Improving Infusion Pump Availability and Utilization With RTLS

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

Kaspar Christian Buchsteiner
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 experience and the ability for effective, practical application of technology
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 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 + 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
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 the need for “hunting”
- Eliminate frustration
- 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
- Operational 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 5 – 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
... but not ...

... providing access to caregivers to the web-based application or floor plan to locate assets.

- Caregivers already have to look at so many other screens – another click / waiting / searching
- Walking to get a pump is still required
- Information does not 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”

- RTLS aggregates number of pumps in central storage location.
- PAR levels and inventory alerts are set by Distribution.
- Versus PAR management interfaces with mail exchange server.
- Automated alert notifications when thresholds are violated:
  - Send an email to designated addresses on an hourly basis until violation is resolved.
  - Send a Pop-up message to designated workstation/dashboard on an hourly basis until violation is resolved.
  - Email triggers a text message to pager/phone.
RTLS – Accuracy

- New process and application is based and reliant on accurate room-level tracking
- Accuracy exceeded expectations by far!!!

Supporting data:
A two-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") was gone on Day 1
- The need for calls to request pumps has been eliminated
- The need for hoarding and hunting has been 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

- Eliminated need for rental and lease 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 and in significant cost savings.
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

Application(s)
- Practical
- Purposeful
- Easy

Solution

Data

Analytics
- Operational Management
- Process Control
- Continuous improvement

Technology

Framework
- Dependable
- Accurate
- Low Maintenance
Questions?

**Contact Information**

Christian Buchsteiner  
Healthcare Improvement Engineer  
Sacred Heart Medical Center at RiverBend  
[cbuchsteiner@peacehealth.org](mailto:cbuchsteiner@peacehealth.org)  
or find me on LinkedIn
Thank You