

***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

- **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**

# 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

	Acute Care	Periop	ED
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

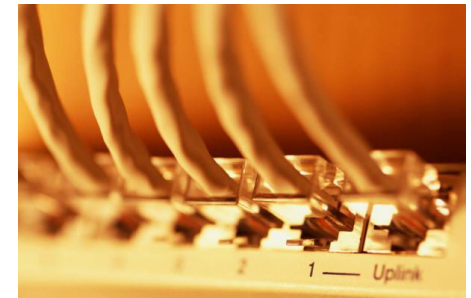
- Workflow requirements
- Barcode/RFID
- Capture 100% data output
- Frequency of data transmit
- Wired/wireless solution
- Wireless roamability
- Driver development
- Device vendor-neutral
- Device manufacturer relationship
- Robustness/reliability
- Backup and redundancy
- Security
- Scalability
- Management 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**



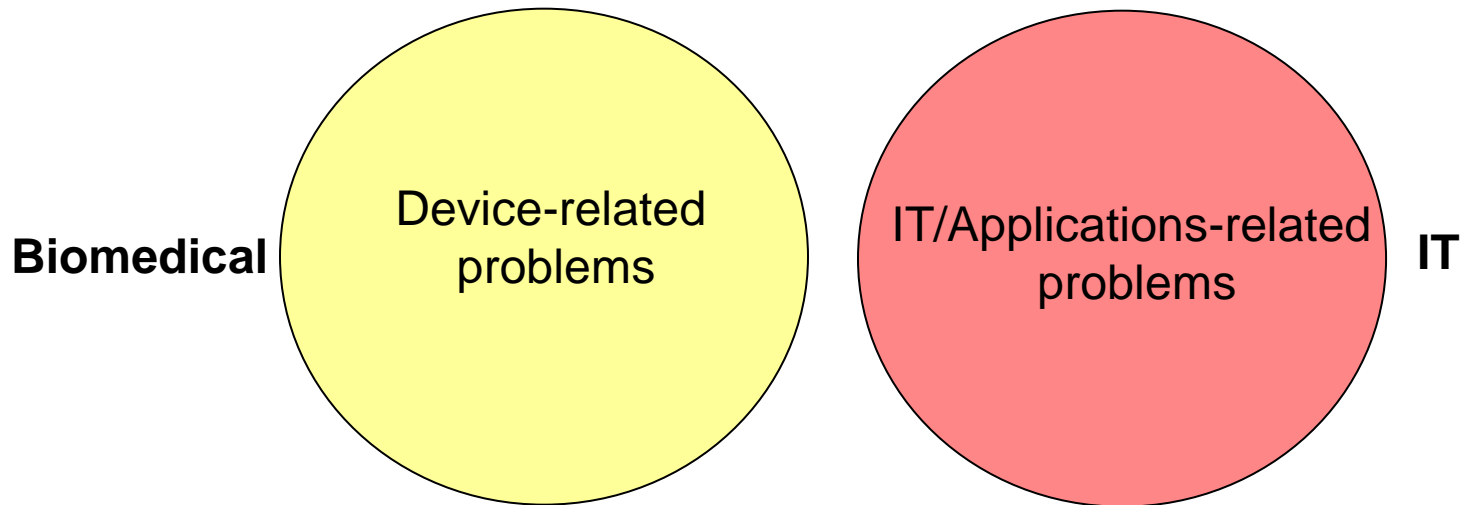
# Assess Facility

- **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



# *Device data is not flowing into CIS ... Who do you call?*

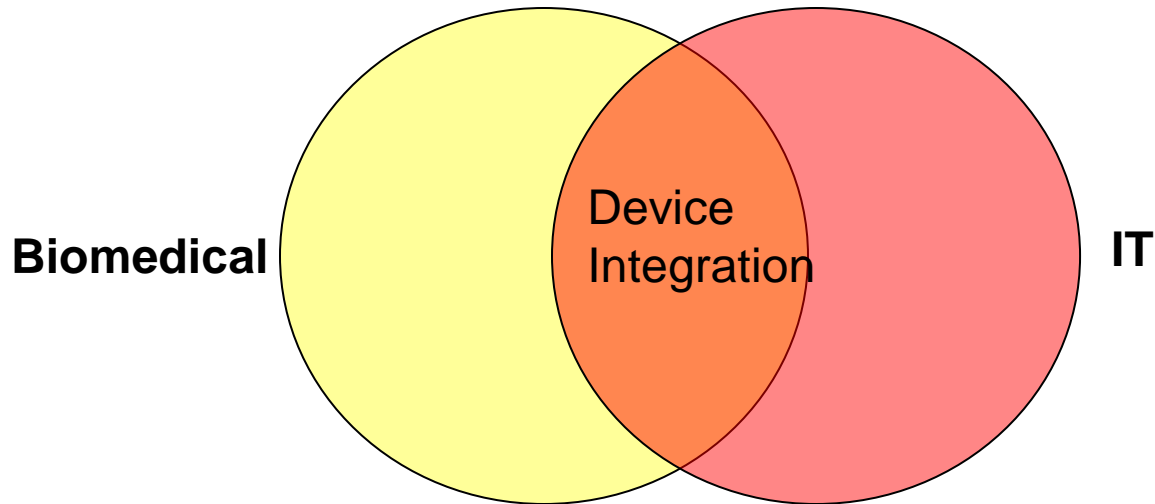


*Fundamental integration point  
between Biomed and IT*

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# 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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