

Pharmacists as a Means of Cost Containment in the Emergency Department

Alison M. Jennett, Pharm.D.
Clinical Pharmacy Specialist, Emergency Medicine
Detroit Receiving Hospital, Detroit, MI

*Presented at American Society of Health-System Pharmacists Mid-Year
Clinical Meeting, Anaheim, CA; December 6, 2006*

Objectives

- Describe how current Emergency Medicine (EM) pharmacist services help contain costs
- Describe documentation of pharmacist cost containment published in the literature
- Describe how the ASHP 2015 initiatives and JCAHO requirements may aide EM pharmacists with potential cost containment

“Economic constraints have generally precluded the incorporation of ED-based clinical pharmacists, but because the enormous economic burden associated with adverse drug events, it may be more cost effective to use the high-level expertise of an in-house clinical pharmacist.”

Where did we begin?

- Initial services offered were primarily distributive
- Pharmacy was a method for inventory management and *cost savings*
- Gradually developed into performance of clinical services
- Cost saving documentation assisted securing job position

What have we done?

- Literature documenting clinical services include the following areas:
 - Toxicology
 - Hazmat
 - Clinical dosing services
 - Attending medical rounds
 - Drug utilization review
 - Code attendance

Where do we practice?

83 institutions (2006)*

- Arizona – 3
- Arkansas – 1
- Australia – 3
- Canada – 4
- California – 4
- Colorado – 3
- District of Columbia - 1
- Delaware – 1
- Europe – 1
- Florida – 4
- Georgia – 4
- Illinois – 6
- Kansas – 1
- Kentucky – 1
- Maryland – 4
- Massachusetts - 2
- Michigan – 7
- Minnesota – 2
- Missouri – 2
- Nebraska – 1
- New Jersey – 2
- New Mexico – 1
- New York – 6
- North Carolina – 2
- Ohio – 4
- Oklahoma – 1
- Pennsylvania – 2
- South Carolina – 1
- Tennessee - 1
- Texas – 3
- Utah – 1
- Washington – 2
- Wisconsin – 1
- West Virginia - 1

*Increased from 49 institutions in 2004

What services do we currently offer?

- Anticoagulation consult service
- Pharmacokinetic consult service
- Code attendance
- Drug information
- Educational in-services
- Order clarification
- Research assistance
- Medication reconciliation
- Patient history
- Therapeutic interchange
- Formulary management
- Interdisciplinary rounding
- Medication history
- Protocol and policy development

Additional Pharmacy Services

- IV preparation
- Appropriate labeling
- Assuring IV compatibility
- Screening for drug interactions
- Allergy documentation
- Review medication orders
- Promote safe medication practices
- Report medication errors, near misses, and adverse drug events
- MUE performance

**So, how can we
contain costs?**

Documented Pharmacist Activities

- Medication reconciliation/history
- Review medication orders/Order clarification
- Clinical dosing services
- Interdisciplinary rounding
- Formulary management/Criteria Monitoring
- Therapeutic interchange

EM Pharmacist Activities

- Discharge prescription control
- Promote safe medication practices
- Staff education
- Reduce medication errors
- Drug utilization review
- Code attendance
- Drug information
- IV preparation

**What does the
literature support?**

Medication Errors

- 44,000 – 98,000 Americans die each year
- 1 in 50 hospitalized patients experiences a preventable adverse event¹
- 3% of these take place in the ED¹
- 71% of serious errors occur during prescribing²

1. Schenkel S. Acad Emerg Med 2000;7:1204-1222

2. Peth HA. Emerg Med Clin N Am 2003;21:141-158

Medication Error Costs

- Drug-related morbidity and mortality has a reported annual cost of \$76.6 billion¹
- Adverse drug events nearly double hospital length of stay²
- Adverse drug events nearly double the risk of death in hospitalized patients²

1. Peth HA. Emerg Med Clin N Am 2003;21:141-158

2. Chassen DC, et al. JAMA 1997;277:301-306

Why More ED Errors

- Nature of the ED (Time and stress)
- 24 hour activity
- Over crowding
- More individual procedures and decisions
- Lack of pharmacist medication review
- High-risk patients
- High-risk medications
- Rotation of staff
- Poor patient history
- Increased number of medications available
- Increased number of ED visits and prescriptions written

2004

Emergency Medicine Statistics

- 110.2 million visits per year
 - 209 visits every minute in 2004
- 12.4% decrease in the number of EDs
- 78% of visits received medication
 - Average number of medications received was 2 drugs per visit
- <1% of EDs have pharmacy presence

2004

Emergency Medicine Statistics

- Number of medications provided or prescribed
 - 1 medication - 26 million
 - 2 medications - 29 million
 - 3 medications - 24 million
 - 4 medications - 13 million
- Adverse drug events
 - 3.3 million

5 Stages of Drug Order and Delivery

1. Prescribing
2. Transcribing
3. Dispensing
4. Administration
5. Monitoring

**Pharmacist can
have a direct
impact on all 5**

Pharmacist Activities Associated with Decreased Medication Errors

- Patient medication admission histories (51%)
 - Drug protocol management (38%)
 - Participation on medical rounds (29%)
 - Pharmacist provided drug information (18%)
 - Adverse drug reaction management (13%)
-
- Increased staffing
 - Clinical research
 - Drug therapy management
 - Drug counseling
 - Increased staffing of clinical pharmacists

- Average cost associated per single medication error = \$2378

Pharmacist Intervention	Associated cost savings/hospital
Patient medication admission histories	\$806,594 (\pm 692,205)
Drug protocol management	\$496,669 (\pm 259,284)
Participation on medical rounds	\$433,676 (\pm 344,613)
Pharmacist provided drug information	\$220,013 (\pm \$190,291)
Adverse drug reaction management	\$137,472 (\pm 103,366)

Documentation of Clinical and Cost-saving Pharmacy Intervention in the Emergency Room

■ Methods

- Document clinical interventions and information
- Utilized a documentation card for input

■ Setting

- ED University affiliated urban Level I trauma center for adult patients in Detroit, MI
- 92 beds

■ Study period

- 1989 - 1991

EM Pharmacist Responsibilities

- Prompt medication selection
- Preparation of medication
- Delivery of medication
- Drug information
 - Appropriateness
 - Cost

Documentation of Clinical and Cost-saving Pharmacy Intervention in the Emergency Room

- Largest cost savings based on clinical interventions
- 2 Major interventions
 - Medication selection
 - Dose change

Year	# of interventions	# of saving interventions	Cost savings (\$)
1989	9,700	1,334	31,041.20
1990	15,770	1,464	54,007.09
1991	15,637	1,541	93,561.22

Documentation of Clinical and Cost-saving Pharmacy Intervention in the Emergency Room

- Study Conclusion:
 - Pharmacists have a positive impact on:
 - Distributional
 - Clinical
 - Educational services
 - Quality of patient care
 - Minimization of medication errors
 - Cost savings: ~ \$180,000

Documentation of Pharmacists' Interventions in an ED and Associated Cost Avoidance

■ Setting

- ED University affiliated urban Level I trauma center for adult patients in Detroit, MI
- ED pharmacy services 24/7
- 85,000 visits annually
- 100 beds

■ Study period

- November 2003 – February 2004

Documentation of Pharmacists' Interventions in an ED and Associated Cost Avoidance

■ Study Objectives

- To perform a descriptive analysis of pharmacist interventions and resuscitation experience in the ED
- To evaluate potential cost savings and cost avoidance associated with interventions

EM Pharmacist Responsibilities

- Drug information
- Pharmacokinetic consultations
- Anticoagulation consultations
- Medical staff in-services
- Emergency resuscitation team participation
- Antimicrobial surveillance
- Research assistance
- Order entry/medication preparation and dispensing
- Formulary interchanges
- Sample medication provision for indigent patients

Pharmacist Interventions Documented During the Study Period

Category (<i>n</i> = 2150)	No. Interventions
Drug information	362
Dosage adjustment	353
Nursing questions	316
Formulary interchanges	181
Suggest initiation of Rx	180
Order clarification	164
Change to alternative Rx	157

Potential Impact

- Time frame = 4 months
- 2,150 total interventions
 - Averaging 539/month
 - Extrapolated to 6,468/year
- Cost analysis
 - \$4.68 – \$16.70 per dollar spent on pharmacist
 - \$1,639,872 – \$5,851,568 range
 - Averaging \$3,745,720 in potential cost savings

Lada, P. *Am J Health-Syst Pharm* 2007
Schumock GT, et al. *Pharmacotherapy* 1996
Schumock GT, et al. *Pharmacotherapy* 2003

Potential Cost Avoidance

Type of intervention	Number of intervention	Avg. cost avoidance per intervention	Avg. probability of harm	Cost Avoidance (\$)
Drug, disease, interactions or incompatibilities	334	1,647	0.54	297,503
Therapeutic recommendation	523	1,188	0.44	273,383
Adverse drug events	48	1,098	0.44	23,190
Medication-error prevention	488	1,375	0.65	436,150
Totals	1393	1,030,226

\$3,090,678

Lada, P. *Am J Health-Syst Pharm* 2007
Lee AJ, et al. *Am J Health-Syst Pharm* 2002

Then and Now

Levy DB, et al

- Focused on 13 interventions
 - Recommended appropriate procedure or treatment modality
 - Reviewed chart of poisoned patients
 - Pharmacokinetics mainly consisted of gentamicin, phenytoin, and theophylline
- Cost savings ranged from \$30,000 to \$94,000

Lada P, et al

- Focused on 15 interventions
 - Nursing question
 - Patient education
 - Discontinuation of drug therapy
 - Drug therapy duplication
 - Pharmacokinetics consists of aminoglycosides, antibiotics, antiepiletics, heparin, warfarin, thrombolytics, etc
- Potential cost savings \$1,600,000 to \$5,800,000

Cut Medication Errors in Half with ED Pharmacist

- One-month pilot test, one pharmacist, 8hr/day
 - Direct cost savings = \$61,000 due to improved use of appropriate medications
- Activities included:
 - Code response
 - Medication order review
 - Staff education
 - Toxicology and drug information
 - Clinical dosing services
 - Patient medication history and review
 - Adverse drug reaction management
 - Safe medication practices

Documentation of Pharmacists' Interventions and Associated Cost Savings

- Hand-held personal digital assistants to collect data on pharmacist interventions
 - Recorded patient information, type of and reason for intervention, recommendation made, and acceptance of recommendation
- Overall acceptance rate = 97%

Documentation of Pharmacists' Interventions and Associated Cost Savings

- Cost avoidance by intervention (annual)
 - Drug-drug or drug-disease interaction or incompatibility
 - \$64,000
 - Therapeutic recommendation
 - \$1,129,600
 - Adverse drug event
 - \$23,700
 - Medication error prevention
 - \$254,700

Cost Containment of Emergency Room Prescriptions

- Pharmacy services developed guidelines for pharmacist review and control of prescriptions written in the ED
- Pharmacy services developed prescription standards and quantity limits for discharge prescriptions generated from the ER
 - Net cost savings per prescription
 - \$119

- Medication errors
- Clinical dosing services
- Interdisciplinary rounding
- Drug utilization review
- Code attendance
- Drug Information
- IV preparation
- Order clarification
- Medication reconciliation
- Therapeutic interchange
- Formulary management
- Discharge prescription control
- Promote safe medication practices

Future Direction

ASHP

2015™

HEALTH-SYSTEM PHARMACY
INITIATIVE

- ASHP vision statement embraces four main themes for improving the practice of hospital pharmacy:
 - “making medication use more effective, safe, and scientific; and contributing in a meaningful way to public health”
- Six key goals and 31 objective
 - Flexible structure to allow implementation of at least some elements

**“Must have”
goals**

■ Goal 1

- Increase the extent to which pharmacists help individual hospital inpatients achieve the best use of medication

■ Goal 2

- Increase the extent to which health-system pharmacists help individual non-hospitalized patients achieve the best use of medications

■ Goal 3

- Increase the extent to which health-system pharmacists actively apply evidence-based methods to the improvement of medication therapy

■ Goal 4

- Increase the extent to which pharmacy departments in health systems have a significant role in improving the safety of medication use

■ Goal 5

- Increase the extent to which health systems apply technology effectively to improve the safety of medication use

■ Goal 6

- Increase the extent to which pharmacy departments in health systems engage in public health initiatives on behalf of their communities

**JCAHO National
Patient
Safety Goals**

JCAHO National Patient Safety Goals

1. Improve the effectiveness of communication among caregivers
2. Improve the safety of using medications
3. Accurately and completely reconcile medications across the continuum of care

JCAHO Key Areas for the ED

1. Monitor the timeliness of lab reporting critical values to the clinician
2. Obtain complete medication lists from patients
3. Assess danger of patient falls
4. Review “Look-Alike/Sound-Alike Drugs”

Thank You

For more information:

Alison M. Jennett, Pharm.D.

Clinical Pharmacy Specialist, Emergency Medicine

ajennett@dmc.org