

## The Role and Value of ED Pharmacy Services

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SCSHP 2010 Annual Meeting



## Objectives

- Describe clinical challenges in the emergency department (ED)
- Describe literature in support of emergency medicine (EM) pharmacy services
- Describe the role of the pharmacist in the ED
- List challenges facing EM pharmacy services



## Clinical challenges in the emergency department



## Error-Producing Conditions

- Providers focused on stabilization (ABC's)
- Safety mechanisms not in place
  - Verbal orders
  - High stress situations
- Lack of information
  - Limited patient data



## Challenges to Patient Care

- Boarding of admitted patients
- Multiple patients treated simultaneously
- On-call physician shortage
- ED visits up 26%
- Wide range of medications used

*Emerg Med Clin N Am* 2003;21:141-58  
<http://www.acep.org/advocacy.aspx?id=21870>  
<http://www.cdc.gov/nchs/data/ad/ad358.pdf>



## Nursing Shortages

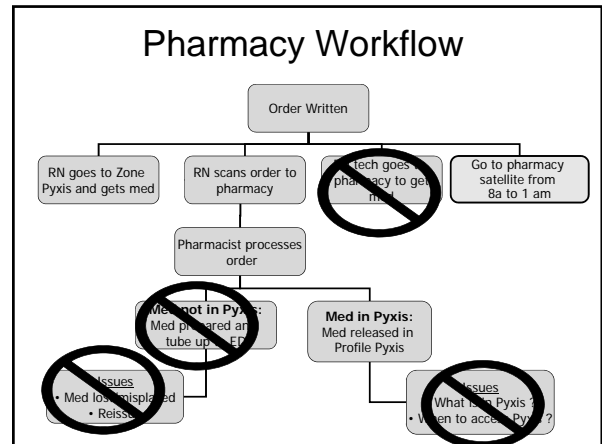
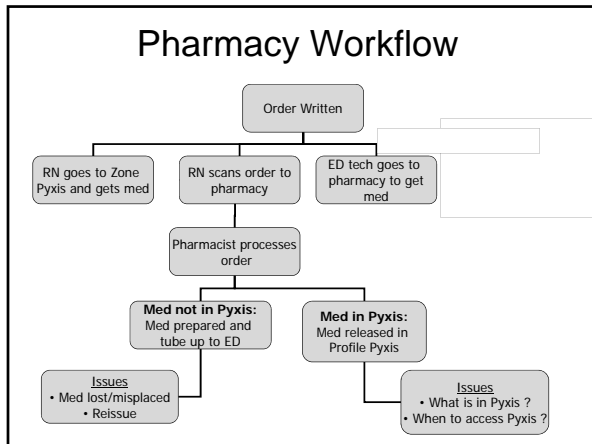
- 55% of surveyed nurses intend to retire between 2011 and 2020
- U.S. hospitals need 118,000 RNs to fill vacant positions (8.5% vacancy rate)
- Voluntary turnover for first-year nurses 27.1%

GHS survey

Area	Nurse: Patient Ratio
Floor	1:4-5
ICU	1:2
ED	1:7-12

<http://www.aacn.nche.edu>  
GHS = Grady Health System





### Hazardous Environment

- Transition of care point
- Patients present as strangers
- Multiple patients treated simultaneously
- Interruptions & distractions
- Time constraints
- Wide range of medications used

Emerg Med Clin N Am 2003;21:141-58  
http://emergencypharmacist.org/doc/DPH\_final.pdf

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### Medication Errors

- High-risk environment
  - Verbal orders
- High-risk medications
  - Intravenous route
- Transitional staffing
  - High turn-over
  - Shift work
  - Lack of experienced providers

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### Medication Errors in the ED

- More than 75% ED visits associated with medication administration or prescribing
  - >210 million medication encounters annually
- Higher prevalence of preventable adverse events
  - Elderly patients (N=898)
    - 3.6% in the ED
    - 5.6% upon discharge

Natl Health Stat Report. 2008;(7):1-38  
Acad Emerg Med 1999;6:1232-42  
Ann Emerg Med. 2002; 39(3):258-67

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### MEDMARX ED Med Errors

- 13,932 errors from 496 ED
  - 78 per 100,000 visits
- Characteristics
  - Administration phase
  - Improper dose
  - Failure to follow procedures

http://dx.doi.org/10.1016/j.jemermed.2008.02.059

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## Literature in support of emergency medicine pharmacy services

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## The Clinical Pharmacist in Emergency Medicine

- 14-item questionnaire (n=54)
- Benefit to patient care
  - Majority of MD and RN
- Recommendations followed
  - Always
  - Most of the time
- Transferable to other ED

Elenbaas RM. AJHP 1977;34(8):843-6

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## ICU Success with Dedicated Pharmacist

- Pharmacist on medical rounds reduced the risk of ADE's
- 99% of pharmacist recommendations to medical staff were well accepted
- Existing pharmacist participated in rounds
- Required no additional resources
  - Different use of existing pharmacists' time

Leape LL, Cullen DJ, Clapp MD, et al. JAMA 1999;282(3):267-70

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## Emergency Pharmacist (Eph) Improves TJC Compliance

- High-yield medication orders are reviewed
- The effects of medication(s) on patients are monitored
- High degree of communication with nurses and physicians <sup>[1]</sup>
- Hospital develops processes for managing high risk/high alert medications <sup>[2]</sup>

[1] Fairbanks, Patel, and Shannon. *Eph Time-Motion Study* (2007). Results presented at AHSP Mid-Year Clinical Meeting, December 5, 2007. (available at [www.emergencyp pharmacist.org/lookit.html](http://www.emergencyp pharmacist.org/lookit.html))

[2] Connors GP, Hays D. *Ann Emerg Med*. 2007;50:414-18

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## Valued Staff Member

- It has been shown that staff value the EPh
  - 26 item survey to random ED staff with 82% responding.
    - 99% felt EPh improves quality of care.
    - 96% felt EPh was an integral part of ED team.
    - 95% indicated they had consulted with EPh at least a few times during last 5 shifts.

Fairbanks RJ, et al. *Emerg Med J* 2007; 24:716-719

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## Clinical and Cost-Saving Pharmacy Intervention In The Emergency Room: A Four Month Study

Type of Intervention	No. Interventions	Average Cost Avoidance per Intervention (\$)	Cost Avoidance (\$)
Drug-drug or drug Disease interactions or drug incompatibilities Identified	334	1,647	297,053
Therapeutic recommendation	523	1,188	273,383
Adverse drug event prevented	48	1,098	23,190
Medication error prevented	488	1,375	436,150
<b>Total</b>	<b>1393</b>	<b>5,308</b>	<b>1,029,776</b>

Lada P et al, *Am J Health Syst Pharm*. 2007;64(1):63-8

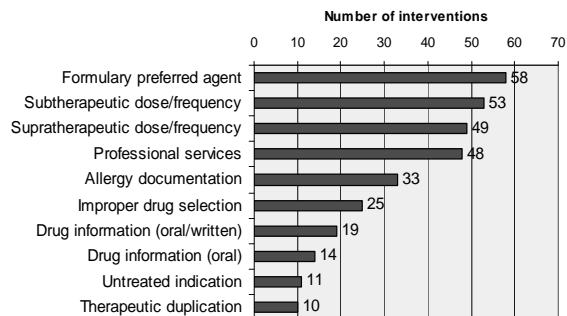
## Documentation of Pharmacist Interventions In The Emergency Department

JM Ling, LA Mike, J Rubin,  
P Abraham, A Howe, J Patka, D Vigliotti

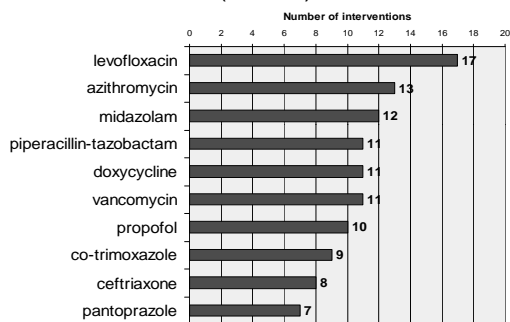
Am J Health-Syst Pharm. 2005; 62:1793-7



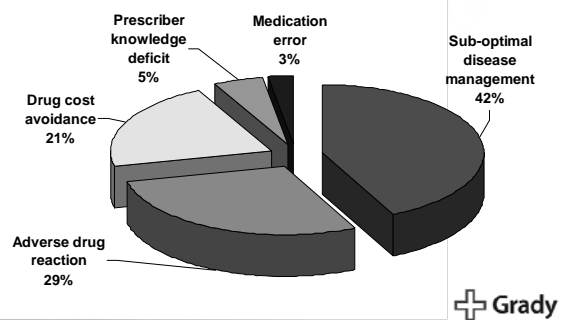
## Top 10 Interventions (N=360)



## Top 10 Drugs (N=360)



## Events Avoided (N=360)



## Cost-Avoidance (N=360)

Category	Percentage	Cost-avoided
Drug information	9%	\$701
Drug cost-avoidance	31%	\$3,354
Avoidance of additional treatment	60%	\$188,868
<b>Total cost-avoidance</b>		<b>\$192,923</b>

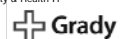
Annual Projected savings of about \$600,000



## The EPh – A Safe Measure In Emergency Medicine

- Presence in the ED improves process measures
  - Time to cath lab, abx in pneumonia, pain management, etc [1]
- Ensures a needed layer of safety in a vulnerable ED environment [2]
- Is a cost saving benefit to the ED [3]

[1] Fairbanks RJ. Results of the AHRQ Emergency Pharmacist Outcomes Study. American Society of Health-System Pharmacists 42nd Mid-Year Clinical Meeting, Las Vegas: 12/5/07. (available at [www.EmergencyPharmacist.org](http://www.EmergencyPharmacist.org))  
 [2] Fairbanks RJ et al. *The Optimized Emergency Pharmacist Role*. Presented at AHRQ Patient Safety & Health IT Conference, June 2006 (available at [www.EmergencyPharmacist.org](http://www.EmergencyPharmacist.org))  
 [3] Lada P et al. Am J Health Syst Pharm. 2007;64(1):63-8



## Medication Errors Recovered by Emergency Department Pharmacists

Rothschild JM, Churchill W, Erickson A, Munz K, Schuur JD, Salzberg CA, Lewinski D, Shane R, Aazami R, Patka J, Jagers R, Steffenhagen A, Rough S, Bates DW  
doi:10.1016/j.annemergmed.2009.10.012

Supported by the ASHP Foundation



## Characteristics of Study Emergency Departments

Site	Hospital A	Hospital B	Hospital C	Hospital D
Annual ED Visits	77,000	37,000	104,000	56,600
ED Beds	41	29	124	46
Pediatric patients	Yes	Yes	Yes	No
Observation unit in ED	No	No	Yes	Yes
Trauma Designation	Level 1	Level 1	Level 1	Level 1
Emergency medicine residency program	No	Yes	Yes	Yes
ED Computerized Physician Order Entry	Yes	Yes	No	Yes
Years of ED Pharmacy Program	7	5	9	2
Full Time Equivalent ED pharmacists	3	2.4	3	4
ED pharmacist coverage – total hours per week	112	97	107	168
ED pharmacist coverage by day and time	Mon-Sat 6AM - 12 MN Sat - Sun 1:30PM - 12MN	Mon - Fri: 7AM - 11PM Sat - Sun: 1:30PM - 10 PM	Mon - Fri: 8AM - 1AM Sat - Sun: 3PM - 1AM	247

## Data Collected

- Cumulative Data:
  - 227 observation periods
    - 791 hours at 4 EDs
  - Pharmacists reviewed 17,320 medications that were ordered or administered
  - 6,471 patients affected
- Mean Data per Observation Period:
  - Number of medications = 76.6
  - Number of patients = 28.6
  - Observation duration = 3.5 hour



## Observations and Recovered Errors

Hospital Site	A	B	C	D	All
Medications reviewed by RPh	3404	3702	3496	6718	17320
Medications reviewed per session	56.7	75.6	54.6	126.8	76.6
Recovered MEs	146	80	110	169	505
Recovered MEs per 100 pts	6.2	8.2	9.6	8.5	7.8 [6.2 – 9.6]
Recovered MEs per 100 meds	4.29	2.16	3.15	2.52	2.92 [2.16 – 4.29]

## Types of Recovered Errors

Type of ME	n (%)	Examples of the Most Frequently Recovered Medication Errors
Under dose	94 (16.8)	Order received for a loading dose of 1400 mg acetylcysteine for a 100 kg pt. with an acetaminophen overdose. The RPh corrected the dose to 14000 mg.
Over-dose	87 (12.5)	Order received for a heparin infusion rate at 500 units/hour but was transcribed by the nurse as 500 units/kg/hour. The RPh corrected the error.
Drug Omission	59 (10.5)	Order received for Ca gluconate, Kayexalate and insulin to treat severe hyperkalemia. The RPh noticed the blood glucose of 100 mg/dl and recommended adding 50 gms IV dextrose.
Wrong Drug	38 (6.8)	Order received for succinylcholine for RSI of a patient with a K+ of 8.3. The RPh recommended changing to rocuronium.

## Summary of Results (1)

- ED RPhs Interventions:
  - 25.7 potentially harmful MEs (mean) per 40 hours of observation
  - 48 % judged potentially serious
  - 36 % significant
  - 4.4 % judged life-threatening
- 96.8 % of ED Pharmacist recommendations were accepted



## Summary of Results (2)

- Status of Recovered Potentially Harmful ADEs:
  - Intercepted 90.3 %
  - Mitigated 3.9%
  - Ameliorated 0.2%
- Most Common Medications Intervened on:
  - Antimicrobials 32 %
  - CNS agents 16%
  - Anticoagulant/lytics 14%



## Conclusions

- ED Pharmacists commonly recover and prevent potentially harmful MEs and improve patient safety
- ED pharmacists play a critical role in improving the quality of patient of care by improving drug treatment regimens
- Controlled trials are necessary
  - Net cost-benefit, safety, quality and costs
  - This is an especially important consideration for smaller emergency and pharmacy departments.

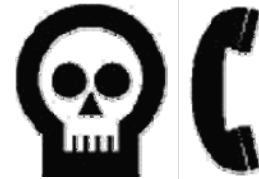


## Role of the pharmacist in the emergency department



## Pioneers of ED Pharmacy

- Purely clinical
  - Academic faculty
  - Research
  - Teaching
- Toxicology
- Trailblazers



## ED Clinical Pharmacy Services

Clinical Service	Hospitals with Dedicated ED Pharmacist (n = 17)
Medication-error or adverse-drug-reaction reporting	14 (82.3)
Order clarification	13 (76.5)
Drug or toxicology information	14 (82.3)
Formulary adjustment	12 (70.6)
Cardiopulmonary resuscitation participation	10 (58.8)
Allergy screening	11 (64.7)
ED inservice meetings	13 (76.5)
Drug interaction screening	11 (64.7)
Antimicrobial dosing	10 (58.8)
Drug-use review	10 (58.8)
Renal dosing	10 (58.8)
Drug therapy recommendations	12 (70.6)
Pharmacokinetic dosing	9 (52.9)
Patient education and counseling	12 (70.6)
Research activities	7 (41.2)
Assessment of patient contraindications to therapy	11 (64.7)
Serving as preceptor for students and residents	9 (52.9)
Medication history review	7 (41.2)
Other	4 (23.5)

Thomasset KB, et al. Am J Health Syst Pharm 2003;60:1561-4

## ED Job Duties

- Emergency response
- Education
- Distributive
- Clinical



## Emergency Response

- Participate in code response, trauma resuscitation, thrombolytic administration
- Titration of critical medications
- Facilitate drug procurement



## Education

- Physicians
- Nursing
- Patients
  - Discharge counseling
  - Smoking cessation
  - Heart failure



## Distribution

- Immediately review high risk medication orders
  - Pediatric orders < 1 year of age and/or less than 10 kg
- Provides immediate accessibility to healthcare team
- USP 797 standards



## Clinical

- Formulary management
  - Consults with MD
- Renal dosing
- Antibiotic recommendations
  - MRSA
  - Resistance
- Pathway development



## Emergencypharmacist.org

Home | Projects | Team | Links | Resources & Tools | Policy | FAQ | Partners | Contacts

Welcome

This website provides the resources and results associated with the [JGIM](#)-funded research program aimed at increasing the use of clinical pharmacists in emergency medicine. The project goal include providing a body of evidence to demonstrate the value of using emergency pharmacists in the emergency department.

New Items

See the [Publicity Page](#) for new relevant journal articles and news items regarding emergency pharmacist programs in the news.

- [ASHP](#) has announced the 2009 [Patient Care Impact Program](#) will include an Emergency Pharmacist Mentorship Program. Dr. Hays and Dr. Farbanks will be mentors for this program. Please see the [ASHP website](#) for further information and application materials.
- [Emergency Practice News](#) January 2009 edition provides an excellent overview of the [ASHP December presentation summarizing the results of the study](#). See the [Publicity Page](#) for links to the article.
- Our program was featured in [AMBO's podcast program "Healthcare 411"](#). See the [Publicity Page](#) for links to the program.
- Our research was featured in the October 2007 edition of [Patient Safety and Quality](#) [newsletter](#), in an article written by Carolyn Chinn, MD, Director of AMBO. See the [Publicity Page](#) for links to the article.

Three slide presentations now available to assist hospitals, pharmacists, and emergency departments in their efforts to describe, justify, and implement new Emergency Pharmacist programs. These tools are a direct result of efforts funded by the Agency for Healthcare Research and Quality, and are available for download. They may be modified and used for any purpose.

- Part 1: Justification.** [Newly Updated!](#) This slideset provides a review of the literature that helps justify the need for an emergency pharmacist program. [Download](#) | [Email Us](#) | [PDF](#)
  - [IA](#) [Download an example of how this resource was modified by staff at Sarasota Memorial Hospital \(FL\)](#) and used as a presentation to hospital leadership. This presentation resulted in approval for 2 EPs to initiate the Emergency Pharmacist Program, which was started in the fall of 2007. (Emergency Pharmacist Nicholas Makrisian participated in a 2007 [ASHP Patient Care Impact Program](#) sponsored by ASHP.)
  - [ID](#) [Attestation to the value of the Emergency Pharmacist Role: Study finds that emergency physicians and nurses highly value the use of an Emergency Pharmacist and feel they improve medication safety and quality of care](#) (published in the [Emergency Medicine Journal](#), October 2007). [Link to abstract](#) (or [email us](#) for a reprint). [Download related quotes from staff](#) (pdf/100kb)
  - [IE](#) Local newspaper article features the emergency physician and nursing reaction to the role of an emergency pharmacist, and discusses cost savings and other advantages. [Download pdf](#) (66 kb)
  - [ID](#) A three-page summary of the [justification for the role of a clinical pharmacist in the emergency department](#) (45 relevant references). [Download PDF](#)
- Part 2: Role of the EP.** This slideset describes the details of the typical role of the clinical pharmacist in the ED. [Download](#) | [Email Us](#) | [PDF](#)
  - [2A](#) A sample [job description](#) which can be adopted for use as a resource for new programs. [MSWord](#) | [PDF](#)
  - [2B](#) A sample list of [job qualifications](#) for the EP which can be adapted for use in job postings. [MSWord](#) | [PDF](#)
  - [2C](#) AMBO Conference presentation: "The Optimized Emergency Pharmacist Role" [Download Presentation](#) | [Download Slideset](#)
  - [2D](#) American Journal of Health System Pharmacy article describing the Emergency Pharmacist pilot program. [Download PDF](#)
- Part 3: Implementation.** This slideset describes some of the challenges, barriers, and solutions that can be experienced during the successful implementation of an emergency pharmacist program. [Download](#) | [Email Us](#) | [PDF](#)
  - [3A](#) [Our Local Emergency Pharmacist, Daniel Hays, Ph.D., presented a talk at ASHP on 10/26/07 entitled "Implementation of an Emergency Medicine Pharmacy Residency."](#) [Download his talk by clicking here](#). (10/26/07)




## Challenges facing emergency medicine pharmacy services

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## ED Crowding

- Once every minute an ambulance is diverted from an ED that is full to one farther away



<http://www.iom.edu/Object.File/Master/35/014/Emergency%20Care.pdf>

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## Evolving Roles

- Clinical
- Distributive
- PGY-2 residencies

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## TJC standards

- Medication review
  - Standard MM.4.10
- Med reconciliation
  - National patient safety goal 8
- Core measures
  - Pneumonia, MI, HF, EGDT

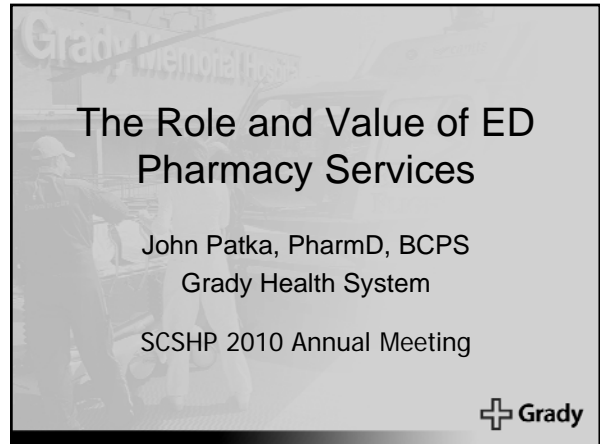
EGDT=early goal directed therapy

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## Healthcare Economics

- Increasing costs
- Healthcare consultants
- Clinical cost avoidance may be considered soft

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