Pharmacy Automation and Technology

Convergence Creates Opportunities Across Health Care Systems

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

Industrial design students at Auburn do a creativity exercise where they are asked to combine a common household appliance with an animal. Have you seen a snake light? In health technology, we have a similar opportunity. In the connection between jewelry and vital sign monitoring technology or household security and health status monitoring, we are witnessing active convergence that will benefit patients, providers, and health systems.

According to Merriam-Webster.com, convergence occurs when distinct technologies, industries, or devices merge into a unified whole. The act of converging is also characterized as coming together or uniting on a common interest. Convergence in our personal lives is easy to identify. For example, our televisions now have built-in Internet access (wired and wireless) with on-board apps that allow us to bring the movie theater into our homes, connect with friends through social media, and get the local weather forecast. We have refrigerators with the capability to maintain and share our grocery list. Our automobiles have connectivity that was unheard of just a few years ago. Clearly, convergence in our personal lives is facilitating the access to and the sharing of information like never before.

Convergence in the health care domain is also occurring at a rapid rate. Convergence in health care faces significant constraints in the form of technical obstacles, financial support, consumer (provider and patient) buy-in, federal and private regulation, and competing interests of stakeholders. Despite these challenges, we are very excited about the ongoing convergence of health information technology that we see happening today, some of which we highlight below.

Many of you have smartphones and are already using apps for professional and personal reasons. Increasingly, your colleagues and patients are using these devices as well. In fact, the widespread uses of smartphones suggest that maybe they are *too* commonplace to include in this discussion. We believe,

however, that their popularity is exactly why they should be included. Smartphone apps and wireless connectivity (Wi-Fi, Bluetooth, near field communication, etc) offer the proverbial “foot in the door” to the use of converged health information (IT) devices. From simple access of information to wireless capture and sharing of personal health and wellness data, the smartphone is poised to be the gatekeeper through which all of an individual’s health information passes and is managed. This is all in a mobile device that we have within arm’s reach 24/7.

We remember our first monitored home security system. It had an exterior siren that alerted our neighbors (for what seemed like miles around) when we forgot to use the physical key to disarm our system. The keypad only had capacity for a single code that the entire family shared. Now, “security system” is almost a misnomer as these systems have integrated health monitoring capabilities. It makes sense that the next wave of convergence is to use the security system as the hub for connecting wireless health and wellness monitoring tools, maintaining medication and behavioral activity management tools, and delivering all of this information to designated individuals.

Indeed, the home security industry has begun to recognize the power of using the existing infrastructure to leverage for new, possibly not originally envisioned, tasks. Similarly, companies that provide the wireless networks on which our smartphones connect are starting to see new opportunities. Verizon Wireless recently announced the availability of a health and wellness wireless monitoring program

*Associate Professor, Department of Health Outcomes Research and Policy, Harrison School of Pharmacy, Auburn University, Auburn, Alabama; †Professor Emeritus, Auburn University, Auburn, Alabama

that allows patients to record health and wellness data, which is then wirelessly communicated to their provider. Patients can record data from their homes or anywhere they have wireless access. With the recent announcement of the appointment of Eric Topol, MD, as Chief Medical Advisor, AT&T has indicated a sincere commitment to advancing the work of its ForHealth program. Like Verizon, AT&T believes their existing wireless network can provide the necessary connectivity among patients, providers, and others to share health care information in a more efficient manner to enable better decisions. It's a logical move for companies to take advantage of the opportunities that the new health care environment presents, especially when they own an infrastructure that can be repurposed.

We can get a glimpse of the future of convergence in health IT and medicine by looking at emerging trends. Wearable bands like those in the Nike+ line that record heart rate, exercise time, and distance are commonplace. We have been following a company that is developing a new approach to wearable technologies. Their products fit into a class known as epidermal monitoring in which an electronic monitoring patch is placed on the skin or in the body. Data can be collected and stored for subsequent download or wirelessly transmitted. Some uses of this technology include measuring UV exposure, monitoring a baby's temperature, monitoring hydration levels, serving as physical shock sensors for athletes, and acting as catheter sensors. The catheter monitoring system

has significant potential in the treatment of a variety of cardiac conditions. We see a future in which epidermal monitoring allows an even more wirelessly enabled patient data collection and sharing tool – one that is with the patient at all times, recording, storing, and sharing pertinent health and wellness data with trusted providers and family members.

For pharmacists, the convergence that we are experiencing leads to greater access for all interested parties to patient-specific and knowledge-based information that is necessary to support better patient care decisions. This converged world is obviously not without challenges. Patients may have concerns about their wireless carrier potentially having access to their private health information, and they may oppose the idea of placing a sensor that is much like a tattoo on the skin. We believe education and appropriate technical and regulatory safeguards are the first steps to addressing these concerns. Financial challenges are arguably the greatest obstacle. However, we believe that demonstration projects and research can identify the optimal models to pay for these converged health tools. As pharmacy continues to make strides to obtaining provider status and regulators call for pharmacist involvement in health IT as key to improving medication adherence, we stand poised to interface with the continuous wave of converged technologies and the information they provide. We welcome your comments to Brent (foxbren@auburn.edu) and Bill (felkebg@auburn.edu). ■

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