

## **Current and Upcoming Technologies in Pharmacy Practice**

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It's almost impossible to ignore the impact that technology has had on pharmacy practice and healthcare in general. From the ubiquitous automated dispensing machines to e-prescribing and electronic health records, pharmacists everywhere encounter information technology in their day-to-day practice. Here is a quick look at some prominent as well as lesser-known information technology trends transforming healthcare.

### **Electronic Records**

Electronic medical records (EMRs) encompass everything that a clinician would find in a patient's chart and more. The ability to access current and past information about a patient in one place is vital to providing consistent healthcare. EMRs are typically intertwined with computerized provider order entry (CPOE), clinical decision support systems (CDSS), and electronic medication administration records (eMAR) among other components. Although the healthcare industry has been slow to adopt the technology, EMRs are steadily making their way into hospital and community settings nationwide.

Of note is the confusion in terminology that has plagued this technology since its early days. According to the Agency for Healthcare Research and Quality and the National Alliance for Health Information Technology, an electronic medical record is limited to information from within one organization. In contrast, an electronic health record "spans episodes of care" and contains data that conforms to national standards and can be accessed by members of various healthcare organizations.

An interesting development is the debut of Microsoft HealthVault and Google Health. Both services let patients aggregate health data from various sources such as physicians, hospitals, pharmacies, health plans etc. in an attempt to let patients participate in their healthcare and stay informed. The success of these services, however, is contingent upon the extent to which other players in the industry are willing to participate. Most recently, Allscripts, which is known for its e-prescribing software, announced its integration with Google Health.

### **Electronic Prescribing**

Aimed primarily at minimizing medication errors attributable to illegible handwriting, this has been a subject of discussion since its

inclusion in the Medicare Modernization Act of 2003 and more recently, the endorsement of medication reconciliation by the Joint Commission. Once again, adoption rates have been modest primarily due to cost, but nevertheless, e-prescribing is here to stay. To encourage doctors to adopt e-prescribing, Medicare recently announced financial incentives that will eventually be phased out by 2013. Last year, the Kentucky Cabinet for Health and Family Services awarded second round grants through its ePPIK program, which is intended to offset the cost for clinicians to implement e-prescribing.

### **Bar-code Medication Administration (BCMA)**

The underlying concept of bedside scanning is simple: scan the patient's wristband, scan the drug, and verify the patient, medication, dosage, route, and time. But by integrating it with electronic medication administration records (eMAR) to become part of the patient's EMR, it takes safety, documentation, and accountability to an unprecedented level.

In an effort to reduce medication errors in hospitals, the FDA issued a final rule in 2004 that requires bar-codes on most prescription drugs. Hospitals nationwide are still in the process of adopting BCMA mainly due to the challenges involved with implementation. BCMA has been implemented in 23% of hospitals nationwide according to the results of a survey released in February of this year by the American Society of Health-System Pharmacists. The ASHP statement on BCMA holds pharmacists ultimately responsible for the successful implementation of BCMA.

### **Document Imaging**

Regardless of how much information is available electronically, it would be naïve to expect healthcare to function as a paperless office. For this reason, document imaging is considered the next best thing. There are many reasons to justify document imaging including, decreasing administrative costs, increasing accessibility, and being HIPAA-compliant. Hospitals that have not implemented computerized physician order entry are using document imaging for pharmacist order entry while retail pharmacies are using it for archiving handwritten prescriptions. Either way, document imaging is one innovation that won't go away anytime soon.

## **Delivery Tracking**

A common problem in hospital pharmacies is the constant need to track medications that were dispensed. Delivery tracking systems take advantage of bar-codes to simplify this process and prioritize workflow. They can be used to record and monitor an order from preparation to dispensing. Nurses can also look up the status of orders thus minimizing the need to call the pharmacy. Ariel and Baxa are two companies currently offering such systems. Ariel Delivery Tracking can be coupled with an IV compounding verification system to reduce compounding errors while Baxa's MedBoard offers standalone medication tracking.

## **Single Sign-on (SSO)**

Password fatigue is not a new concept in the digital age. Every online service from email to banking expects users to remember complex login credentials. Single sign-on solutions are aimed at easing the pain of logging in and out of the ever-increasing number of electronic services used in healthcare without compromising security. They employ fingerprint biometrics and proximity among other technologies to authenticate users. They're also advertised as being cost effective by reducing the number of phone calls made to helpdesks for passwords. Although promising, single sign-on does have some disadvantages such as installation challenges and the consequences of misuse.

## **Wireless Temperature Monitors**

Wireless temperature monitors were originally developed for the food industry but are perfect for hospital refrigerators. Typically, a probe attached to the refrigerator transmits data via radio frequency signals that are sent to a computer, which if necessary, generates alerts. In addition to keeping hassle-free records, these systems are helpful to document follow-up actions and generate reports.

The trends discussed here are only a handful in a vast array of promising technologies that are transforming healthcare. Without a doubt, the road to adoption of these and future advancements is an uphill one, but with the right combination of mindset, expertise, and management, clinicians and patients alike can benefit greatly.

## References and Links

- Agency for Health Research and Quality  
<http://healthit.ahrq.gov> Accessed Sep 21, 2008
- National Alliance for Health Information Technology  
<http://www.nahit.org/> Accessed Sep 23, 2008
- Microsoft HealthVault  
<http://www.healthvault.com/> Accessed Sep 20, 2008
- Google Health  
<https://www.google.com/health> Accessed Sep 20, 2008
- Allscripts Live with Google Health Integration for Real-Time Information Sharing Between Physicians and Patients  
<http://investor.allscripts.com/phoenix.zhtml?c=112727&p=irol-newsArticle&ID=1198534&highlight=> Accessed Sep 20, 2008
- HHS Takes New Steps to Accelerate Adoption of Electronic Prescribing  
<http://www.hhs.gov/news/facts/eprescribing.html> Accessed Sep 20, 2008
- e-Prescribing Partnerships in Kentucky  
<http://www.gold.ky.gov/grants/stategrants/eprescribing.htm> Accessed Sep 21, 2008
- FDA Issues Bar Code Regulation  
<http://www.fda.gov/oc/initiatives/barcode-sadr/fs-barcode.html> Accessed Sep 21, 2008
- Survey Investigates Role of Pharmacy in Technology Use in Hospitals  
<http://www.ashp.org/import/News/pressreleases/pressrelease.aspx?id=471> Accessed Sep 22, 2008
- ASHP Statement on Bar-Code-Enabled Medication Administration Technology  
[http://www.ashp.org/s\\_ashp/docs/files/BP07/New\\_St\\_BPOC.pdf](http://www.ashp.org/s_ashp/docs/files/BP07/New_St_BPOC.pdf) Accessed Sep 21, 2008
- Ariel Delivery Tracking  
[http://www.onariel.com/Delivery\\_Tracking.htm](http://www.onariel.com/Delivery_Tracking.htm) Accessed Sep 16, 2008
- Baxa MedBoard  
<http://www.baxa.com/medboard> Accessed Sep 16, 2008
- Gregory ME. Wireless Refrigerator Temperature Monitoring Systems: Because You Have Other Things to Worry About.  
[http://www.pppmag.com/documents/V3N2/PPP\\_V3N2\\_pp4-6FridgeWireless.pdf](http://www.pppmag.com/documents/V3N2/PPP_V3N2_pp4-6FridgeWireless.pdf) Accessed Sep 22, 2008