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Shifting Patient Safety into High Gear

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Lessons in Medication Safety

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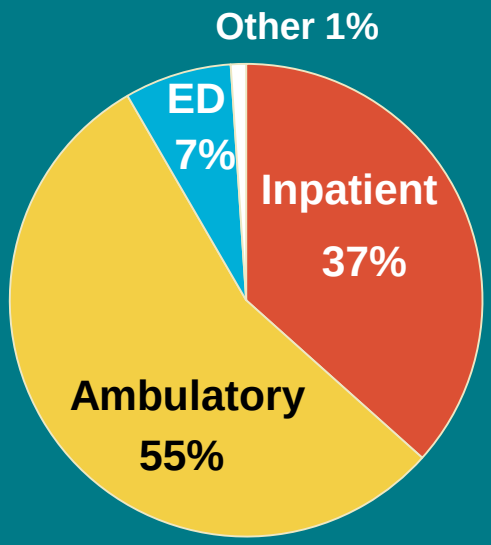
Medication-related Malpractice Data

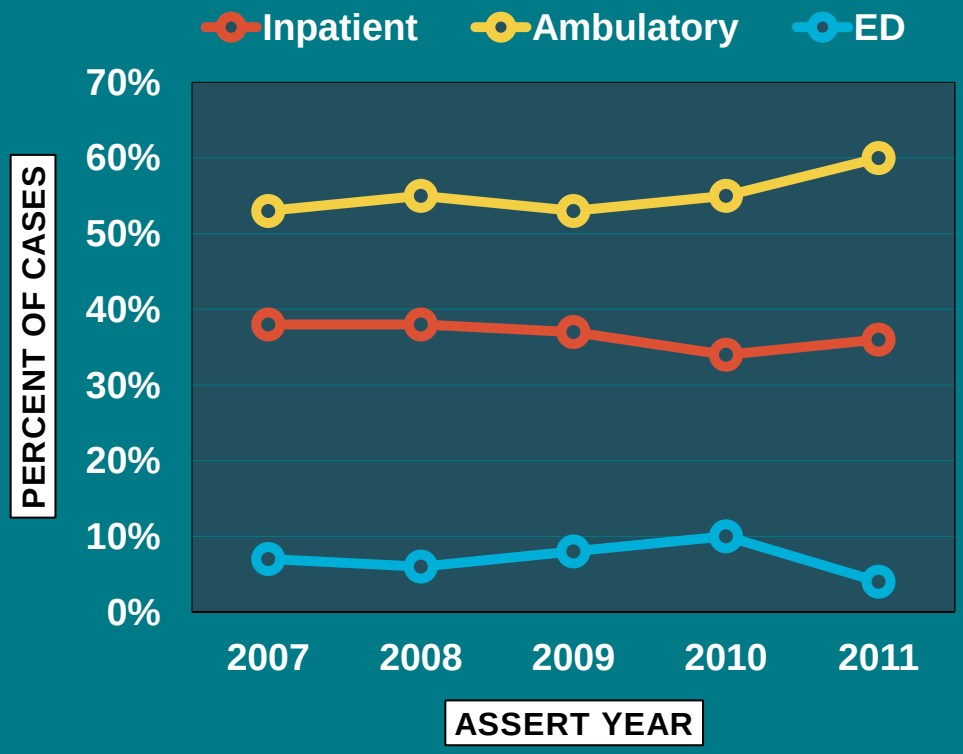
1,147 cases | $264M total incurred

2007-2011 (for CBS cases coded as of 10/31/12)

Ambulatory care medication claims trending up

Claimant Type Trends in Medication Cases





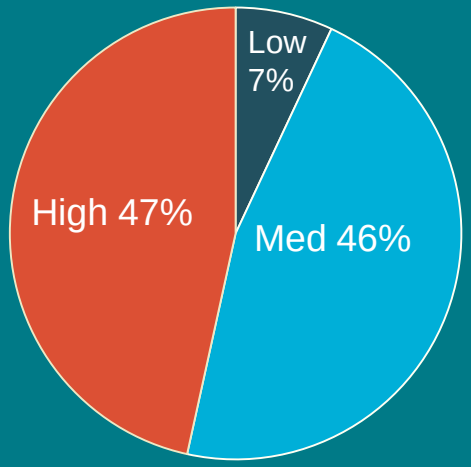
CBS N=1,147 professional liability cases asserted 1/1/07–12/31/11 with a Medication-related major allegation.

1,147 cases | $246M total incurred

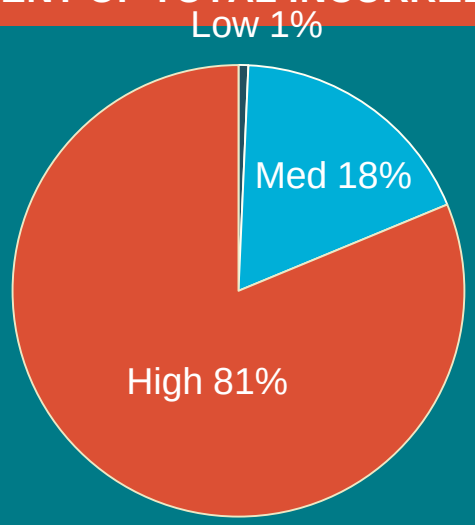
Close to 50% involved a high-severity injury

Injury Severity in Medication-related Cases

PERCENT OF CASES



PERCENT OF TOTAL INCURRED



CBS N=1,147 coded PL cases asserted 1/1/07–12/31/11 with a Medication-related major allegation.

Total Incurred=reserves on open and payments on closed cases.

Severity Scale: High= Death, Permanent Grave, Permanent Major or Permanent Significant
Medium= Permanent Minor, Temporary Major or Temporary Minor
Low= Temporary Insignificant, Emotional Only or Legal Issue Only

Monitoring, management top issue in both settings

Process of Care in Medication Cases

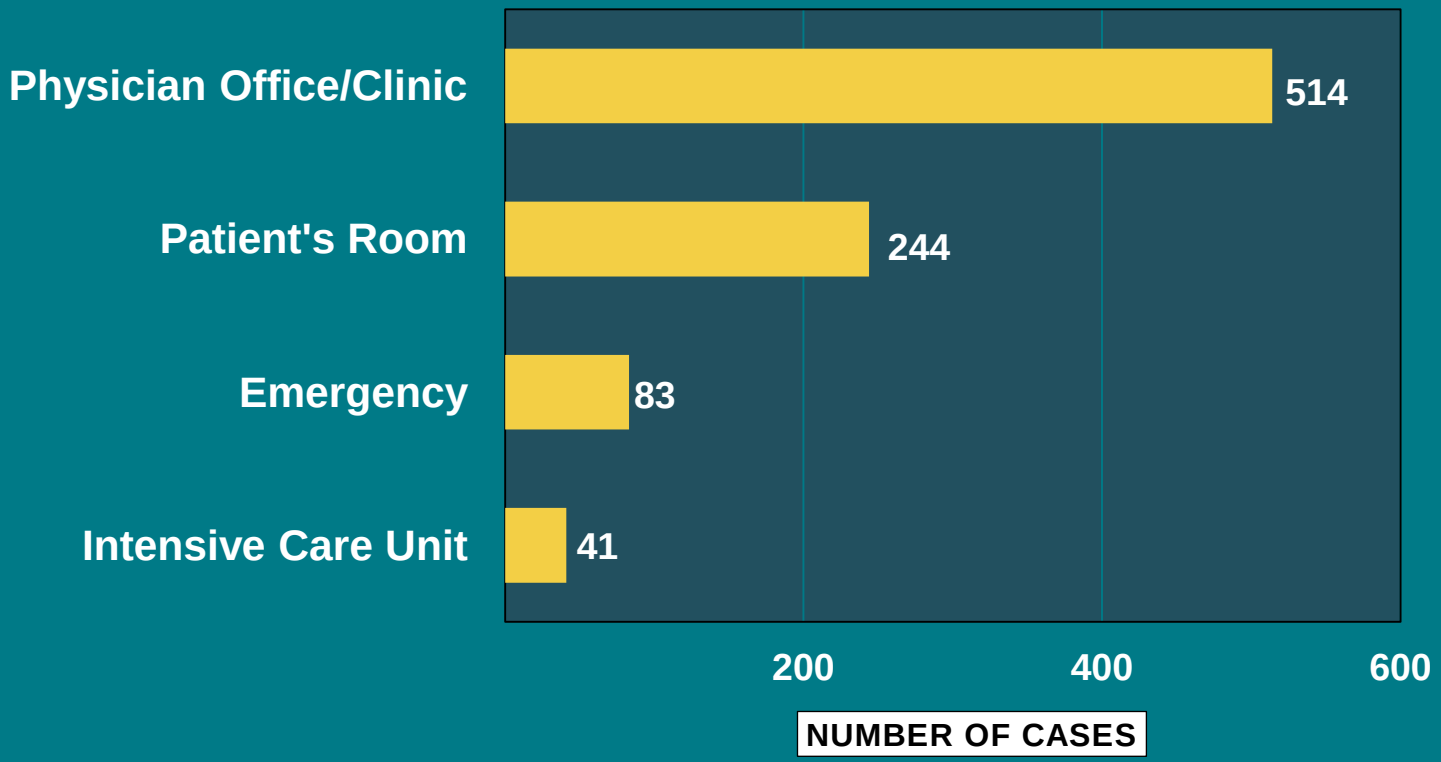
	INPATIENT			AMBULATORY		
STEP	# CASES	% CASES	TOTAL INCURRED	# CASES	% CASES	TOTAL INCURRED
1. Ordering	94	22%	$16,443,571	93	15%	$9,523,877
2. Pharmacy dispensing	11	3%	$18,511,614	17	3%	$490,553
3. Provider administration	59	14%	$18,639,757	51	8%	$8,807,465
4. Monitoring and management	194	46%	$58,602,664	378	60%	$73,612,454
Other medication related	62	15%	$17,046,189	92	14%	$15,032,166

CBS N=1,147 coded professional liability cases asserted 1/1/07–12/31/11 with a Medication-related major allegation.

Total Incurred=reserves on open cases and payments on closed cases.

45% occur in MD Office or clinic practice

Top Locations in Medication Cases



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Case Study

Case Study

- 75-yo female with multiple recent admissions and PMH significant for:
  - end stage liver disease
  - chronic renal failure
  - candidal esophagitis
  - hypertension
  - non-insulin dependant diabetes mellitus
  - recent right arm fracture, complicated by DVT RUE and treated with Fragmin

Case Study

- Day 1 (Friday): Admit to IM with mental status changes and HIT (Heparin Induced Thrombocytopenia)
  - Hematology consult: anticoagulate with direct thrombin inhibitor
  - Lepirudin @ 0.15 mg/kg/hr (= 7.2 mg given pt's wt) ordered
    - PTT Goal 50-70: titrate dose by PTT
    - Check PTT after start and q2 hrs after dose changes

Case Study (cont'd)

- Day 2 (Saturday): RN started Lepirudin
  - Dose set by Pharmacy at 0.1 mg/kg/hr (7.2 mg/hr)
  - Pharmacy set maximum dose at 11mg/hr
  - Bruise noted R chest
    - patient with potential medication clearing problems 2nd to CRF and liver disease discussed
    - but need for anticoagulation outweighed the bleeding potential
- Days 3-4 (Sun., Mon.): Lepirudin doses (based on PTT results):
  - 3.6 mg/hr
  - 1.8 mg/hr
  - 0.9 mg/hr
  - 0.45 mg/hr

Case Study (cont'd)

- **Day 5 (Tuesday)**
  - 6:00a: PTT 87.6: infusion stopped x2 hrs and ordered to restart at 50% previous dose
  - infusion pump turned off leaving pump with no visual display of previous rate
  - no new order for Lepirudin in CPOE System
  - poor documentation regarding dose changes, dose history,
    - some RNs documented dose changes on VS flow sheet while others documented changes in narrative notes 7:00a: RN restarted Lepirudin at 0.229 mg/kg/hr (16.5 mg/hr)
    - Dose should have been 0.229 mg/hr
    - Patient received ***72*** times the dose

Case Study (cont'd)

- **Day 5 (Tuesday)**
- 12:00p: PTT lab drawn: lab listed as sample compromised Sample ***not*** redrawn
- 3:30p: MD writes order to continue Lepirudin @16.5 mg/hr with labs to be drawn in the morning
  - ?? whether MD aware of actual doses being given
  - Pharmacy approved order
- 7:00p: patient c/o shoulder pain; ↑ size of ecchymotic area
  - Lepirudin stopped
  - Hct =16, platelets =19
  - Patient transferred to MICU and transfused
  - PTT >150, INR >19
- Despite aggressive resuscitation, patient developed profound shock and expired

Case Study (cont'd)

- **Day 6 (Wednesday)**
- Postmortem blood test showed significant presence of Lepirudin 10 hrs after it was discontinued

What are the key issues that led to this adverse outcome?

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Case Study (cont'd)

Contributing Factors/Pitfalls

- Need for policy/procedure
- Staff training/education
- Patient monitoring: medication regimen
- Selection/management medication: other
- Medication error: administration of incorrect/inappropriate dose
- Incompatible systems/technology
- Inconsistent documentation
- Weekend/nights/holiday

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Strategies for Decreasing Intravenous Medication Administration Errors

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Director, Clinical Systems Innovations

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Strategies

- Medication Safety Technology
  - Bar Code Scanning at Administration
  - Smart Infusion Pumps
    - Maintaining clinically significant drug libraries
- “Back to the Basics” Campaign
- Share the Story
- Independent Double Checks

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Medication Safety Technology

Bar Code Scanning

- Validates right drug for right patient
- Validates right admixture based on provider order
- Does not validate correct admixture/dose programmed on infusion pump at administration

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Medication Safety Technology: Smart Infusion Pumps

- Smart Infusion pumps
  - Guardrails in drug libraries offer dosing guidance for the clinician
  - Pump does not provide alerts if dose errors occur within the defined guardrail range
  - Balancing alert fatigue with clinically significant alerts
  - Drug library maintenance requires dedicated resources

IV Medication Administration System

CPOE
Provider writes order

Smart IV Pump

Auto-ID: RN verifies on pump:
Right medication
Right dose
Right concentration

Pharm -> Pump interface:

Pharmacy
Pharmacist Approves Order

Bi-directional information between Pump and eMAR

RN verifies prior to starting pump:
Right medication
Right dose
Right concentration
Right Patient

RN Starts Pump

eMAR
RN acknowledges Approved order

RN logs in and obtains med from ADC machine

RN Verifies:
Right Patient

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Drug Library Creation and Maintenance

Goal

- Continually striving to create clinically significant entries that provide optimal safety

How?

- Analyze Continuous Quality Improvement (CQI) data
- End user requests- must be consistent with organizations approved references
- BWH Smart Pump Infusion team
- Create library entries
- Validate library function with Informatics Committee
- Wireless capability
- Drug Safety Committee oversight

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“Back to the Basics”

- 2013 Annual Competency “Reducing Intravenous Medication Errors”
  - Reviews high alert/ high risk medications
  - Highlights both human and system factors that contribute to medications errors
  - Identifies nursing practices that must be adopted to mitigate the risk of human error
- Unit based program
  - Share safety report data
  - Identify high risk meds

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Alaris Smart Pump Safety Tips

1. **Use Drug/Fluid Libraries** whenever possible
2. Drug entries may be on different screens; be sure to **Page Down**
3. If the medication is not in the Drug Library *and* **Basic Infusion** is being used, consider having a **Colleague Review** the calculations and pump entries as an independent double check
4. **ONE at a TIME, RUN the LINE**: initiate only one infusion at a time and verify the IV bag and tubing is connected to the module being programmed and the correct infusion site on the patient.
5. **Pause and Review** settings prior to initiating the infusion
6. **Review** the pump set-up and dose entries with your colleague at **Hand Over Report**
7. If a medication is “on hold”/discontinued, **Disconnect** the tubing from the patient3

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Share the Story

- Safety leaders participate in CRICO patient safety forums
- Distribute Institute for Safe Medication Practices (ISMP) publications to all staff
- Benchmark your organization against other institutions
- Focus on the importance of safety reporting, especially near miss events

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Independent Double Checks

- *ISMP Definition: An independent double check is a procedure in which two clinicians separately check (alone and apart from each other) then check results prior to administration.
- Is this a value added task?
- Who has adopted this practice?

*ISMP Medication Safety Alert! ® Nurse Advisor -ERR , Dec 2008

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Medication Reconciliation: Opportunities and Challenges

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Massachusetts General Hospital

Case Study

- 67 year-old with PMH: AF, CABG and DM. Treated with Coumadin for 5 years to reduce risk of embolism
- PCP notes indicate that Cardiologist is overseeing coumadin management and that patient was sophisticated and understands meds, PCP checks INRs and adjusts doses, Last INR was prior to 4/09, no notes from PCP to cardiologist
- Cardiology notes suggest that PCP was monitoring warfarin, scattered INR measurements documented, occasional post-visit notes sent to PCP

Case Study

- 4/09 ED visit:
- AF rate 140 while on vacation. Warfarin listed as current med. Patient converted to NSR.
- Upon return, wife advised cardiologist of ED visit. Holter monitor performed - no AF. Patient currently off warfarin; placed on ASA.
- 5/09 Cardiology visit:
- No mention of vacation AF episode but no documentation of further AF; Continued current dose of Norpace.

Case Study (cont'd)

- 3/10 Cardiology: Note "discontinuing warfarin"
- 6/10 PCP Rate controlled, no mention of warfarin
- 12/10 PCP (annual exam):
- Patient in AF; PCP stated later that the patient said he was taking warfarin
- No documentation of warfarin discussion, no warfarin in Tx plan, and no urgent cardiology consult
- 2/5/11 Cardiology:
  - EKG c/w AF; warfarin restarted, as well as Atenolol to control HR

Case Study (cont'd)

- 2/6/11: After 1st dose of Atenolol patient became dizzy and was admitted to hospital for hypotension
  - No EKG changes noted
  - PT 15.1; INR 1.2 (subtherapeutic)
  - Patient became aphasic and hemiplegic
  - Dx: Cerebral embolism due to AF and lack of anticoagulation
- 18 mos later: Patient expired of heart disease

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Discussion

Coordination of care:

- Unclear who was making the decisions regarding whether the patient should/should not be on warfarin
- Lack of routine communication between the two providers
- INRs were not monitored routinely
- Patient not seen regularly

Inadequate patient assessment and documentation: lack of:

- updated H&P (e.g., recurrent AF not noted)
- problem list, or
- medication list (e.g., warfarin not noted in Tx plan)

Lack of patient education re: anticoagulation

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Opportunities for Improvement:

Sound Medication Reconciliation Practices

Clearly delineate roles and responsibilities of providers when a patient has multiple care providers

Complete and maintain an up-to-date medication list: including dosages, frequency, and any special instructions

- **Provider update** of medication list each time a change is made; leverage EMR

Patient education:

- Importance of taking medications as prescribed (e.g. risks of not taking medication as ordered)
- Advise patient to bring/review up-to-date medication list with providers at each visit

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Optimal Medication Reconciliation practices for shared patients

Potential Approaches

- Every provider is responsible for every medication.
- Every provider is responsible for reconciling medications at each encounter.
- Providers are responsible only for medications they prescribe or medications within the scope of their practice.
- Other suggestions?