Reducing Cardiac Telemetry Alarm Fatigue

VA Boston Healthcare System

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Learning Outcomes

- Identify contributing factors for cardiac telemetry alarm fatigue
- Improve understanding on the value of utilizing scientific method to implement quality improvement initiatives
Major events to draw attention to alarm system shortfalls (Cvach, 2012; Vockley, 2012)

700 physiologic monitor alarms per patient per day (Cvach, 2012; The Joint Commission, 2013)

High ratio of false positive alarms: Ranges from 80%-99% (Gross, Dahl, & Nielsen, 2011; Cvach, 2012)

As alarm limits become more sensitive, more false positive alarms are generated (Clark et al., 2006; Cvach, 2012; Graham & Cvach, 2010; Korniewicz, Clark, & David, 2008; Pergher & Silva, 2013)

Ongoing Emergency Care Research Institute (ECRI) investigations on adverse patient events continue to demonstrate correlation between frequency of false positive alarms and alarm related incidents (Clark et al., 2006, page 11)

A 30 percent decrease in alarm signals after a combination of education for nurses and alarm configuration was instituted (Vockley, 2012)
PURPOSE

With the Joint Commission’s National Patient Safety Goal (2014) on Alarm Management, the importance of selectively managing alarm signals and reducing alarm fatigue in the clinical environment has taken precedence nationwide.

The goal of this pilot project was to facilitate an environment of care where nurses are tuned to cardiac alarms that are clinically significant so more efficient patient care can be provided for truly actionable events.
DECISION ANALYSIS TOOLS

• Microsystem Assessment utilizing 5 P’s
  ✦ Aids in selecting the theme for improvement
    ▪ Purpose, Patients, Professionals, Processes, & Pattern

• Fishbone Diagram
  ✦ Offers detailed analysis of cause and effect

• The Model for Improvement Framework
  ✦ Test ideas and change in cycles for learning and improvement
Fishbone Diagram

Process:
- Unconsolidated Policies
- Overuse of Telemetry
- Orders Renewed Every 48 Hrs
- Inexperienced Providers
- Various Skill Levels

People:
- Higher Nurse Patient Ratio
- "L" Shaped Floor
- Other Devices That Alarm

Machine:
- Device Not Configured for Med/Surge
- Majority of yellow alarms are inactionable

Environment:
- 1 Slave Monitor per Wing

Alarm Fatigue
METHODS

The Model for Improvement Framework

- **Analyze initial alarm load & noise level**
- **Expand to other clinical areas**
- **Plan**
- **Do**
- **Run PVCs**
- **Multiform**
- **Pair**
- **Act**
- **Study**

**24 bed unit**

5 other Med/Surg/Spinal Cord Units

**Default off Yellow PVC alarms**

Compare pre and post alarm load & noise level
RESULTS

3N Before and After Alarms Rates (Alarms/Bed/Day)

- Pair PVC
- Multiform PVC
- Run PVC
- Total PVC Alarms
- Total Alarms

Before

After

% Change
Average Decibels for 3N Pre Vs. Post Changes

<table>
<thead>
<tr>
<th></th>
<th>Decibels Range (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Wing Pre-Changes</td>
<td>58.94</td>
</tr>
<tr>
<td>Left Wing Post-Changes</td>
<td>57.84</td>
</tr>
<tr>
<td>Main Hallway Pre-Changes</td>
<td>58.04</td>
</tr>
<tr>
<td>Main Hallway Post-Changes</td>
<td>54.43</td>
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</tbody>
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CONCLUSIONS

- Overall 54% reductions in the number of alarms/bed/day
- Actual and Perceived noise level decrease on the unit
- Nurses are more attentive to actionable alarms
FRAMEWORK FOR DISSEMINATION

- Microsystem: Staff on the Unit
- Mesosystem: QI throughout the hospital
- Macrosystem: Sharing of knowledge with national audience
**Global Aim**
Reduce medical device alarm desensitization (fatigue) amongst caregivers

**Aim**
To promote an environment where nurses are tuned-in to significant cardiac telemetry alarms

**Outcomes**
- Optimized device
- Improvement in nurses awareness and response to alarms
- Overall decrease in noise level

**Key Driver Diagram**

- Identify the severity of the alarm desensitization of the staff in 3N through survey
  - Default off yellow PVC alarms: Multiform, Pair, and Run PVCs
  - Provide vendor assisted training on alarm configurations to staff

- Utilize a computerized software tool to measure the alarm load pre and post implementation
  - Revise and consolidate Policy on cardiac telemetry to reflect evidence based practice recommendations

- Improve staff knowledge by providing education on alarm tailoring, arrhythmia analysis, and nursing interventions
  - Support staff learning needs through classes such as ACLS and monthly mock codes
REFERENCES


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