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Hospital Pharmacists' Information Needs: Adoption of Best Practices

Educational Requirements

Pharmacists in the United States need a minimum of a Pharm. D. (Doctorate of Pharmacy) degree in order to practice. Prerequisites to the Pharm. D. program include an emphasis on chemistry and biology. In addition to obtaining an accredited degree from an institution approved by the ACPE (Accreditation Council for Pharmacy Education), pharmacists must complete 1500 internship hours, pass licensing examinations, and meet other state specific licensing requirements. The NAPLEX, or North American Pharmacist Licensure Examination, measures a candidate's knowledge of the practice of pharmacy. It is just one component of the licensure process and is used by the boards of pharmacy as part of their assessment of a candidate's competence to practice as a pharmacist. The NAPLEX assesses whether a prospective pharmacist:

- Can identify practice standards for safe and effective pharmacotherapy and optimize therapeutic outcomes in patients
- Can identify and determine safe and accurate methods to prepare and dispense medications
- Can provide and apply health care information to promote optimal health care

Pharmacist Duties

Pharmacist responsibilities include a range of care for patients, from dispensing medications to monitoring patient health and progress to maximize their response to the medication. Pharmacists also educate consumers and patients on the use of prescriptions and over-the-counter medications, and advise physicians, nurses, and other health professionals on drug decisions. Pharmacists also provide expertise about the composition of drugs, including their chemical, biological, and physical properties and their manufacture and use. They ensure drug purity and strength and make sure that drugs do not interact in a harmful way. Pharmacists are drug experts ultimately concerned about their patients' health and wellness (Pharm D). Pharmacists can be employed in hospitals or in community (independent retail) settings.

With the growing complexity of the healthcare arena in the Information Age, the increase in evidence-based medicine and the increasing number of patients with multiple co-morbidities will make the coordination of medications between different members of a patient's health care team vital for patients. Thus, the role of pharmacy in the modern healthcare environment is constantly changing to convene with the needs of all patients.

Issues Facing Pharmacists

There are many issues facing the pharmacists today. There is a need for improvement in medication safety, access to pharmaceutical care, incorporating the prudent use of technology and supportive personnel, the delivery of medication therapy management services, reducing the incidence of adverse drug events, and more collaborative management of medications. I would like to discuss how information and technology and collaborative practice can improve pharmacy care involving adverse drug reactions.

One of the largest problems facing pharmacists is adverse drug reactions (ADEs) in patients. The prevalence of ADEs is difficult to measure, since there is not a uniform way of measuring (setting, patient hours, or outcomes). However, according to the Committee on Identifying and Preventing Medication Errors (2006), medication errors injure 1.5 million people in the United States annually. According to a systematic review (Kaushal, 2003) each year, an estimated 770,000 people are injured or die in hospitals from ADEs, and other literature reviews suggest that many are preventable (Table 1).

Table 1

Setting	Preventable ADEs	Year of Study	Authors
Hospital Care	450,000	2003	Bates, et. al
Long-term Care	800,000	2005	Gurwitz, et. al
Ambulatory Care	530,000	2003	Ghandi, et al

Literature Review

The Institute of Medicine has proposed the enhancement of decision support resources, better labeling/packaging of medications, more effective communication between professionals and patients, and higher standards for information technology in the healthcare field. The IOM called on pharmacists to routinely review medications and counsel patients regarding why and how to use their medications.

Part of the problem is that there are many different settings and stakeholders involved the process of prescribing, ordering, dispensing, and administering medications. At each step in the medication process there is a potential for mistakes. Physicians used to prescribe medications by hand writing scripts, but now most prescriptions are entered by computerized provider order entry (CPOE).

Physician computer order entry decreased the rate of serious medication errors by more than half (Bates, 1998). Although CPOE solves some problems, a survey found that there were still high rates of ADEs if CPOE was not integrated with CDSS (clinical decision support systems) (Nebeker, et al, 2005). This study was a review of 937 patients in a 20-week period at a VA hospital. The following stages and percentage of errors were found: Errors associated with ADEs occurred in the following stages: 61% ordering, 25% monitoring, 13% administration, 1% dispensing, and 0% transcription. A second study (Leape) also found that the stage that the most errors were made were during the prescription process: physician ordering 49%, nurse administration 26-38%, transcription 11-12%, and pharmacy dispensing 11-12%. Computerized physician order entry (CPOE) and clinical decision support systems (CDSSs) are promising interventions that target the ordering stage of medications, where most medication errors and preventable ADEs occur (Kaushal).

A study (Rommers et al, 2007) states that 70% of ADEs can be prevented, with the best results accomplished with a combination of CPOE with CDSS, accompanied by pharmacist participation on ward rounds. CDSS and electronic health records (EHR) can help with increased adherence to guidelines based care, enhanced surveillance and monitoring, and decreased medication errors (Chaudry, 2006). Decision support systems should be based on algorithms for evidence based medicines.

Even though CPOE can reduce medication error rates, apparently it is not as well adopted as it could be. The overall deployment of CPOE and clinical decision-support systems in U.S. hospitals after nearly 10 years of effort is roughly 15%, with greater penetration occurring in hospitals with more than 200 beds, according to 2007 and 2009 ASHP surveys. A more-recent 2010 report found similar results, with only 14% of hospitals achieving the expected stage one meaningful use requirements; in community hospitals with fewer than 200 beds, the figure was less than 12% (Siska).

EHRs must be made available to pharmacists so that a complete medication record, laboratory results, and patient diagnoses, allergies, are available to support decision making regarding medications (Fox, 2011). Out of 1000 hospitals surveyed, a large number (90.7%) of pharmacists could view the EHR but a much smaller number (56.7%) allowed pharmacists to document to the record (Pedersen, 2007). The care that pharmacists provide needs to be documented for other providers to review (Fox, 2007). Only 37.0% of hospitals made clinical patient information beyond the electronic prescription available to outpatient pharmacies. As electronic communication improves in the future, increasing direct transfer of prescription information to pharmacies should improve safety and efficiency, and allowing outpatient and ambulatory pharmacists access to detailed clinical information will enable improved drug therapy management. (Pedersen). A statewide study of 1953 licensed pharmacists in Nebraska found that only 8% had access to electronic health records created by others (Fuji). Since patients receive care in multiple places, it is imperative that all care providers who work with a patient have access to and be able to update the medical record.

ADEAS (adverse drug event alarm systems) have been incorporated into some technical systems. A study in Massachussets done by chart review on over 230,000 charts found that electronic prescribing alerts prevented 3 deaths, 14 permanent disabilities, and 31 temporary disabilities (Weingart, 2009). The best ADEAS are triggered through the EHR and allow independent assessment by a pharmacist. The alarm systems need to be calibrated so that physicians do not get alarm fatigue if too many low risk alerts are set off. The best way to handle the automatic alert systems is to have a pharmacist check the potential adverse drug event first, and only escalate it to the physician if there is a true risk (Brajovic, 2012; Thompson, 2007).

ADE reporting is currently is currently voluntary and non-standardized. The FDA should have access to adverse drug event data so that once a drug is approved the data can be collected to improve safety of medications.

A new concept called “medical home” means that medical care should be patient centered, despite how many places and care providers the patient receives care (Fox). Electronic health records play an important role in the sharing of medical information among care providers. Technology cannot solve all of the problems leading to ADEs, and many studies have found that a collaborative team also increases patient safety. A study found that pharmacist

participation on ward rounds decreased medication errors (Rommers 2007). Another study (Feldman, 2012) found that pharmacist-nurse collaboration allowed many potentially harmful medication discrepancies to be corrected prior to causing harm. The collaboration on medication reconciliation improves patient safety, and is efficient and cost effective.

Solutions

Pharmacists need to be able to receive, record, and share accurate information regarding patient medications. Many changes have already taken place such as CPOE, CDSS, and HER, and ADEAS. Although these technologies and processes exist, they are not always well distributed.

Proposed Action: Best Practices Checklist

After a thorough literature review, I propose that a best practices checklist be provided to hospital pharmacists and hospital administrators. The proven technologies to reduce medication errors have already been created, but not always adopted and implemented. The rationale for providing hospital pharmacists and their administrators with this checklist of best practices is that the information needs of pharmacists can be better met by implementing these best practices. The use of the suggestions on the checklist can raise patient safety and ultimately save the hospital money. As a self-evaluation tool, a hospital pharmacist can check which tools and processes are available and consider improvement where necessary.

Tool/Process	Yes	No	Notes
Computerized Physician Order Entry System			
Electronic Health Record			
Clinical Decision Support System			
Adverse Drug Event Alert System			
Adverse Drug Event Reporting to FDA			
Medication Reconciliation			
Collaboration with Physicians/Nurses			

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