Pharmacy Automation and Technology

Consider the Benefits of a Fully Integrated Medication Use Process

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We believe a pharmacist's professional goal is simple to articulate but challenging to achieve – medication use that is safe and efficacious. Pharmacists do not operate alone in the medication use process and are not the only professionals who can influence medication safety and efficacy. We discuss the medication use process from a systems perspective, identifying opportunities for pharmacists (and others) to address medication safety and efficacy.

If you have been reading our column for very long, you will know by now that we consider system integration to be one of the highest, if not the highest, priority for health information systems. For the most part, the good news is that all of the pieces of the information technology (IT) puzzle are present and are being used in higher percentages in health systems across the nation. What we still seem to lack is the total integration of these systems to make the flow of information seamless across an ever-expanding health enterprise.

Health systems are spending hundreds of millions of dollars selecting and implementing systems that promise end-to-end reports for their operations. Many health system management vendors face challenges implementing their products; they struggle with integrating their systems internally and integrating them into the legacy systems used by their health system clients. The systems that are needed for the medication use process (MUP) are a logical place to start for high-level integration in every health system operation. The medication use process starts with the physician assessment of the patient and that leads to order entry. The need to transcribe orders is beginning to diminish with the use of computerized provider order entry (CPOE), but many systems still require transcription; this continues to be an opportunity for errors. Dispensing steps in the MUP are made more complex when both centralized and decentralized processes must be combined for individual patients. The administration component of the process is especially critical, as it is the last step before the medication reaches the patient.

In every health system, order entry can be scrutinized by several people to identify potential problems

and opportunities for enhancement of each order. Barcode medication administration (BCMA) should provide the ultimate safety step, because of all of the checks that occur prior to a medicine entering the patient's bloodstream. Unfortunately, the last check in medication administration is done by a human, and this has a way of defeating the systems that were created to protect patients from human error. The final step in the MUP, monitoring, can be highly integrated, depending upon the acuity of the patient's illness.

The federal government has been providing stimulus dollars to health systems when they acquire and utilize information systems in a meaningful way. The meaningful use requirements continue to evolve and require greater specificity in the way they are adopted and employed in the everyday care of patients. It is no longer acceptable to say that systems are being acquired. These systems must be used in a manner that can produce outcomes for patients downstream. The expectation is that these systems will also help contain costs. Ultimately, the use of IT will allow multidisciplinary teams to take care of patients wherever these patients are located.

To aid in the assessment of patients, the electronic health record (EHR) should contain any and all objective and subjective data for assessment of the patient, including patient vitals, past medical history, laboratory data, and the medication reconciliation data available. Ideally, data on drug use will be bolstered from claims databases accessed in real time. There should be no need to have a separate CPOE application for this beginning component of the MUP. CPOE fields should be surrounded by all relevant patient data and backed up by

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clinical decision support systems (CDSS) overseeing any new orders. Emerging, meaningful use requirements state that information fields, calculators, and guideline monographs should be presented when and where they are needed in the MUP.

Ideal order entry occurs when the prescriber directly inputs data into the CPOE, but there should be a way for orders that began as verbal or written instructions to be processed and verified. Intelligence should be present in the system to appropriately route orders according to pharmacy protocols that determine authorized personnel and procedures on a per drug basis. Information such as dosage calculations, preparation procedures (where needed), and monitoring parameters would be available in a form preferred by users (alerts, reminders, information monographs, etc). Wherever possible, rule-based proprietary database support from entities such as *First DataBank* or *Medispan* – in addition to the conditions monitoring performed by the health system – would provide CDSS monitoring at every juncture. Every attempt to avoid false positive alerts would be made.

The inventory and storage requirements for every drug, including tracking technologies, would supplement the processing of every order and integrate seamlessly with the pharmacy department application, unit-based cabinets, and dispensing procedures while subsequently flowing through the medication administration record (MAR). These components would ultimately connect to systems that oversee procedures for

administration at the bedside or in the emergency department. Each of these subsystems would require real-time connectivity to provide additional safety in every process. The timely flow of information would be supported by the best science available at every juncture in decision making. Reduction of waste of all types would be facilitated by this integrated system and efficiency would be enhanced.

We have always believed that documentation should occur as a byproduct of providing care. Front office information in the form of admission, discharge, and transfer data as well as back office processes of billing and filing insurance information should be as seamlessly integrated as the clinical processes. Objective data should be organized in every EHR according to the preference of each clinician. For example, one clinician may prefer to see the drug history grouped by indication whereas another might want the data to be chronologically sequenced. Health record applications should be able to support these preferences, within reason.

We also believe that the system integration will be able to evaluate when conditions for adverse drug reactions or medication errors have taken place in the past and provide additional insights when these same conditions appear to be aligning in the present. We welcome your comments, especially about your successful and unsuccessful efforts to achieve a fully integrated medication use process (Bill at felkebg@auburn.edu; Brent at foxbren@auburn.edu). ■

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