October 20, 2017
12pm to 1pm

From the AAMI Foundation's *National Coalition for Alarm Management Safety*

Utilizing Lean Methodologies to Manage Telemetry Devices

Christina Carranza, MSN, RN-BC, CNML
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Speaker Introduction

Christina Carranza, MSN, RN-BC, CNML
Nurse Manager Cardiac Telemetry
NCH Healthcare System

Utilizing Lean Methodologies to Manage Telemetry Devices

October 20, 2017

AAMI Foundation
Patient Safety Seminar

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NCH Healthcare System

NCH Healthcare System

Non-for-profit, multi-facility healthcare system in Naples, Florida

MAYO CLINIC CareNetwork Member

- Two hospitals (716 beds)
- An alliance of over 730 physicians, over 213 mid-level providers, and medical facilities throughout Collier County and Southwest Florida
- ACGME Accredited
- Extensive inpatient and outpatient services
- 2016 System Statistics:
  - 40,000 total admissions
  - 98,000 ED visits
  - 3,600 Births
  - 365 Open Heart Surgeries
  - 11,800 Surgical Procedures
  - 4,200 Staff Members
  - 1,300 RNs

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Industry Recognition

HIMSS Analytics Stage 7 Award

The Joint Commission National Quality Approval

HealthCare's most wired

Becker's Hospital Review 100 Great Community Hospitals

U.S. News & World Report

American Heart Association

The Society of Thoracic Surgeons

Society of Chest Pain Center Early Recognition and Response Cardiovascular Patient Care

The Leapfrog Group A Hospital Safety Score Spring 2013

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Objectives

By the end of this presentation, the learner will:

- Discuss the effects of poor telemetry device management in the acute care setting
- Review benefits of inventory control to improve patient safety and financial mitigation
- Explain how to recognize key stakeholders required for telemetry inventory

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Background

- Based on Industry recommendations, NCH decentralized telemetry in late 2014.
- Divided boxes and leads across both hospital campuses and sent them to the Emergency Department. ED to keep inventory and provide boxes on demand to the inpatient units.
- “Do you have a tele box?”

Voice of Costumer

December 2015

- “Continue to have delays with telemetry admits, telemetry boxes are not being returned to the ED, most are returned without the leads, Biomed called to replace the leads throughout the day, multiple calls to the floors to retrieve the boxes and leads.”

What Does the Research Say….

- "The Institute for Healthcare Improvement demonstrated that regardless of the location, crowding and holding admitted patients is a result of ineffective hospital flow processes. Recognizing patient flow is a hospital-wide system issue, the Joint Commission established the standard "The hospital manages the flow of patients throughout the hospital." (ENA, 2014)
- LWBS
  - Left Without Being Seen. Each patient who tires of waiting and leaves the ED without being seen represents an average loss of $1,000 (CEP, 2015)
- "Problems in management practices, employee deployment, work and workspace design, and the basic safety culture of health care organizations place patients at further risk." (Keeping Patients Safe, IOM, 2004)

Team Formation

- **Small workgroup formed in Fall 2015**
  - Lean Management Engineering, Nursing, Clinical Engineering (Biomed), Transport
- **Ad hoc Members**
  - Education, Infection Prevention, Manufacturers, Billing, Supply Chain, Clinical Informatics, Engineering, Executives

Problem Statement: Voice of the Customer results from Emergency Room, Nursing Floors and Clinical Engineering state that GE Telemetry boxes are not readily available at the point of use. The delays associated with "search and find" methods for telemetry boxes impact quality of patient care, throughput, patient satisfaction, transporter efficiency and the clinical continuum of care. Currently there are no standard processes for tele box transport, inventory, and cleaning within NCH.

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Project Charter

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Project Charter

Project Organization			
Project Name	*What is this about?*	**Updated**	
Champion(s)/Senior Executive(s)	*Who is authorizing this?*	**Start Date**	
Team Leader(s) /Owner	*Who will own this?*	**End Date**	

Project Definition	
Problem Statement	▸ *What is the problem or need –* ▸ *What is the gap in performance? Actual vs target/goal? Quantify, How bad/big is it?* ▸ *What specific performance measure needs to be improved?*
Goal Statement (include how much by when)	▸ *What is the Target Condition?* ▸ *What outcome is required?* ▸ *What specific improvements in performance do you need to achieve?* ▸ *Show visually how much, by when and with what impact* ▸ *By When?* ▸ *Don't state a countermeasure as a goal*
Baseline Performance (trend to show a chronic problem)	▸ *What is happening currently? How?* ▸ *What is happening now versus what needs to be happening?* ▸ *Where did you go to determine this? How did you determine this?* ▸ *What facts & data indicate the issue further?* ▸ *What specific conditions indicate that there is a problem or need?* ▸ *Where and how much? can you break the problem into smaller pieces?* ▸ *Show facts and processes visually using charts, graphs, maps*
How does project support the Strategic/ Business plan?	▸ *What is the strategic, operational, historical or organizational context of the situation?* ▸ *What is the impact on the business?* ▸ *What business purpose is not being fulfilled?* ▸ *Why is this important?*

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Lean Management and Healthcare

- **2015/2016 Season**
  - ED Holds (Patient Safety)
  - Inventory
    - *Who owns the boxes?*
    - *How many do we have?*
  - We were successfully hitting the mark on all 8 wastes…..

Gemba

"Sorry, can't stop to talk.
I've got to finish my gemba walk!"

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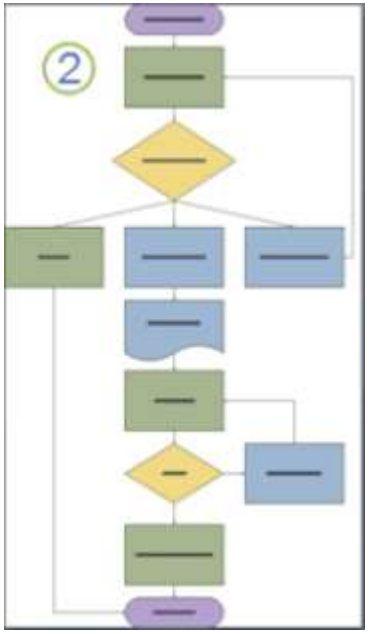
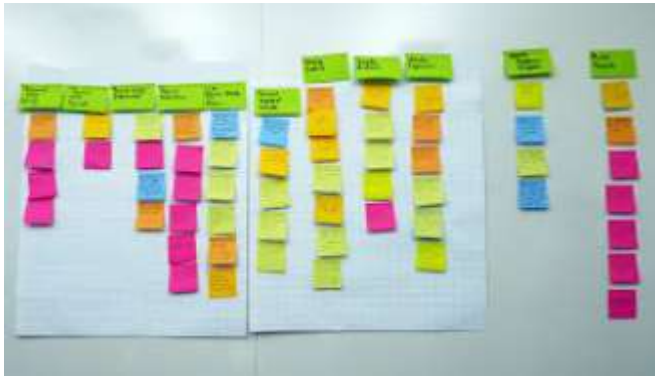
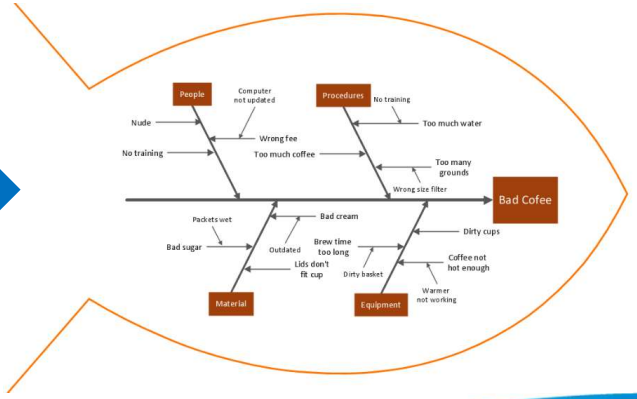
Structured Problem Solving



Process Mapping





Affinity Diagram

Fishbone Diagram

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What We Began to Learn….

- No standard work for transport of telemetry boxes and leads.
- Variation in cleaning practices.
  - Boxes were damaged due to inappropriate cleaning practices
- No clear process for inventory of telemetry boxes and leads
  - How many boxes do we have?
- Care and storage of device not consistent with manufacturer's recommendations.
- Use and disposal of batteries inconsistent.

What We Began to Learn….cont'd

- Flow of boxes through the system was disjointed, varied, and lead to hoarding practices and staff dissatisfaction
- Boxes were leaving the system entirely (discharged with patient, linen).
- Understanding use and capabilities of Centralized Information Center (Telemetry Monitors) was inconsistent between departments.

What We Learned…

Repair Issues

- Over a 4 month span (Nov 2015-Feb 2016), 73 tele boxes were sent out for repair, of which 38 boxes were attributed to cleaning/corrosion issues. (data based on 3rd party repair service)
- $425/approx repair charge x 38 boxes= $16,150.00 (4 months of data)**potential cost avoidance)**
- $16,150.00 x 3 (extrapolated over 1 year) = $48,450.00 **(potential cost avoidance)**

Transport Non-Value Added time:

- Over a 2 week period, the average non value added time wasted to specifically have a transporter do tele box rounding = approx 73 minutes/day
- 73 min/day x 365 days/yr =27,645 min/yr or 444 hrs/yr (this equates to approx 3.5 transport jobs/day).
- 444 hrs/yr x avg transporter hrly wage = several thousand dollars **(potential cost avoidance)**

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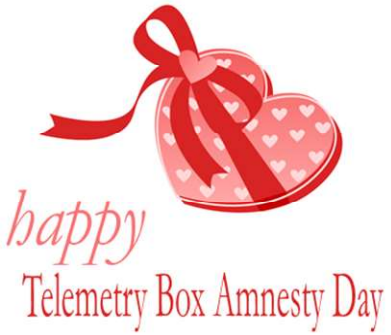
Searching for Telemetry Box Non-Value Added time

- Over a 2 week time period in March 2016, the average non-value added time wasted to specifically search for a tele box = approx 488 min/day x 150 days in a 5 month period (season Dec-April)
- 73,200 minutes/60 min = 1,220 hours/season
- 1,200 hrs/season x (avg wage (CT, RN, US) = several thousand dollars **(potential cost avoidance)**

On-demand Inventory (Amnesty Day):

- Count every box on a patient at one specific time and turn off the rest….
- Before this day we had a total of ????? boxes
- After… 364



Partnership with the Clinical Engineering Department (Biomed)

- Understand what information we needed from each other
- Asset Tags versus Serial Numbers versus TTX number
  - Need to speak the same language
  - How are we tracking this?
- FH versus CH
  - Important factor when exchanging boxes for repair from the nursing department
- Why are boxes malfunctioning?
  - Top culprit…corrosion of battery contacts.
- Capability of onsite repairs versus send-outs. Cost and time savings. Improve turn around time to get boxes back in service.

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Partnership with the Nursing Department

- How many boxes does each unit “need?”
- Utilization reports based on telemetry order sets
  - Set pars for each unit based on unique needs of department
    - *Cardiac versus Medical Telemetry*
  - Provide Biomed with a par for replacements
- Consistent communication about unit needs, device performance (specific units with higher rate of device failure)
- Concomitant workgroup focusing on Nurse-driven Telemetry Discontinuation

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Some Accomplishments – Standard Work

- **Cleaning**
- **Storage**
- **Transport**
- **Inventory**

- Moved the inventory of boxes to the nursing departments.

Cleaning

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Partner with Infection Prevention, Nursing, Education

- Identify Infection Prevention recommendations for cleaning products.
- Observe workflow and develop standard process. Trial. PDCA.
- Involve Education Department for roll out and education for new staff.

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Transporting

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Transporting

- Map Process
- Brainstorm
- Utilization of Resources
- Pneumatic tube system capabilities?
  - RFID?
  - Engineering routes in house
  - What does the manufacturer say?
  - Network with other hospitals
  - Trial process
- Visual Management

Inventory

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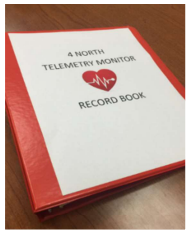
Inventory



- Pars
- Identify who is responsible for taking telemetry off of the patient
- Process for signing in and signing out box
- Shift change, charge nurse performs a reconciliation of all the unit's telemetry devices with oncoming charge nurse: rack or room?
- Boxes sent for repair are swapped with a biomed box, the TTX number is changed to create a static inventory on the unit
- Master list kept electronically on unit and in binder

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Storage

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Storage

- Identify manufacturer recommendations
- Create education module and flyers based on these recommendations, with pictures, to support process
- Visual management.
  - Red and Green
- Each unit had unique locations for storage depending on the unit

Results

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Results so far - continued

- **2016/2017 Season**
  - ED Holds related to Telemetry boxes - **None!**
  - Inventory
    - 364 boxes x $1,500/box = $546,000
  - Potential Cost Avoidance
    - Repair issues: $425/approx repair charge x 38 boxes= $16,150.00 (4 months of data), extrapolated 1 yr $48,450.00
  - Non-value added time savings:
    - Transport jobs: 73 min/day x 365 days/yr =27,645 min/yr or 444 hrs/yr (this equates to approx 3.5 transport jobs/day).
    - Searching for boxes: $444 hrs/yr x avg transporter hrly wage = $X,XXX.00 **(variable potential cost avoidance).**

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Lessons Learned

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Lessons Learned – Contributing Factors for Success

- Utilizing a Lean Management approach helped solve a potential patient safety problem that plagued the organization.
  - Structured problem-solving
- Effective communication starts with effective listening
- Continual management of the process is an absolute necessity
  - Ownership to the unit's for maintaining the integrity of the telemetry boxes to ensure patient safety.
- Impact:
  - Staff satisfaction
    - No more search and find
    - No more hoarding
  - Financials
    - Stewardship and throughput
  - Patient care
    - Timely care
    - Appropriate device….when the patient needs it!

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Next Steps

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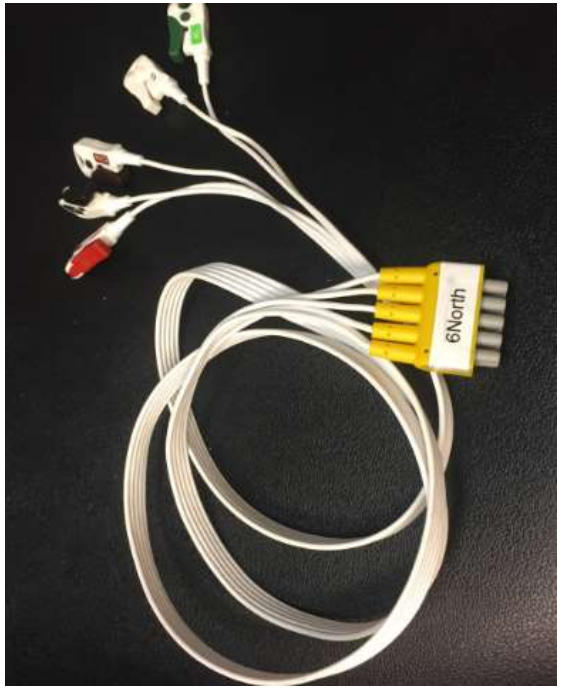
Next Steps

- Sustain unit management of telemetry boxes
- Use of EMR to track telemetry boxes, scanning?
- Automating the inventory process
- Moved to disposable leads house-wide



Final Thoughts

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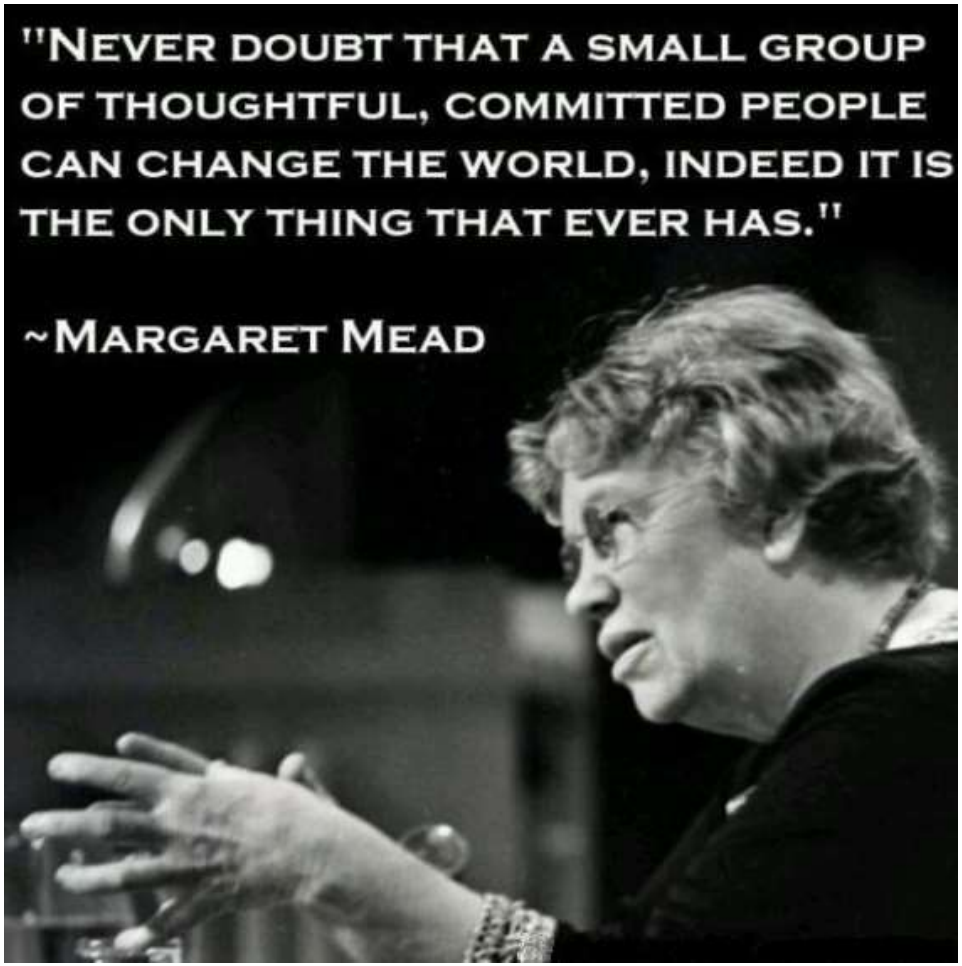
Final Thoughts



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