By Daniel P. Hays, PharmD, BCPS

Improving Patient Safety with **Clinical Pharmacy Services in the ED**

THE EMERGENCY DEPARTMENT IS A UNIQUE ENVIRONMENT IN MEDICINE, and many of the safety mechanisms used in the inpatient setting cannot be applied to the ED. For hospital inpatients, clinical pharmacists provide extra layers of protection by crosschecking provider orders for appropriate dose, route, indication, allergies, and so on. Because of the chaotic and complex environment of the ED, this same safety approach is not feasible. The delay resulting from off-site central pharmacy services could be detrimental to patient care. As a result, EDs are without the layer of protection that pharmacy services offer to inpatient units. Indeed, studies have found that the emergency department has the highest rate of preventable adverse events versus other clinical environments studied.[1,2]

> With the annual number of ED visits virtually exploding, it is imperative to **train pharmacists** for this type of clinical practice.

Because more and more patients utilize the emergency department for primary care, it is particularly important that a pharmacist work with them to optimize their care. From the simple medication refill to inhaler discharge counseling, the pharmacist can offer expertise to just about every patient in the ED.

As the clinical pharmacy specialist in the department of pharmacy and emergency medicine at the University of Rochester Medical Center's Strong Memorial Hospital, my practice is primarily patient care-based, as well as academic, and I am involved in departmental research. Strong Memorial Hospital is a university-based educational facility, a Level I trauma center, and a regional burn center. With almost 100,000 ED visits per year and over 500 doses dispensed in the ED daily, the opportunity for error abounds. With physicians taking care of patients with traumatic injuries, as well as common colds, and nursing staff continually changing gears, many aspects of pharmacy tend to be forgotten. There are 36 EM physician residents, and they have the opportunity to complete a two-week rotation to optimize their knowledge of pharmaceuticals. This rotation is not mandatory, but is strongly encouraged. This provides a great chance to mold the medical residents and ensure formulary is followed and proper dosing and medication selections are made. By having the emergency pharmacist (EPh) directly involved with the EM residents, information is immediately communicated and every opportunity is used for education.

The Emergency Pharmacist's Role: The role of the pharmacist in the ED is to provide their pharmaceutical expertise in the following areas:

Medical/Surgical Resuscitation: For all medical and surgical codes, the pharmacist is at the bedside assisting with the medications. Whether for dosing or actual medication selection, the pharmacist is available for input.

Dose Recommendations: The pharmacist is available to all members of the medical team for medication doses. In our pediatric ED, for any patient under 14 years of age and/or under 40 kg, all medication orders need to be on a mg/kg basis, and the pharmacist's help in calculating these doses can prevent errors.

Therapeutic Consultation: The pharmacist participates with the medical team to ensure that the optimal medication is selected and initiated promptly. In cases with the potential for a medication interaction, the pharmacist will provide input to ensure patient safety.

Disease State-Specific Pharmacotherapy: There are many therapeutic regimens that can be tailored to fit a patient's specific need. For example, a patient with a history of cystic fibrosis presents with presumed pneumonia. The pharmacist is available to recommend the appropriate antibiotics and ensure the dosages are correct, based on the patient's specific needs.

Patient-Specific Pharmacokinetics: The pharmacist is available on a case-by-case basis to ensure that pharmacokinetic parameters are applied when the patient's medication regimen is initiated. Traditionally, the EM physicians will write for one or two doses before the patient is admitted to a service. The pharmacist can ensure both the accuracy of the dose and appropriateness of the time interval between doses.

Taking Medication Histories: For patients with complex medication histories, the pharmacist is available to glean the appropriate information. A pharmacist is the only health care provider formally trained in taking medication histories and may be able to pick up items that were missed in the patient interview. In addition, the pharmacist can track down a patient's history via their family, their community pharmacy, or other avenues to ensure that an up-to-date list is obtained prior to additional medications being administered. For patients that may benefit from therapies that are not currently prescribed or are underutilized, the pharmacist can intervene and speak to their team to ensure that appropriate regimens are started. On the other hand, if a patient is taking medications that may not be necessary (polyutilization), the pharmacist has a great opportunity to intervene.

Patient Discharge Counseling: There are many times that a patient is discharged from the ED without easy access to a pharmacy. For example, an acute asthma patient has a mild exacerbation and is discharged from the ED with an inhaler. The pharmacist can provide appropriate discharge counseling, evaluate the patient's inhaler technique, and ensure compliance to prevent the patient's return to the ED.

Additionally, the pharmacist is available for patient consultation and education, discharge counseling, and assistance with medication-related ED visits. Many patients use the ED for primary care and may even arrive for the sole reason of a medication refill. The pharmacist can assist these patients to decrease their length of stay. It is also feasible to work with a patient's primary care provider to optimize their therapy. Many times patients are over/under-medicated, and pharmacist intervention can remedy the situation.

Strong Memorial Hospital chose to not have a satellite pharmacy based on the concern that, if the emergency pharmacist is not visible, he or she will not be utilized. Our emergency pharmacists carry wireless phones and are available when on shift. Green and red electronic signs signal if an emergency pharmacist is present and absent, respectively. We currently have two full-time positions approved, with the final goal of staffing four emergency pharmacists for 24/7 coverage. With two full-time positions, a pharmacist is present from 11:00AM to 11:00PM, seven days a week.

Implementing an EPh Program

When implementing an emergency pharmacy practice, there are always obstacles. One of the primary issues is the overall shortage of pharmacists, which often requires clinical pharmacists to assist with medication distribution. In addition, training pharmacists for this practice area can be a challenge. In the United States, there are only six recognized programs for pharmacists in emergency medicine, and only two are accredited. With the annual number of ED visits virtually exploding, it is imperative to train pharmacists for this type of clinical practice.

A year of pharmacy practice residency is a prerequisite of the University of Rochester's specialty residency in emergency medicine/ critical care, to ensure the resident is comfortable with critical patients. The residents' training consists of rotations ranging from ambulatory to intensive care, including emergency medicine, toxicology, emergency medical services, and pediatric emergency medicine. There are also several ICU rotations to ensure that the pharmacist is able to manage acute situations. We offer additional advanced training in ACLS, ATLS, ABLS, and AHLS. Our residents are required to become ACLS instructors so they are fluent with all means of medical resuscitation. The EM pharmacist resident also contributes to weekly education conferences, as well as to different areas of academia within the medical center.

The Impact of Emergency Pharmacy Services on Medication Safety

With chaos being the rule, rather than the exception, in the ED, a pharmacist can feel

out of place. Many pharmacists are detail-oriented and prefer a standard outline of their duties. With emergency medicine, triage is the only way to manage a shift. There is never a standard order to the day. It becomes necessary to handle tasks, just like the patients themselves, in the order required, based on urgency and complications. Many times, the pandemonium can be so overwhelming that the urge to "call it a day" early wars with the extreme gratification and reward of such intense patient contact, patient care, and teamwork in these life-saving efforts.

It is hard to describe the chaos of a trauma in words. For this typically short, seemingly insane time, the care that the patient requires is critical. The hectic environment makes the occurrence of errors all too feasible. Through pilot data, we were able to demonstrate that having a pharmacist as a member of the trauma resuscitation team reduced both potential and actual errors. Our goal was to reduce medication errors as well as provide safe, timely, and appropriate medication therapies to patients. (See table at right.)[3]

While initiating the growth of our EPh program, we looked at medication errors that occurred when the pharmacist was present versus absent. Anecdotally, we found that there were 19 reported errors over 19 months when the pharmacist was absent. Although our error-reporting system is voluntary, this data was enough evidence to substantiate the need for expanded pharmacy services. We are involved with an AHRQ grant to study the effect of a patient safety pharmacist within the ED, and our data is available at www.emergencypharmacist.com. The study was conducted over 12 months and evaluates 10,000 patient charts to determine the occurrence of medication errors in the ED when the pharmacist is present versus absent.

We discussed utilizing the emergency department pharmacist in the medication reconciliation process, but decided to leave the actual reconciliation to our admissions team. For treat-and-release patients, the pharmacist is involved in the decision-making process to continue or discontinue medications. All of the patient's medications are considered prior to any new medications being added to their treatment regimen.

Because of the Joint Commission's new regulations requiring all non-urgent medications be reviewed prior to administration, the pharmacist is involved in the drug therapy decision-making process. The initial ED orders are handwritten. Once the patient is admitted to the hospital, all medication orders are entered via CPOE and reviewed by the inpatient pharmacists. It is not unusual for a patient to board in the ED when beds are unavailable in the rest of the hospital. Since the majority of these medications are not considered urgent, the delay in access from inpatient pharmacy is acceptable.

Timing of Medications

The timing of medications was calculated from the difference between arrival time to ED and recorded medication administration time on trauma flow sheet.

	Pharmacist Involvement		Control (no pharmacist)	
Medication	**Median (minutes)**	**Range (minutes)**	**Median (minutes)**	**Range (minutes)**
Time to first medication	5	(1-25)	12	(1-587)
RSI	4	(1-35)	10	(1-46)
Analgesia	14	(4-60)	20	(3-300)
Sedative	17	(1-200)	28	(1-540)
Paralytic*	12	(1-60)	25	(1-255)
Antibiotic	11	(2-30)	20	(1-699)

* Paralytic medication time does not include succinylcholine used for rapid sequence intubation (RSI).

Conclusion

Integrating a pharmacist into the emergency health care team can be a challenge. Many emergency medicine practitioners question the need for a pharmacist until they have had the opportunity to work with one. It could be argued that the ED is one of the most critical areas of the hospital. With ICU pharmacists as the norm rather than the exception, it is only logical that the ED is also in dire need of clinical pharmacy services. If a pharmacist is able to prevent one significant medication error per year, the cost savings from avoided lawsuits could easily cover the

salary expenses. Naysayers only need a few shifts with these pioneers of pharmaceutical emergency medicine to understand the clear value of this role – one that is beyond price. Just as they have at Strong Memorial Hospital, the ED staff comes to depend on the pharmacist as a fundamental part their team and integral to quality outcomes and the welfare of their patients. ■

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Current residencies available for pharmacists in emergency medicine:

University of Rochester Medical Center*
Detroit Receiving Hospital*
Huntington Hospital
University of Illinois Chicago
Lakeland Regional Medical Center
Maimonides Medical Center
Robert Wood Johnson University Hospital

*Accredited by ASHP

References:

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