TENTH ANNUAL CONFERENCE AND EXHIBITION

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Improving Infusion Pump Usage and Utilization With RTLS

RTLS technology in health care

“Knowing the location of assets … and then what?”
Introduction

Christian Buchsteiner is a Healthcare Improvement Engineer at PeaceHealth in Eugene, Oregon.

- Certified Lean Health Care Black Belt
- Bachelor’s degree in Mechanical Engineering
- Wide range of experiences across different industries, including manufacturing, laboratory and hospital operations
- A passion for improvement, supported by operational know-how and the ability for effective, practical application of technology
Any health care system utilizes hundreds of expensive assets every day. The management of these assets has been an ongoing challenge. The main reasons are the lack of data, utilization of technology, understanding of asset utilization, stewardship and demand for assets.

The savings potential is in the millions, by eliminating waste in inventory, utilization, storage, hording and hunting.

Fixing these problems has been a daunting task. Justifying new or additional equipment during the capital budgeting process also is a pain … but often the only solution.
Presentation - Key Objectives

✓ Design approach to establish a standardized “asset management process” supported by RTLS

✓ Determining how to reduce the number of assets, while in the past adding was the solution

✓ How the facility can realize a $2.7 million savings over 10 years by tracking and managing IV pumps utilizing RTLS technology

✓ The “power” of RTLS – Location information and its operational meaning and purpose
Sacred Heart Medical Center at RiverBend

The state-of-the-art, comprehensive medical center and Level II trauma center opened in August 2008.
SHMC at RiverBend

Design Vision:
- Healing environment for patients, visitors and staff
- Patient- and family-centered
- Flexible, expandable and adaptable
- State-of-the-art design and use of technology

Details:
- 1.2 million square feet (23 football fields)
- 347 licensed private beds and 47 ER beds
- 28 OR suites (4 Cardiac Surgical Suites)
- Complete Women’s Services line
SHMC RiverBend - RTLS

RTLS Technology by Versus Technology, Inc.

- **Versus Sensory RFID-IR Network:** Provides data using infrared (IR) and/or radio-frequency (RF) technology
- Room-level locating and tracking
- Entire hospital and selected ancillary buildings are wired
- 2,104 sensors
- 2,700 badges
- 1,500 (and growing!) asset tags
- Integration to Nurse Call
SHMC RiverBend – RTLS Journey

- **2008**
  - ED and Anesthesia Clinic Patient/Staff/MD/Equipment
  - OR Equipment tracking
  - Staff tracking in Nurse Call

- **2009**
  - OR Nursing staff tracking

- **2010**
  - Interpretive Service Equipment
  - Distribution Asset Module (for IV Pumps)

- **2011-**
  - L&D and M&B Patient/Staff/MD/Equip.
  - Expanding Asset Module for other assets
  - Utilization of location information for CQI
Design Foundation

“The starting point for improvement is to recognize the need” (IMAI)

- Executive leadership
- Process ownership
- Frontline-user design involvement
- PeaceHealth internal IT resources and expertise
- Strong RTLS vendor relationships
Design Approach / Cultural Transition

We knew we needed to design a completely new distribution process for Infusion pumps and other house-wide small assets.

The availability of assets and the management of inventory and distribution are critical to patient care and safety, but also caregiver satisfaction and efficiency.
Step 1 – Asset Utilization

Evaluate asset (IV pump) utilization and determine how many are required.

- Benchmarks
- Calls to other hospitals
- Internal (cumbersome) observations
- (New) Streamlined data collection by tagging and tracking a sample number of assets to determine usage and utilization
Step 2 – Goal setting

- Reduce the number of Infusion pumps by 26% from 923 to 700 channels
- Improve patient care and safety
- Eliminate “hoarding” and need for “hunting”
- Eliminate frustrations
- Eliminate the need for rental (lease) equipment
- Establish a standard process for asset management
Step 3 – Design Basics

- Establish process operational ownership
- Frontline user involvement – design champions
- Brainstorm distribution process options (Centralized vs. Decentralized vs. Hybrid Model)
- Location information + operational meaning/purpose
- RTLS technology is process “backbone”
- RTLS room level accuracy is vital
- Process Management is required for sustainability and continuous improvement
Step 4 – Current State

What’s wrong with the current state process?

- Distribution process = “Provide what is available”
- Prone to pump “hording” and “hunting”
- Produces daily caregiver frustration
- Impacts patient safety and delays patient care
- Adding more IV (rental) pumps (assets) and increasing inventory is not solving the root causes of the problem
- Expenses are no longer sustainable
Step 4 – Future State

RTLS support decentralized PAR management process, based on a JIT delivery concept.

“RTLS information with operational meaning/purpose!”

- Identify **one** central storage location on each unit
- Establish PAR levels – number of pumps required
- Establish critical inventory alerts (High and Low)
- Ensure RFID infrastructure is in place and accurate
- Build application and tool to support JIT model
Future State – What it is not!

Providing access to all caregivers to the web-based application or floor plan view to locate assets.

- Caregivers already have to look at so many other screens – just another click / waiting / searching
- Walking to get pump is still required
- Information doesn’t always tell if the pump is in use
- Significant expense for infrastructure and training
The key “Barrier”

“You are doing what? Taking away pumps? We never have enough! You must be crazy!”

- Engage frontline users in the data collection
- Fosters understanding of usage and stewardship
- Design champions
The new “Process”

- **Distribution** balances pump inventory and responds to system-generated inventory alerts – JIT delivery model

- **Clinical staff (RNs/CNAs)** facilitate cleaning and removal of unused pumps from patient rooms and return to units’ central location

- **ENVS** to clean and remove unused pumps at discharge and return to units’ central location
The “Application” – Phase I

PeaceHealth
Dedicated to Exceptional Medicine and Compassionate Care

Riverbend Sigma Pump Count by Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Pump Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 NICU totals:</td>
<td>0</td>
</tr>
<tr>
<td>5N L/D totals:</td>
<td>10</td>
</tr>
<tr>
<td>5S M/B totals:</td>
<td>7</td>
</tr>
<tr>
<td>6N Ortho totals:</td>
<td>3</td>
</tr>
<tr>
<td>6S Neuro totals:</td>
<td>2</td>
</tr>
<tr>
<td>7N Surg totals:</td>
<td>7</td>
</tr>
<tr>
<td>7S Surg totals:</td>
<td>6</td>
</tr>
</tbody>
</table>

This report provides a total of each badged and sensed Sigma Pump in the defined Riverbend locations for the following time: 2010-07-21 17:00:00.

Actual assessment between 17:00 - 18:15
The “Application” – Phase II

<table>
<thead>
<tr>
<th>Unit</th>
<th>Current IV Pump Count</th>
<th>Critical Low</th>
<th>Per Level</th>
<th>High Warning</th>
<th>Notifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility Wide</td>
<td>141</td>
<td>185</td>
<td>250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5N Labor Delivery</td>
<td>14</td>
<td>8</td>
<td>16</td>
<td>23</td>
<td>Yes</td>
</tr>
<tr>
<td>5S Mother Baby</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>5th floor NICU</td>
<td>5</td>
<td>2</td>
<td>8</td>
<td>13</td>
<td>Yes</td>
</tr>
<tr>
<td>5N Ortho</td>
<td>2</td>
<td></td>
<td>0</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

From: versus.messenger@versustech.com
[mailto:versus.messenger@versustech.com]
Sent: Wednesday, March 14, 2012 9:59 AM
To: DL:PHO-Asset Tracking Paging
Subject: IV Pump Notification

IV Pump count 2, critical 2, par 8 in 7S Surgery.
RTLS – VERSUS accuracy

- New process and application was based and reliant on accurate room-level tracking
- Accuracy exceeded expectations

Supporting data:
A one-year post implementation inventory accounted for 99.7% of pumps (698/700).
Ongoing challenges

Removal of unused and in-active pumps from patient rooms by caregivers

”A system must be managed. It will not manage itself. A system must have an aim and the purpose or aim must be clear to everyone in the system.”

(E. Deming)
Results

- Total number of IV channels was reduced:
  - By 26% from 923 to 700
  - Utilization increased from 43% to 75%
- Frustration ("noise") is gone
- The need for calls to request pumps is eliminated
- The need for hoarding and hunting is eliminated
- A system of "Economy of plenty" for caregivers
- Ability to track pumps utilizing RTLS
  - Know location
  - Know utilization
  - Can obtain data to streamline inventory values
Cost Savings and ROI

- Eliminate need for rental equipment and expense
- Eliminating of IV Channels by 26% resulted in:
  - Cost avoidance of about $600,000
  - 10-year cost saving of $2.7 million
- Utilizing the same approach for other assets allowed for an estimate of 30% to 50% reduction of assets.

Other savings since IV pump go-live:

<table>
<thead>
<tr>
<th></th>
<th>Cost Avoidance</th>
<th>10-Year Saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syringe pump replacement</td>
<td>$45,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Feeding pump replacement</td>
<td>$38,000</td>
<td>TBD</td>
</tr>
<tr>
<td>PCA pump replacement</td>
<td>$184,000</td>
<td>TBD</td>
</tr>
<tr>
<td>SCDs reduction</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Acknowledgement – “Team”

From Left to Right: Vina Riedger (CHR), Doug Duval (CHR), Marvin Hammerschmied (CHR), Steve Willis (HID), Ginger Banks (CHR), Ben Amacher (HID), Deedee Heyland (CHR), Rebecca Barquist-Despatie (HID), Brian Cherry (Distribution Coordinator), Chris McGuire (Distribution Manager / Operational Lead IV Pump Process)

Not in picture: Donna Woelfel (HID), Tim May (Clinical Leadership), Marty Arno (Biomed Engineering), Nursing team, Alice Wagner (Environmental Services), Paul Roche (Pharmacy), Tina Hoffman (HID), Michael Rodeen (Finance), Versus Experts, Christian Buchsteiner (CHI)
Final Take-Away

“RTLS is an operational foundation and a necessity for any enterprise.”

BASIC: “Know” locations

ADVANCED: “Use” location information

SUPERIOR: “Translate” location information

The possibilities are endless ……
Superior RTLS = Technology + Solutions + Reports/Data

(Framework)      (Applications)      (Analytics)

Analytical utilization of RTLS location and tracking data to support operational decision-making and CQI.

Examples:

- IV pump inventory data collected by the Versus PAR Management Module – imported to worksheet.
- Spaghetti Maps – translate location information into activity
  - Caregiver/Patient Face-time
  - Environmental services room cleaning cycle times
Sigma Infusion Pump - Asset / PAR Management Alert Summary Report

(8/15/11 to 8/22/11)

Alerts - Total
- High: 0
- Low: 0

Alerts per hr (average)
- High: 0.00
- Low: 0.00

Total Alerts for period observed
- High: 0
- Low: 0

Alerts per day of the week
- High: 0
- Low: 0

Alerts Trend - Time of the day
- High
- Low

Alerts by Location
- par 13 in ED Hall 4.
- par 16 in SN Labor Delivery.
- par 6 in Anesthesia Tech Room.
- par 9 in ED Hall 2.
- par 14 in PACU Recovery.
- par 4 in CDU.
- par 8 in ICU S Neuro.
- par 8 in ICU S Cardio.
- par 7 in SPA (Pre Op).
- par 24 in CVOR.
- par 14 in ICU Medical.
- par 5 in ICU Step Down.
Questions?
Thank You