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Digital Health Innovation Super-Utilizer Challenge: Themes and Lessons

By Rebecca Sax, Center for Health Care Strategies

IN BRIEF

Although the market for digital health tools is flourishing, relatively few products are designed to meet the unique needs of low-income, high-need, high-cost patients. To address this market gap, in early 2015 the Center for Health Care Strategies (CHCS), with support from Kaiser Permanente Community Benefit, held the first of three national *Super-Utilizer Health Innovation Challenges* to demonstrate the viability of products designed for this population. An examination of the entries reveals insights that may guide future development of digital health tools for individuals with complex needs. Considering the focus of the Challenge entries, additional efforts are needed to address the social determinants of health and range of technology capabilities to support high-need, high-cost populations.

Digital health products have proliferated in the last few years, with wearable technologies like FitBit and Jawbone and apps including MyFitnessPal and YogaStudio exemplifying the wide range of products on the mainstream market. However, most of these tools are aimed at relatively healthy individuals and few target low-income, high-need, high-cost individuals or their care teams. These patients, sometimes referred to as "super-utilizers," often have behavioral health needs, multiple chronic health conditions, and substance use disorders. High-need individuals are also disproportionately affected by social and environmental factors such as homelessness and social isolation, which often lead to frequent interactions with the health care system, particularly publicly financed safety net organizations. Within the Medicaid population, five percent of the highest-cost patients account for more than 50 percent of program spending,[1] suggesting an opportunity to target new digital tools to assist these patients and their care teams in both improving health outcomes and reducing overall public sector costs.

As the field of digital health grows, smartphone ownership rates are simultaneously rising among individuals making less than $30,000 a year.[2] This increase creates new opportunities to invest in digital innovations that support low-income people with complex health care needs.[3] CHCS conducted a series of focus groups with Medicaid enrollees with complex medical and behavioral health needs and found that 95 percent of participants owned a cell phone, 58 percent owned a smartphone, and 35 percent were comfortable using mobile applications.[4] As smartphones become more accessible and affordable, health care reform is also facilitating shifts in payment models from fee-for-service to value-based payments that can generate new financial incentives for payers and providers to maintain the health of their members, particularly those with high health care costs. This combination of factors should create business opportunities for

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entrepreneurs to develop digital health products that address the needs of these patients, their providers, and the payers that are at risk for them.

Fostering Digital Innovations

In response to the concurrent changes in health care financing and access to technology, CHCS created the *Super-Utilizer Health Innovation Challenge* (the "Challenge") to foster the development of digital health products that acknowledge the complex health and social issues of high-need, high-cost patients. The Challenge presented a fictional case study of a patient with complex medical and social needs and invited entrepreneurs, designers, and software developers to submit functional products that addressed one or more of the following issues:

- Benefits eligibility and coverage management;
- Chronic disease and care management;
- Hand-offs, care transitions, and connections to social services;
- Appointment management; and
- Access to health and wellness resources.

The Challenge received 29 submissions from individual software developers, private for-profit companies, and organizations connected to academic centers. Submissions ranged from wearable technology to patient-facing mobile apps and provider-oriented web-based solutions. Of the 29 submissions, 26 were eligible for judging, and three were selected as winners by an independent panel of judges for their innovative designs, applicability to the market, potential for impact, and feasibility of implementation.

SUPER-UTILIZER HEALTH INNOVATION CHALLENGE WINNERS

- ***First place ($25,000)***: **AdhereTech's** smart pill bottles use wireless sensor technology to remind an individual when to take medications; contacts the patient via text message or phone call if dosages are missed; and shares real-time medication usage data with clinicians.
- ***Second place ($15,000):*** **A-CHESS** is an addiction relapse prevention app that provides individuals with: recovery support tools, including linkages to others in recovery; tailored resources that promote sobriety; and predictive analytics that alert providers when patients are at risk of relapse.
- ***Third place ($10,000):*** **Wellth** is a mobile app that encourages behavior change among patients by providing financial incentives that reward healthy behavior.

All three winners were given opportunities to share their proposed tools with potential "buyers," including health insurance plans, provider groups, and health care delivery systems. For a list of all entries, visit www.chcs.org.

Broad Issues Addressed

Within the Challenge's five broad submission categories, most developers tackled issues related to chronic disease and care management or access to health and wellness resources — topics that are likely more familiar to developers based on their own personal experiences.

Chronic Disease and Care Management

The majority of entries addressed improving chronic disease management and care management, with two of the three Challenge winners — **AdhereTech** and **Wellth** — falling into this category. Several submissions offered communication portals for providers, patients, and care managers to seamlessly collaborate. Many of these products were originally intended for the general population, but were tailored to target high-need, high-cost patients for the Challenge.

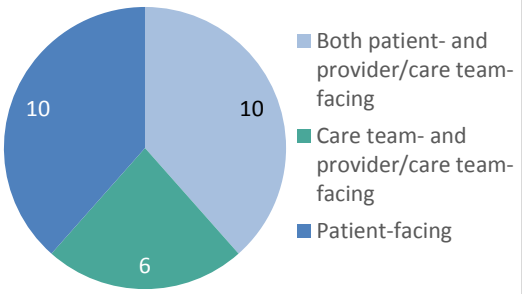
Access to Health and Wellness Resources

Another popular topic was access to health and wellness resources. Exemplifying this category is the mobile application designed by second-place winner **A-CHESS**, which, among other features, provides addiction-specific resources based on individual user information. Other submissions developed resource-focused apps to support activities such as healthy eating behaviors, locating physicians, and finding nearby addiction support groups.

Key Characteristics

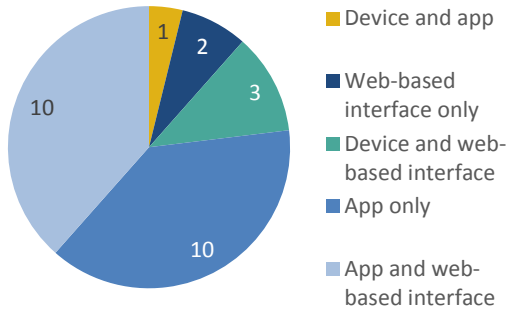
There were several commonalities among the submissions that cut across the issues presented by the Challenge. A majority of Challenge entries facilitated care coordination between patients and providers in both clinical and non-clinical settings. Submissions were most commonly designed to be used only by patients or by patients and care team members together (both 38 percent). A smaller proportion of entries were intended solely for care team or provider use (23 percent) (see Exhibit 1).

Exhibit 1: Challenge Entries, by Intended Audience



Mobile applications were the most popular technology used, with 38 percent of entries being standalone apps and another 38 percent of submissions consisting of an app plus a web-based platform — some of which were integrated with existing electronic health record systems. Smart devices with an application or desktop interface (e.g., **AdhereTech's** smart pill bottles and **Pivotal Living**'s wearable activity tracker) comprised 15 percent of submissions, while two entries had only a web-based component (see Exhibit 2).

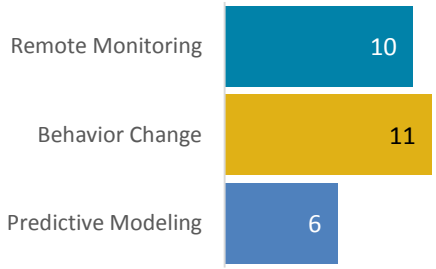
Exhibit 2: Challenge entries, by Technology Type



Key Functions

The submissions generally served at least one of three functions: remote monitoring; behavior change; and predictive modeling (see Exhibit 3).

Exhibit 3: Key Functions of Entries



Remote Monitoring

Remote monitoring is the wireless transmission of data from a patient's app or device that allows for ongoing observation of health behaviors and risk factors, and alerts providers to anomalous events. Ten entries (38 percent) leveraged the connectivity and prevalence of mobile devices to observe and track behaviors and health status in this way. Most entries with remote monitoring functionality also included a patient interface, creating an opportunity for real-time communication and feedback between patients and care teams. One example is **Twine**, a mobile and web platform that allows patients and their care teams to monitor health behaviors and outcomes, and also communicate about interventions and health status.

Behavior Change

The case study presented in the Challenge described a number of barriers to medication adherence, healthy eating, and other behaviors that are necessary to support an individual's health and wellness. Eleven entries (42 percent of submissions) aimed to provide users with cues and tracking mechanisms to change behaviors. Third-prize winner **Wellth** encourages healthy behaviors in patients by providing financial incentives that align with providers' recommendations. Another entry, **WatchRX**, provides appointment and prescription reminders through visual, auditory, and tactile signals from a wearable device.

Predictive Modeling

Predictive modeling is used to identify those at risk for health problems, providing an opportunity to initiate preemptive clinical or care management interventions. Six entries (23 percent) performed some type of predictive modeling. For example, predictive modeling can be conducted by tracking patients' behaviors and risk factors. Challenge winner **A-CHESS** employs this technique for individuals in recovery to alert an individual's providers if the user appears to be at risk of addiction relapse. Modeling can also be accomplished by analyzing population-level data. One of the submissions, the **Equip Predictive Model**, analyzes individual behaviors and population data to assess potential risk of inpatient admissions in a provider's patient population, and recommends appropriate clinical interventions.

Additional Opportunities

While the Challenge received a wide range of entries that addressed a number of the issues faced by individuals with complex needs, there were a few key areas that were not widely considered by participating developers:

- **More Basic Technologies**: Most of the patient-facing submissions consisted of mobile apps and were therefore inaccessible to users who lack an internet-enabled device or smartphone. Devices such as **AdhereTech** and **WatchRX** eliminate the need for smartphones by creating passive designs that require little to no user training. Reaching low-income, high-need populations without smartphones or individuals who are not comfortable with digital technology through text messaging or voice-based systems should be an important consideration for developers looking to target this population.

- **Social Determinants of Health**: Social determinants of health — the underlying environmental and social forces that impact health and wellbeing — include homelessness, history of trauma, lack of social support, and low literacy, among others. Issues of poverty, culture, and environment are complex and multifaceted, and developers working in this space may want to consider engaging with potential consumers in order to better understand theses challenges and inform product design. Designing tools that address the social determinants of health can also require interacting with disparate entities and data systems — such as homeless shelters and food banks — which can be challenging from a technical perspective. However, these issues and systems have a considerable impact on high-need, high-cost patients and should be carefully factored into digital products intended for this population.

- **Eligibility and Coverage Management**. Because publicly financed health care and social services operate differently in each state, developers may benefit from partnering with knowledgeable local organizations that can help guide product development. This could include working closely with health systems, providers, or state agencies that have an intimate knowledge of these systems and their population's specific needs.

Next Steps

Building on the lessons of the this first Developer Challenge, the next challenge launched by CHCS will focus on creating opportunities for health systems and developers to work together to pilot tools that address needs already identified by the health systems. These pilots will help further the evidence base for using digital health tools to improve care for complex populations.

Digital health products designed to assist high-need, high-cost individuals and their care teams have the potential to be valuable tools as delivery systems, health plans, states, and the national health care system seek to improve health outcomes in the most cost-effective manner. Partnerships between developers and health care entities can help lead the way in understanding how digital health tools can have the greatest impact.

To learn more about the Challenge, winners, and all submissions, please visit the CHCS website.

ABOUT THE CENTER FOR HEALTH CARE STRATEGIES

The Center for Health Care Strategies (CHCS) is a nonprofit policy center dedicated to improving the health of low-income Americans. It works with state and federal agencies, health plans, providers, and consumer groups to develop innovative programs that better serve people with complex and high-cost health care needs. For more information, visit www.chcs.org.

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ENDNOTES

[1] J. Paradise. "Medicaid Moving Forward." Kaiser Family Foundation (2015). Available at: http://kff.org/health-reform/issue-brief/medicaid-moving-forward/.

[2] A. Smith. "46% of American Adults are Smartphone Owners." Pew Internet and American Life Project, March 1, 2012. Available at: http://www.pewinternet.org/2012/03/01/nearly-half-of-american-adults-are-smartphone-owners/.

[3] J. Leber. "Tackling the Daily Challenges of Being Poor, Now There are Some Apps for That." Fast Company, August 29, 2014. Available at: http://www.fastcoexist.com/3034648/tackling-the-daily-challenges-of-being-poor-now-there-are-some-apps-for-that.

[4] R. Davis. *Digital Health Innovations for Medicaid Super-Utilizers: Consumer Feedback*. Center for Health Care Strategies. December 2013. Available at: http://www.chcs.org/resource/digital-health-innovations-for-medicaid-super-utilizers-consumer-feedback-to-steer-new-technologies/.