Pharmacy and Nursing Collaboration to Reduce Infusion Device Alarms

February 13, 2017
AAMI Foundation

Vision: To drive the safe adoption and safe use of healthcare technology

National Coalition for Infusion Therapy Safety
Quick Guides

Optimizing Patient Outcomes

Improving the Safe Use of Multiple IV Infusions

http://www.aami.org/thefoundation

2 more coming soon! How to Improve Compliance With Smart Pump Drug Libraries and.....Reducing Non-Actionable Smart Pump Alarms
A Special Thanks
Thank You to Our Premiere Industry Partners

Without the generous support of our industry partners, we would not be able to produce the many tools and deliverables created by the coalition to help you improve infusion therapy safety. The AAMI Foundation is managing all costs for the series. The seminar does not contain commercial content.
LinkedIn Questions

Please post questions on the
AAMI Foundation’s LinkedIn page.

OR

Type a question into the question box on the webinar dashboard.
Polling Questions
Speaker Introductions

• Carol Suarez, MSN, APRN, CNS, FNP, PHN, Clinical Nurse Specialist at Palomar

• Diana Schultz, BS Pharm. MHSA, Manager of Medication Safety at Palomar

• LaQuoia Johnson, PharmD, BCPS, Pharmacy Supervisor…who is now working at Novant Health
Learning Objectives

• Define nuisance alarms and the implications in relation to patient safety

• Understand the most frequent causes of alarms occurring with infusion devices

• Describe interventions that may lead to a reduction in infusion related alarms
Institution

Palomar Health Facilities

- 107 bed Palomar Medical Center Poway
- 288 bed Palomar Medical Center, Escondido, CA
- 72 bed Palomar Medical Center, Downtown Escondido, CA

The mission of Palomar Health is to heal, comfort and promote health in the communities we serve.
Project Purpose

Reduction of nuisance alarms

SEA #50 & Joint Commission
National Patient Safety Goal 06.01.01 on Alarms Management

Clinical Excellence Grant
CareFusion® Foundation

An ounce of prevention…
Define alarm concerns
Safety, risk, variability, fatigue
- Identify the problem(s):
  Alaris alarms Module
  Time of Day Care Area
  Practice / workflow Drug / Fluid

Measure the Contributors
You can’t manage what you can’t measure
- Magnitude of the Problem
- Benchmark against others
- Objective metrics to quantify noise
- Isolate variables

Analyze the Problem
Prioritize a process improvement strategy
- Understand customer specific practice
- Determine root cause
- Prioritize solutions
- Cross functional experts

Improve Your Process
Develop process improvement strategies based on data
- Clinical education
- Support policy changes/creation with supporting metrics
- Process standardization

Control the Process
Continuous quality improvements
- Actionable data provides direct feedback of improvement
- Are the implemented strategies/policies effective?
- Quantify the change
Define

- Pre-intervention Survey to Nursing Staff
  - 31.8% Response Rate (n= 413)
  - Most frequent types of alarms
    - Air in line alarms (18%)
    - Patient-side occlusion (80%)
    - Fluid-side occlusion (2%)

Data analysis shows an average of 1.1 alarms per infusion during September at Poway
PMC Poway Analysis Overview

**MEASURE**

- Date Range Analyzed: **03/20/2014 to 07/20/2014**

- Total infusions during sample period: **43,000+**

- Total Air in Line (AIL) Alarms during sample period: **8,627 (2%)**

- Total Patient Side Occlusion (PSO) Alarms during sample period: **15,885 (37%)**

- Care areas included Critical-Care, General, and IMC-Tele
• Nursing’s perception versus actual Pump data illustrate similar findings for drugs most likely to cause infusion related alarms
Measure
Knowledge Portal Data
Number of Alarms Per Infusion
250mcL AIL Dataset
Analyze

- Direct observations of Nursing units
  - Mixing and priming processes
  - Visualization of primary and secondary setups
  - Observe/collaborate on troubleshooting “live” alarms
  - One on one discussions with nursing staff

- Direct observations of Pharmacy
  - Observation of medication preparations, storage, and delivery process
Improve

- Change to Pump settings
  - Changed all Auto-restarts to 9 in every profile (prev. 4)
  - Changed max occlusion pressure initial value to 525 mmHg *(except Epidural)*

- Change in process for plugging in pumps
Improve

Implementation of Anti-Siphon Valve

- Amiodarone
- Albumin
- TPN
- Lipids
- Etoposide
- Crofab
- IVIG
Improve

• Standardized education plan
  • Target reduction in AIL and PSO alarms
  • Super user sessions by Vendor consultant
  • Reproducible education with support materials
Improve

- Skills day for 1200 nurses
- Re-education on use of infusion pumps
- Causes and how to prevent alarms
- Use of anti-siphon valve
- Understanding pressure sensor
Skills Day

- Nurses received education on the best way to decrease air in line alarms.
  - Line priming
  - Anti-siphon valve
  - Drip chamber
- Nurses re-educated on best ways to decrease patient side occlusions.
  - IV site placement
  - Patient awareness
  - Pressure regulator
Pre vs. Post Comparison : AIL
Statistical Summary (Critical Care Area Only)

Pre Period: 03/20/2014 to 05/18/2014
Post Period: 02/01/2015 to 03/31/2015

Test of Statistical Significance:

Results:

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean AIL per Infusion per Day:</td>
<td>.148</td>
<td>.123</td>
</tr>
<tr>
<td>Median AIL per Infusion per Day:</td>
<td>.139</td>
<td>.120</td>
</tr>
<tr>
<td>Standard Deviation:</td>
<td>.082</td>
<td>.046</td>
</tr>
</tbody>
</table>

p-Value: .024

Results: There was a statistically significant decrease in AIL alarms per infusion per day for the post period critical care area.
Pre vs. Post Comparison:
Total AIL Alarms per Infusion by Drugs

Pre Period: 03/20/2014 to 05/18/2014
Post Period: 02/01/2015 to 03/31/2015
CU1 Use Infusion Analysis
SELECT COUNT(DISTINCT fid.InfusionSequenceGroupId) AS InfusionCount
FROM [InfusionAnalysis].[ivs].[FactInfusionDetail] fid
WHERE (fid.LocalDateTime >= '2013-05-01')
AND (fid.LocalDateTime < '2013-07-31')
CareFusion User, 9/3/2013
Total Infusion Alarms PMC Poway
On average, how many infusion pump alarms do you encounter per shift?

Pre Survey:
- 0-10: 140
- 10+: 131

Post Survey:
- 0-10: 292
- 10+: 57
## Training Topics Rating

From the training content, select the three educational opportunities that were most useful to yourself and your team members.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Checking Line feature</td>
<td>17.8%</td>
</tr>
<tr>
<td>Steps for infusing from a glass bottle</td>
<td>19.8%</td>
</tr>
<tr>
<td>Dynamic Pressure display</td>
<td>21.5%</td>
</tr>
<tr>
<td>How to adjust audio on Alaris System</td>
<td>26.1%</td>
</tr>
<tr>
<td>Steps for proper set loading</td>
<td>41.5%</td>
</tr>
<tr>
<td>Location of IV containers (primary and secondary) relative to the pump</td>
<td>42.1%</td>
</tr>
<tr>
<td>Importance/value of Guardrails compliance</td>
<td>42.4%</td>
</tr>
<tr>
<td>Location of pump relative to the patient</td>
<td>42.4%</td>
</tr>
<tr>
<td>Priming techniques for the administration Set</td>
<td>49.3%</td>
</tr>
</tbody>
</table>
Control

• Ongoing education at Nursing Orientation

• Continuous review through Knowledge Portal

• Periodic compliance rounds

• Targeted re-education from review
Future/Ongoing Initiatives
Mark Your Calendars!

March 6th; 12pm to 1pm

Tina M. Suess MHA, BSN, RN-BC, CPHIMS
Manager Medication Safety Integration
Lancaster General Health

Interoperability: EHR and Smart Infusion Pumps

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• Or you can email your question to: mflack@aami.org
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*Thank you for your support!*
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Slides and Recording:

http://www.aami.org/PatientSafety/content.aspx?ItemNumber=3694&navItemNumber=3084