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The [Center's](#) Julia Holber had the opportunity to talk with Dr. Rotondi to learn more about his work.

Julia: So far, I have spoken to innovators and health professionals who are using eHealth and mHealth interventions to help patients with generalized anxiety, depression, HIV/AIDS, even patients recovering from cancer surgery. What population(s) do you work with?

Armando: I primarily work with people with schizophrenia or schizophrenia spectrum disorders. Early on, I did some work with traumatic brain injury, but I ended up focusing on severe mental illness.

Julia: Why do you think eHealth/mHealth is important for treating people with schizophrenia?

Armando: The strength of eHealth and mHealth generally is the ability to be more convenient for people who are using the services and for the people providing the services. The ability to individualize the services and treatment for each person's needs and the ability to adapt to people in a very brief period of time as their conditions change. I've done a little work with what some people call "JITAs," *just-in-time adaptive interventions*. I sort of look upon them as *personalized adaptive interventions*. In our case, we used both interactive voice response and phone app to try and adapt to a person's conditions. So, for example, about 75-95% of people with schizophrenia are seen less than four times a year by their psychiatrist. 50-55%, about half, aren't seen in a given year. In a two-year period, anywhere from 75-85% discontinue their medications for a significant period of time. Having eHealth and mHealth interventions and monitoring patients can allow you to adapt to what's going on with a patient with schizophrenia. Their symptoms can change rapidly, but they're not being seen very often. So we've done a number of things, including monitoring the symptoms that people have, developing responses that they would take if a symptom emerges, and providing feedback to their clinicians so the clinicians can actually contact them. Adapting to changing conditions as they happen is what people are calling just-in-time adaptive interventions. That's a really powerful thing that can be done with these types of interventions.

Julia: What projects are you currently working on that you are excited about?

Armando: I have a project at VA where we're using eHealth-based interventions with veterans with schizophrenia and comparing them to an evidence-based alternative that's in person. We're looking at advantages and disadvantages of people receiving interventions by the phone or by laptops versus coming in for everything and getting it in person. One of the things we're finding that is a little more prominent than I've found in the past with people with schizophrenia, though I don't doubt that this is kind of a general phenomenon, people are becoming more paranoid about going online. Security, loss of privacy, things like that. It turns out not everyone with schizophrenia has a home computer or a smartphone, so for some people we provide the technology and the training. It's a project I'm pretty excited about. Another project I'm trying to get going and I'm hopeful for is a Pittsburgh-area based needs assessment of

schizophrenia. We want to get funding to explore the lived experiences of people with schizophrenia and their family members in terms of what their priorities are for their lives and treatments, what service barriers they've encountered, how can we better meet their needs and integrate services with their lives, how can we help them achieve their goals, and how services and treatments can incorporate their preferences. Earlier I mentioned some of the really poor uptake of mental health treatment among people with schizophrenia, and it's a barrier to providing services and to them feeling better. One of the things we want to do with this is get a deeper understanding of how can we provide services to integrate with people versus people having to conform to the services. That's a project I'm really excited about.

Julia: Can you tell us a bit about your training? Who are your mentors?

Armando: I'm actually an engineer. I have a PhD in Health Systems Engineering that I received from the University of Wisconsin, in the Industrial engineering department. A significant mentor for me was Dave Gustafson. He was my advisor and major professor in graduate school, and he was doing work in healthcare. I learned from him and from industrial engineering the perspective that you identify a problem and then engineer a solution. That's a perspective that I got from Dave that I think has served me well. Another mentor of mine was Carol Anderson at the University of Pittsburgh. She created the first modern model in the late 1970's, early 1980's for treatment for people with schizophrenia. In fact, it was the first modern model for treating people with mental illness, period. Up until that point, people with schizophrenia and their family members were not told of their diagnosis because they thought it would be too devastating. Families were even blamed for the illness. Carol turned that all on its head. She gave up-to-date education about the illness and created an entire treatment program, which is a foundation for the work I do now.

Julia: What are some of the challenges you've faced in your work?

Armando: In my work with Carol Anderson and Rohan Ganguli, we were the first group to be funded by NIMH to provide treatment to people with schizophrenia using a personal computer. What was really interesting was, whereas all of us saw this as a really appropriate way to go, the NIMH review panel was reluctant for us to allow people with schizophrenia to have computers and to get the treatment directly. They weren't sure how individuals with schizophrenia were going to react to the computers, maybe it would feed into their delusions or other illness processes. We took steps to address these legitimate concerns. Part of our intervention also included educational materials in both written and audio forms. The review panel was very skeptical that people with schizophrenia would use reading materials to learn anything. I think they're absolutely right, given that, up until our intervention, they would have to go to the library to find any reading material. We were creating things that were designed specifically for them, one click away. Their final request, and this was a really good request was for us to stay connected with each individual's treatment team. Overall, there was a lot of skepticism in the beginning because it was new, and it was legitimate skepticism.

Julia: What are the most rewarding parts of your work?

Armando: I love the idea of being innovative and trying to move the field forward. I enjoy helping people and creating designs that allow people to do better. It turns out that people with schizophrenia have a number of unique design needs for technology. There's a range of course, but they often have cognitive impairments. This can really interfere with their use of technology, their use of smartphones, laptops, and websites. No one had looked at how you design technology for people with schizophrenia and/or people with cognitive impairments. Our first designs were absolute failures. But after a huge amount of usability testing and design work, we've figured it out. We've done a really good job. There's more work to be done, but there's no question we've developed some very high performing websites. So that was definitely rewarding.

Julia: Finally, where do you see eHealth and mHealth going in the next 5-10 years?

Armando: I have to admit I don't have great insight. I think people are doing a lot with sensors, and I think those will become very important in certain areas. I think there are a couple of obstacles that mHealth has, and they're kind of the same obstacles that in-person healthcare has. There's an attitude in mHealth of "build it and they will come." And, for some people in some situations in some populations, that works to some extent. But I think there has been a fair

amount of neglect on the issue of engagement. We need to work with individuals to get them to the point where they actually believe that technological interventions will help them accomplish what they want to do. That will be really important for mHealth success.