Pharmacy Automation and Technology

Virtual Reality and Pharmacy: Opportunities and Challenges

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We often find inspiration in tech happenings. This month, we explore the opportunities and challenges for using one of the most popular tech gifts of 2016 to advance safe and efficacious medication use.

In 2016, virtual reality (VR) systems were some of the more popular tech gift ideas. Flight simulators that are used to train pilots are the most recognizable examples of virtual reality for many of us. Characteristic of all VR systems, pilots in training interact with a computer-generated 3-dimensional environment through the use of special hardware and software. A key aspect of VR systems is that they completely engage the user's field of vision and can include wearable devices that serve as inputs to the VR system.

The cost of a truly immersive VR system that includes a physical environment like a flight simulator is not within the realm of possibility for most of the US population. However, in 2016, VR headsets were introduced that range in price from \$400 for a tethered system that is connected to a computer. Mobile VR systems that attach to smartphones were as little as \$80 (plus the cost of a smartphone). With these price points falling in the "reasonable" realm, we wonder how soon it will be before VR systems fit in the pharmacy's efforts to provide safe and effective medication use.

The first area in which VR could help is education and training. Entry-level educational use would occur when a patient receives a new prescription and needs to receive standard counseling regarding safety and efficacy. The VR system could provide visual and auditory instructions for the range of information that the patient needs. The next level of educational use aligns with more complex or higher risk medication regimens. In this scenario, the VR system could include demonstrations of techniques or administration procedures. The patient could then

use the VR system to perform these behaviors in the virtual world, providing an opportunity to practice with no risk of harm or waste of medications. The third education-related use of VR is an extension of the previous scenarios. Here, the patient participates in a teach-back (or similar) VR session during which they describe and demonstrate what they have just experienced. While immediate recitation of what was just experienced in a VR session does not necessarily equate to long-term retention and application of what was learned, it does allow immediate practice and the opportunity to identify misunderstandings. One challenge to this use is that current VR systems do not incorporate the user's spoken words as an input. This capability would be necessary to implement the teach-back use case.

A second, more advanced opportunity for VR involves incorporation of data from other devices and sources. Wearables (eg, Fitbit) are playing a growing role as tools to encourage positive behavior change. We envision a VR system that uses longitudinal data from wearables, weight scales, dietary intake, adherence monitoring tools, glucose monitors, and other devices that document the user's past behaviors and current state. The VR system would use these data to create a comprehensive vision of the user's current health. It could then sequence the user through the reasons for their current health status. The VR system could depict what the user could expect if they make a menu of changes to positively (or negatively) affect their future health status. The user could interact with the VR system to explore the impact of increasing their total daily steps, decreasing their total caloric intake, or improving their medication adherence, for example.

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Another opportunity for the VR system is within the pharmacy itself. We tested some early applications of VR in a medication verification process and were able to control workplace distractions and decrease problems such as low ambient lighting by use of the technology.

Challenges, however, do exist. First, the software – and in some cases associated hardware – needs to be developed. It is our opinion that challenges related to technical capabilities are often more easily addressed than challenges related to acceptance and buy-in. Imagine you are the patient using a VR system in an ambulatory clinic pharmacy. There may be a few odd

glances your way initially. Additionally, when incorporating a user's health data, the VR system would likely be used in the patient's home. This would require that the patient have a VR system that is able to integrate data from a variety of sources. As personal health records and patient portals grow in popularity, VR systems could use these tools as the access point for patient data. Maybe these ideas seem a bit far-fetched to some, but one pharmacy chain in Sweden has already launched a VR system for patients with acute pain (see <http://bit.ly/2hoGjCj>). We welcome your thoughts on VR and pharmacy (Brent at foxbren@auburn.edu and Bill at felkebg@auburn.edu). ■