an elder including heart rate and breathing patterns. Another task this design helps to accomplish is monitoring the comfort level and mood of the patient.



The **second design** is an application that tracks general information about the patients health and wellbeing. There are three main focuses in the app: mood recording, medication tracking, and vital information gathering and storing. As a caregiver is going through her day spending time with elders, she is recording information as she collects it. By the end of her time with the elder, most of the information should be recorded. This information is then shared with the rest of the staff and can be analyzed for patterns or anomalies.

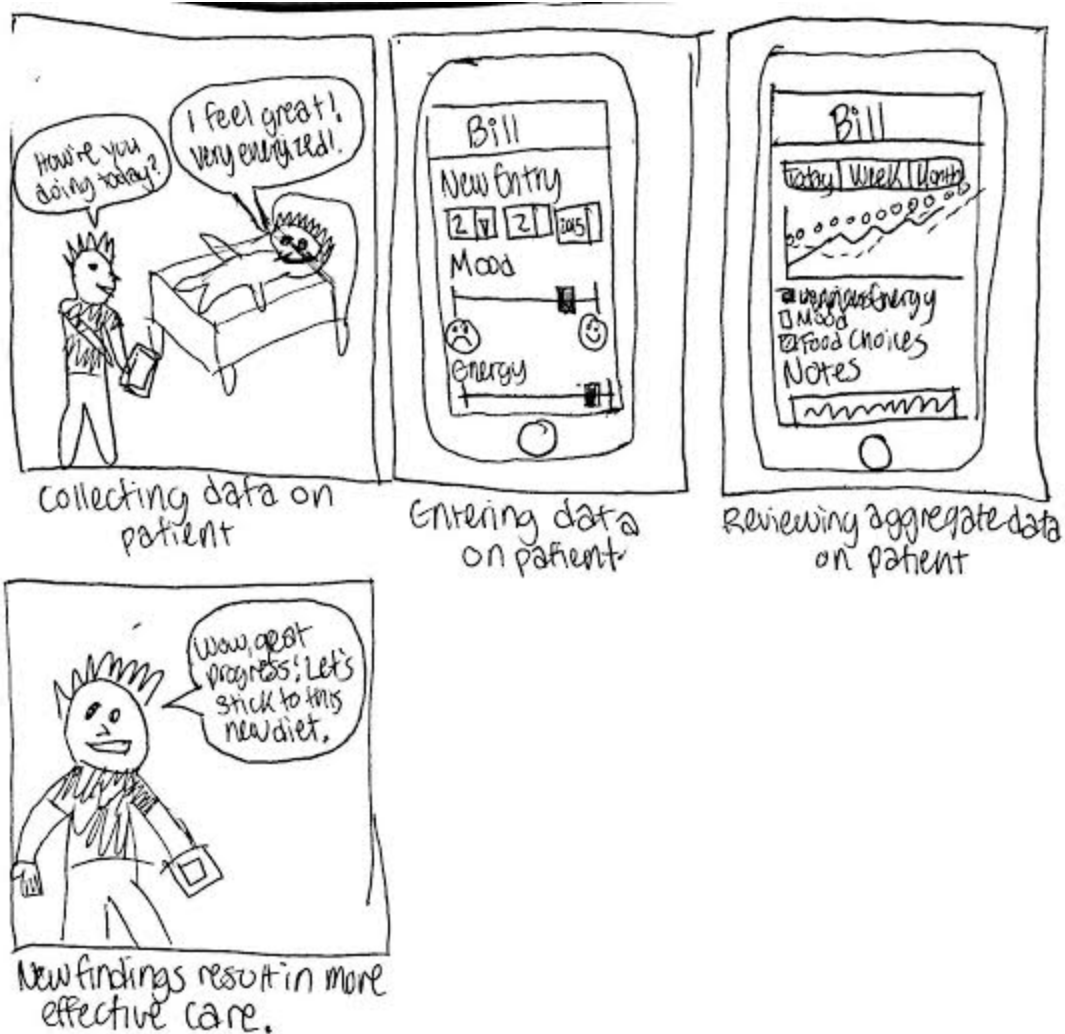


The **third design** tackles the challenges of communication with elders in order to address issues of communicating patient needs, mood, symptoms and more with caretakers and family members. The idea is that while language barriers, strokes and other factors related to age may create difficulty in oral communication, it is much easier to select a button with an image that has a universal meaning to communicate what the patient (or caretaker) means to say.

Selected Design

Our selected design is Design 2 because we want to narrow our focus to the two tasks, Task 1: Tracking the Mood, Comfort Levels & Well-Being of Elders, and Task 6: Communicating with Other Caretakers. We feel these are tasks that have fewer currently existing technologies and do not seem to have overarching medical restraints. Our design will hopefully be able to provide new insight and processes to current caretaker practices other than providing and taking medical information. Since we were so surprised with similar answers regarding empathy, mood, and comfort from the caretakers we interviewed in our CI's, we want to focus our attention on this idea. Design 2 was most favored because it streamlined tasks caretakers in our CI's currently perform. We included typical medical measurements such as medications and vitals, but our main focus of this design is patients' overall well-beings. We take into consideration happiness, alertness, and talkativeness, because we learned that these moods increase when the elder is more comfortable. The app will also analyze mood information to help caretakers better understand when certain moods might occur so they know how to treat and prevent them. These were also things that caretakers talked about to each other to notify or warn caretakers who might need more attention. This design helps caretakers immediately share this information with other caretakers, because we were informed that many times caretakers don't always review logs before their shifts, as it takes away time from actually doing their work. We understand the importance of reviewing logs and creating them for others as to better elder well-being.

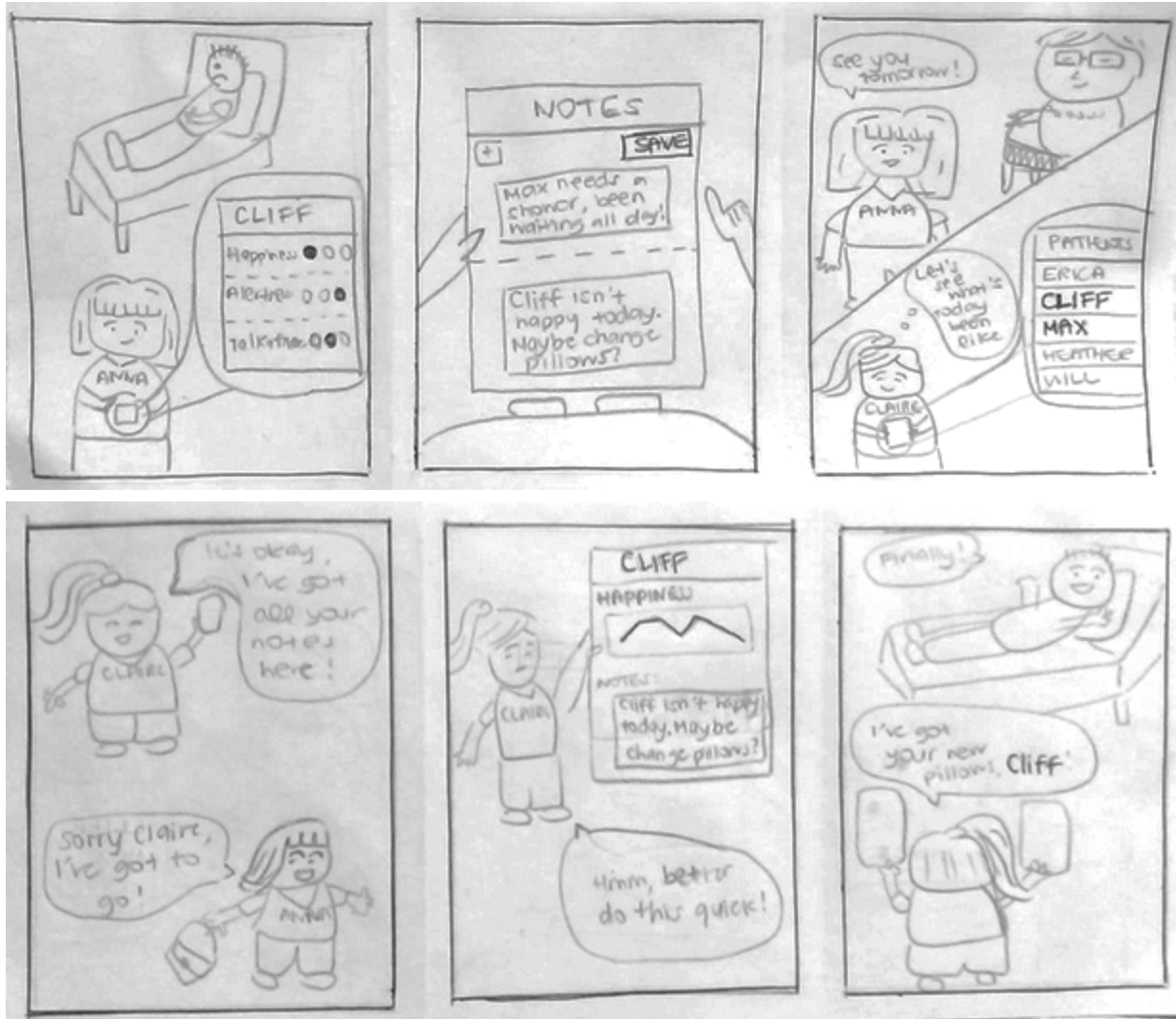
Storyboards and Scenarios



Storyboard for Task 1: Tracking the Mood, Comfort Levels & Well-Being of Elders

With so many patients to attend to, Dan struggles to keep the facts on his patients straight. Tracking and understanding these trends over time is crucial in understanding the interrelatedness of the variety of factors contributing to an elder's overall health. In order to tie specific data to specific patients and allow Dan to see patient vital signs, symptoms, mood and comfort over time to detect correlations, he regularly enters data on patient mood, vitals, comfort, habits and more, at least daily. As a result, despite juggling so many patients, he knows that Midge in Room 14 has been showing increased moodiness since starting a new pain medication 4 days ago while Bill in Room 7 has been in higher spirits since changing his diet two weeks ago, as displayed on a trends/summary screen which conveys where correlations exist.

Storyboard Task 6: Communicating with Other Caretakers



Anna is a busy certified nursing assistant and has spent the past 7 hours checking up on 15 different patients. Many of her notes on each patient has been forgotten and mixed up in her head. To prevent mishaps she inputs happiness, alertness, and talkativeness information after each patient visit into Elder Carennection. She also puts special notes about each patient so that Isabelle, the caretaker after her can see it. After her shift, Anna is in a hurry to pick up her kids and runs out of time to tell Claire all of the things that she should watch out for. Good thing Claire has already quickly updated herself with this information after she clocked in - Cliff is getting upset because he needs new pillows and Max has been waiting for his bath. She quickly runs through the previous moods of her patients on Elder Carennection to see if there is any new information she should know since she had last checked, and takes care of those that need immediate attending.