York Hospital

Medication Safety:

A Performance Improvement Imperative

Medication Safety Committee
A Focused, Multidisciplinary Approach

Mission:

"The York Hospital Medication Safety Committee will continuously and systematically evaluate the safety of our medication use system in order to minimize medication errors and promote positive clinical outcomes for the patients we serve."

Medication Safety Committee
A Focused, Multidisciplinary Approach

- Goals:
  - Increase the quantity and quality of medication error reports
  - Create a non-punitive reporting culture
  - Learn the root causes of medication errors, and make recommendations for system/process changes to prevent re-occurrence
  - Implement systems that will prevent errors from occurring here that have been reported elsewhere
  - Educate practitioners about the causes of medication errors and the prevention strategies that we have implemented

Medication Safety Committee
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- Tasks:
  - Review aggregate YH medication error data and individual significant events. Make recommendations for improvement actions
  - Review external error data and make recommendations on how to prevent those errors from occurring at YH
  - Develop and conduct audits of problem areas, and use the PDSA cycle for system/process improvements
  - Learn and apply FMEA techniques to our medication use processes in order to reduce errors.

Failure Mode and Effects Analysis (FMEA)

- Mathematical model to predict and prioritize risk
  - Likelihood of occurrence of failure (1-10)
  - Likelihood of detection of failure (10-1)
  - Severity of outcome of failure (1-10)
- Multiply 3 factors = Criticality Index (CI) or Risk Priority Number (RPN)

Failure Mode and Effects Analysis (FMEA)

- References:
  - **1. "The Basics of FMEA", McDermott RE, Mikulak RJ, Beauregard MR. 75 page booklet published by Quality Resources, a division of The Kraus Organization Limited. 902 Broadway, New York, NY 100100 (212-979-8600 or 800-247-8519)**
  - **2. *The Use of FMECA in a Medication Error Subcommittee,* Williams E, Talley R. Hospital Pharmacy, Vol 29, #4, pp 331-7.**
  - **3. *FMEA: A Novel Approach to Avoiding Dangerous Medication Errors and Accidents,* Cohen MR, Senders J, Davis NM. Hospital Pharmacy, Vol 29, #4, pp 319-330.**

Medication Safety Committee A Focused, Multidisciplinary Approach

- Multidisciplinary - Nursing, Pharmacy, Medical Staff, Administration, Risk Management, Quality Management
- Sole function is improving medication safety
- Completed ISMP Medication Safety Self-Assessment
- Developed prioritized action list from self-assessment

ISMP Medication Safety Self-assessment

- **What?** A 194 question survey of institutional compliance with best demonstrated practices
- **How?** Committee and selected content experts evaluated degree of compliance with practices
- **Results?** Our problem list (A's, B's, and C's), which was prioritized via FMEA

FMEA
Problem List "Top Five"

Process	Severity	Occurrence	Detection	Criticality Index
Paralyzing agents	10	5	8	400
High-risk infusions	10	5	7	350
Transcription errors	10	5	4	200
High risk unit stock	10	5	8	400
Dispensing high-risk medications	10	4	5	200

Neuromuscular Blocking Agents

- Warning label on each vial:

SUCCINYLCHOLINE

Caution !!! Caution !!!

Neuromuscular blocking (paralyzing) agent. To be used in conjunction with mechanical ventilation only! Please double check drug/order prior to administration.

Neuromuscular Blocking Agents

- Refrigerated vials sequestered in a box with identical warning label on outside
- Vials in POC automated dispensing cabinets contain on-screen warning:

  Paralyzing agent - use caution!

  No - verify order first

  OK - patient intubated

High Risk Infusions

- Nurse double check of high risk infusions (drug, concentration, programmed infusion rate)
  - Heparin
  - Opiates/narcotics
  - Insulin
  - Hypertonic NaCl

High Risk Infusions

- Critical Care Infusion Protocols
  - Initial rate and titration schedules for inotropes and vasoactive agents
  - Protocol matches medication programming in infusion pumps (i.e. weight-based or non-weight-based)
  - For use by the physician *or* in the absence of specific orders from the physician

Transcription Errors

- Medical Staff approved 9 medication prescribing standards
  1. Use leading zeros: 0.5mg not .5mg
  2. No trailing zeros: 5mg not 5.0mg
  3. Write units not “U” or “u”
  4. Spell out micrograms, do not abbreviate as mcg or ug
  5. Write full drug names, do not abbreviate (penicillin, not PCN)

Transcription Errors

- Medical Staff approved 9 medication prescribing standards
  6. Do not write QD, QID, or QOD - write “Q Day”, “Daily”, “Four times daily” or “Every other day”.
  7. Where applicable, order medications by the metric dose (micrograms, milligrams, grams) as opposed to #of tablets, vials, etc.
  8. Write legibly with a ballpoint pen using firm pressure so carbons and faxes are clear.
  9. Include the date, time, and pager # with all order sets.

Transcription Errors

Standard	Baseline	First Review
1. Leading zero	94.4%	100%
2. Trailing zero	100%	100%
3. Units	14.3%	57.1%
4. Micrograms	N/A	N/A
5. Full name	97.4%	84.6%
6. QD, QID, QOD	53.8%	40%
7. Metric dose	94.5%	95.4%
8. Legible	100%	100%
9. Date, time	97.7%, 51.2%	97.7%, 68.2%

High Risk Unit Stock

- Auxiliary labeling for parenteral ketorolac

"WARNING! Ketorolac (Toradol) is contraindicated in patients who have experienced angioedema, bronchospasm, nasal polyps, or other allergic reactions to aspirin or other NSAIDs. Question all patients about these reactions prior to giving ketorolac, and do not administer if there is a history of any such reaction."

High Risk Unit Stock

– Auxiliary labeling for LA penicillins

"WARNING! Procaine penicillin and benzathine penicillin are for IM administration only. DO NOT GIVE INTRAVENOUSLY!"

High Risk Unit Stock

- Apply FMEA, and review internal and external error data for unit stock decisions
- Removal/denial of:

Potassium Chloride

Vancomycin

Magnesium Sulfate (MDV)

Hypertonic NaCl

Esmolol

Gentamicin

Lidocaine (1 gram vials)

NMBA's (Except ICU)

Dispensing High Risk Medications

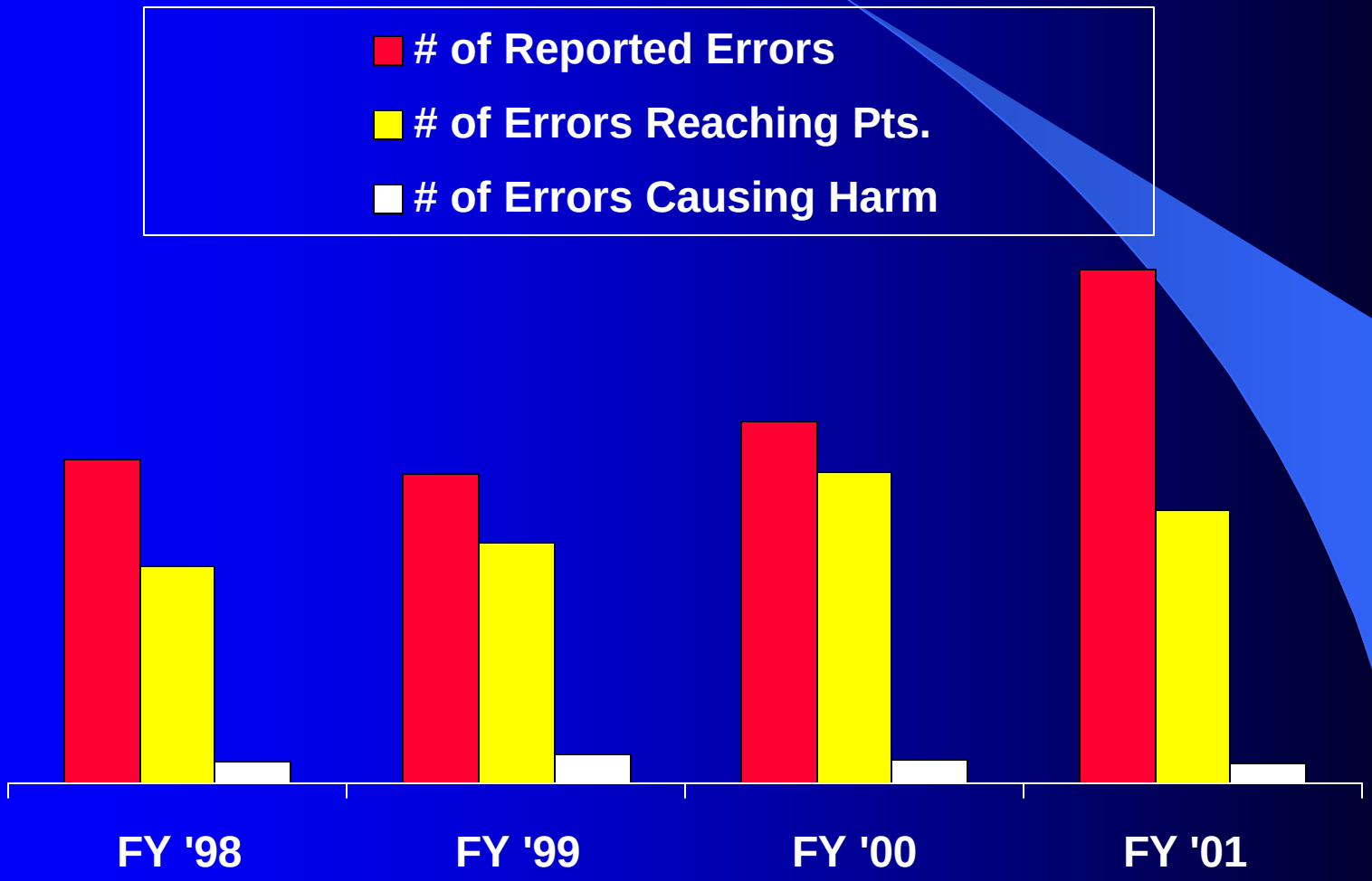
- Independent pharmacist double check of dose calculation, computer entry, and admixture/dispensing of all cancer chemotherapy and neonatal orders
- Final refractometer check of all compounded dextrose infusions for neonatal and pediatric patients
- Pharmacy preparation/dispensing of narrow therapeutic index oral liquids in amber oral syringes that do not fit IV catheters

Outcomes ???

FMEA Problem List
Top Five "Post" Action Steps

Process	Severity	Occurrence	Detection	Criticality Index
Paralyzing agents	10	3	3	90
High-risk infusions	10	3	2	60
Transcription errors	10	3	4	120
High risk unit stock	10	2	2	40
Dispensing high-risk medications	10	3	2	60

Medication Error Trended Data



Medication Error Trended Data

- 42% increase in # of reports
- 12% decrease in # reaching patients
- 12% decrease in # causing harm

Safety Culture Survey

- Institute for Healthcare Improvement
- 10 question survey, 10% of clinical staff
- Year end goal median score of 4, scale 1-5
- *Baseline* results:
  - Overall median score of 4
  - Median of 4 on 9 questions, 5 on the 10th

Current Activities

- Participating in the IHI "Quantum Leaps" Medication Safety Collaborative
  - Goal: 10-fold reduction in ADE (*harm* from medication use)
  - Tools to *measure* ADE rather than relying on spontaneous, voluntary reports
  - Targeting core processes and high-risk medications