Client Needs: Deliverable B

Health

1. Detect respiratory rate when less than 10 breaths/minute
2. Detect if less than 90% oxygen levels.

Software / Hardware

3. Detect location
4. Call authorities immediately
5. Deliver naloxone within 3 minutes

Cost

6. Cheap (around $100)

Battle Stigma

7. Discrete for the user, lightweight
8. Cannot stigmatize user
9. Mainly for the working class
10. Mainly for men ages 20-30s.
11. Durable, not delicate
12. Comfortable, simple

Translated Needs:

1. Use oximeter to detect oxygen levels
2. Detect location and call authorities
3. Dispatch needle once oxygen levels reach 90%
4. Material dependent device
5. Is on a part of the body that can detect pulse
8. Silicon, spandex, cotton material
10. Blue, black, grey: basic colours

Respiratory detectors

The main reasons as to why someone may be using opioids, is as a form of coping with pain or stress. This is because opioids act as a form of pain relief and sedation, giving the person using them a feeling of euphoria. Slowing down the person's breathing rate is one of the functions that opioids do, although this is the main reason someone can go into an overdose. What happens is that their breathing rate slows so much to where the oxygen level in their blood becomes dangerously low and the user can go into cardiac arrest. Respiratory detectors are a very important aspect of our design and it's the principle feature that will help identify when someone might be having an overdose. This device will work similar to many of the current heart/breathing rate monitors that are already being used daily (such as fitbits, fitness apps on smartphones, etc). This device will monitor how fast or slow the user is breathing, as well as the oxygen percentage level in their blood. When these two factors get too low to the point where the patient will have a cardiac arrest, it will send a signal to another part of the device so that the naloxone can be administered.

GPS Alert

The device's main role is to call for help in the situation of an overdose because the victim can not help themselves. The plan is to create a GPS alert which will send the exact location of the distressee to emergency respondents. This will happen automatically as soon as the device detects that the oxygen level of the user is below 90%. The device is to work like the WhatsApp share function or a search on google maps. Instead of an approximate location, it could give exact coordinates to help respondents know exactly where to look in case they aren't easily visible. An added characteristic that is still under discussion is an alarm system that will function simultaneously with the GPS alert. The purpose is that if the user is at a construction site there may not be a map of the building. In such circumstances, the alarm will either call over other workers in the vicinity or help the respondents find the victim easily.

Naloxone Injection

Naloxone is a drug that is commonly administered to nullify the effects of opioids. The drug is extremely potent and side effects of the drug are almost nonexistent, as such, it is perfectly suited to be used to prevent an overdose. Preventing the immediate effects caused by an overdose with Naloxone is important as it can greatly increase the amount of time an individual has before treatment is required. This will be beneficial as EMS services will usually require over three minutes to reach an overdosing individual. At the same time, by administering the drug immediately, the severity of long term effects from an overdose, such as permanent brain, is also greatly reduced. Our device will be designed to immediately administer a specific dosage of Naloxone to an individual when the device detects symptoms of an overdose (Client Needs 1,2). The Naloxone will be held within a small capsule in the main device, the capsule will contain a small needle that will be used to inject Naloxone into an overdosing individual. Due to the potency of the drug, the capsule will be light and can be easily exchanged for a new one when used.

Inexpensive

Cost is a very important criterion to consider a drug overdose detector. Most opioid users cannot afford a very expensive device, even if it was the greatest device on the market. Many of these users would rather keep their money for necessities and for drugs. It is important to know how much a user is willing to spend on a device like this. In addition, nearly 47% of opioid users are unemployed. Therefore, the device must have a low cost. Our objective is to keep the price under $100 so that it is affordable for most opioid users. With recent technological advances, the price for many components used to make these devices go down, allowing for our goal to be achievable.

Fashionable/Discrete

The device must be discreet so that the user can have it on most of the time without worry of people noticing what he does. Many users use their device on the job and do not want others to notice their addictions. This is important so that the user avoids stigma. The workers around the user may judge him/her if they notice what the device does. Therefore, discreetness is very important in avoiding stigma and in keeping the user more comfortable in the workplace. It is also important for the device to have some aesthetics to it in order to help keep it more discreet. Furthermore, most users would rather purchase a nice looking device than a device with an unpleasant look.

Audience

This device targets users who are between the ages of 20-30 in the working class, specifically men. The stereotypical users of opioids are homeless, and it's common to see them in centers seeking help, or getting treatment. For the working class, taking opioids is done more discreetly as there can be judgment from colleagues. Sometimes opioid addiction can be stemmed from prescription for injuries within the construction field. The men who work in the construction field who want to continue using opioids may want a device that can alert authorities once an overdose occurs. These people do not have a community that they can use with, so this device will be helpful as they will be by themselves and unable to seek help. This device will also be discrete so the client will not have to disclose what it's purpose is with their colleagues. It will be comfortable, lightweight and simple so it can also be worn during work hours and doesn't need to be taken off.

Problem Statement

Our client needs a discrete, affordable/inexpensive device that monitors a person's oxygen level to detect an opioid overdose. It then alerts authorities and administers naloxone within three minutes.