Pharmacy Automation and Technology

An Optimistic but Cautionary Outlook on Mobile Health

Brent I. Fox, PharmD, PhD,* and Bill G. Felkey, MS†

Mobile health (mHealth) pushes forward and provides an active area for research. We briefly review 2 mHealth research articles and discuss the implications of their findings for hospital pharmacists.

It's no secret that we are enthusiastic proponents of health care information technology (HIT) in general and of mobile health (mHealth) technology specifically. At the turn of the millennium when personal digital assistants and truly mobile laptops were the buzz, we felt like kids in the candy store as we explored the opportunities these devices offered to enable patients and providers to be more connected and informed. Technology can extend our capabilities and perform repetitive tasks more efficiently and accurately than humans. Humans, on the other hand, can perform complex decision-making processes and can identify areas where technology should be deployed to address systems problems and opportunities. Many conversations about the emerging role of HIT as a potential threat to humans' jobs often neglect to discuss the fact that humans are the designers of HIT and are charged with its implementation and maintenance and with monitoring and studying its effects. These roles are critical to ensuring optimal use of HIT.

In the case of mHealth, we believe there should be a heightened sense of responsibility to determine the impact of HIT on patients. Why? Recent data show that 85% of American adults own a cell phone, 45% own a smartphone, 31% own a tablet computer, and 26% own an e-reader. These devices are the platforms on which mHealth information and services are delivered. In fact, 31% of cell phone owners use their phones to find health/medical information. Clearly, the penetration of these devices into American culture is strong and on the rise. While the evidence shows that mobile technology is in fact used for health-related reasons, is there evidence to suggest that there are problems that need to be addressed? Yes.

Our first example comes from research recently presented at the American Academy of Dermatology annual meeting and published in *JAMA Dermatology*.¹

There are a variety of smartphone apps designed to take a picture of skin lesions and determine if the lesions are benign or malignant. The apps use a variety of methods to determine lesion status, including onboard software algorithms that analyze images and one that sends the image to a board-certified dermatologist for analysis. This research found rather alarming results. Sensitivity (ability to identify true positive cases) of the 4 apps was 7%, 69%, 70%, and 98%, and specificity (ability to identify true negative cases) was 30%, 39%, 37%, and 93%. The take-home message is that 3 of the 4 apps missed a diagnosis of malignancy in 30% of the cases. None of us want to be diagnosed with a melanoma, but we definitely want to know if we have it so we can seek appropriate treatment. These findings indicate that work still needs to be done before we can rely on this group of apps.

Other researchers in the UK have looked at this issue on a larger scale. They conducted a meta-analysis of 75 published studies of "technology-based health interventions delivered to health care consumers."² More studies looked at text-message interventions than apps. Overall, these researchers had inconsistent findings about the value of the interventions to achieve the desired results. Although their research did not identify ground-breaking advances in patient care, 2 studies suggested that medication adherence and smoking cessation can be positively impacted through text messaging. The authors called for additional research to provide more evidence upon which to make future decisions concerning the role of mobile technology-based interventions.

Where does this leave us? We know that patients have mobile devices in abundance, especially cell phones, and a growing number have smartphones. We also know that 19% of smartphone users have medical apps, and the single most common intervention across

*Associate Professor, Department of Pharmacy Care Systems, Harrison School of Pharmacy, Auburn University, Auburn, Alabama; †Professor Emeritus, Auburn University, Auburn, Alabama

all health care delivery settings is medications. It follows, then, that smartphone apps for medication management are important. A quick search of your favorite app catalog confirms this deduction. We are tracking how hospitals are creating mobile tools to engage their patients. We believe that medication management tools should be a part of a hospital's strategy to engage patients and reduce costly readmissions, and we strongly believe that pharmacy should be driving this strategy.

We have previously written about the potential role of mHealth apps to reduce unnecessary readmissions and the importance of personalizing the communication channel management strategy. We envision that a major component of an institution's mobile strategy should be focused on medications. Think of it like an onion, where the onion represents medications. Our goal is to ensure safe and effective medication use, which represents the core of the onion. Each layer expanding from the center of the onion represents specific actions we can take to achieve our goal. One layer should represent the mobile device strategy, while other layers may represent dispensing automation or policies and procedures designed to streamline processes.

Pharmacy should be leading the effort to design the layer that makes up the medication-related mobile

strategy. This could include identifying the information sources to which patients have access, an "ask a pharmacist" function, a medication status feature for outpatient pharmacies, a medication adherence tool for patients, a symptom logger for patients at their homes, and the list continues. We believe that it is important to personalize interactions with patients (as we have written before), but once this has been done, it's time to focus on providing, receiving, and using the information that mobile devices make it so easy to exchange. We can see from the studies discussed above that much work remains to be done to ensure that patients are using mobile tools that provide the desired results.

We welcome your comments to Brent (foxbren@auburn.edu), Bill (felkebg@auburn.edu), or on our blog (www.pharmacy-informatics.com).

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