Infusion Pumps: a structured approach to drug library optimization

Dennis M. Killian, Pharm.D., Ph.D.
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Peninsula Regional Medical Center

Associate Professor
UMES School of Pharmacy
AAMI Foundation

Vision: Healthcare technology promotes positive patient and healthcare provider outcomes and causes no harm

NEW: Annual Meeting – Hot Topics in Healthcare!
San Diego, CA—November 18 and 19, 2017- 2 day conference
Nursing CEs and Respiratory Therapist CEs...great presentations and great food!
$50 dollars/day or $70 dollars for both days
Mark your calendars....registration info and final agenda will be sent to you next week
A Special Thanks

National Association of Clinical Nurse Specialists
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.
Infusion Pumps: a structured approach to drug library optimization

Dennis M. Killian, Pharm.D., Ph.D.
Pharmacy Director
Peninsula Regional Medical Center
Associate Professor
UMES School of Pharmacy
Disclosure

• The views and opinions presented are entirely my own. They do not necessarily reflect the views of Peninsula Regional Medical Center or the University of Maryland Eastern Shore School of Pharmacy.

• I have served as a speaker on behalf of Baxter Healthcare in regards to IV infusion devices and how to achieve a high level of drug library compliance.
Learning Objectives

• Define Dose Error Reduction System (DERS) and identify key components of this vital smart pump safety software.

• Explain the purpose of Continuous Quality Improvement (CQI) reports and how to leverage this data to optimize smart pump safety features and identify near misses.

• Discuss wireless connectivity for infusion pumps and best demonstrated practices for publishing drug library updates.

• Identify scenarios where Clinical Conditions (Modifiers) can be used to help promote safe IV medication delivery.
Peninsula Regional Medical Center

- 3000+ employees; 350+ physicians
- 289 acute care, 28 nursery beds
- 30 pharmacists; 50 pharmacy technicians

21,000 admissions
95,000 ED visits

www.peninsula.org
Peninsula Regional Medical Center
Automation Overview

- EPIC Electronic Health Record
- Baxter SIGMA Spectrum Infusion System
- KitCheck: passive RFID tagging of medications
- ICU Medical Diana® oncology dose system
- Omnicell MedCarousel: inventory management
- Pearson Medical high speed oral unit dose packagers
- Baxter EXACTAMIX 2400 Compounder and REPEATER Pump
- Baxter DoseEdge Pharmacy Workflow Manager
- Omnicell AcuDose, Anes-Rx, NarcStation
- McKesson Horizon Platform: BCMA, CPOE
What is the “Drug Library”? 

- Intelligence, is essentially the medication or Drug Library and all the associated safety features with this software.

- We need to use the Drug Library as much as possible to help enhance infusion safety measures.

- Not using the Drug Library is comparable to the scarecrow not using his newfound intelligence.
Infusion Devices
Market Analysis

• KLAS
  – Feedback from healthcare professionals
  – “Best in KLAS”

• ECRI
  – [https://www.ecri.org/](https://www.ecri.org/)
  – Evidence-based evaluations
## Infusion Device PRMC Vendor Fair Scoring

<table>
<thead>
<tr>
<th>Efficiency - Ease of Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of loading and unloading administration sets</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ease of programming a primary infusion</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ease of programming a secondary infusion</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ease of programming a bolus dose</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ease of titrating an infusion rate</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Overall clarity of information on display</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ability to infuse multiple medications efficiently for a patient (e.g., Critical Care, Anes)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Physical dimensions of device (weight, size, lifting, transportability)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

## Safety - Drug Library

<table>
<thead>
<tr>
<th>Efficiency - Ease of Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of locating a medication in the drug library</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Customizability of drug limit alerts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Clarity of drug limit alerts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

## Overall Performance

<table>
<thead>
<tr>
<th>OVERALL: Efficiency and Ease of Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL: Safety and Drug Library Features</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
### Infusion Device PRMC Decision Matrix

<table>
<thead>
<tr>
<th>Vendor Fair</th>
<th>Weight</th>
<th>Comment</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency - ease of use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety - drug library</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reliability / Biomed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of recalls (less recalls = higher score)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device reliability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data Analytics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard report options</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real-time analytics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to review &quot;all events&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System infrastructure and integration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless integration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMR integration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTLS integration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application/Server</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Support and education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall support from company</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational resources and plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Business Case / Margin</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 year NPV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact on disposables (sets, fluids etc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ratings:**
-2 Bad
-1 Not as Bad
0 Neutral
+1 Not as Good
+2 Good
Infusion Pump Decision

• Which of the following can be used when deciding on an infusion device:
  (select all that apply)
A. Decision Matrix
B. Market Intelligence (e.g., KLAS, ECRI)
C. Opinions from other facilities
D. Vendor Fair
Infusion Pump Decision

• Which of the following is not a key driver for purchasing an infusion device?

A. Cost
B. Efficiency / Ease of Use
C. Safety Features
D. RTLS (Real-Time Location System) Integration
E. Wireless Integration
Drug Library or Dose Error Reduction System (DERS)

- Defaults to the drug library, not opt-in
  - Must opt-out of drug library, if needed
  - Helps to ensure a high level of drug library compliance

- PRMC Drug Library Specifics:
  - Care Areas: 30
    - ED, ICU, Cath Lab, Oncology etc.
  - Medication Entries: 411
    - All Care Area entries are linked to a master medication listing
Key Factors for Peninsula Regional

- Lower Hard Limit
- Lower Soft Limit
- **Default** Starting Rate*
- Upper Soft Limit
- Upper Hard Limit

- Clinical Advisories
- **Default** Volume to be Infused*
- Dose Rate/Change (Titration) limits*
- **Default** Bolus amount and time*

*Peninsula Regional identified these as key factors for safe IV medication delivery
Key Factors for Peninsula Regional

• Ability to default the starting rate and volume to be infused (VTBI) for end users
  – Improved standardization
  – Removes guessing
Key Factors for Peninsula Regional
Drug Library Setup
Linking Entries
Drug Library Setup Question

• When establishing drug library parameters for an intermittent IV antibiotic (e.g., ampicillin), which of the following is the least important from a patient safety standpoint:
  A. Default starting rate
  B. Volume to be infused (VTBI)
  C. Upper soft limit
  D. Lower hard limit
  E. Upper hard limit
Continuous Quality Improvement (CQI)

Immediately After Implementation

May 2015
Continuous Quality Improvement
DERS Compliance – May/June 2015

% DERS Compliance

DERS Mode
Continuous Quality Improvement
DERS Compliance – May/June 2015
Continuous Quality Improvement
Soft Limit Alerts

Top 5 Care Areas Exceeding Soft Limits

<table>
<thead>
<tr>
<th>Area</th>
<th># of Soft Limits Exceeded</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPI</td>
<td>900</td>
</tr>
<tr>
<td>ED</td>
<td>600</td>
</tr>
<tr>
<td>4 South</td>
<td>100</td>
</tr>
<tr>
<td>ICU</td>
<td>100</td>
</tr>
<tr>
<td>3 West</td>
<td>100</td>
</tr>
</tbody>
</table>
Continuous Quality Improvement
Soft Limit Alerts

Top 10 Medications Exceeding Soft Limits

- IV Fluid
- Dexamethasone
- Iron sucrose
- Propofol-ANES
- Blood products
- Oncology Drug 1
- Ondansetron
- Potassium chloride (PERIPHERAL)
- Oncology drug 2
- INTRAPARTUM-oxytocin

# of Soft Limit Exceeded
Continuous Quality Improvement

Hard Limit Alerts

Top 5 Care Areas Attempting Hard Limits
(Excluding IV fluids)

<table>
<thead>
<tr>
<th>Care Area</th>
<th># of Hard Limits Attempted</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED</td>
<td>50</td>
</tr>
<tr>
<td>3 West</td>
<td>45</td>
</tr>
<tr>
<td>OPI</td>
<td>40</td>
</tr>
<tr>
<td>5 South</td>
<td>25</td>
</tr>
<tr>
<td>2 West</td>
<td>20</td>
</tr>
</tbody>
</table>
Continuous Quality Improvement
Hard Limit Alerts

Top 10 Medications Attempting Hard Limits

<table>
<thead>
<tr>
<th>Medication</th>
<th># of Hard Limits Attempted</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. Fluid</td>
<td>90</td>
</tr>
<tr>
<td>IV. Fluid-bolus</td>
<td>60</td>
</tr>
<tr>
<td>nafcillin</td>
<td>40</td>
</tr>
<tr>
<td>oncology drug 3</td>
<td>30</td>
</tr>
<tr>
<td>iron sucrose</td>
<td>20</td>
</tr>
<tr>
<td>antibiotic 1</td>
<td>15</td>
</tr>
<tr>
<td>aztreonam</td>
<td>10</td>
</tr>
<tr>
<td>heparin</td>
<td>7</td>
</tr>
<tr>
<td>vancomycin</td>
<td>6</td>
</tr>
<tr>
<td>antibiotic 2</td>
<td>5</td>
</tr>
</tbody>
</table>
Continuous Quality Improvement

Hard Limit Alerts

Top 10 Medications Attempting Hard Limits

# of Hard Limits Attempted

IV Fluid
IV Fluid-bolus
nafcillin
oncology drug 3
iron sucrose
antibiotic 1
aztreonam
heparin
vancomycin
antibiotic 2
Continuous Quality Improvement
Alert Optimization

• Gemba and discuss with key stakeholders
  – Outpatient infusion area
  – ED
  – Anesthesia
  – Cath/EP Lab
  – Labor & Delivery
  – Clinical nurse specialists
• Discussion: current practice vs recommended practice
Continuous Quality Improvement (CQI)

A Few Months After Implementation

June/July 2015
Continuous Quality Improvement
DERS Compliance – Before and After

DERS Utilization

**BEFORE**
- DERS: 99.1%
- non-DERS: 0.9%

**AFTER**
- DERS: 99.3%
- non-DERS: 0.7%
Continuous Quality Improvement

Soft/Hard Alerts – Before and After

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>normal</td>
<td>85.7%</td>
</tr>
<tr>
<td>soft limit</td>
<td>12.1%</td>
</tr>
<tr>
<td>hard limit</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

**Before**

- normal: 85.7%
- soft limit: 12.1%
- hard limit: 2.2%

**After**

- normal: 95.8%
- soft limit: 2.9%
- hard limit: 1.3%
Continuous Quality Improvement
Soft/Hard Alerts – Before and After

Percentage

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Soft Limit</th>
<th>Hard Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>85.7</td>
<td>12.1</td>
<td>2.9</td>
</tr>
<tr>
<td>After</td>
<td>95.8</td>
<td>2.9</td>
<td>1.3</td>
</tr>
</tbody>
</table>

75% Reduction
40% Reduction
Continuous Quality Improvement (CQI)

Current State
Continuous Quality Improvement
DERS Compliance – Our Recent Data
Continuous Quality Improvement
DERS Compliance – Feb17

DERS Compliance (%)
Continuous Quality Improvement

DERS Compliance – Feb17

DERS Compliance (%)

- Peds: 75.4%
- 2 East: 89.3%
- ED-Peds: 92.7%
- 4 South: 94.1%
- 2 West: 94.9%
Hard/Soft Alerts
Feb 2017

• Total program events
  – 17,474

• Soft alerts
  – 894 (5%)
    • Reprogram: 11%
    • Continue: 89%

• Hard alerts
  – 231 (1.3%)
Continuous Quality Improvement

Which of the following is not a positive benefit from interpreting CQI data:

A. Review drug library compliance
B. Obtain user satisfaction
C. Review soft limit overrides
D. Review hard limit attempts
Infusion Device
Wireless Integration
Uncontrolled variation is the enemy of quality.

— W. Edwards Deming —
Infusion Device Wireless Integration

1. Forced to move to semi-annual updates instead of quarterly updates
2. Frustration amongst staff due to change in drug library from pump to pump
3. Higher possibility of patient safety risk
Infusion Device
Wireless Integration

• Wireless connectivity is more complex than simply connecting to “WiFi”
• Bi-directional wireless integration is the goal
  – Drug library updates
    • Data from a central hosted server to the pumps
  – CQI data
    • Data from pumps to a central hosted server
Infusion Device
Wireless Integration

• **Medication library updates**
  - Can initiate an update to the medication library in a few minutes
  - Majority of pumps receive the update in less than 10 minutes
  - No end user intervention required for the update to occur
  - No pump “down time” required
Infusion Device
RTLS Integration

- RTLS = real-time locating system
- PRMC uses the Stanley Aeroscout system
- Integration of Stanley w/Baxter Sigma occurred in early 2017
- Sigma has an integrated RTLS tag in its battery module
# Infusion Device RTLS Integration

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Location</th>
<th>Status</th>
<th>Last Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/3rd Floor/West A/3 West Pump Storage</td>
<td>Depleted Battery</td>
<td>15 Apr 17 5:41 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/5th Floor/5 East A</td>
<td>Available</td>
<td>15 Apr 17 5:47 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/3rd Floor/West A/3 West Pump Storage</td>
<td>Available</td>
<td>15 Apr 17 5:48 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/3rd Floor/West A</td>
<td>In Use</td>
<td>15 Apr 17 5:47 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/3rd Floor/Clinical Decision Unit (CDU)</td>
<td>Available</td>
<td>15 Apr 17 5:48 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Layfield/1st Floor/ER, ER 200/ER Pump Storage</td>
<td>Available</td>
<td>15 Apr 17 5:49 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Layfield/1st Floor/ER, ER 200</td>
<td>Available</td>
<td>15 Apr 17 5:49 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Layfield/3rd Floor/C Station</td>
<td>Available</td>
<td>15 Apr 17 5:50 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/5th Floor/West A</td>
<td>Depleted Battery</td>
<td>15 Apr 17 5:48 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/2nd Floor/Cath Lab</td>
<td>Available</td>
<td>15 Apr 17 5:48 PM</td>
</tr>
<tr>
<td>Sigma (+1)</td>
<td>Sigma Infusion Pump</td>
<td>Main Building/1st Floor/PACU, Surgical Pump Storage</td>
<td>Available</td>
<td>15 Apr 17 5:48 PM</td>
</tr>
</tbody>
</table>
Clinical Conditions (Modifiers)

- Drug library build team
  - Vendor, pharmacists, nurses, physicians
- Post-live = multi-disciplinary team
  - P&T committee, CP&S
Clinical Conditions
(Modifiers)

<table>
<thead>
<tr>
<th>Modifier Name</th>
<th># Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 GRAM DOSE</td>
<td>2</td>
</tr>
<tr>
<td>1 HOUR Infusion</td>
<td>1</td>
</tr>
<tr>
<td>1st Infusion</td>
<td>1</td>
</tr>
<tr>
<td>250mL</td>
<td>1</td>
</tr>
<tr>
<td>2nd Infusion</td>
<td>1</td>
</tr>
<tr>
<td>30 MIN Infusion</td>
<td>5</td>
</tr>
<tr>
<td>3rd and Beyond</td>
<td>1</td>
</tr>
<tr>
<td>4 HOUR Infusion</td>
<td>6</td>
</tr>
<tr>
<td>500mL</td>
<td>1</td>
</tr>
<tr>
<td>Brand Name: Bendeka</td>
<td>1</td>
</tr>
<tr>
<td>Brand Name: Treanda</td>
<td>1</td>
</tr>
<tr>
<td>BRIDGE dosing</td>
<td>1</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>4</td>
</tr>
<tr>
<td>GREATER THAN 1 GRAM</td>
<td>3</td>
</tr>
<tr>
<td>Hypomagnesium &lt; 40kg</td>
<td>1</td>
</tr>
<tr>
<td>Hypomagnesium &gt; 40kg</td>
<td>1</td>
</tr>
<tr>
<td>LESS THAN 1 GRAM</td>
<td>2</td>
</tr>
<tr>
<td>LOAD</td>
<td>1</td>
</tr>
<tr>
<td>MAINTENANCE #1</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Modifiers: 30 of 500

Enter a new modifier name and click Add
Clinical Conditions
(Modifiers)
Clinical Conditions (Modifiers)
Clinical Conditions (Modifiers)
Clinical Conditions (Modifiers)

• Which of the following situations could benefit from the use of a clinical condition? (Select all that apply)
  A. Vasopressin dosing for two different indications
  B. Propofol dosing for both bolus and infusion
  C. Multi-step infusion (e.g., IVIG)
  D. A medication that requires a 0.22-micron filter
Continuous Quality Improvement
DERS Compliance – Benchmarking

- Regenstrief Center for Healthcare Engineering
  - Catalyzecare.org
  - Purdue University
- Performs benchmarking for compliance data
- Data analysis for alerts
- Contact: Richard Zink (zinkr@purdue.edu)
Continuous Quality Improvement
DERS Compliance – Benchmarking

Data from: Regenstrief Center for Healthcare Engineering, Infusion Pump Informatics
Continuous Quality Improvement
DERS Compliance – Benchmarking

Data from: Regenstrief Center for Healthcare Engineering, Infusion Pump Informatics
Continuous Quality Improvement
DERS Compliance – Benchmarking

Data from: Regenstrief Center for Healthcare Engineering, Infusion Pump Informatics
Continuous Quality Improvement
DERS Compliance – Benchmarking

Data from: Regenstrief Center for Healthcare Engineering, Infusion Pump Informatics
Infusion Pumps & EMR Integration

- Peninsula Regional has migrated to the EPIC EMR in November 2016.
- Our plan is to integrate our infusion pumps with the new EMR system as part of optimization.
Conclusions

• Implement a structured approach when deciding on an infusion device.
• Default starting rates, VTBI etc. whenever possible to improve standardization.
• Leverage CQI data in coordination with gemba to optimize DERS compliance and minimize unnecessary soft and hard limit alerts.
Conclusions

• Leverage wireless connectivity to efficiently publish drug library updates with minimal disruption to end users.

• Use clinical conditions (modifiers) in key situations to improve IV medication safety and streamline user interaction with an IV infusion device.
References

Future/Ongoing Initiatives
Upcoming Seminars

Mark your calendars for these 3 great learning opportunities!

September 11, 2017 – 12 noon to 1pm EST

Sonia Pinkney, PEng, MHSc | Manager, Electromedical Group, Medical Engineering, University Health Network | Human Factors Engineer, HumanEra | Adjunct Lecturer, IHPME, University of Toronto

Making the Invisible Visible

Secondary IV infusions and shared infusion volume

Learn how to address the risks through education, workflow changes and technology
September 18, 2017 – 12 noon to 1pm EST
Peggy Bartholomew, MHSM, RN, PMP
Project Manager
Quality Project Management
UT Southwestern Medical Center

A Journey to Reducing Alarm Fatigue; Tips on What Not to Do

Identify operational barriers to impacting alarm reduction
Identify clinician barriers to impacting alarm reduction
Learn recommendations to reduce non-actionable alarms
September 25, 2017 - 12 noon to 1pm EST
Sonia Pinkney
and
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Human Factors Engineering Consultant
Human Factors North Inc., Canada

Where’s My Line?

Learn how to reduce the safety risks associated with problems in IV line identification and with IV pump boluses with validated evidence-based recommendations
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