Patient Care Device Integration (PCDI)
Developing a Strategy for Integrating Medical Device Data with Clinical Information Systems

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Overview

- Motivation
- Challenges
- Planning Process
  - Create a Vision
  - Assess Inventory and Database
  - Define Data Needs and Clinical Workflow
  - Prioritize Devices
  - Evaluate Vendors
  - Assess Network
  - Assess Facility
  - Create a Support Model
- Located in Southern New Jersey
- Four Hospitals – 975 licensed beds
- Specialized Programs of Excellence
- Long-Term Care
  - Berlin 128 beds
  - Mt. Holly 180 beds
- Ambulatory
  - Ambulatory Centers (2)
  - Satellite Emergency Room
  - Surgical Centers (4)
  - Health Fitness Centers (2)
  - Home Health
- Physician Services
  - 150 employed physicians
- Foundation
- Insurance Captive
- Nearly 8,000 employees
- Net revenue ~$1 billion
Virtua’s STAR underpins everything we do.
Motivation

- Implement multi-generational enterprise and department clinical information systems
- Ensure accuracy of data
- Increase productivity
- Enhance quality of care
- Increase staff satisfaction
Challenges

- 10,000 devices in our inventory
- Wide variety of make/model medical devices with different connectivity options
- Proprietary medical device communication protocols
- Best of breed clinical systems with different connectivity options
- Lack of collaboration between biomed and IT
- Limited best practice information
Planning Process

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Create a Vision

- Determine the goals for device integration
  - Enhance patient safety and quality of care - ensure accuracy of data, provide real-time patient data for clinical decisions, provide closed loop medication administration
  - Increase nursing productivity
  - Increase nursing satisfaction

- Align strategic plan for device integration in Biomed, IT, Purchasing and Clinical
Assess Inventory and Database

- Start with a comprehensive biomedical database
  - Make/model, serial #, biomed #, description
  - End of life projection
  - Firmware version
  - IP address scheme
  - Network diagrams
  - Server information
  - Communication/interface port
  - Wireless capabilities
  - Communication Protocol
  - Data Output (type, frequency, elements, format)
  - Technical Manuals

- Create a knowledge library
- Look for standardization opportunities
Define Data Needs & Clinical Workflow

- Assess current and future workflow with clinicians, HIM, biomed, IT and informaticists
- Define device data needs, storage, and flow
- Define data validation approach
- Design CIS flowsheet and data display
- Map the patient identification and patient-device association/disassociation process
Prioritize Devices

- Prioritize devices based on benefits you want to achieve
  - Potential to improve productivity (amount and frequency of data gathering)
  - Potential to improve quality of care (importance of real-time data for clinical decisions)

- Consider device connectivity options and workflow
## Device Integration Roll-out Plan

<table>
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<tr>
<th>Phase</th>
<th>Acute Care</th>
<th>Periop</th>
<th>ED</th>
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| **Phase 1** (within 6 months – 1 year) | - Physiological monitors and ventilators in critical care  
- Fetal monitors in L&D | - Physiological monitors, ventilators, anesthesia machines, BIS monitor in OR, PACU, and IR |  |
| **Phase 2** (within 2 years) | - Spot VS monitors in Med surg |  |  |
| **Phase 3** (within 2 – 3 years) | - Infusion pumps | - Infusion pumps |  |
| **Phase 4** (within 4 years) |  |  | - Physiological monitors, ventilators, spot vital signs monitors in ED |
Evaluate Vendors

- Three types of device integration vendors
  - Medical device manufacturer (often involve a gateway)
  - Independent third party vendor
  - Clinical Information System vendor

- Involve end users, biomed and IT to design evaluation criteria and testing
Vendor Selection Criteria

- Workflow requirements
- Barcode/RFID
- Capture 100% data output
- Frequency of data transmit
- Wired/wireless solution
- Wireless roamability
- Driver development
- Device vendor-neutral
- Device manufacturer relationship
- Robustness/reliability
- Backup and redundancy
- Security
- Scalability
- Management tools
- Remote diagnostic capabilities
- Ease of maintenance (hardware, server, software)
- Experience in healthcare IT and medical device industry
- Training
- Cost
Set up a Test Lab
Assess Network

- Work with IT and biomed to assess network infrastructure
  - Identify all biomed and IT networks (either segregated or converged)
- Develop system-level network diagrams
- Assess bandwidth, capacity, wireless coverage, EMI, latency, redundancy, and scalability based on future state
Assess Facility

- Conduct a walkthrough with IT, biomed and facility
- Consider
  - Data and power drops
  - Environment for servers, network gear
  - Physical space in patient care areas and closets to put device integration hardware
  - Consolidation opportunities between biomed and IT closets
  - Decision on UPS
Create a Support Model

Traditional Support Model

- Biomedical - Device-related problems
- IT/Applications-related problems
- IT
Device data is not flowing into CIS ... Who do you call?

Fundamental integration point between Biomed and IT
Create a Support Model

New Support Model

- Clearly define roles and responsibilities
- Create new processes
- Assess organizational structure
- Plan for cross training
- Form a *partnership* between IT and biomed
- On-going process
Summary

- Consider workflow throughout planning
- Create a strategic, multi-generational integration plan
- Need substantial planning effort, start as early as possible and get stakeholders involved
- Set up a test lab to effectively evaluate device integration solutions
- Prepare for collaboration and role changes in your IT and biomed departments
Questions?

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