

# **Infusion Connect Contract Book**



**infusion connect**

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# Abstract

Infusion Connect is a mobile application developed for effective infusion pump troubleshooting and optimal communication between patients and nurses involved with home infusion therapy. Through field research at Johns Hopkins Home Care Group, I discovered root problems that diminish the quality of home infusion care: insufficient patient training, insufficient communication among nurses and between nurses and patients. Infusion Connect solves these problems by providing an accessible platform which incorporates training and troubleshooting videos and infographics, checklists, forum for nurses, live video chat, pump and therapy information, appointment scheduling among other useful features. Infusion Connect provides cost related benefits to Home Infusion Providers (HIPs) and health insurance providers, either of whom are the target clients. In short, the pitch to investors is to convince them that Infusion Connect can save the home infusion industry 70% of call center costs and ask that they invest \$699,780 for the business to be operational in the first 2 years.

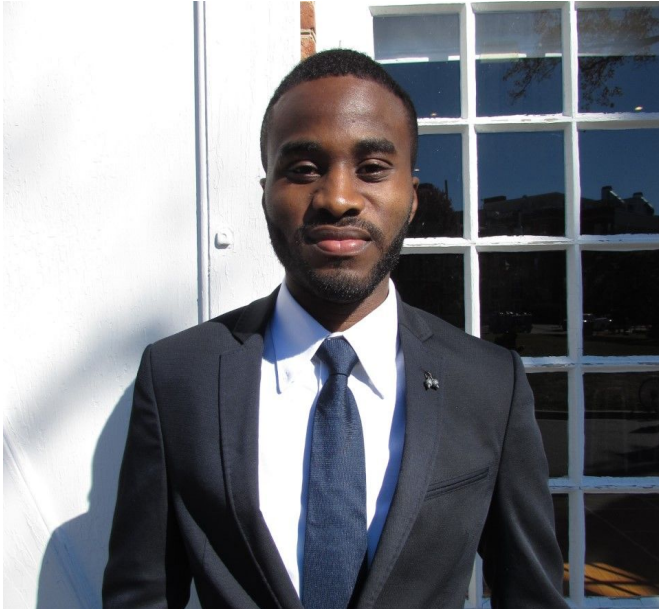
# Introduction

The Home Infusion Market in the US is currently \$15B and is projected to grow to \$31B by 2020. Home infusion therapy is used daily by 2 million patients in USA.<sup>1</sup> The primary motivations behind this therapy are cost efficiency, convenience and independence. Nurses visit patients at their homes every few days or as minimally as once a week. Hence, patients or their caretakers often have to administer infusions to themselves and operate complicated equipment without the guidance of professionals.

Several problems may occur while patients are trying to administer infusion independently. The infusion pump might malfunction and the user might be unable to adjust pump settings accordingly. The settings are locked when delivered to patients to prevent accidental change, so changing the setting can be complex and challenging. The pump could be alarming for reasons unknown to patient. Blood could be on the patient's dressing. The list of possible mishaps goes on. Under such circumstances, patients could become distressed and make calls to their infusion nurse. These calls are typically answered by call centers before a professional can be reached. Long wait times may lead to unnecessary and costly trips to the hospital by anxious patients.

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<sup>1</sup> "Infusion FAQs." NHIA, [www.nhia.org/faqs.cfm#faq14](http://www.nhia.org/faqs.cfm#faq14).



## Founder's Bio

Valentine Ezenwa is Master's student in Engineering Management at Johns Hopkins University. He has a BSc. in Electrical and Computer Engineering from University of Rochester. He started Infusion Connect as part of a Product Design course, during which he gained first-hand exposure to the home infusion Industry through Johns Hopkins Hospital. He set out to develop a mobile application that he believed would

solve some of the problems in the industry.

# Field Survey

The field survey comprised of two meetings with home infusion care nurses from Johns Hopkins Home Care Group (JHHCG) and a patient visit at Johns Hopkins Hospital.

## Nurses

I sat in on a monthly nurses' staff meeting and spent an hour asking questions and listening to the nurses explain what they felt were the issues with infusion pumps. This was incredibly enlightening because it quickly became apparent that many nurses weren't having as many issues with the pump itself, but in some cases, with how comfortable they felt using the pump and in general, how confident they were in the current system of training patients and troubleshooting problems.

A lot of the communication issues involves training. Nurses have no formal training with the pump. When they start their job, they go through an orientation which tells them detailed, but basic functions of the pump. They don't get to program it until they face an issue in patient's home. Also, nurses deal with many different cases and could spend weeks or months without seeing any Bodyguard pumps (used by JHHCG). When they get cases with Bodyguard pump again, their skill may not be as sharp as it used to be.

Another problem I found is the lack communication of communication among nurses (and pharmacists) which several of the nurses acknowledged. Nurses who are not very familiar with the pump call more experienced nurses for help in the middle of troubleshooting a problem. The nurse manager has the power to reach out to the pump manufacturer and request them to make certain changes, but the nurse manager doesn't go out on calls as often and does not know a lot of the recent problems.

## Patients

I experienced an initial patient training visit in the hospital. I learned how nurses interact with and train patients during their visits. This gave me ideas about how to improve patient training and troubleshooting scenarios through videos, infographics, checklists and accessible infusion pump information.

When the home infusion program starts, a nurse will teach a patient the basic functions of the pump: turning on and off, charging the battery, attaching the bag to the pump, starting and stopping the infusion, clicking the 'info' button to check status, and very basic troubleshooting. Patients are given a basic manual to go home with. Several nurses claimed that the training and the supporting materials are far from sufficient. One nurse suggested that the training should take several days and let the patient get familiar with the pump and see potential troubles they could face. Another nurse suggested snapshots of critical interfaces as important supporting materials for when patients need to troubleshoot themselves. A few nurses claimed that patients often take videos of them during training, so a video would make it a lot easier for patients to review what they learn. Several nurses suggested a comprehensive manual with instructions and solutions to possible problems. The manual was given to the patients in the past, but they aren't given out anymore because the manufacturer stopped printing them. While nurses are helping patients troubleshoot over the phone, it may also be difficult for both parties to be on the same page. For example, there are currently two software versions of the bodyguard 323; if the nurse on call does not know which version he/she is dealing with and the patient isn't knowledgeable enough to convey this information early on, this could lead to miscommunication and lost time.

Patients in different stages of the therapy deal with different problems. One of the most common problems is that patients on TPN mode therapy stop their sessions prematurely without knowing. When they want to start a new session, the pump continues the previous session, the infusion stops after a few minutes and the patients think that the pump has broken down. There are also patients who have been in therapy for some time and become

complacent because they are used to clicking 'ok' continuously to start infusing. Their failure to account for certain details could lead to problems.

## **Statistics on mobile phone use<sup>2</sup>**

Mobile Friendly Population: 57% of home infusion patients are under the age of 55, the majority of which are comfortable and often prefer using mobile apps in their daily life. 18-55 year-olds spend from 25 to 37 hours per month on mobile apps.

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<sup>2</sup>"For Home Infusion Providers." *Citus Health*, [www.citushealth.com/for-home-infusion-providers](http://www.citushealth.com/for-home-infusion-providers).



# Intended use

## Patient Training

In order to effectively communicate with patients in times of crisis or confusion, there needs to be a baseline of training for all patients, regardless of socio-economic background. This baseline training material in the application will incorporate simple videos, easy-to-understand infographics and weekly checklists. The training material need to draw on the best practices from each nurse's experience and knowledge. Capitalizing on the great breadth of knowledge already present on the nurse team will allow the homecare pump specialists to streamline their training and increase the baseline understanding of all patients.

One easy way to teach patients the basics of using their pumps in through training videos. The nurses I met with mentioned that many patients already use their own technology to videotape the nurses teaching them how to use the pump so they can reference it later when they were on their own. There are many premade videos available online through YouTube channels and other home care systems that could be drawn upon for reference. Making these videos available to patients through the app could improve their skill set and comfort with using the pump. For example, a new video tailored to the way Johns Hopkins Home Care uses the pump could easily be created with available resources. Utilizing technology that the patients are familiar with is a great way to make them comfortable using a new piece of technology.

In cases where the patient is walking through a multi-step process everyday, but a nurse is only coming to the home once a week, a checklist can be utilized to hold the patient accountable for the crucial steps in their therapy. In the long run, it can help patients avoid problems that may result from rushing through steps in their therapy and missing something.

## Nurse Communication

Infusion Connect includes a forum that would allow nurses to post problems they found and comment on other nurses' posts. Nurses who have experience on some issues could help

nurses facing the problem for the first time. Pharmacists can join the forum and find places where they can help with the issue. If several nurses recognize the same problem, they could discuss possible solutions during their next meeting. If adjustment on the pump is necessary, the nurse manager can contact the manufacturer.

The app should drastically reduce the frequency of phone calls to home infusion providers with common queries<sup>3</sup> such as:

- There is blood under my picc dressing
- My pump is alarming
- My infusion site is stiff and sore a day after picc insertion
- The medication is not dripping
- There are air bubbles in my IV line

Such common queries make up 85% of calls received by home infusion nurses.

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<sup>3</sup>"Our Services." *Home Infusion Services - Lehigh Valley Health Network - A Passion For Better Medicine*

# Competition and Patent Survey

A likely competitor to Infusion Connect is an application called Call Bell owned by Citus Health which was founded late 2016. In addition to catering to patients and nurses as Infusion Connect is designed to do, Call Bell caters to the pharmacist, delivery manager, billing representative, pharmacy tech and case manager. I believe this approach is not specialized enough to solve the key problems that patients face in the home infusion industry with regards to their independence and communication with nurses. Call Bell's model is focused primarily on the home infusion providers and reducing their costs; whereas Infusion Connect's primary focus is to improve the quality of patients' care. For example, an important feature of Infusion Connect's communication platform is live video chat between patients and nurses. This helps patient provide a visual on the problems with their infusion to the nurses. Call Bell does not include this feature. Unlike Call Bell, Infusion Connect bridges the gap between patients and their personal nurses, not just on-call nurses who may be less familiar with the patients' cases. According to Mimi Mcvey of Johns Hopkins Home Care Group, few nurses provide their personal phone numbers to patients in order to maintain their privacy. However, she was very receptive of Infusion Connect's feature that allows nurses to have their contact info hidden in the app while indication when they are online and available to answer patients or offline.

More specialized apps such as Care Trend are in competition with Call bell in the area of workflow and supply chain management for providers. Call Bell currently does not have a patent but I discovered a patent application that they reportedly filled. As a result, I made sure that claims on my patent for Infusion Connect did not infringe on Call Bell claims. Their application has not been approved by the US Patent and Trademark Office. A less likely source of competition is infusion pump manufacturers. B. Braun recently released an app solely designed to train users of their infusion pumps on how to use the pumps.

# Regulatory Issues

Infusion Connect will take every measure required to become HIPAA compliant. “HIPAA, the Health Insurance Portability and Accountability Act, sets the standard for protecting sensitive patient data. Any company that deals with protected health information (PHI) must ensure that all the required physical, network, and process security measures are in place and followed.”<sup>4</sup> The application includes relevant patient information in ‘patient profiles’ and correspondence between patients and nurses. Hence, HIPAA compliance is required to ensure the security of patient information.

HIPAA compliance is not officially certified by any governing body but organizations are responsible for ensuring that they meet the set standards through internal or third party audits. “There is an evaluation standard in the Security Rule § 164.308(a)(8), and it requires you to perform a periodic technical and non-technical evaluation to make sure that your security policies and procedures meet the security requirements.”<sup>5</sup> The Office of Civil Rights from the Department of Health and Human Services is the governing body that enforces the Security Rule.

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<sup>4</sup>*What Is HIPAA Compliance?*, [www.onlinetech.com/resources/references/what-is-hipaa-compliance](http://www.onlinetech.com/resources/references/what-is-hipaa-compliance).

<sup>5</sup>“Who Certifies HIPAA Compliance?” *Who Certifies HIPAA Compliance?* - TrueVault

# Product Description, Application Installation and Navigation Instructions

Home infusion providers that subscribe to Infusion Connect will be provided with access codes for their nurses and patients. Users will be able to download the app from their phone app store and put in their given access codes. The user can then indicate whether he or she is a nurse or patient, before setting their login ID, password, security questions and answers. After setting of credentials, the user will be given the option to take a tour through the app features.

The Infusion Connect start page gives a user the option to move onto the patient page or nurse page. Next, the patient or nurse will have to sign in. Figure 1 below depicts the patient page. “Pump information” will provide details about a patient’s pump such as serial number, software version etc. “Training & Troubleshooting” and “Checklist” will have specific training and troubleshooting material (videos, infographics) and patient checklist respectively will help the patients maintain best practices while using their pump to administer their medication. Via “Infusion contact”, patients will be able to reach an on-call nurse working for their home infusion provider via instant messaging, phone call or live video chat during regular hours and after hours. Patients can also reach their personal home infusion nurse instead, if the nurse is online. The patient will be able to turn the phone camera during a live video chat to face their pump or medication in order to provide a visual of the problem during troubleshooting. This camera turn is enabled in current smartphones and used effectively in apps such as Snapchat.

As for the nurse page (Figure 2), “Patient Profiles” will contain information about patients’ bio, contact, therapy, in addition to an “Appointments” scheduling and “Communications” tabs. “Troubleshooting” will have the same material provided for the patient as mentioned above so that nurses and patients are on the same page while troubleshooting specific problems. As mentioned in the Nurse Communication recommendation, “Forum” will help the nurses communicate better with one another, post and answer questions and address concerns

collaboratively. “Calendar” will allow both nurses and patients keep track of scheduled visits and dates that are important to the therapy. See appendix for more application pages.

“Patient profiles” will be integrated with the patient’s electronic medical record held by the home infusion provider; thus relevant information such as patient name, type of therapy, therapy duration, type of medication, medical history will be extracted from the patient’s record. In addition, “pump information” will be linked to infusion pump via bluetooth. Smart infusion pumps with bluetooth capability are growing in popularity. This will enable seamless import of relevant information such as battery life, alarm status, duration of medical intake, status of medication intake, percentage level of medication intake.

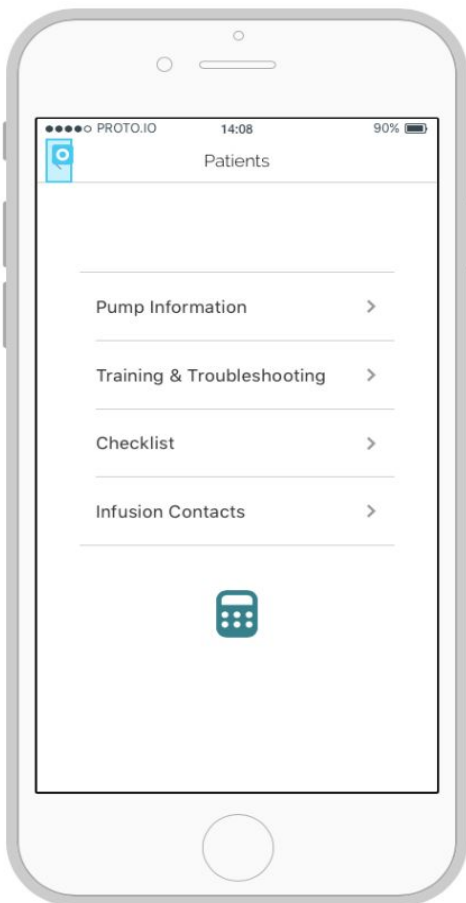


Figure 1. Patients Page

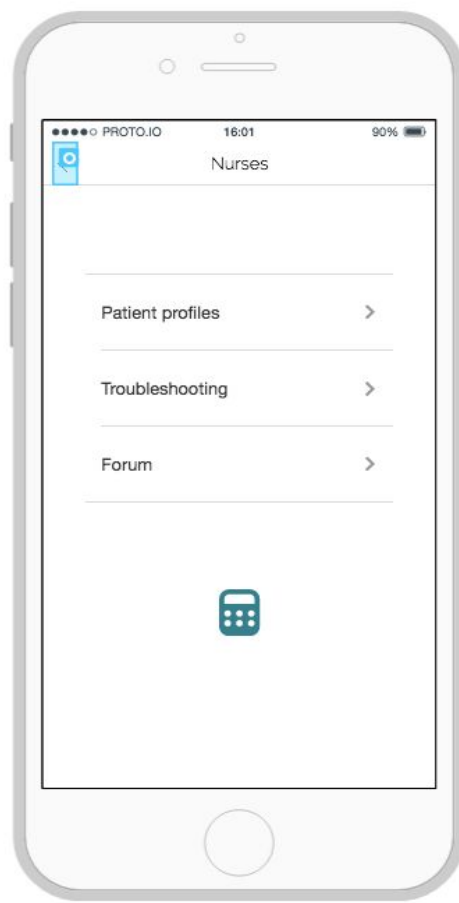


Figure 2. Nurses Page

# Communication

Information about Infusion Connect can be found on the [website](#). In the occurrence of any technical issues, users can reach Infusion Connect customer support at (347)-897-8262.

## FAQs

Who will pay for Infusion Connect?

*Home infusion providers such as CVS, Walgreens, Johns Hopkins Home Care Group, via monthly subscription currently priced at \$25 per patient.*

Will pharmacists use Infusion Connect?

*Infusion Connect is specifically geared towards home infusion patients and nurses. Pharmacists play an important role in the home infusion industry, but for the most part, they have an indirect relationship with the patients, with the nurses in between. They are not expected to use the app. However, they have knowledge about the infusion process that they can contribute to the troubleshooting material in the app, through the infusion companies that they work for.*

Is a smart phone required to use Infusion Connect?

*Yes, at the moment, a smartphone, as opposed to a non-smart phone, is required to use Infusion Connect mobile app, in order to take advantage of features such as live video chat, instant messaging, integration with medical records etc.*

What other device can the app be used on?

*Infusion Connect currently only exists as a mobile application but a web application for laptops, desktops and iPads will be introduced in the future, depending on feedback to piloting.*

# Website

The Infusion Connect [website](#) is a source of information about the app geared towards home infusion providers, health practitioners and patients. The website was developed with Jekyll which required development with HTML and CSS.

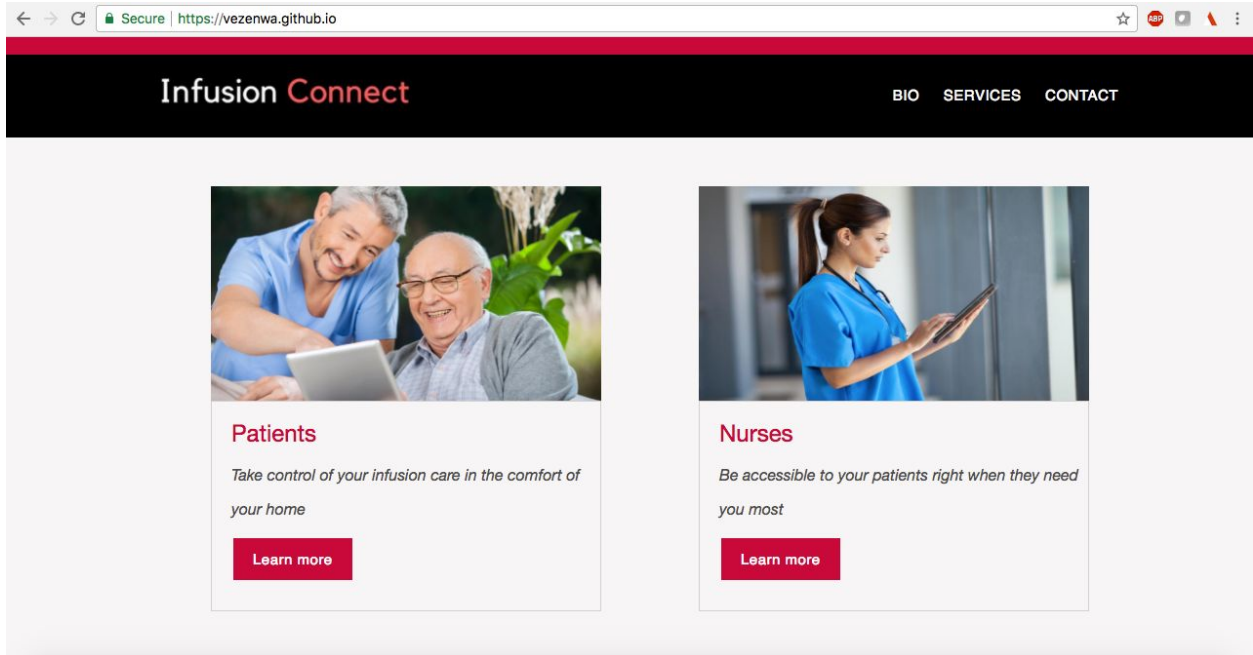


Figure 3. Infusion Connect website home page



# Reimbursement

Home infusion providers will not get reimbursed by health insurance companies for Infusion Connect. The app will drastically reduce call center costs for home infusion providers (by about 70%). Although health insurance companies will benefit because Infusion Connect will reduce hospital readmissions of patients, home infusion providers stand to gain the most financially as a result of adopting and paying for Infusion Connect. Hence, they are the sole clients.

# Business Model

Market entry will be through partnership with one home infusion providers. There are 1,500 home infusion providers across the US and 2 million patients receiving home infusion daily. 30% of the market is made up of 4 companies; CVS, Walgreens, BioScrip and OptumRX. The remaining companies are independent home infusion providers.<sup>1</sup>

Partnership with HIPs is essential to the success of Infusion Connect. In addition to having their nurses adopt the app, it will ensure that HIPs contribute training/troubleshooting material and nurse forums, allow for synchronization with their patient information databases, provide useful feedback and help promote the app across the industry.

	Client	Cost-related Benefit
Primary	Home Infusion Providers (HIP)	Reduction of call center cost, Reduction of nurses’ heavy workload (on-call hours) and high turnover
Possible alternative	Insurance Companies	Reduction of hospital readmission cost

Table 1. Clients and cost-related benefits

“Hospital readmission” refers to an individual who goes back to the hospital typically within 30 days of being discharged.

## Pricing

Call center cost on average: \$1.4 million per year per HIP<sup>6</sup>

Total cost to industry: \$1.4 million x 1500 HIPs = \$2.1 billion per year

Cost savings through Infusion Connect: 70% of \$2.1 billion per year = \$1.47 billion

- 85% of call queries are common and solvable with app resources
- 70% predicted success rate

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<sup>6</sup>“Modernizing a Traditional Business.” *Citus Health*, 23 May 2017

Charge to clients: \$25 per patient per month (subscription-based)

60% of 2 million patients use smartphones with apps = 1.2 million patients

\$25 x 1.2 million patients x 12 months = **\$360 million (theoretical market size)**

- 17.14% of industry call center cost
- 24.5% of cost savings through Infusion Connect

# Financial Plan

The target is to partner with one of the 4 major companies in the industry (CVS, Walgreens, BioScrip and OptumRX) in the first year. Sales revenue is the percentage of the theoretical market size (\$360 million).

Year	Percentage of industry	Sales Revenue
1	<1%	NA
2	3%	\$10.8 million

Table 2. Sales Forecast

3% of the industry can be achieved in the second year through partnership with one of the 4 major companies. The first year will be dedicated to setup, further research, piloting and revision in partnership with the first client.

Item	Amount
App store fee, website domain hosting	\$140 per year
Software developer	\$100,000 per year
Founder	\$70,000 per year
Cyber security expert	\$45,000 per year
Industry advisor (Home infusion nurse)	\$35,000 per year
Regulatory compliance lawyer	\$20,000
Business licensing	\$2,500
Patent costs	\$41,000
• Filing	• \$23,000
• Attorney fee	• \$18,000
Office space	\$18,000 per year
Further research, piloting and revision	\$100,000
Total for year 1	\$431,640
Total for year 2	\$268,140
<b>Total for 2 years</b>	<b>\$699,780</b>

Table 3. Expense Budget

# Summary

Infusion Connect has unique features that primarily help home infusion patients to be more self-sufficient and capable of managing their care. 85% of phone calls that made by patients requesting troubleshooting guidance from their caregivers are common queries. By providing immediate responses to patient queries, Infusion Connect drastically reduces the over-reliance on caregivers. It also enables nurses to be of better service to their patients, allowing them to be easily accessible, coordinate engagements easily and help manage their patients' care more effectively. The cost-related benefits to home infusion providers are immense since Infusion Connect is predicted to have a 70% success rate for solving patients' queries. This means that HIPs can rely significantly less on call centers during after hours. This cost related benefit also speaks to how lucrative Infusion Connect can be. The projected theoretical market size stands at \$360 million which is just 17.14% of the industry call center cost. The company's business target is to partner with a home infusion provider and validate the value proposition in the first year. The validation will serve as a foundation to capture 3% of the industry in the second year which is a realistic goal provided that Infusion Connect gains one of the 4 major home infusion providers that make up 30% of the industry as a subscriber. In order to meet this vision, an investment of \$699,780 is required to launch and operate the business for 2 years.

# Appendix

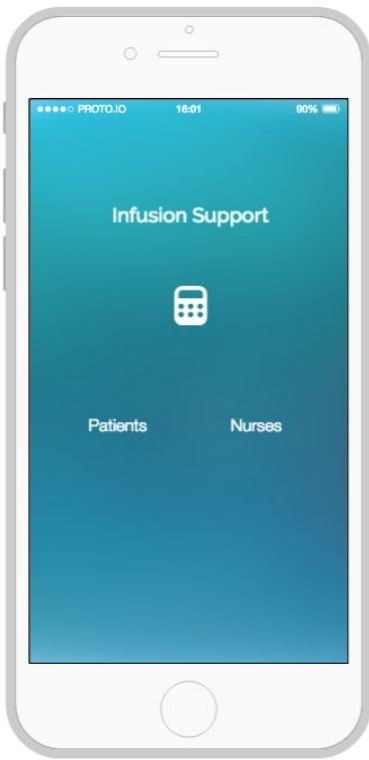


Figure 4. Start Page

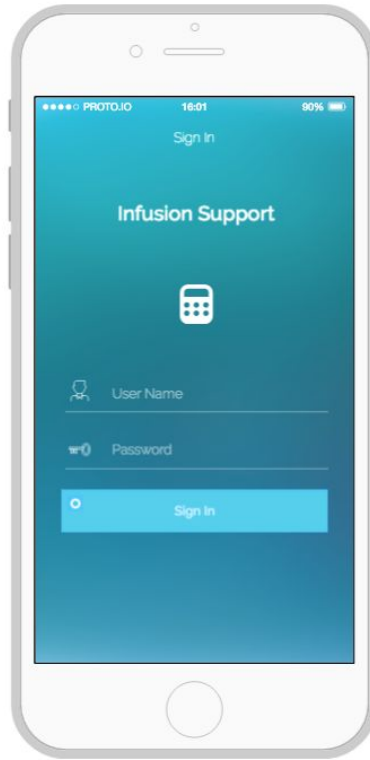


Figure 5. Login Page

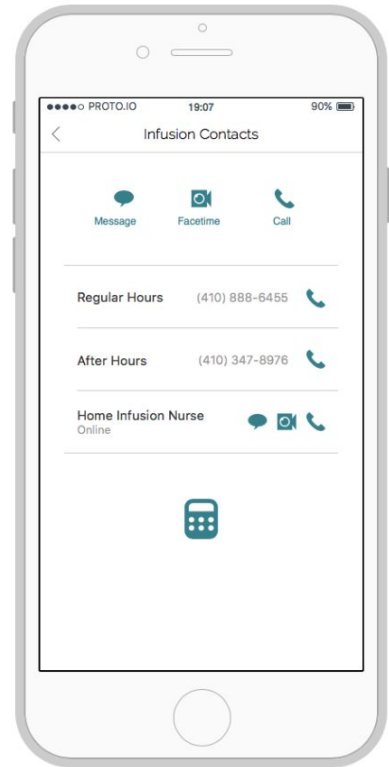


Figure 6. Contacts Page