Beyond acceptability and feasibility: moving mHealth into impact

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Comment on: Jenkins C, Burkett NS, Ovbiagele B, *et al*. Stroke patients and their attitudes toward mHealth monitoring to support blood pressure control and medication adherence. Mhealth 2016;2.

In this issue of *Mhealth*, Jenkins *et al.* (1) offer a summary describing attitudes of 60 stroke patients towards the use of mobile phone tools—specifically smart phones—to monitor blood pressure and facilitate medication adherence.

The authors are to be commended for their attention to a patient population that is relatively understudied in the ever more crowded field of mobile and digital health solutions. We have seen numerous individual studies, research syntheses and meta-analyses that consider the use of the Internet, text-messaging, social media, and apps for health promotion and disease self-management for multiple and diverse chronic conditions (2-7). However, we have relatively little data on the application of mobile and digital health strategies among stroke patients. As they note, stroke is the leading cause of adult disability and among the leading causes of mortality in the U.S. Recurrent strokes represent over a quarter of all strokes and costs for the healthcare industry to manage strokes has been estimated at $34 billion annually (1).

Jenkins *et al.* (1) hone in on blood pressure control and medication adherence as two key behavioral factors that are key in reducing stroke risk. They further argue that a better understanding of stroke patient access to and use of mobile devices and their attitudes towards using mobile technologies for self-management of blood pressure and medication adherence will contribute to our understanding of how to design and develop mobile and digital tools for this audience.

Their findings from a sample of 60 stroke patients offer information from a diverse sample, another important contribution. While the aforementioned literature on

mHealth is growing, there remains a strong call to expand the field to include more attention to older populations, minority populations, and low-income communities given their over-representation among those with one or multiple chronic conditions. To that end, the sample, including 48% African American, and close to half with incomes of less than $30,000 annually offers a glimpse of preferences for and attitudes towards mobile and digital solutions that captures an important group also relatively underserved in the field.

The authors show that patients are largely in agreement that a mobile tool to facilitate blood pressure monitoring and medication adherence would be acceptable and appreciated, that they were willing to use a program and believed they could do so. They showed some important demographic predictors of use, i.e., that women were more likely to endorse the idea of mobile solutions for stroke self-management, and that with every 1 year increase in age there was a 4% increase in willingness to use the system with continual technical support.

The findings from Jenkins *et al.* (1) are consistent with the other ample literature that considers acceptability of using mobile phones and other digital solutions for health promotion and disease self-management (8,9), including those that use sensors to monitor activity (10), those that consider acceptability for mHealth in low and middle income settings (11) and those that consider acceptability for low income (12) and elderly (13).

Although there is value of documenting acceptability of using a mobile phone solution to facilitate self-management in stroke patients and in demonstrating acceptance among

African American, low income and elderly stroke patients, it is critical to now move beyond acceptability studies into actual research on the efficacy, effectiveness, cost-effectiveness and scalability of these tools. There are multiple reasons this is becoming more urgent. There has been an explosion of mobile and digital solutions without a concomitant body of evidence to show they work to impact health behaviors or health outcomes. Building this evidence requires a rapid and responsive infrastructure for digital health research that doesn't currently exist and may be a challenge to create in academic environments whose goals and rewards are poorly aligned with those of the technology industry. However, growing pressure to create meaningful use and to meet quality outcomes in health care delivery may offer important opportunities to overcome these challenges. The following paragraphs expand on these challenges and opportunities.

As of 2015, the IMS Institute for Healthcare Informatics reported that there were over 165,000 mobile phone applications that have been developed with a specific focus on health (14). Of these, the vast majority offers little beyond providing basic information, and very few offer evidence that they actually work to change behavior or health outcomes. It is notable that the IMS report focuses only on mobile phone applications or apps, and does not consider the ample opportunities for health promotion and disease self-management available from simple text message programs and social media programs such as Facebook. There are, as noted by Jenkins *et al.*, electronic and phone based systems for monitoring blood pressure and a growing body of evidence showing that medication adherence reminders can be facilitated through technology that have been developed for a broader base of patients beyond stroke patients. What we need are studies that are focused on efficacy specifically—for self-management as well as biomedical outcomes related to stroke. But we also need replication studies, studies of effectiveness, to demonstrate utility across diverse populations, and cost-effectiveness research. This need is now acute—without this type of evidence the mHealth field runs the risk of being dismissed as inconsequential or insignificant because we simply are not keeping up to document the impacts of new innovations, and in many cases, our slow-moving research renders our findings obsolete.

Our current research processes are poorly structured to support the type of rapid and responsive research that will facilitate growth of evidence in mHealth. Riley *et al.* (15) initiated a clarion call to improve our research structures

and processes several years ago. They critiqued the lengthy and often cumbersome process involved in obtaining federal funding for health research—the largest source of extramural funding available to scientists in the U.S. It may take as long as 7 or 8 years to move from a research idea to having data on efficacy, which represents the time frame for several generations of innovation. Furthermore, investigators in our academic institutions face different reward structures than innovators and entrepreneurs in the mHealth industry. Rewards in the academic setting are linked strongly to the peer review processes such as extramural grant funding and journal publications, whereas in the mHealth industry rewards are linked to producing products with demonstrable commercial value. Digital health entrepreneurs do not want to wait 7 or 8 years to realize commercial success, and are motivated to move forward with new solutions without evidence of impacts on health behavior and health.

We need to go beyond efficacy to effectiveness and cost-effectiveness research, replicating successful studies and exploring if mHealth solutions will work with larger and more diverse audiences in diverse settings. Furthermore, we must carefully study the process of dissemination to verify that an mHealth solution is not a burden or cumbersome within systems. Jenkins *et al.* discuss the willingness of their participants to enter data into an mHealth system to facilitate their self-management. What they did not explore was whether clinicians have the time and willingness to review large amounts of data with greater frequency to monitor patients, and if doing so is more beneficial than standard of care. Well-evidenced mHealth approaches for patient self-management may fall apart if providers perceive they will increase workload or interfere with workflow.

Even the most successful mHealth solutions researched to date are not demonstrating large effect sizes and impacts. In order to truly realize the promise of the field we must expand the reach of relatively low impact interventions to substantially larger populations of users (16); doing so requires study of the dissemination and implementation of new technology tools into care delivery systems (17). Cost-effectiveness research will establish the return on investment (ROI) payors might expect when considering the integration of an mHealth solution into their system.

The ROI is a particularly important metric in the context of our rapidly evolving care delivery environment. The 2009 Health Information Technology for Economic and Clinical Health Act (HITECH) mandated the use of certified electronic health records and also encouraged flexibility for

providers to make information available electronically and to allow for patients and consumers to easily exchange that information (18). Section 3025 of the Affordable Care Act requires the Centers for Medicare and Medicaid Services to reduce payments to hospitals with excessive readmissions, defined as readmissions within a 30-day period (19). Hospital systems are likely to be very interested in strategies that can help avoid these penalties.

The mechanisms that Jenkins *et al.*, considered for technology based blood pressure and medication adherence monitoring offer a strong opportunity to explore both how to integrate technologies as directed through HITECH and also to consider what the impacts of doing so will be on hospital readmission. Such evidence will be compelling for insurers, hospital systems, Medicaid and other payors to consider reimbursement or licensing or other approaches to commercialize an mHealth solution.

In conclusion, while Jenkins *et al*. offer relevant information on acceptability of a mobile solution for self-management among stroke patients, this simply confirms what we already know about acceptability and falls short of the critical work that is now needed to demonstrate that mHealth is both effective and impactful. Academic institutions, peer review publications, and the mHealth industry need to align priorities and rewards so that we can fully realize the long ago promised potential for mobile and digital health solutions to make demonstrable impacts on population health.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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