Practical Approaches to Patient Safety

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Part I: Medical Error Scenarios and Perspectives on Patient Safety

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Patient Safety
Part I: Overview

• Extent of the Problem
• Systems Thinking
• Success Stories in Safety
• Error Reporting and Analysis
• Root Cause Analysis
• Designing Systems
• Safety Improvement Initiatives

Scenarios
Wrong Site Surgery

• 53-year-old male
• History:
  – diabetes
  – stroke
  – drug-resistant staphylococcus aureus infection
  – leg ulcers
  – heart failure
• Admitted for treatment of bilateral leg ulcerations and cellulitis
Scenarios
Wrong Site Surgery

• Unresponsive to treatment (Tx)
• Developed distal ischemia bilaterally
  – worse in the right lower extremity
  – gangrene in the right lower extremity
• Surgery scheduled
  – below-the-knee amputation
  – right side

Scenarios
Wrong Site Surgery

• Surgical prep:
  – surgeon marked RLE with an “X”
• At time of surgery:
  – RLE was covered
  – LLE was draped for surgery
Scenarios
Wrong Site Surgery

- Surgeon’s perspective:
  - thought he had marked the appropriate limb preoperatively
  - did not find the “X” on the left limb, and the right limb was covered
- Surgeon proceeded with below-the-knee amputation of the LLE

Error discovered postoperatively

Patient underwent a below-the-knee amputation of RLE
  - patient became a double amputee

WHAT REALLY WENT WRONG?
Scenarios

The Sign-out

• 83-year-old hypertensive woman
  – arrhythmia
  – recent pacemaker placement
• Hospitalized for fatigue and shortness of breath
• Evaluated for heart failure, myocardial infarction, and arrhythmia

Scenarios

The Sign-out

• Patient’s primary care physician (PCP) and cardiologist were off
• Covering physicians made rounds and discharged the patient
  – PCP ordered discharge and prescribed Lopressor® (metoprolol)
  – cardiologist examined patient and prescribed Toprol XL® (metoprolol)
  – Resident prescribed amiodarone and digoxin
• Each physician was not aware of the prescriptions written by the others
• Time pressures on the floor
  – nurse did not go over prescriptions with patient
**Key Definitions**

- **ADVERSE EVENT**
  - an injury caused by medical management

- **ERROR**
  - failure of a planned action to be completed as intended or use of a wrong plan to achieve an aim

- **PREVENTABLE ADVERSE EVENT**
  - an adverse event caused by error

**Extent of the Problem**

**Estimated Impact of Medical Errors**

- 44,000–98,000 deaths per year
- Potential underestimate or overestimate
- Medication errors are especially prevalent

Source: Institute of Medicine 2000.
### Federal Mandates for Quality Improvement

1997: Advisory Commission on Consumer Protection and Quality in the Health Care Industry

1998: Advisory Commission cites quality problems
   - avoidable errors
   - underutilization of services
   - overuse of services
   - variation in services

1998: Quality Interagency Coordination (QuIC) Task Force focuses on medical error research

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### 1999: The 1st IOM Report

*To Err is Human*

- **The challenge**
  - reduce medical errors by 50% in five years

- **The call to action**
  - non-punitive error reporting systems
  - legislation for peer review protections
  - performance standards for safety assurance
  - visible commitments to safety improvement
  - attention to medication safety

Source: Institute of Medicine 2000.
2001: The 2nd IOM Report
*Crossing the Quality Chasm*

- Safety is a key dimension of quality
- Systems approach to safety improvement
  - simply trying harder will not work
  - stepwise correction of problems in the system is the key to success
  - overcome the culture of blame and shame: Human error is to be expected!


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**Quality health care is...**

- SAFE
- Effective
- Patient-centered
- Timely
- Efficient
- Equitable

Pathophysiology of Error

Human Factors

- **Slips, lapses**
  - triggered by interruptions, fatigue, time pressures, anger, anxiety, fear, boredom, etc.
- **Mistakes**
  - result from a wrong plan of action
  - involve misinterpretation of problem, lack of knowledge, habitual patterns of thought

Sources: Reason J. *Human Error*, 1990

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Two Ends of Health Care Systems

PATIENT

Sharp End

- Practitioners
- Tools of the Trade

Blunt End

- Physical Infrastructure
- Health Plans, Payers...
- State Mandates, Regs...
- Federal Mandates, Regs...

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Life at the Sharp End

TRIGGER
(wrong drug prescribed)

1st Defense
(distracted nurse)

Latent failure
(understaffing)

2nd Defense
(pharmacy)

Latent failure
(no Rx tracking)

3rd Defense
(vigilant nurse)

Latent failure
(understaffing)

Adverse Event Averted

Life at the Sharp End

Standardized approaches can reduce variability and improve system efficiency

TRIGGER
(wrong drug prescribed)

1st Defense Template

Adverse Event Averted

Where Are Latent Failures in Office-Based Practice?

- Incomplete information
- Understaffing
- Distractions
- Patient nonparticipation
- Communication skills
- Transcultural issues
- Information systems
- Medication errors
- Tracking and follow-up
Health Care vs. Aviation

Similarities
- Complex, inherently hazardous
- Exacting performance requirements

Differences
- Higher preventable incident rates
- Most incidents are less visible
  - errors often go undetected
- Professional interactions are not standardized

Aviation: A Success Story in Safety

Aviation Safety Reporting System (ASRS)
- Funded by the FAA, administered by NASA
- Focuses on prevention
- Entails collection, analysis, and response to aviation safety incident reports
  - reports are submitted voluntarily
  - includes only near misses
  - analysis and response are key to improvement
**Anesthesiology: A Success Story in Safety**

*Anesthesia Patient Safety Foundation (APSF)*

- Dramatic reduction in anesthesia-related deaths
  - from 1/10,000 in early 1980s to 1/200,000 today
- Raised awareness and culture of safety
- Technological advances are a part (e.g. pulse oximeters, capnometers, $O_2$ analyzers)
- Simulators
- Benefits to practitioners
  - anesthesiologists used to pay $30,000/year for malpractice insurance; now they pay $5,000–$10,000/year

Source: Guadagnino C (Interview with Dr. Ellison Pierce) 2000.

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**VA: A Success Story in Safety**

*Veterans Health Administration*

- Bar-coding of medication systems
  - reduced medication errors by two-thirds
  - in place at all VA facilities
- Surgical Quality Improvement Program
  - 10% reduction in mortality
  - 30% reduction in post-op complications

Source: Department of Veterans Affairs 1999.
Current Reporting Systems

- Complex
- Duplicative
  - Joint Commission on Accreditation of Health Care Organizations, Department of Public Health, Medical Board
- Focus on sentinel events
- May be discoverable
- In the absence of tort reform will not work

Root Cause Analysis (JCAHO)

What Happened?
- Details of the sentinel event

Failure Mode Analysis
- Why did it happen?
  - proximal cause
- Under what circumstances?
  - potential root causes

Risk Reduction Strategies
- Action plan to prevent recurrence

Source: [http://www.jcaho.org](http://www.jcaho.org)
Understanding the Current System

*Error reporting alone is not enough*

- Tendency to focus on individuals, not the system
- Proximal causes happen at the sharp end
  - hindsight bias (20-20 vision) — observations not apparent before or during the event
  - don’t swat mosquitoes, drain the swamp
- Complex systems harbor latent failures
  - elements can operate in an unintended or undesirable manner
  - Murphy’s Law applies

Designing Systems for Safety

- **Simplify processes**
  - reduce hand-offs
  - make workplace user-friendly
- **Reduce variation**
  - standardize processes
  - reduce reliance on memory and vigilance
- **Collaborate and improve communication**
  - physicians, nurses, NPs, PAs, pharmacists...
  - patients and their families
### Automation and Information Technology (IT) Systems

#### Benefits
- **Incorporate templates**
  - Computerized Physician Order Entry (CPOE) eliminates handwriting errors
  - Drug interaction/duplicate Rx alerts
- **Facilitate tracking and follow-up**
- **Streamline communications among practitioners and with patients**
- **Simplify and standardize record-keeping practices**

### Automation and IT Systems

#### Barriers
- Money
- Learning curve
- Standardization of IT systems
- Patient privacy
- Resistance to change
Medication Safety Programs

MedWatch (FDA)
- Mandatory postmarketing surveillance for drug and device manufacturers

National ePrescribing Patient Safety Initiative (NEPSI)
- Joint $100 M, 5-year project funded by several major technology companies.
- Free to every physician in the USA
  http://www.nationalerx.com/

Medication Safety Programs

Medication Errors Reporting Program (MER)
- Conducted by the U.S. Pharmacopeia (USP) and the Institute for Safe Medication Practices (ISMP)
- Voluntary reports (phone, mail, Internet) from frontline practitioners
- Reports shared with FDA and pharmaceutical manufacturers
- MER-TM (transfusion medicine) reports are de-identified
### Prescribing Safety Programs

**MedMARx (USP)**
- Anonymous, voluntary reports (via Internet)
- For hospitals’ internal use
- Includes RCA forms for convenience
  - *not* integrated with JCAHO database

### Nationwide Safety Initiatives

- [Institute for Safe Medication Practices (ISMP)](http://www.ismp.org)
- [The Leapfrog Group](http://www.leapfroggroup.org)
- [Joint Commission on Accreditation of Healthcare Organizations](http://www.jcaho.org)
- [National Center for Patient Safety (NCPHS-VA)](http://www.va.gov/ncps)
- [Institute for Healthcare Improvement](http://www.ihi.org)
- [National Patient Safety Foundation](http://www.npsf.org)
The Leapfrog Group

- Large, self-insured employers
- Market incentives to reward delivery of high-quality health care
- Three initiatives underway
  - evidence-based referral
  - ICU staffing and response
  - Computerized Physician Order Entry (CPOE)

A Few Simple Rules for Health Care in the 21st Century

<table>
<thead>
<tr>
<th>Current Approach</th>
<th>New Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Do no harm</em> is an individual responsibility</td>
<td><em>Safety is a system property</em></td>
</tr>
<tr>
<td>Information is a record</td>
<td>Knowledge is shared and information flows freely</td>
</tr>
<tr>
<td>Secrecy is necessary</td>
<td>Transparency is necessary</td>
</tr>
<tr>
<td>The system reacts to needs</td>
<td>Needs are anticipated</td>
</tr>
<tr>
<td>Professional autonomy drives variability</td>
<td>Decision-making is evidence-based</td>
</tr>
</tbody>
</table>

Source: Institute of Medicine 2001
Part I — Conclusion

- Mandate to reduce medical errors
- Systems thinking is the key
- Successful in other complex systems
- Error reporting and analysis
  - can uncover latent system failures
  - potential for improvement
- Some improvement initiatives underway
Practical Approaches to Patient Safety

- Prescription and medication safety
- Communication issues
  - tracking and follow-up
  - communication skills
- Transcultural issues

Types of Medication Errors
(>40 steps from doctor to patient)

- Prescribing errors
  - wrong drug
  - wrong dose
- Transcription errors (miscommunication)
- Dispensing errors
- Administration errors
  - wrong drug
  - wrong route
  - wrong time
  - improper syringe or IV prep
Common Causes of Medication Errors

1. Incomplete patient information
2. Unavailable drug information
3. Miscommunication of drug orders
4. Environmental factors and distractions
5. Labeling problems

Source: AHA Quality Advisory 1999
http://www.hospitalconnect.com/DeskttopServlet

Common Causes of Medication Errors

1. Incomplete Patient Information
   • Diagnoses
   • Lab values
   • Allergies
2. Unavailable Drug Information
   • Drug contraindications
   • Other medications
     – Duplicate prescriptions
     – Drug interactions
## Common Causes of Medication Errors

### 3. Miscommunication of Drug Orders
- Written prescriptions
- Look-alike names
- Sound-alike names
- Misuse of decimal points and zeroes
- Inappropriate abbreviations
- Misuse of metric and apothecary measures
- Ambiguous or incomplete orders

### 4. Environmental Factors and Distractions
- Noise, interruptions
  - transcription errors
  - multitasking
- Written prescriptions
- Fatigue
- Work overload
- Poor lighting
- Stocking and storage problems
Common Causes of Medication Errors

5. Packaging and Labeling Problems

- Look-alike packaging
- Hard-to-read labels

Source: Institute for Safe Medication Practices 2000. (Photos used with permission)\(^{17}\)

Common Causes of Medication Errors

When the Patient Leaves the Office

- Dispensing error at pharmacy
- Failure to read or understand labeling and product information
- Drug (e.g., OTCs) or food interactions
- Non-adherence
  - Prescription not filled or refilled
  - wrong dose, wrong time
  - improper administration (e.g., asthma inhalers)
Solutions for Look-alike or Sound-alike Names

• Don’t rely solely on memory

• Tips for error prevention
  – tell the patient/caregiver what it is and why you are prescribing it
  – provide both generic and brand names on handwritten prescriptions
  – consider ePocrates, MDPad, iScribe for Palm Pilot
  – Computerized Physician Order Entry (CPOE) systems


Solutions for Look-alike or Sound-alike Names

For Verbal or Telephone Orders

• Spell out the name of the drug
  – e.g., “X” and “Z” are common sound-alikes
  Ask listener to repeat the drug name, dosage, and frequency — “Hear Back”

### Danger of Handwritten Prescriptions

- Virtually all prescriptions are handwritten
- >30% of pharmacies investigated (n = 245) filled prescriptions for potentially lethal drug combinations
- Computerized pharmacy orders increase safety
  - allergy alerts
  - interaction alerts
  - tracking and record-keeping functions


### Solutions for Measures and Administration Orders

- Symbols and abbreviations can be dangerous
  - Q.D.  Q.I.D.  Q.O.D.
  - Never use “U” for “unit,” easily confused with “0” and “4”
  - Write the indication with “prn” meds
- Triple check dose, form (e.g., XL, CR, SR), and frequency
- Use leading zeroes, but not trailing zeroes
  - 0.5  NOT .5
  - 5  NOT 5.0
- If you *must* write, do so legibly and include the purpose!

Medication Errors at Home

- Patients or caregivers are in control
- Pharmacists are your partners
- Information and education are critical
  - is labeling/information easy to read?
  - is labeling/information easy to understand?
  - how do you know?

Systems & Communication
Tracking and Follow-Up

What happens when...
- you hand off to another physician?
- the patient goes home?
- the patient switches health plans?
- the patient moves to a different state?

How do you know?
### Systems & Communication

#### Dealing with Handoffs

**Handoff = Opportunity for Error**

- **Miscommunication**
  - especially with verbal communications
  - listening skills are critical: “Hear Back”!
  - due to distractions (e.g., noise, interruptions)
  - due to fatigue and stress

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### Systems & Communication

#### Tracking and Follow-Up

**Reducing the Risk of Error**

- information must follow the patient
Systems & Communication
Continuity of Care and Safety

High Risk
- Chronic conditions
  - complex care
  - many providers
- Changing health plans/employers
- Vulnerable populations
- Cultural/language issues
- Post-screening
  - for cancer, cardiovascular disease, etc.

Systems & Communication
Electronic Medical Records

- Tremendous potential
  - rapid, seamless communication; easy retrieval
  - automatic interaction and allergy checking

- Barriers to adoption
  - patient privacy
  - money
  - reimbursement
  - training
  - proprietary systems that can’t communicate with each other
### Systems & Communication

#### Available Tracking Systems

**Examples of Computerized Medical Records**

- MedicaLogic
- PocketChart
- MedData
- ChartWare*
- Practice Partner
- EpicCare*
- Health Probe PIM
- Q.D. Clinical
- PowerMed EMR
- SOAPware

* include good functionality for patients

- Patient Home Records
  - asthma, diabetes tools

Source: Rehm S, Kraft S. Electronic Medical Records, 2001

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### Systems & Communication

#### Communication Skills

- Sometimes you see or hear what you expect, not what’s really there
  - slips and lapses due to conditioning biases

- Every link in a chain of communications harbors a latent failure
  - put it in writing
Many Ways to Communicate

- Speaking
  - face-to-face
  - via telephone

- Writing
  - on a chart, sign-out, or prescription pad
  - in a letter or fax
  - via computer (e-mail)

- Sign language

Body language

Cultural Diversity Adds Complexity

- Language barriers: “once” vs. once
- Health belief models
- Social styles and moral values
- Religious beliefs and practices
- Economic considerations
**Systems & Communication**

**Language Barriers**

- **Access to translators**
  - “language banks”: AT&T, etc.
  - multicultural staff
  - judicious use of family members as translators
- **Qualifications**
  - ability to translate medical terminology
  - competence with dialects
- **Expense/reimbursement**
  - another unfunded mandate
  - an issue that will not go away

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**Systems & Communication**

**Health Belief Models**

- **Diverse views on health and wellness**
  - perceptions of distinguishing physical attributes
  - how the human body works and stays well
- **Attitudes toward physical intervention**
  - drawing or receiving blood; surgery
  - laying on of hands
- **“Alternative” therapies**
  - home remedies
  - physical therapies (e.g., acupuncture)
  - diet
Social Styles and Moral Values

- Trust
- Eye contact
  - propriety
- Touch
  - modesty
- Social interactions
  - within family systems
  - between males and females
  - between different age groups

Religious Belief and Practices

- Fasting
- Prayer
- Reverence for elders, family, and ancestors
## Systems and Communication

### Transcultural Resources

- **National Center for Cultural Competence**
  (Georgetown University Child Development Center)
  [http://gucdc.georgetown.edu/nccc/ncccabout.html](http://gucdc.georgetown.edu/nccc/ncccabout.html)

- **The Initiative to Eliminate Racial and Ethnic Disparities in Health (HHS)**
  [http://raceandhealth.hhs.gov/](http://raceandhealth.hhs.gov/)

- **The Cross Cultural Health Care Program**
  [http://www.xculture.org/index.cfm](http://www.xculture.org/index.cfm)

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## Part II - Conclusion

- **Prescription and medication safety**
  - look-alike and sound-alike drug names
  - decimals, zeroes, and abbreviations
  - CPOE and pharmacist consults can reduce errors

- **Tracking and follow-up**
  - chronic conditions present problems
  - complete, accurate charting and confirmation
  - electronic medical record systems can help

- **Transcultural issues**
  - more than language
Patient Safety

Improving a Critical Dimension of Quality in Health Care

Part III: Case Studies and Root Cause Analysis of Adverse Events

Patient Safety Curriculum

Part III

Case Studies and Root Cause Analysis

• Case #1: Post-surgical Chest Pain
• Case #2: Adverse Drug Event
• Case #3: Missed Ectopic Pregnancy
Guidelines for Root Cause Analysis

- Describe event
- Identify immediate (proximate) cause(s)
  - human factors
- Identify contributing factors
  - latent errors
  - systems and processes
- Create action plan for the SYSTEM

Source: Joint Commission on Accreditation of Healthcare Organizations 2001.

Identification of Contributing Factors

- Human resource issues
- Information management issues
- Environmental issues
- Leadership and organizational culture
- Communication

Source: Joint Commission on Accreditation of Healthcare Organizations 2001.
Case #1: Post-Surgical Chest Pain

65-year-old Haitian man
Non-English-speaking

- Patient admitted for elective cholecystectomy
- Surgery performed

The next morning...
- Daughter reported father’s chest pain to staff

Surgeon’s follow-up on the surgical floor:
- evaluated patient, analyzed EKG (tachycardia)
- paged medical consultant (no immediate reply)
- got paged to OR
- ordered chest radiograph to rule out postoperative pneumonia
Case #1: Post-Surgical Chest Pain

- Patient taken to Radiology

  2 hours later...
- Daughter asked nurse about father’s whereabouts
  - nurse called Radiology
  - technician said patient would return to floor soon

  30 minutes later...
- Patient returned to floor
  - had chest pain and increased shortness of breath

Case #1: Post-Surgical Chest Pain

- Surgeon was paged (in OR)
  - OR nurse returned page, conferred with surgeon
  - Repeat EKG was ordered

- Second EKG completed and faxed to surgeon

- Surgeon requested Radiology review of chest film
  - film could not be located
Case #1: Post-Surgical Chest Pain

- Patient’s condition worsened
  - diaphoretic, hypotensive, tachypneic
  - \( O_2 \) saturation = 75% (\( O_2 \) given @ 2L/hr)
- Code called and patient transferred to ICU
  - emergent intubation
  - CT angiogram revealed saddle pulmonary embolus
- Chest film had never been completed

Sample Flow Chart: Case #1

<table>
<thead>
<tr>
<th>Processes</th>
<th>Proximate Causes</th>
<th>System Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PACU follow-up</td>
<td>SURGEON</td>
<td>Inexperience</td>
</tr>
<tr>
<td>• Consult request and follow-up</td>
<td>• Delayed diagnosis of pulmonary embolus</td>
<td>Consultant inaccessible</td>
</tr>
<tr>
<td>• Transfer of responsibility</td>
<td>TRANSPORT WORKER</td>
<td>No clinical backup available</td>
</tr>
<tr>
<td>• Transfer of responsibility</td>
<td>• Left patient in Radiology without notifying responsible person</td>
<td>Overworked staff</td>
</tr>
<tr>
<td>• Transcultural communication</td>
<td>RADIOLOGY NURSE</td>
<td>Handoff process</td>
</tr>
<tr>
<td></td>
<td>• Did not monitor patient</td>
<td>Communication environment</td>
</tr>
<tr>
<td></td>
<td>• Did not notify responsible nurse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Did not recognize patient’s distress</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RADIOLOGY TECHNICIAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Did not recognize patient’s distress</td>
<td>No interpreter available</td>
</tr>
</tbody>
</table>
### Case #1: Conclusions

**Keys to Improved Safety**

- **Interdepartmental monitoring and tracking**
  - transport protocols and adherence
  - handoff/sign out protocols and adherence

- **Staffing**
  - distinction between clinical and nonclinical tasks

- **Transcultural communications**
  - language banks

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### Case #2: Adverse Drug Event

88-year-old woman with dementia and history of hypertension/CAD

- Patient became confused at nursing home
  - transferred to Emergency Department
  - previous admission for urosepsis
    - notation of allergy to levofloxacin

- Initial evaluation in ED
  - leukocytosis and pyuria
  - no fever or flank pain

- ED physician ordered levofloxacin
Case #2: Adverse Drug Event

- Levofloxacin administered on medical floor

*Over the next 6 hours...*
- Patient became agitated
  - required sedation and restraint
- Patient showed signs of anaphylaxis

Case #2: Adverse Drug Event

- Patient transferred to ICU

- Treated with...
  - IV corticosteroids
  - antihistamine
  - inhaled beta agonist

- Antibiotic switched to IV cephalosporin
### Sample Flow Chart: Case #2

<table>
<thead>
<tr>
<th>Processes</th>
<th>Proximate Causes</th>
<th>Contributing Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Document drug allergy</td>
<td>1st FLOOR NURSE</td>
<td>Incomplete documentation</td>
</tr>
<tr>
<td>• Transfer to nursing home</td>
<td>• ADR not recorded</td>
<td></td>
</tr>
<tr>
<td>• Check transfer sheets</td>
<td>ED PHYSICIAN</td>
<td>Incomplete transfer data</td>
</tr>
<tr>
<td>• Check in-house medical record</td>
<td>• Ordered drug to which patient was allergic</td>
<td>Delayed record</td>
</tr>
<tr>
<td>• Antibiotic Rx</td>
<td></td>
<td>ED workload</td>
</tr>
<tr>
<td>• Check medical record</td>
<td>PHARMACY</td>
<td>Medical record not checked</td>
</tr>
<tr>
<td>• Rx dispensing</td>
<td>• Dispensed drug to which patient was allergic</td>
<td></td>
</tr>
<tr>
<td>• Documentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Check medical record</td>
<td>2nd FLOOR NURSE</td>
<td>Overworked staff</td>
</tr>
<tr>
<td>• Rx administration</td>
<td>• Administered drug to which patient was allergic</td>
<td>Medical record not checked</td>
</tr>
<tr>
<td>• Documentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient monitoring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Processes
- Document drug allergy
- Transfer to nursing home
- Check transfer sheets
- Check in-house medical record
- Antibiotic Rx
- Check medical record
- Rx dispensing
- Documentation
- Check medical record
- Rx administration
- Documentation
- Patient monitoring

#### Proximate Causes
1st FLOOR NURSE
- ADR not recorded

2nd FLOOR NURSE
- Administered drug to which patient was allergic

ED PHYSICIAN
- Ordered drug to which patient was allergic

PHARMACY
- Dispensed drug to which patient was allergic

#### Contributing Factors
- Incomplete documentation
- Incomplete transfer data
- Delayed record
- ED workload
- Medical record not checked
- Overworked staff
- Medical record not checked
- Incomplete computerized medical record
- Lack of integrated system

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### Case #2: Conclusions

#### Keys to Improved Safety

- **Maintenance and transfer of medical records**
  - recordkeeping protocols and adherence
- **Multiple allergy alert mechanisms**
- **CPOE?**
  - allergy alerts available at point of care
  - automatic updating of medical records
Case #3: Missed Ectopic Pregnancy

35-year-old woman with painless vaginal bleeding

- Patient observed vaginal bleeding for 3 weeks
  - called physician’s office for appointment
  - PCP’s associate covered the case

- History
  - last menstrual period 3 weeks ago
  - uterine fibroids
  - no medications or herbal remedies

- Unremarkable exam

Case #3: Missed Ectopic Pregnancy

- Pelvic examination
  - blood at cervical os
  - nongravid uterus
  - several small masses (myomas)
  - no cervical motion tenderness

- Suspected bleeding due to fibroid
  - possible annovulation, incomplete abortion or uterine polyp

- Tests ordered
  - cultures
  - CBC
  - blood pregnancy test
Case #3: Missed Ectopic Pregnancy

- Instructed patient to call office for lab results
- Prescribed medroxyprogesterone acetate
- Patient called for test results
- Physician unavailable, no callback

- Bleeding continued
- Patient presented to Emergency Department
  - orthostasis
  - tachycardia
  - tachypnea
  - Hct = 14%
- Ruptured ectopic pregnancy
  - emergency laparoscopy/salpingectomy
  - hypotension and sepsis
Sample Flow Chart – Case #3

<table>
<thead>
<tr>
<th>Processes</th>
<th>Proximate Causes</th>
<th>Contributing Factors</th>
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<tr>
<td>Examination</td>
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<td>Atypical presentation</td>
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<tr>
<td>Diagnosis</td>
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<td>Referral process</td>
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<tr>
<td>Treatment (Rx)</td>
<td></td>
<td>Lab reporting and follow-up processes</td>
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<tr>
<td>Referral</td>
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<td>Sign-out process</td>
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<tr>
<td>Check lab results</td>
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<tr>
<td>Follow-up w/ associate</td>
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<tr>
<td>Dictation/transcription</td>
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<tr>
<td>Communication</td>
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<td>– with patient</td>
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<td>– with provider</td>
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<tr>
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<td>– with associate</td>
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<tr>
<td>– with patient</td>
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</tbody>
</table>

Covering Physician
- No mechanism for explicitly transferring responsibility for outpatients
- No mechanism to ensure labs returned to office and viewed by appropriate clinician

RN
- No mechanism for disclosing lab results to patient

Primary Care Physician
- No mechanism for calling patient back

Case #3: Conclusions

Keys to Improved Safety
- Point-of-service pregnancy testing
- Messaging systems and protocols
  - between associates
  - between office and labs
- Algorithm for nurses
  - elicit important information from patient
Questions

It's QUESTION TIME!!

The End

Thanks