Pharmacy Automation and Technology

Health System Dashboard: It's All Coming Together

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

We are all familiar with the function and purpose of dashboards in our automobiles. Dashboards that serve a similar purpose are increasingly being found in hospitals and health systems. In this installment, we describe the convergence that is enabling dashboards to be powerful components of care delivery workflow. We also describe several example dashboards and how they are used.

You've seen quarterbacks driving cars that demonstrate total digital convergence and situational awareness on television. OnStar, if we've been in a wreck, checks to see whether we are injured and helps keep us calm while first responders are summoned to the scene. Our cars send us an e-mail that our tire pressure is elevating as summer months approach. Home interfaces, originally for security, now let us remotely control the systems running in our houses. We can be connected to health care on-demand by pushing a button on our jewelry. When health monitoring values exceed normal measured variances, these devices alert our appropriate caregivers.

Centers of excellence such as Tigerplace at the University of Missouri equip patient homes with an integrated sensor network that detects when falls occur, when lit stovetops are left unattended, and when drug or condition changes impact the quality of sleep for the occupants. Many of us are much more connected than we wish right now. Many feel that they are drowning in the data stream directed at their personal and professional lives. While many of us are overwhelmed, others can't wait to get their hands on wearable devices that will allow them to be even more connected.

Health systems that are approaching 100% digital, and therefore paperless environments, are awakening to the powerful possibilities that a closed loop, real-time information system offers. Although many have struggled with implementing their digital systems on the basis of the Meaningful Use criteria, this focused array of requirements is largely responsible for the benefit being reaped from implementation of electronic health records (EHRs). By increasing the

expectation of the percentage of use for the subsystems, such as computerized prescriber order entry (CPOE), the opportunity for integration and lessening of adoption challenges is possible. Many users do not want to go back and forth between paper and digital order entry methods. Some adopters, however, are still pushing back on whether the effort required to use these systems is significantly stimulated and whether the penalties are significantly punitive. Technology-related adverse events are stimulating some pushback on EHR adoption when human-machine interfaces have been shown to create errors that harm patients.

Stage 1 of the Meaningful Use criteria requires the use of limited CPOE that would be supported by clinical decision support systems. Demographic data collection on patients is specified along with drug, allergy, and disease data collection. Other requirements include vital signs, smoking status, and the ability to communicate clinical summaries of the care provided to both patients and other care providers. Stage 2 focuses on measures that can be utilized in a more rigorous health information exchange (HIE) where data repositories communicate relevant information across the continuum of care, transmitting patient care summaries across multiple settings. Increases in CPOE and the incorporation of laboratory data are required. In this stage, we see the first efforts being made to increase patient and family engagement in their own health care efforts. Stage 3 focuses on clinical quality measures and health outcomes in both individual patients and patient populations. There are 6 domains for reporting to include patient and family engagement, patient safety, care coordination, population and public health, efficient

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

use of health care resources, and clinical processes/effectiveness.

All Meaningful Use stages set the groundwork for digital dashboards. Think about the function of the dashboard for your automobile. Very complex data analysis is performed continuously and displayed for drivers and passengers using gauges, alerts, and even spoken feedback. Dashboards give instant feedback on the status of the car's systems. The best automobile systems not only provide feedback, but can also prevent accidents by analyzing driver performance and making small corrections using active handling systems to help keep us on the road.

Health system dashboards are being used to provide feedback on the entire enterprise down to the specific provider. A niche industry called enterprise performance management (EPM) monitors financial, quality, and clinical data to help satisfy health care standard requirements. Other industries have been benchmarking and measuring performance for years. Walmart headquarters in Arkansas knows the stock levels of products in each of its outlets nationwide. McDonald's knows the number of seconds it takes to process each drive-through order in each of its franchised restaurants.

EPM companies, such as onFocus Healthcare, assist health systems to move through the strategic and planning goals for the enterprise and produce system-analyzed critical success factors and key performance indicators to measure tactical performance throughout the health system. Data that are generated as a byproduct of providing patient care can be analyzed and used to detect performance variances. These variances can identify both highly successful caregivers as well as those who are struggling to meet assigned accountability goals.

An example of a nursing unit level of focus dashboard can be seen in McKesson's Awarix dashboard that provides a visual representation of the patients, providers, equipment, and system status throughout the nursing unit. Looking at a patient's bed graphic

will inform you that the patient has been taken to imaging. Looking for an IV pump? Type in a search and you will see that two available units are located in the utility closet 30 feet from the nursing station. Do you want to know who's being discharged today? It is clearly indicated on the dashboard.

One example of a provider-level dashboard is taking place in the emergency department. This dashboard displays at-a-glance patient status and triage information while concurrently gathering provider performance information for analysis. Providers can compare themselves to their counterparts and build a learning environment within the team for maximizing efficiency and effectiveness.

We attended a session by Sentara Healthcare, which is a large health system that operates over 100 care sites in Virginia and North Carolina. They began their presentation by showing a completely empty medical records room. Their data flow occurs at such a high rate that public health services contacts them to assess public health issues like the regional spread of influenza. We believe that their information system will help ensure that they are a successful accountable care organization. Digital information convergence leading to situational awareness is a powerful tool.

If you are struggling with the transformation of getting your health system into the digital age, we empathize with you. We know that your array of legacy components make it difficult to achieve high levels of integration. We also know that the massive change that is impacting the people in your organization is probably creating very difficult adoption challenges. Yes, we are technology enthusiasts, but we remain confident that your future on the other side of the transition will be one from which you will not want to retreat once you have arrived. We welcome your comments and questions. You can reach Bill at felkebg@auburn.edu and Brent at foxbren@auburn.edu. You can also visit our blog at: www.pharmacy-informatics.com. ■