# A description of you and your team, including your backgrounds and expertise

Our 3-member team, Pharmadote (formerly Harking Narcans), represents collaboration of pharmacy, public health, and health IT in addressing the opioid epidemic. Collectively, we have experience in translating knowledge of patient-centered practice to mobile application platforms.

**Kamilah Rashid, PharmD** (Doctor of Pharmacy), is a FDA Regulatory and Health Policy Strategy Senior Associate at Avalere Health LLC. She applies her background in chemistry, biomedical research, and pharmacy to provide key expertise to help clients make informed decisions. Dr. Rashid has pharmacy experience in retail, clinical, and pharmaceutical industry settings, counseling patients and providing drug information to medical providers to guide therapeutic choices. Additionally, she has research experience that includes assessing the barriers and benefits of developing regulatory affairs mobile applications for patients, healthcare providers and industry leaders. Based on her findings, she designed the Regulatory Affairs Mobile Application (US & Global Industries) prototype mobile application and was nominated by the Atlanta Mobile Marketing Organization at the Annual Atlanta Mobile Awards. Dr. Rashid received her PharmD from Mercer University College of Pharmacy, a BS in Chemistry from Spelman College and an AA from Bard College.

**Michelle Vu** is a PharmD/MPH dual-degree student (Master of Public Health) at Mercer University College of Pharmacy and Health Sciences. As a pharmacy intern, she has assisted in creating a Veteran’s Affairs (VA) Opioid Dependence Academic Detailing guidebook and facilitating live training events for VA pharmacists in identifying and treating opioid users. Her team of student pharmacists created the Know Your Numbers Health App, a free, community-based app promoting screening for blood pressure, glucose, and cholesterol values to improve chronic disease management. This health app won the 2016 Student National Pharmaceutical Association (SNPhA) Prescription for Service Competition award.

**Viet Dang, BS** (Bachelors of Science in Computer Science), is an Android Application developer. He coded the Know Your Numbers health app.

# A description of your app concept, including the audience your app is designed to target

The inarCAN mobile app uses applies a social network, called NarNet, to an emergency response framework to allow opioid users to select their first responder network. Opioid addiction is a social taboo, with legal consequences from reporting an overdose (without Good Samaritan Laws).1 By having an established connection (family, friend, or fellow addict) as a preferred responder, opioid users would feel more comfortable registering for the app and more secure in their privacy.2 To accomplish this, within our inarCAN app, we created a NarNet: an opioid user’s social network of naloxone carriers and overdose responders. The advantages of the social network overlay in addition to crowdsourcing are to increase the likelihood of a response by reducing the bystander effect. This design also complements public health “community-based” naloxone distribution programs. For example, users can grow their NarNet through meeting healthcare personnel and other users at needle exchanges and naloxone kit distribution programs.3 We believe the social networking basis of inarCAN is an innovative approach to maximizing effective naloxone sharing.

The target population of inarCAN consists of three user groups: opioid users, first-responders without naloxone, and naloxone carriers. These users would own either a smartphone and/or smart watch to utilize the app. As seen by the step-by-step video walkthrough, the app’s simple design aims to be easily navigable for emergency situation or cognitively impaired responders. Given inarCAN’s social network design, users with experience using social media applications (e.g. Facebook, Snapchat) would adapt quickly to our app’s user interface.

The inarCAN app has three purposes: 1) allow opioid users to set-up a personal naloxone network (NarNet) consisting of individual and organizational naloxone carriers, 2) allow first responders to alert an overdose and activate the overdoser’s NarNet, and 3) allow naloxone carriers to register and respond to emergency signals via the universal NarNet.

Users register under an inarCAN username, which allows an option for anonymity and privacy. To create a personal NarNet, opioid users can register and import their close naloxone carrier contacts directly from their phone or contact directory. The app will send an invitation to use inarCAN to these contacts, who may choose to accept the request and register. Opioid users may also invite non-naloxone carriers. In an overdose emergency, these non-carriers may serve as first responders, by alerting emergency help and providing basic life support. Opioid users also set a preferred radius for response or accept a pre-determined radius of response, based on general naloxone-carrier availability and on the spread of the opioid user’s selected personal NarNet responders. This feature allows for adaptability to urban and rural areas. With all these features, opioid users are active players in maximizing their chances of a naloxone rescue.

The inarCAN emergency feature provider’s first responders a five-step walkthrough on responding to an overdoser. Reflecting the streamlined instructions of Red Cross emergency apps, this process includes education on recognizing an opioid overdose and a 911 button connecting to phone service to notify the emergency. The process recommends other non-naloxone methods of assisting the overdoser, including positioning the unconscious person into a rescue position and prompts to provide rescue breathing. These steps would improve survival and allow for time for emergency response. The app will send the NarNet signal alert, including a sound alert typical of Amber Alert emergency alert systems, and a prompt for naloxone carriers to open the inarCAN app. Naloxone carriers within the overdoser’s NarNet can choose to accept to respond, and the app opens GPS navigation to first responder’s location. This walkthrough aids fast recognition and alert activation, shortening the overdose onset to naloxone administration time.

How will the app allow for quick network growth and identification of overdoser networks? Social networking innovations also provide a solution. Snapchat’s QR reader functionality has become a popular method to quickly share and add contacts to social networks. With this principle, each inarCAN user has a personal inarCAN QR code, in which users can share. Preventatively, opioid users may choose to share this code to grow their personal NarNet. In an emergency situation, a first responder can identify an overdoser and alert his or her NarNet simply by scanning the overdoser’s inarCAN QR code, available on the overdoser’s smartphone lock screen, or if they are already connected on NarNet, through the first responder’s app. The growth of NarNet reflects a movement from stationary administration of naloxone (e.g. at emergency rooms, health departments, or pharmacies) to a mobile administration network.

Additionally, naloxone carriers may register as independent individuals or organizations. These carriers will be displayed publically through a universal NarNet search tool. Examples of organizational carriers include hospital emergency rooms, crisis centers, pharmacies, and health departments. Organization managers can encourage naloxone-trained personnel to download the app and respond to alerts within normal business hours. The app will publicly track and display the number of naloxone rescues per organization/individual, as a promotional incentive for these groups to advertise their humanitarian impact on saving lives and combating the opioid epidemic. With this data, these organizations can recoup resource expenditures (e.g. training, naloxone purchases, or personnel wages) by submitting findings and program expansion requests to national substance abuse grants. This model provides both social/public relations and financial incentives for carriers to register and respond to overdose alerts.

Amongst legislation for increased naloxone access, pharmacies are evolving into an access point for naloxone distribution.4,5 CVS pharmacies have elected to sell naloxone kits without a prescription in 14 states.4 Likewise, the pharmacy profession is an evolving potential responder to opioid overdose emergencies, who can intervene by providing basic life support, administering naloxone, and detailing physicians to change opioid overprescribing practices.3 By highlighting pharmacies as a major public organizational naloxone carrier, our inarCAN app leverages pharmacies as a major naloxone access point, first responder, and opioid and naloxone medication information resource for the public.

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# A description of your technical design, including any planned linkages between the app and other systems or databases

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# The application will use the Firebase database, because it features real time updates. Geographical information will be stored in Firebase and used in conjunction with the Google Maps API, to display locations of naloxone carriers as well as where an overdose is taking place. This is done by getting the user’s geographical information and temporarily storing it in the database, and then placing the overdose victim on a map for other users to see. When information is changed on a user’s profile, the change will happen instantly, such as when a carrier changes their hours of operations, they may appear or disappear from the list of carriers for opioid users depending on what they change. These features allow for users to have the most updated information, in situations where time is crucial. Supporting the app’s economic sustainability, Firebase has basic features for free, and a package called Blaze, which allows for scalability as the app grows. Firebase is supported on both Android and iOS making the app compatible with both Android and Apple devices, including watches.

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# Because the opioid users may be in possession of illegal substances, their status as an opioid user will not be identifiable, for this information is not stored on the database. Instead their status will be saved to their phones and the only information in the database will be the user’s name, phone number, and email. Only information on first responders or naloxone carriers will be stored on the database. The NarNet will be stored in the database, where each user will have a unique ID. Using the IDs, the app will connect users together to create the NarNet.

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# Crowdsourcing can be achieved through the opioid user adding contacts to the app and first responder role. The first method of crowdsourcing has the user directly adding their friends and family; this direct connection may help motivate those contacts to use the app. Whereas the second method, the first responders employ the help of people who want to assist others. With each overdose victim saved, a counter will be incremented which will be stored on the database. Every user can see the impact of the app via the number of lives saved, giving them an incentive to use an app that is actively saving lives.

# References

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5. Availability of Naloxone in Pharmacies. https://www.health.ny.gov/diseases/aids/general/opioid\_overdose\_prevention/directories.htm. Accessed October 28, 2016.

# URL to video: <https://www.youtube.com/watch?v=v-5Op1eUmpk&feature=youtu.be>