The Need For Continuous Electronic Monitoring

Physician-Patient Alliance for Health & Safety
University of Notre Dame
(February 21, 2012)
**Agenda**

- How Often Do PCA Errors Occur?
- Faces of Tragedy
- PPAHS Safety Checklist Initiative
- Veteran Affairs Example
- The Goal: Continuous Electronic Monitoring for All Patients
How Often Do PCA Errors Occur?
Reported PCA Errors: Just The Tip of the Iceberg

“PCA errors certainly occur, both in programming and in delivery, but any published estimate is likely to be only the tip of the iceberg.”

Dr Richard Dutton
(Executive Director, Anesthesia Quality Institute)

Anesthesia Quality Institute’s mission:
• develop and maintain an ongoing registry of anesthesia cases and outcomes to help anesthesiologists assess and improve patient care
• goal include data from all practicing anesthesiologists and all practice locations in the United States.

# MEDMARX

## Reported PCA Errors

<table>
<thead>
<tr>
<th>What is MEDMARX?</th>
<th>largest nongovernmental, Internet-accessible database of medication errors in U.S.</th>
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<tbody>
<tr>
<td>How many errors were reported?</td>
<td>919,241 reported errors (5yr period: July 1, 2000, to June 30, 2005)</td>
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<tr>
<td>How many were PCA errors?</td>
<td>1% (or 9,571) associated with PCA</td>
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<tr>
<td>Limitations of MEDMARX reported errors</td>
<td>MedMarx only a voluntary reporting system (i.e. 801 healthcare facilities reporting)</td>
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Voluntary to All Reports

Professor Rodney Hicks
(then Manager, Patient Safety Research and Practice, United States Pharmacopeia - now Professor, Western University College of Graduate Nursing, Pomona, California)

“The general rule of thumb is that for every reported event, there can be between 300-1,000 unreported events.”

Voluntary to All Reports (5 years)

9,571 voluntary reports = between 2.8 million and 9.6 million total events (5yrs)
Voluntary to All Reports (yearly)

about 600,000 to 2 million events per year
Faces of Tragedy
In Amanda’s Memory,
Always Monitor
PPAHS
Safety Checklist Initiative
IV Line Infections: Concept

Checklist:

1. Wash hands with soap.
2. Clean the patient’s skin with chlorhexidine antiseptic.
3. Cover the patient’s entire body with sterile drapes.
4. Wear a mask, hat, sterile gown and gloves.
5. Put a sterile dressing over the insertion site after the line was in.
IV Line Infections: Results

- prevented 43 infections
- avoided 8 I.C.U. deaths
- saved hospital approximately $2 million
**Surgical Checklist**

New England Journal of Medicine*

- Deaths - 1.5% to 0.8%  
  (about 50% decline)
- Complications - 11.0% to 7.0%  
  (more than 40% reduction)

PCA Safety Checklist

Dr. Elliot Krane
(Director, Pediatric Pain Management, Lucile Packard Children’s Hospital at Stanford)
A checklist would help avoid many things that could go wrong with PCA.

Dr. Julius Cuong Pham
Department of Emergency Medicine, Department of Anesthesia and Critical Care Medicine, Armstrong Institute for Patient Safety and Quality at Johns Hopkins University School of Medicine:
In practice, checklists serve as a mental reminder of critical steps that we may or may not remember. Therefore, the value of a checklist with regards to PCAs would be to remind us/double check a critical step in the process.

Dr. Richard Dutton
(Executive Director, Anesthesia Quality Institute)
A checklist would help to avoid simple but recurrent errors in packaging and programming the PCA.

Dr. Andrew Kofke
(Co-Director, Hospital of the University of Pennsylvania Neurocritical Care Program)
The use of a well-constructed checklist that ensures proper procedures are followed in patient-controlled analgesia would enhance patient safety.
Veteran Affairs Example
The VHA Problem: High PCA Error Rate

VHA Root Cause Analyses (since 1999)
• 13% involved two types of pumps
• about 50% general-purpose and 50% PCA
The VHA Problem: High PCA Error Rate

“... there are about 10 times as many general-purpose pumps in use across the VA system than PCA pumps. This suggests that incidents with PCA pumps are about 10 times more than with general-purpose pumps. That's significant!”

Bryanne Patail
biomedical engineer
U.S. Department of Veterans Affairs
National Center for Patient Safety

The VHA Solution: Implement Strong Fixes

Three-Types of Fixes
“Use of PCA pumps is a process, and improving that process is an area that involves many stakeholders. In looking at fixes, they can be categorized as strong, intermediate or weak fixes.”

“The strongest fix for PCA pumps is a forcing function, such as an integrated end tidal CO2 monitor that will pause the pump if a possible over infusion occurred. So, healthcare providers should first look at these strong fixes. There they will see the most impact on reducing errors and improving patient safety.”

Bryanne Patail
biomedical engineer, U.S. Department of Veterans Affairs, National Center for Patient Safety
http://wp.me/p1JikT-dH
The VHA Solution: Reducing PCA Errors by more than 60%

“A capnograph measures in real-time the adequacy of ventilation. Using this technology could prevent more than 60 percent of adverse events related to PCA pumps.”

Bryanne Patail
biomedical engineer
U.S. Department of Veterans Affairs
National Center for Patient Safety
# St Joseph’s Hospital & Candler Hospital

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<tr>
<th>What Happened</th>
<th>3 significant patient events in less than 2 year period</th>
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<td>What They Did in 2002</td>
<td>replaced its existing traditional IV pumps with “smart” IV safety systems - PCA pump with integrated capnography</td>
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<tr>
<th>Location</th>
<th>Savannah, Georgia</th>
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<tbody>
<tr>
<td>History</td>
<td>2 of oldest continuously operating hospitals in US</td>
</tr>
<tr>
<td>Patient Volume</td>
<td>39,064 admissions annually</td>
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</table>
| Staff     | - 407 physicians  
            | - 716 nurses      
            | - 50 pharmacists |

Ray Maddox & Carolyn Williams, “Clinical Experience with Capnography Monitoring for PCA Patients”, APSF Newsletter (Winter 2012)
Return on Investment*

St Joseph’s Hospital & Candler Hospital

- no PCA-related respiratory events with a serious outcome
  - now approaching their 8th ‘event free’ year
- averted at least 471 preventable adverse drug events
- prevented estimated potential expenses of almost $4 million
- 5 year ROI of $2.5 million

✴ “There can be no adequate valuation of a life saved from preventing an adverse medication event.” - Ray Maddox & Carolyn Williams, “Clinical Experience with Capnography Monitoring for PCA Patients”, APSF Newsletter (Winter 2012)
The Goal: Continuous Electronic Monitoring for All Patients
We Already have the Technology & Know-How

Careful use of the knowledge and technology we have now can do much to help realize the vision that ‘No Patient Shall Be Harmed By Opioid-Induced Respiratory Depression’.

Ray Maddox & Carolyn Williams
St. Joseph’s/Candler Health System, Inc
“Clinical Experience with Capnography Monitoring for PCA Patients”
APSF Newsletter (Winter 2012)
In Amanda’s Memory, Always Monitor