York Hospital

Medication Safety:
A Performance Improvement Imperative
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.”
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
A Focused, Multidisciplinary Approach

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)
References:


2. The Use of FMECA in a Medication Error Subcommittee, Williams E, Talley R. Hospital Pharmacy, Vol 29, #4, pp 331-7.

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”

<table>
<thead>
<tr>
<th>Process</th>
<th>Severity</th>
<th>Occurrence</th>
<th>Detection</th>
<th>Criticality Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralyzing agents</td>
<td>10</td>
<td>5</td>
<td>8</td>
<td>400</td>
</tr>
<tr>
<td>High-risk infusions</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>350</td>
</tr>
<tr>
<td>Transcription errors</td>
<td>10</td>
<td>5</td>
<td>4</td>
<td>200</td>
</tr>
<tr>
<td>High risk unit stock</td>
<td>10</td>
<td>5</td>
<td>8</td>
<td>400</td>
</tr>
<tr>
<td>Dispensing high-risk medications</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>200</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Standard</th>
<th>Baseline</th>
<th>First Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Leading zero</td>
<td>94.4%</td>
<td>100%</td>
</tr>
<tr>
<td>2. Trailing zero</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>3. Units</td>
<td>14.3%</td>
<td>57.1%</td>
</tr>
<tr>
<td>4. Micrograms</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>5. Full name</td>
<td>97.4%</td>
<td>84.6%</td>
</tr>
<tr>
<td>6. QD, QID, QOD</td>
<td>53.8%</td>
<td>40%</td>
</tr>
<tr>
<td>7. Metric dose</td>
<td>94.5%</td>
<td>95.4%</td>
</tr>
<tr>
<td>8. Legible</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>9. Date, time</td>
<td>97.7%, 51.2%</td>
<td>97.7%, 68.2%</td>
</tr>
</tbody>
</table>
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!”
Apply FMEA, and review internal and external error data for unit stock decisions

Removal/denial of:

- Potassium Chloride
- Esmolol
- Vancomycin
- Gentamicin
- Magnesium Sulfate (MDV)
- Lidocaine (1 gram vials)
- Hypertonic NaCl
- 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

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<td>10</td>
<td>3</td>
<td>3</td>
<td>90</td>
</tr>
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<td>10</td>
<td>3</td>
<td>2</td>
<td>60</td>
</tr>
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<td>2</td>
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Medication Error Trended Data

- # of Reported Errors
- # of Errors Reaching Pts.
- # of Errors Causing Harm

FY '98: # of Reported Errors, # of Errors Reaching Pts., # of Errors Causing Harm
FY '99: # of Reported Errors, # of Errors Reaching Pts., # of Errors Causing Harm
FY '00: # of Reported Errors, # of Errors Reaching Pts., # of Errors Causing Harm
FY '01: # of Reported Errors, # of Errors Reaching Pts., # of Errors Causing Harm
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