

Cognitive Prosthetic Medication Reminder Platform enabling Healthcare Professionals and Patients to Manage Medications Together using a smartphone App and IoT Pill Dispenser



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CEOCFO: Dr. Sterns, would you tell us about iRxReminder?

Dr. Sterns: I spent about ten years working with people living with dementia.

The major reason that they would often lose their independence and be removed from the home they had owned for many years and be placed in an institution was that they failed to manage their medications correctly. I was inspired to create what I call a cognitive prosthetic which is now the iRxReminder Platform to help people and empower patients with their healthcare professionals to manage medications together.

CEOCFO: How does iRxReminder work?

Dr. Sterns: The core mission is to empower patients and healthcare professionals to manage their medications together. We do that by providing the patient with our Internet of Things pill dispenser, or if they are taking multiple medications, a set of pill dispensers. We call our device an iLidRx Pod; these work with our smartphone apps. Together the pod and app talks to the cloud where regimens are managed by the healthcare professionals.

CEOCFO: What happens when it is medication time?

Dr. Sterns: The key to our system is a dosing window. Each pod has a window of time when the medication becomes available and when it is no longer available. At the beginning of the dosing window on the iLidRx pod, a green LED light comes on that lets you know the window is open. You can take the medications half-way through that window completely on your own. Half-way through the window plus five minutes an alert is generated that goes to your smart watch, to your smartphone, it can go to your smart home devices, like your TV, and it can go to your caregiver. About ten minutes before the window closes you get another alert. What is unique to our platform is that if you take the medication, you get no alerts. So the alerts are always meaningful.

The time and state (ontime, alerted, late, skipped, or missed) you dispensed the medication are then shared with the app and also goes to the healthcare professional team. What this platform does is help you to learn to take your medication on time. You can always decide to skip your medications by letting the app know if you are not going to take them so every time you do take the medication simply by lifting the pod, placing it on your hand and tilting it and the pill comes out, that automatically records the medication-dispensing. Because you are deciding to take the medication every time, that is reinforcing that health decision so you are more likely in the future to take them again. We see through that, that people achieve high adherence. And it continues to get better over time.

Another important distinction is that the pod increases safety. You can only take the right amount at the correct. There are no pills around for children or animals to ingest, and you can't take too many pills at a time, or get ahead of schedule.

CEOFCO: *Is each pod separate?*

Dr. Sterns: Think of it as a smart bottle, the same bottle you would get through your mail-order pharmacy; up to a 3-month supply. When we work with larger medications such as oral chemotherapies, with those we tend to end up with a two-week supply but that is a full course of treatment generally.

CEOFCO: *Are you able to get another one out of there if you drop the pill?*

Mr. Sterns: The protocol for that is to send an alert that you have lost a pill and then it would release another pill. Let's talk about those extra pills lying around. That is a significant concern with many systems that are available today. The typical pill box or wireless pill bottles do not have any way to stop you from getting ahead of your schedule and taking too many. Pill packing has the same problem, when you miss a dose now you have an expensive pack of pills distracting you from all your other pills. In our system, you take the medication and if you miss or skip then that medication is available for a future dispense. There is no danger of accidentally taking too much. You absolutely can only take it at the right time and at the right amount.

CEOFCO: *Is the product available now?*

Mr. Sterns: We are pre-FDA Class II clearance. We are being utilized in research settings. If you are doing research we are available. We are not available for general use yet but we are coming soon.

"The core mission is to empower patients and healthcare professionals to manage their medications together." - Dr. Anthony (Tony) Sterns

CEOFCO: *What have you learned about the product as it is being used?*

Mr. Sterns: We have a number of published studies. We have been conducting research for about six years. First was a focus on the application itself in work with people who have experienced transient ischemic attack or mini-stroke that went immediately home. We saw very high adherence from what is considered a cognitively impaired population. Adherences were in the mid-eighties. We had a lot of great anecdotal information where almost all the participants in that study commented that their time sense being disrupted by the stroke. The alerts were incredibly helpful to them to make sure that they were taking the medications on time. They said things such as they were always surprised when the alarm went off and that they could not believe that it was already time to take their medications again.

In a more recent study we have done with Kent State University and Case Western Reserve University, we worked with patients who were living with heart failure and that group was also highly compliant at 82%. We did a study with and without the alerts and in those cases those folks were compliant enough that the alert was not a significant differentiator. It is the organization and the support that makes the difference. Unlike a text message service for example, you are getting the same reminder at 8:00 am every morning, so if you have already taken your pills, then you quickly learn to ignore it so later you do not pay attention to it when it is meaningful, when you forgot your medications in the dosing window. However, with our system the alerts always mean that you have not taken your medication so they are much more meaningful. It is like if you had a smoke alarm go off every day you would probably ignore it but when that alarm goes off and you are not cooking, you really do react. I use the system myself and I find myself showing up at the pod five minutes early and waiting around for the lights to come on similar to my cat who wants to get fed.

CEOFCO: *What were the biggest challenges in putting together this whole system?*

Mr. Sterns: There were certainly technical challenges and there are a lot of lessons learned from working with many people. It is finding the champions who are busy helping people save lives or have their own research agendas and introducing them to the possibilities of this methodology. Over time, we will become more successful and definitely as smart technologies becomes more a part of our existence. The number of smartphones have moved from non-existent when we first started, to 54% of people over sixty-five having them now. Those barriers and concerns about having and knowing how to use the technology are falling away.

CEOFCO: *Are you seeking funding, partnership or investment?*

Mr. Sterns: The simple answer to all that is yes.

CEOFCO: *Do you find that what you are doing is easy to understand for most people?*

Mr. Sterns: I think that the slow implementation of the ACA and then the recent future becoming a little more grey has made it more difficult to want to take a chance on innovative methodology. There are a lot of engineers trying to solve this

problem in ways that are not very focused on health behavior. There must be a thousand medication alarm programs and none of them have solved the problem. There is a lot of bandwidth to overcome to understand the subtleties and the strengths of iRxReminder's platform and the health behavior and the experience with cognitive impairment and the challenges of aging. It is a complex story sometimes and bringing them all together takes the right person to hear it the first time.

CEOCFO: *What is the projected timetable?*

Mr. Sterns: We are raising funds today to bring us to enough to complete our 510k Class II testing. We have magnetic and electronic testing to complete and then we are ready for submission and then we will begin rolling out the technology. We are months from completing testing and submission.

CEOCFO: *Why pay attention to iRxReminder?*

Mr. Sterns: We have excellent medications and ever-better ones in the pipeline but people are not good at taking their medications. According to the CDC, there are about 700,000 ER visits and 341,000 hospitalizations and 125,000 deaths each year directly attributed to not taking your medications correctly. Half the people who visit the ER over 60 are there because of non-compliance with their cardiovascular medication. This is one of the biggest problems of medicine that we in one sense have solved because we have the medications but we have not solved the behavior side and iRxReminder is that solution.

