Pharmacy Automation and Technology

Are All of Your Point of Information Needs Covered?

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We have long advocated that information is the core of health care delivery. Yes, procedures and testing make up a considerable portion of the cost and effort in care. However, these efforts are usually the result of the consideration of extensive amounts of information, or they are performed to gain more information. Certainly, information is key. In this installment, we explore information resources, characteristics of information use that support care delivery, and how it all fits together.

We describe the point of information as that place in the care provision for patients, performed by health care knowledge workers, where evidence-based information is used to reduce uncertainty in decision making. As the electronic health record (EHR) meaningful use stages continue to emerge, we are getting excited about the levels of integration and interoperability in our information systems. Clinical decision support systems (CDSS) are now being integrated into operations that include medication reconciliation, documentation, and transactions in the EHR, in health information exchange (HIE), in computerized provider order entry (CPOE), and in the form of tertiary references and apps housed in portable information appliances.

When we ask our pharmacist audiences about the support and specific sources of their evidence-based information, we discover some interesting findings. The great majority of pharmacists are utilizing smartphones that contain tertiary references. Many of these are updated on a daily basis. Others supplement this portable resource with health system-based Internet resources that are constantly updated. Traditional resources like PubMed are used to identify primary literature. Increasingly, tools such as *Google Scholar* are also used. Recent studies have shown that physicians frequently are consulting medical textbooks and colleagues as primary information sources.

It is surprising that readily available resources, such as *Ingenta* that contains more than 26,000 publications and more than 5400 full-text online journals, are seldom used by the pharmacists we address. This service, which is already in use in most health systems, can deliver a table of contents for

journals of interest to the pharmacist. Interesting articles can be supplied quickly by the health system's librarian. Alternatively, a topic of interest in a specialized practice focusing on neonatal patients can be specified. *Ingenta* examines and reports results from hundreds of journals.

Online resources, such as *Citeulike* that helps manage over 7 million scholarly articles and *Delicious* that is a social bookmarking cite for valuable online resources, are often not even known to our audiences. We also discovered that the use of personal bibliographic management tools, such as *EndNote*, was confined primarily to the use of pharmacy graduate students; few practitioners employ it.

Other information challenges continue to present themselves. Decision support services should, ideally, strive to become online, closed-loop, and real-time. Multidisciplinary teams should be connected in the same way, enabling new levels of operation and collaboration. Information should allow the provider with the right skill set to do the appropriate intervention, in the right facility, at the right time, for the right patient. Patients and their nonprofessional caregivers must also be folded into this multidisciplinary team. Because patients spend much more of their time outside of the hospital than inside, decision support that is designed to enable appropriate lifestyle decisions and adherence needs to be integrated as well.

Content should be both multimedia and multilingual to address the diversity in learning styles and language preferences found in our patient and caregiver populations. We have discovered some *Apple* and *Android* resources that deliver patient-specific education and video formats that also support 26

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different languages. Patients often find their most preferred learning style to be visual, and now resources can support this preference. The fact that *YouTube* is the number two search engine on the Internet is further proof of the need for integration of visual educational resources into the patient education point of information.

The same kind of CDSS that providers enjoy needs to occur in a patient-friendly manner within the personal health record (PHR) of patients. As patients record their activities of daily living, vital signs, and health outcome data, feedback should alert patients to seek assistance when potential medication and/or medical problems are detected. Certainly, false positives will occur for patients just as they do for everyone else, but potential "saves" may help make these nuisance flags tolerable. In the ambulatory care setting, large increases in patient panels will also create a new point of information need as Web visits increase in number.

When patient panels increase to double what they are today per primary care physician, professional associates that include physician assistants, nurse practitioners, and certainly pharmacists will be utilized to provide episodes of care. If you are used to seeing your personal physician face-to-face 2 or 3 times a year, you need to expect that others may greet you for your visit. Additionally, when appropriate, you

may be asked to drop by the office for your laboratory samples to be taken, but the review of the results may take place electronically. This electronic interaction may be in the form of a report or an online session.

Information dashboards are being introduced by both major PHR and niche providers that promise enterprise performance management (EPM) support. In a digital information system, it is possible to track financial, clinical, and quality measured data as a byproduct of care provision. Across the health system, units can be compared for performance criteria, and e-mail alerts inform managers when exceptionally poor or good results are occurring. In real time, entire systems can be monitored and managed for improvement because transactions produce actionable data.

We hope we have described the landscape for point of information opportunities to emerge. We continue to be excited by all that is happening and are realistic enough to believe that there will be many bumps in the road that will need to be overcome. We remain optimistic that constant improvement and change will take place and benefits from these changes will be enjoyed. We invite your comments and questions regarding this topic. You can reach Bill at felkebg@auburn.edu and Brent at foxbren@auburn.edu. ■

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