**LifeKit: Rapid Response Predictive Technology to Locate Naloxone Carriers**

LifeKit is a rapid response predictive technology to locate naloxone carriers via an integrated innovative platform using both smartphone device and predictive technology. As a solution to opioid overdose epidemic, LifeKit can potentially predict, monitor, notify, and locate naloxone carriers rapidly. LifeKit has four unique distinguishing qualities: 1. Rapid location of the closest naloxone carrier or pharmacy inventory of naloxone 2. Predict individuals at high risk of an opioid overdose using evidence based risk assessment tools 3. Monitor opioid users for a potential overdose via smartphone technology combined with an accelerometer and algorithm prediction 4. Notify opioid user’s emergency contacts of an ongoing or potential opioid overdose.

**Our Team**

Our team is uniquely fitted to solve this problem because we are working closely with Dr. Anita Gupta, international expert anesthesiologist, pharmacist, and pain medicine physician at Drexel University in Philadelphia, PA. Dr. Gupta has created an experienced team of scientist and engineer collaborators at Drexel University Department of Computer Science and Biomedical Engineering that have a broad range of expertise in innovative technology development, software, and medical device marketing and development.

* Anita Gupta - Conceptualization Expert, Founder, Medical Expert
* Khoi Tran - Code Lead, Device Integration Manager
* Jake Smith – Team & Workflow Manager and Requirements Engineer
* Kathy Lu - User Experience Manager & Code Developer
* Anh Le - Graphic Design Developer, Brand Manager & Predictive Algorithm Developer
* Jae Hoon Kim - Algorithms Manager & Code Developer
* Justice Ogbonna – GitHub, Video, and Code Developer

**Innovation**

LifeKit has the potential to improve the quality of life of an opioid user, and connect users to naloxone carriers and effectively predict the likelihood of an opioid overdose. LifeKit offers innovative technology that employs an integrated algorithmic predictive monitoring system that can connect with smartphone technology coupled with an accelerometer that can accurately detect a change in an opioid user’s condition rapidly. Through this integrated innovative predictive mobile application platform, a potential opioid overdose could be detected rapidly, location of a naloxone carrier can be found immediately using the geo-location features and then the naloxone carrier can get to the user in time to prevent an opioid death. In addition, the predictive component of LifeKit utilizes evidence based risk assessment tools in combination with a self-reporting component which via an algorithmic approach to predict the likelihood of high risk opioid behaviors which can in turn lead to a potential opioid overdose. Such early prediction can further increase the opioid user’s chance of survival in the event of an opioid overdose crisis. In addition, Lifekit offers additional features that include a naloxone carrier locator which displays the locations of the nearest naloxone carrier and the nearest stocked pharmacies on a visual geographical map relative to the user’s location.

**Usability**

We have tested our mobile application on users in various simulated situations including a opioid emergency. Opioid users have indicated that LifeKit offers a ‘simple solution’ to end the opioid crisis. The input we received helped us create a user-friendly interface that is simple and understandable for a broad population of individuals. We also have the capability to design our platform in other languages to appeal to non-English speaking individuals. In addition, Our LifeKit run continuously in the background therefore allowing for 24 hour prevention of an opioid overdose. Smartphone integration have the capability to monitor vitals signs and with this information in addition to accelerometric changes in opioid users (such as fall) can accurately predict a potential opioid overdose. LifeKit will send notifications to selected emergency contacts such as loved ones, caretakers, family, physicians to allow for additional rescue measures (such as 911) to be initiated in parallel to LifeKit’s functions. LifeKit does this by sending SMS or text notifications to these select emergency contacts in a potential emergency or ongoing crisis. Moreover, since LifeKit will be always running in the background, any variations in vital signs or accelerometric changes will trigger a blinking flashlight and vibration alert on the opioid user’s smartphones to allow for bystanders to assist.

**Functionality**

When the patient is detected via LifeKit to have an overdose the phone will alarm vigourously with a blinking flashlight and vibration and audible alarm. In addition, LifeKit has a constant monitoring component that evaluates the user’s vital signs and accelerometric changes to analyze and predict a potential overdose. Once any change has been detected, LifeKit uses the flashlight, vibrations and sound to draw the bystanders in to help. Once the phone has been located, the procedure on how to treat the patient is displayed prominently as well as a map of the closest pharmacy and most importantly, LifeKit also has the ability to hail on-duty naloxone carriers to help. In addition, LifeKit includes an emergency contact component that allows opioid users to specify persons or relatives that should be contacted in the event of a potential or ongoing crisis.

**Adaptability**

Our solution is adaptable to all environments as it is entirely adaptable to various users, environments, rural, urban and communities. It also can be adaptable to a hospital environment for various conditions that require immediate administration of medical services such as cardiac or respiratory arrest. Lifekit allows individuals in multiple environments to obtain access to the medical providers rapidly.

**LifeKit for Opioid Users**

LifeKit is the first innovative integrated mobile application aimed at helping solve the opioid overdose epidemic. The goal of this application is help opioid users overcome deadly overdoses by monitoring vital signs through smartphone technology. LifeKit aims to detect overdoses before fatal incidents happen and save lives by sending alerts to nearby emergency responders, naloxone carriers, family, friends, and caretakers. To use the application, an opioid user can simply download and register within the application as an opioid user. After registration is complete, a short tutorial and calibration with their smartphone device will be required. Then you are all set to go. Simply the opioid user would need to keep the application running in the background and have their smartphone on during opioid use.

**LifeKit for Naloxone Carriers**

LifeKit is a simple, yet life changing application that could help good samaritans become heroes. By carrying naloxone and using this application, users will be alerted of nearby potentially fatal overdose incidents. Carriers will, then, be able to respond rapidly and save opioid overdose victims by delivering naloxone to the site of the emergency and effectively reversing the effects of the opioid overdose almost immediately. To use the application, the naloxone carrier would simply download and register within the application as a naloxone carrier. After registration is complete, the naloxone carrier would have to complete a short video based training tutorial. Then the naloxone carrier is all set to go and save lives. The naloxone carrier would simply have to remember to carry naloxone with them, and have the application running in the background when they are actively able to assist in an emergency. With LifeKit, we plan to get more naloxone in the hands of ordinary people so that they can be ready to assist effectively and rapidly.

**LifeKit Technical and Platform Specifications**

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| **Product Name** | LifeKit | |
| **Product Type** | Mobile Application | |
| **Compatibility** | Mobile smartphones devices using iOS and/or Android and Bluetooth and/or WiFi enabled devices | |
| **Content Format and Device Requirements** | SMS/Text, Audio, Video, Flashlight, Vibration, Accelerometer, and Future Vital Sign Integration with Medical Devices | |
| **Features** | 1. Rapid location of naloxone carriers and stocked pharmacies in immediate area 2. Predict high risk of opioid use and potential of opioid overdose via evidence based algorithms and self-reporting data 3. Educate on safe opioid and naloxone use and how to detect opioid overdose 4. Monitor via accelerometer, user vitals, and self-reporting data which activates overdose mode | |
| **Emergency/Overdose Mode** | 1. User can manually activate overdose mode or automatically activated when a fall is detected (Accessible only to patient) 2. SMS or text messages sent to all emergency contacts and naloxone carriers within immediate area 3. Vibrate and audible alarm on opioid users phone to alert individuals of ongoing crisis and automatically displays map of closest pharmacy stocked with naloxone for bystanders | |
| **Application User Types** | *Opioid User* | * Signs up for mobile application * Monitoring capability * Ability to add, view and create notification settings for emergency contacts |
|  | *Naloxone Carrier* | * Signs up for mobile application as naloxone carrier * Completes short training on naloxone use * Can turn active carrier function on or off depending on availability * Receives notification via either mobile application and/or SMS or text notification depending on setting selection |
|  | *Family/Friends* | * Alerted when opioid user in potential or ongoing overdose via SMS or text messaging alerts * No official sign up needed |