

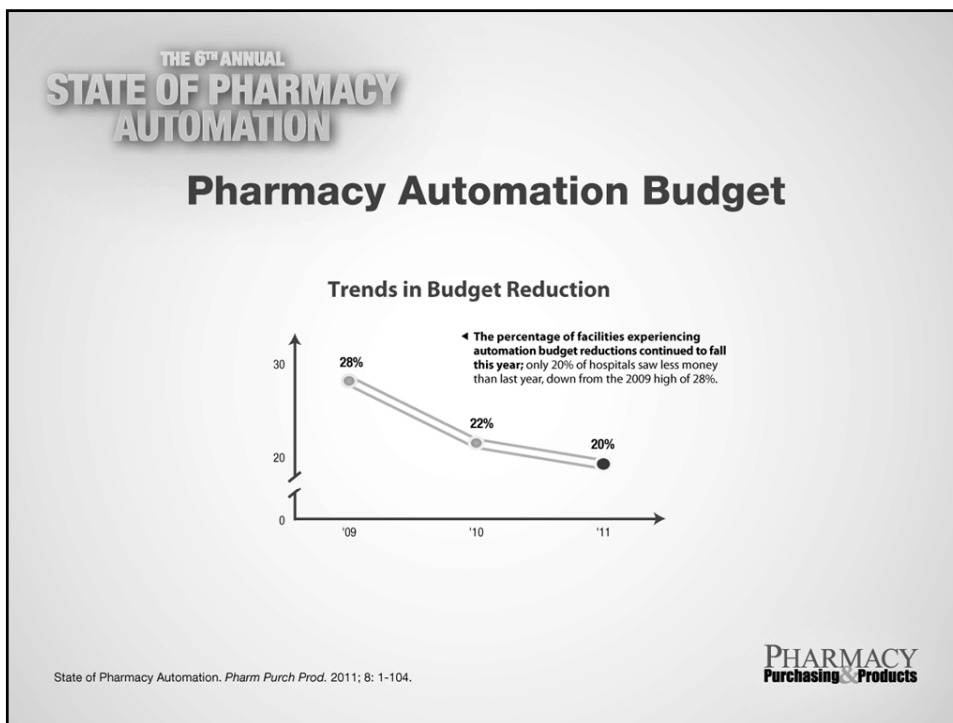
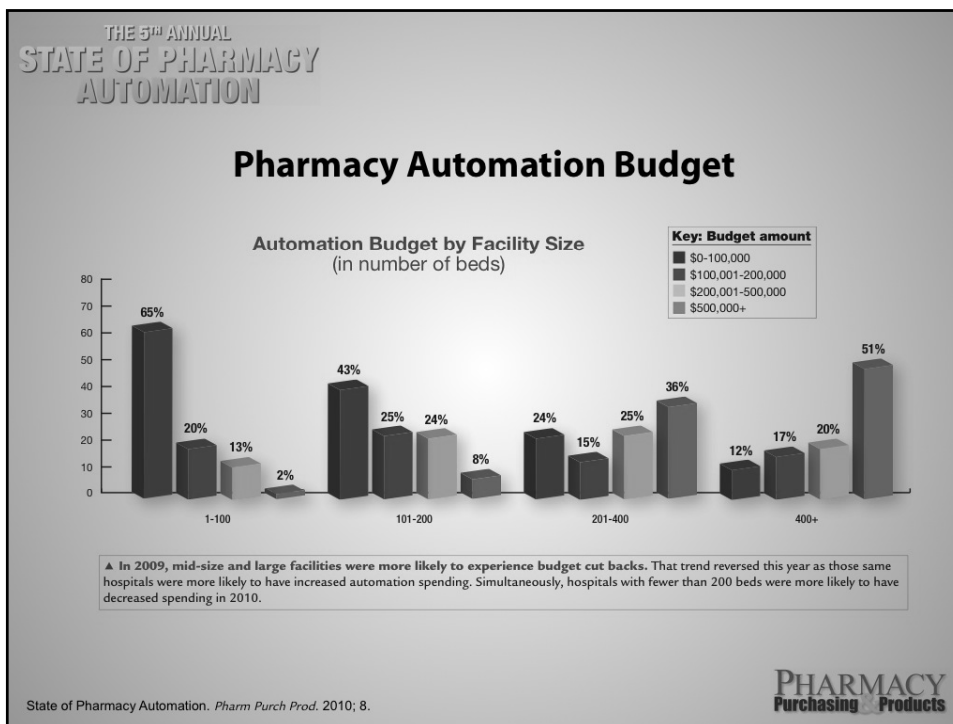
Building a Business Case and Selling Your Automation Plan

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Neither I or my spouse have any actual or potential conflict of interest in relation to this presentation.

Learning Objectives

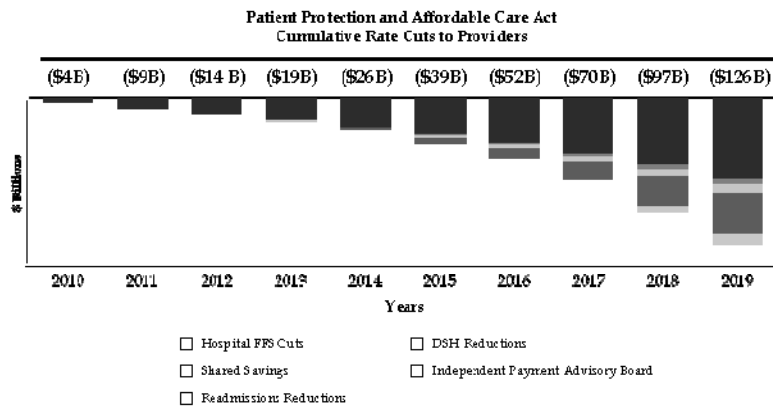
- Describe three reasons for developing a pharmacy automation plan
- Explain business process mapping and how it can be used to quantify key value drivers for automation
- Compare two methods of determining the economic value of automation
- Describe three tactics for achieving organizational support and executive team buy-in for automation



Are We Approaching a Financial Storm?



Healthcare Reform Impact on Budgets



Source: The Advisory Board

Increasing Economic & Capital Concerns

- The need for the nation to “bend the healthcare cost curve” is grudgingly accepted, *but*, on an individual institutional basis, initial reaction to the resultant gap (the allocation of the national “bend” to a specific hospital/system) is too big to believe: **“Our gap is \$150M and we found \$50M. We don’t really think the remainder is ever going to disappear...”**
Navigant Consulting: UHC - Reframing with Reform, January 26, 2011
- Continued tenuous economic conditions, occasionally volatile financial markets, severe governmental budgetary constraints and healthcare industry reform have combined to make **capital access a challenge for hospitals nationally**. In light of these issues, even strong hospitals face difficult questions about their future from rating agency analysts, bond investors and increasingly the banks, as part of the capital financing process. HFMA NJ- Healthcare Finance and Tax Update, June 14, 2011
- New FASB requirement for leases to be treated like capital on balance sheets.

Pharmacy Automation Planning Audience Poll

- Have you been involved in requesting budget dollars for pharmacy automation in the past?
- Have you had one or more of those requests denied?
- Do you expect to be developing or helping develop a budget request for pharmacy automation within the next two years?
- Do you work in a pharmacy that has a written multi-year plan for pharmacy capital needs?

Reasons for an Automation Plan

- Identify technology needs to help achieve organizational goals
- Prioritize technology investments where greatest risks and opportunities exist
- Define future capital funding needs
- Coordinate needs and timing with IT, facilities, nursing, etc.
- Facilitate pharmacy resource planning

Best Practice in Pharmacy Planning



Best Practices for Pharmacy Strategic Planning – UHC July, 2011

BEST-IQ Model Tasks

- B - Form a steering committee
- B - Define the purpose and the process
- B - Review previous plans
- B - Identify strategy design teams
- B - Develop a timeline for the project
- B - Prepare background information
- B - Review existing statements and positions
- B - Review the hospital & IT strategic plan
- B - Review the ASHP 2015 Initiative
- B - Review the requirements of regulatory agencies
- E - Create specialized task forces
- E - Complete the environmental assessment (the internal and external SWOT analysis)
- E - Review the implications of the plan for stakeholders
- E - Create an organizational profile of the finalized assessment
- S - Develop/redefine the mission, vision, and values
- S - Identify opportunities and gaps
- S - Define prioritization criteria
- S - Prioritize strategy
- T - Define the strategic plan's tactics
- T - Develop action plans (SMART goals)
- I - Finalize the timeline
- I - Enlist support for the action plan (staff, resources, management, technology)
- I - Communicate the strategic plan
- I - Implement the plan

Automation in UCMC Strategic Plan

| Planned FY10 Results | Planned FY11 Results | Planned FY12 Results | Planned FY13-FY15 Results |
|--|--|---|--|
| <ul style="list-style-type: none"> • PCAP expanded to evenings • 8 Residents matched & > 100 student rotations • UHC Top 40 on drug cost/Rx-adj CMI-adj Dischg • Barcoded meds dispensing implemented • Comer II cleanroom & peds pharmacy operations established • Retail filling >50% health plan Rx's • Establish billable pharmacy services • >50% participation in Clinical Ladder program • NHP med distribution model selected with nursing | <ul style="list-style-type: none"> • UHC Top 30 on drug cost/Rx-adj CMI-adj Dischg • Specialty residency established, 12 residents matched & > 125 rotations • >75% participation in Clinical Ladder program • 80% of meds dispensed with barcodes • Cleanroom automation implemented • Retail filling UCHP mail-order Rx's • Pharmacy oversight of all ambulatory drug purchasing & storage • NHP med distribution system RFP and contract signed • Pharmacy CRC established | <ul style="list-style-type: none"> • UHC Top 25 on drug cost/Rx-adj CMI-adj Dischg • Specialty residency established, 15 residents matched & > 150 rotations • >85% participation in Clinical Ladder program • All outsourced parenteral preparation brought in-house to Comer II • Pharmacy oversight of all ambulatory drug purchasing & storage • Barcoded meds administration implemented | <ul style="list-style-type: none"> • UHC Top 10 on drug cost/Rx adj CMI-adj Dischg • > 95% barcoded meds administration (inc. outpt) • >90% participation in Clinical Ladder program • NHP pharmacy operations established |

UCMC Pharmacy Capital Plan

| | | <u>FY10</u> | <u>FY11</u> | <u>FY12</u> | <u>FY13</u> | <u>FY14</u> |
|-----------------------|--|--------------------|--------------------|--------------------|--------------------|------------------|
| 1 | Upgrade/replace AcuDose Rx dispensing system | | | \$3,931,200 | | |
| 2 | Upgrade/replace Pharmacy robot | | 1,169,000 | | | |
| 3 | Other equipment | 24,000 | 26,000 | 26,000 | 28,000 | 30,000 |
| 4 | Automated locks for med refrigerators | 50,000 | | | | |
| 5 | Medication system modernization | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 |
| 6 | Carousels | 342,000 | | 220,000 | | |
| 7 | Robot rod configuration | 42,000 | | | | |
| 8 | PoC barcoding technology | | | | 2,000,000 | |
| 9 | IV preparation Robot | | 725,000 | | | |
| 10 | Reconfig. Pharmacy areas- Mitchell | 300,000 | | 150,000 | | |
| 11 | Replacement of med refrigerators | 30,000 | | | | 70,000 |
| 12 | Replace Laminar flow hoods w/isolators | | | 80,000 | | 165,000 |
| 13 | Replace retail pharmacy system | 450,000 | | | | |
| Total Pharmacy | | \$1,338,000 | \$2,020,000 | \$4,507,200 | \$2,128,000 | \$365,000 |

Building a Business Case – Key Value Drivers Approach

- KVD Definition: The key areas of performance that are essential for the organization to accomplish its mission
 - Financial
 - Safety
 - Service
 - Regulatory
- Sources:
 - Annual Goals and Objectives
 - Strategic Plan

Building a Business Case – Key Value Drivers Approach

- Identify Key Performance Indicators Cost Implications
 - Financial: Cost, Productivity, Revenue
 - Safety: ADE, CS incidents
 - Service: TAT, Satisfaction Surveys
 - Regulatory: Compliance Failures
- KPI Value example for IV robot system
 - Financial: Decrease outsource cost - >\$100k/yr
 - Safety: Reduce OR med draw-up errors↓ - \$50k/yr?
 - Service: Increase OR room utilization - \$?

Building a Business Case – Key Value Drivers Approach

- KPI Value example for med distribution system
 - Financial: Improved nursing labor efficiency - \$1.1mil/yr.
 - Financial: Reduced equip. cost (buy vs lease) - \$500k/yr.
 - Safety: CS & med security - \$50k/yr?
 - Service: Reduce med delivery time
 - (95% CI of 70 min. will drop to 35 min.), admin time too?

**Business Case Measurement Tools Poll –
BPM means:**

- A. Best Practice Methodology
- B. Business Process Mapping
- C. Business Process Monitoring
- D. Big Problem Management

**Business Case Measurement Tools Poll –
VSM means:**

- A. Visual Systems Model
- B. Virtual Site Manager
- C. Value Stream Mapping
- D. Vector Simulation Monitoring

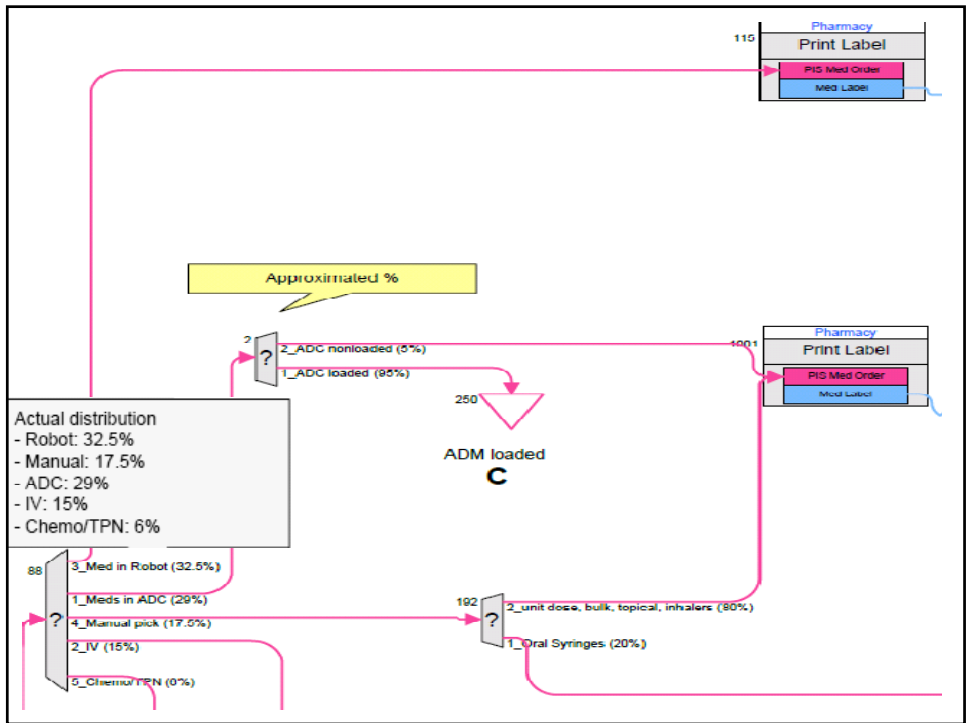
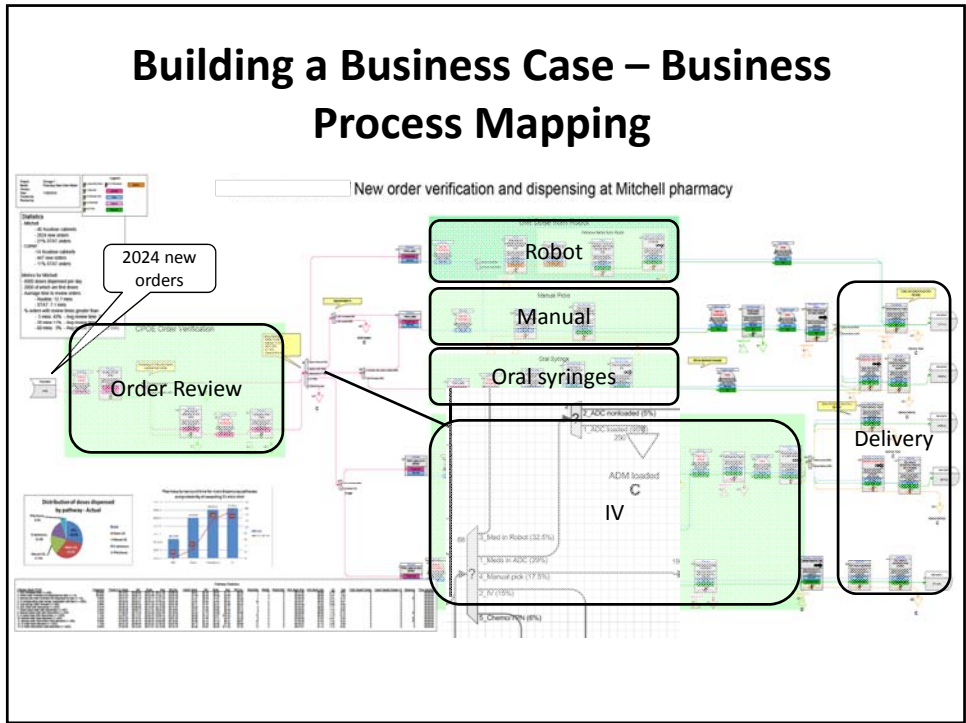
Business Case Measurement Tools – BPM & VSM Definition

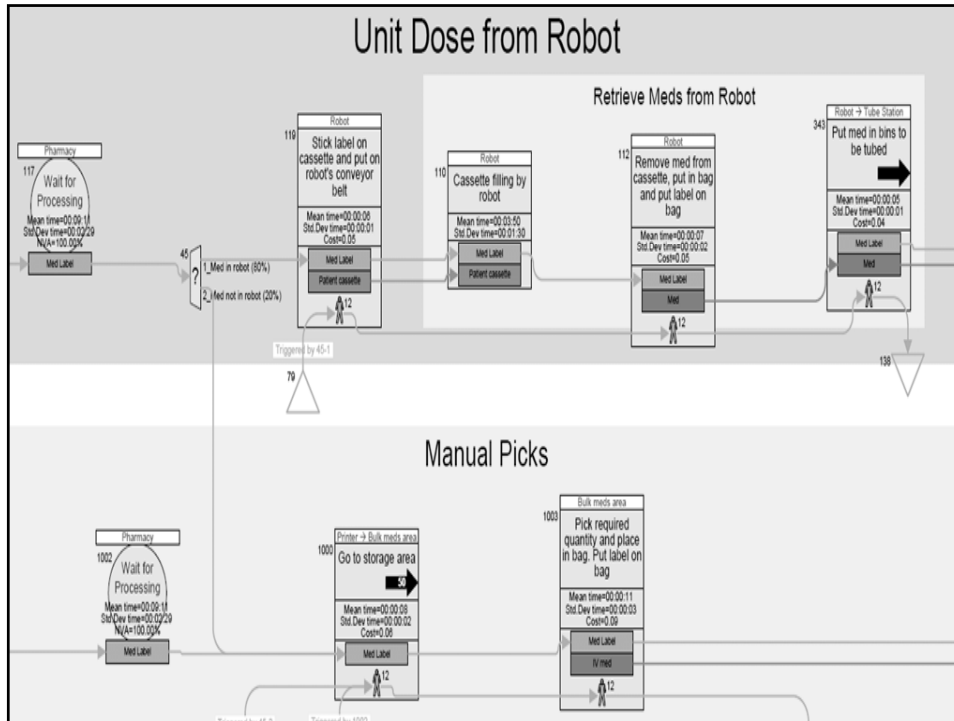
- Workflow Analysis Tools: Business Process Mapping (BPM) or Lean Value-Stream Mapping (VSM)
 - A visualization of the flow of supplies, information, or service to a customer
 - Tasks and times quantified
 - In VSM, tasks are value-added, non-value added, or necessary
 - Manual or consultants
 - Software: Visio 2010, Allclear Analyzer

Building a Business Case – Value Stream Mapping



Building a Business Case – Business Process Mapping





Building a Business Case – Business Process Mapping

| Pathway (Begin→End) | Frequency | Time(h:m:s) Mean | Cost(\$) Mean |
|--|-----------|------------------|---------------|
| 1. ADC reviewed order (1->250) | 22.04% | 00:12:07 | \$0.81 |
| 2. Robot order reviewed and dispensed by tube (1->13) | 20.80% | 00:31:23 | \$1.00 |
| 3. Manual pick order reviewed and dispensed by tube (1->13) | 8.96% | 00:37:57 | \$1.21 |
| 4. IV compounding order review, preparation and tube (1->1020) | 4.52% | 00:39:26 | \$3.81 |
| 5. Oral syringe order reviewed (1->294) | 2.80% | 00:36:14 | \$2.71 |
| 6. ADC order with intervention (1->250) | 5.51% | 00:36:32 | \$3.02 |
| 7. Robot tubed order with intervention (1->407) | 5.20% | 00:55:48 | \$3.21 |
| 8. Manual tubed order with intervention (1->407) | 2.24% | 01:02:22 | \$3.42 |
| 9. IV tubed order with intervention (1->1020) | 1.13% | 01:03:51 | \$6.02 |
| 10. Manual order hand delivered (1->294) | 2.24% | 00:41:28 | \$2.85 |
| 11. Manual order intervention hand delivered (1->294) | 0.56% | 01:05:53 | \$5.06 |
| 12. IV order hand delivered (1->1022) | 1.13% | 00:41:24 | \$4.73 |
| 13. IV order intervention hand delivered (1->1022) | 0.28% | 01:05:49 | \$6.94 |

Building a Business Case – Business Process Mapping

| Initial Doses | Current 29% | Future 74% | Difference |
|---|----------------|---------------|---------------|
| Pharmacy turnaround time | 0:31:30 | 0:20:52 | - 48 % |
| Time to Initial Dose | 0:34:22 | 0:25:14 | -27% |
| Total Workload | 77:34:36 | 64:11:31 | -17% |
| Total Workload in dispensing excluding Order review & IV | 21:22:29 | 7:59:24 | -63% |
| Total Daily Labor Cost for Pharmacy | \$ 3,739.86 | \$ 3,339.35 | -11% |
| Labor cost to dispense and administer an initial dose | \$ 3.42 | \$ 3.37 | -1.4% |

Business Case Measurement Tools Poll – TCO means:

- A. Total Cost of Ownership
- B. Technology Cost of Ownership
- C. Total Combined Output
- D. TiVo Central Online

**Business Case Measurement Tools –
TCO Definition**

- Financial Analysis Tools
 - Total Cost of Ownership (TCO) Model
 - Estimate of all direct and indirect costs associated with an acquisition over its entire life cycle.

**Business Case Measurement Tools Poll –
ROI means:**

- A. Rate Of Increase
- B. Return On Investment
- C. Return On Integration
- D. Rate Of Interest

**Business Case Measurement Tools –
ROI Definition**

- Financial Analysis Tools
 - Return on Investment (ROI)
 - A measure of percent profit or loss achieved on an investment

**Business Case Measurement Tools Poll –
NPV means:**

- A. Negative Predictive Values
- B. National Prime Vendor
- C. Net Present Value
- D. Non Par Value

Business Case Measurement Tools – NPV Definition

- Financial Analysis Tools
 - Net Present Value (NPV)
 - The value in current (present) dollars of an investment's future net cash flows minus the initial investment.

| PROFORMA BUDGET (Expand Hybrid Model to NHP) | | | | |
|---|---|----------------------|---|---------------------|
| | | Date: | 6/1/2011 | |
| | | Project Name: | Medication Distribution System Automation | |
| | | Operating Cost Rate: | 12% | |
| | | Inflation Rate: | 4% | |
| CAPITAL COSTS | | | | |
| I. Software Costs | | | | |
| <i>Application Software License Costs</i> | | | | |
| | Remote RN SW | Qty | Unit Cost | MOC |
| | | 1 | \$ 106,000 | |
| **Total Application Software License Cost: | | | | \$ 106,000 |
| Software Costs Sub Total | | | | \$ 106,000 |
| II. Hardware Costs | | | | |
| <i>Hardware Infrastructure Costs</i> | | | | |
| | | Qty | Unit Cost | MOC |
| | Server | 1 | \$ 30,000 | |
| | 30 new Cabinets/Towers for NHP | 30 | \$ 47,232 | |
| | NarcVaults (Comer & NHP) | 2 | \$ 35,000 | |
| | Robot 12' Circular HP | 1 | \$ 880,000 | |
| | Carousels (2 @ Comer II, 4 @ NHP) | 6 | | |
| **Total Hardware Infrastructure Cost: | | | | \$ 4,294,750 |
| <i>Equipment & SW Upgrade Costs (3 upgrades over 10 yrs)</i> | | | | |
| | 15 current cabinets/towers need to be replaced in 5 years | Qty | Unit Cost | Total Cost |
| | | 15 | \$ 47,232 | \$ 708,480 |
| **Total Equipment & SW Upgrade Costs (3 upgrades over 10 yrs): | | | | \$ 708,480 |
| Hardware Costs Sub Total | | | | \$ 5,003,230 |
| III. Implementation Costs | | | | |
| <i>Vendor Installation Costs - Hardware</i> | | | | |
| | | Qty | Unit Cost | Total Cost |
| | Robot | 1 | \$ 50,000 | \$ 50,000 |
| | Carousels | 5 | \$ 27,000 | \$ 135,000 |
| **Total Vendor Hardware Installation Cost: | | | | \$ 185,000 |
| <i>UCMC Implementation Costs</i> | | | | |
| | Labor | | \$ 283,280 | \$ 283,280 |
| | IT Hardware | | \$ 54,730 | \$ 54,730 |
| | Facility Modifications | | \$ - | \$ - |
| Total UCMC Implementation Costs | | | | \$ 338,010 |
| Implementation Costs Sub Total | | | | \$ 523,010 |
| CAPITAL COSTS TOTAL | | | | \$ 5,632,240 |

| ONGOING OPERATING COSTS (includes annual inflation) | | | | | Operating Year 1 Total Cost | Operating Years 1-10 Total Cost |
|--|------------|------------------|-------------------------------|------------------|-----------------------------|---------------------------------|
| Annual Software Maintenance Costs | Qty | Unit Cost | | | | |
| Remote RN | 12 | \$ 2,167.00 | | \$ 26,004 | \$ 312,207 | |
| **Total Annual Software Maintenance Costs: | | | | | \$ 26,004 | \$ 312,207 |
| Annual Hardware Maintenance Costs | Qty | Unit Cost | | | | |
| Server | 12 | \$ 250 | | \$ 3,000 | \$ 36,018 | |
| Binnet Lease + Support (5yr, 40 replacements, 15 renewed) | 12 | \$ 42,585 | | \$ 511,020 | \$ 6,118,787 | |
| Robot 12' Circular HP | 12 | \$ 7,000 | | \$ 84,000 | \$ 1,008,513 | |
| Carousels (2 @ Comer II, 4 @ NHP) | 12 | \$ 4,040 | | \$ 48,480 | \$ 582,056 | |
| **Total Annual Hardware Maintenance Costs: | | | | | \$ 646,500 | \$ 7,745,374 |
| Annual Medication Distribution System Pharmacy Labor Operating Costs (MH & NHP) | | | | | | |
| | | | Annual Doses Dispensed | 2,920,000 | | |
| | | | % | | | |
| | | | Unit Cost | | | |
| ADC Dispensed | 26% | \$ 0.45 | | \$ 340,122 | \$ 4,083,536 | |
| Robot Picked First Dose | 16% | \$ 0.19 | | \$ 90,637 | \$ 1,088,195 | |
| Manual Picked First Dose | 3% | \$ 0.73 | | \$ 64,211 | \$ 770,922 | |
| Robot Cartfill Dose | 45% | \$ 0.59 | | \$ 768,690 | \$ 9,228,974 | |
| Manual Picked Cartfill Dose | 10% | \$ 1.61 | | \$ 469,828 | \$ 5,640,805 | |
| | 100% | | | \$ - | \$ - | |
| **Total Annual Medication Distribution System Pharmacy Labor Operating Costs: | | | | | \$ 1,733,487 | \$ 20,812,433 |
| Annual Medication Distribution System Nursing Labor Operating Costs (MH & NHP) | | | | | | |
| | | | Annual Doses Dispensed | 2,920,000 | | |
| | | | Volume | | | |
| | | | Unit Cost | | | |
| Med pass one location 3 meds (All ADC) | 2667 | \$5.66 | | \$ 5,512,189 | \$ 66,179,931 | |
| Late dose | 346 | \$2.18 | | \$ 274,363 | \$ 3,294,034 | |
| Missing doses | 173 | \$3.40 | | \$ 214,445 | \$ 2,574,647 | |
| Narc count | 80 | \$15.00 | | \$ 438,000 | \$ 5,258,675 | |
| **Total Annual Medication Distribution System Nursing Labor Operating Costs: | | | | | \$ 6,438,997 | \$ 77,307,287 |

| FINANCIAL SUMMARY | | Current System | Operations Year 10 | Cartless System | Operations Year 10 |
|---|--|----------------------------|------------------------|-----------------------|----------------------|
| PROJECT CAPITAL: | | | | | |
| SOFTWARE | | \$ 106,000 | | \$ - | |
| HARDWARE | | \$ 5,003,230 | | \$ 4,699,205 | |
| IMPLEMENTATION | | \$ 523,010 | | \$ 651,285 | |
| CONTINGENCY (5%) | | \$ 281,612 | | \$ 267,525 | |
| TOTAL PROJECT CAPITAL: | | \$ 5,913,852 | | \$ 5,618,015 | |
| ONGOING OPERATING COSTS: Includes 4% annual inflation rate. | | | \$ 12,585,596 | | \$ 10,802,789 |
| TOTAL COST OF OWNERSHIP: | | | \$ 112,091,153 | | \$ 96,743,121 |
| ANNUAL DEPRECIATION (Includes Contingency): | | \$ 1,182,770 | | \$ 1,123,603 | |
| RETURN ON INVESTMENT SUMMARY (Expand Hybrid Model to NHP) | | | | | |
| TOTAL PROJECT CAPITAL COST: | | \$ 5,913,852 | | \$ 5,618,015 | |
| Total Annual Software Maintenance Costs: | | \$ 26,004 | \$ 312,207 | \$ 293,136 | \$ 3,519,422 |
| Total Annual Hardware Maintenance Costs: | | \$ 646,500 | \$ 7,745,374 | \$ 78,957 | \$ 947,964 |
| TOTAL INVESTMENT (A): | | \$ 6,586,356 | \$ 13,971,433 | \$ 5,990,107 | \$ 10,085,401 |
| FINANCIAL SAVINGS POTENTIAL GENERATED : | | | | | |
| None | | | | \$ 954,681 | \$ 11,462,000 |
| TOTALS SAVINGS POTENTIAL (B): | | \$ - | \$ - | \$ 954,681 | \$ 11,462,000 |
| NET SAVINGS POTENTIAL (B-A): | | \$ (6,586,356) | \$ (13,971,433) | \$ (5,035,427) | \$ 1,376,599 |
| CUMULATIVE SAVINGS: | | \$ (6,586,356) | | \$ (5,035,427) | |
| | | Current (Lease/Buy) | | Cartless (Buy) | |
| RETURN ON INVESTMENT (Net Savings % Cost) | | | -100% | | 14% |
| NET PRESENT VALUE @ 5.5% | | | (\$11,576,449) | | (\$143,217) |

Financial Analysis - IV Robot

| Drug | Drug dose | Container | Container Size | Vial | Doses per vial | Vial cost | Container cost | Diluent cost | Tamper evident cap cost | Transfer syringe cost | Transfer needle cost | Label cost | Cost per dose | Savings per dose |
|---|-----------|-----------|----------------|------------------|----------------|-----------|----------------|--------------|-------------------------|-----------------------|----------------------|------------|---------------|------------------|
| Phenylephrine | | | | | | | | | | | | | | |
| | 1 mg | Syringe | 10 mL | 10mg/mL x 5mL | 50.00 | \$3.47 | \$0.09 | \$0.01 | \$0.17 | \$0.00 | \$0.04 | \$0.03 | \$0.41 | \$5.34 |
| Oxytocin | | | | | | | | | | | | | | |
| | 30 unit | Bag | 500 mL | 10unit/mL x 10mL | 3.33 | \$8.75 | \$1.27 | \$0.00 | \$0.00 | \$0.24 | \$0.04 | \$0.03 | \$4.21 | \$5.79 |
| Vancomycin 10 gram powder reconstituted with 95mL (100mg/mL) | | | | | | | | | | | | | | |
| | 750 mc | Bag | 250 mL | | 13.3 | \$32.96 | \$1.38 | | \$0.00 | \$0.27 | \$0.04 | \$0.03 | \$4.19 | \$2.22 |
| | 1000 mc | Bag | 250 mL | | 10.0 | \$32.96 | \$1.38 | | \$0.00 | \$0.27 | \$0.04 | \$0.03 | \$5.02 | \$2.39 |
| | 1500 mc | Bag | 250 mL | 10 GM | 6.7 | \$32.96 | \$1.38 | \$0.09 | \$0.00 | \$0.40 | \$0.04 | \$0.03 | \$6.80 | \$4.70 |
| Sodium Bicarbonate | | | | | | | | | | | | | | |
| | 150 ml | Bag | 1000 mL | q/50mL | 0.33 | \$0.59 | \$1.10 | \$0.00 | \$0.00 | \$0.40 | \$0.04 | \$0.03 | \$3.33 | \$7.62 |
| Ephedrine | | | | | | | | | | | | | | |
| | 50 mg | Syringe | 10 mL | 50mg/mL x 1mL | 1.00 | \$2.31 | \$0.09 | \$0.00 | \$0.17 | \$0.00 | \$0.04 | \$0.03 | \$2.65 | \$1.35 |

Financial Analysis - IV Robot

| | Year 0 | 1 | 7 |
|---|------------------|------------------|------------------|
| Capital Purchase | | | |
| Purchase Price of ivSTATION Robot | \$275,000 | | |
| Vendor Implementation & Training | \$0 | | |
| Total Capital Expenses | \$275,000 | | |
| Ongoing Operating Expenses | | | |
| Waste Containers (a) | | \$2,600 | \$3,484 |
| Robot Service and Maintenance Costs (b) | | \$41,250 | \$41,250 |
| Total Operating Expenses | | \$43,850 | \$44,734 |
| Total Investment | | \$316,250 | \$563,750 |
| Total Cost of Ownership | | \$318,850 | \$584,919 |
| Ongoing Savings (@50% capacity) | | | |
| Oxytocin 30 units / 500 mL D5W (b) | \$ 5.79 | 1,500 | \$8,691 |
| Sodium Bicarbonate 150mEq / 1000mL D5W (b) | \$ 7.62 | 2,628 | \$20,016 |
| Vancomycin 1000mg / 250mL D5W (b) | \$ 2.39 | 6,376 | \$15,257 |
| Vancomycin 1500mg / 250mL D5W (b) | \$ 4.70 | 4,075 | \$19,162 |
| Vancomycin 750mg / 250mL D5W (b) | \$ 2.22 | 768 | \$1,708 |
| Phenylephrine 1000mcg/10mL NS (b) | \$ 5.34 | 6,520 | \$34,793 |
| Ephedrine 50mg/5mL NS (b) | \$ 1.35 | 10,150 | \$13,703 |
| Total Savings Potential | | | \$113,330 |
| Total Savings Potential @ 85% Capacity | | | \$253,121 |
| Total Net Savings (Loss) | | (\$275,000) | \$69,480 |
| Cumulative Net Savings (Loss) | | (\$275,000) | (\$205,520) |
| Net Present Value (discount rate = 5.5%) | \$604,292 | | |
| Return on Investment | 156% | | |

Selling Your Automation Plan

- Establish “business of pharmacy” credibility
- Identify key stakeholders, esp. C-Suite
- Identify C-Level champions
- Paint a vision based on KVD’s, tie to KPI goals
 - Describe how automation aligns with org. strategy
 - Describe impact on cost, clinical, & safety objectives
- Benchmark against peer data: AJHP, GPO, PP&P
- Routinely update all stakeholders

Selling Your Automation Plan

- Plan your lead times:
 - Organizational triggers
 - Multidisciplinary consensus
 - Make current contracts co-terminus
 - Workflow & financial analysis
- Network for successful strategies
 - Professional meetings & calls
 - Vendors

Selling Your Automation Plan

- **Build Multidisciplinary consensus**
 - Create a product selection team
 - Write a Charter or Statement of Work
 - Define purpose, scope, history, funding, members
 - Define plan, objectives, measures of success
 - SWOT and workflows of current process
 - Needs and vision for best practice process
 - Use consultants or vendors to assist
 - Team validation/recommendation of key decisions
 - Have team sponsor a product fair

Summary to Building Your Case

- Capital will be increasingly scarce
- Have a strategic plan that includes automation
- Quantify KPI improvements with automation
- Do robust financial analysis on everything
- Paint a vision to C-suite & stakeholders
- Build a multidisciplinary consensus

Questions?



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Roundtable Workshop Tasks (20 min.)

1. Describe any challenges you have encountered in getting pharmacy automation funding approved.
2. Identify the highest \$ multidisciplinary or pharmacy-only item you plan to buy within the next 3 years.
3. Moderator to select one planned purchase for the group effort
4. For the selected purchase, complete the table form:
 - a) Identify three Key Value Drivers
 - b) Identify a KPI for each KVD & how measured
 - c) Identify top 3 expected cost savings & estimate from volume, value, etc.
 - d) Determine ROI from #2 & 4c
 - e) Identify key executives and stakeholders to convince

Building a Business Case and Selling Your Automation Plan

Workshop Case

1. As a warm-up, each table member to introduce themselves and describe any challenges they have encountered in getting pharmacy automation funding approved.
2. Each table member to identify the highest cost multi-disciplinary or pharmacy-only item they or their department plans to buy within the next 3 years. Record below the table member name, item, and item cost.

| | Name | Item | Cost |
|----|-------|-------|-------|
| a) | _____ | _____ | _____ |
| b) | _____ | _____ | _____ |
| c) | _____ | _____ | _____ |
| d) | _____ | _____ | _____ |
| e) | _____ | _____ | _____ |
| f) | _____ | _____ | _____ |
| g) | _____ | _____ | _____ |
| h) | _____ | _____ | _____ |
| i) | _____ | _____ | _____ |
| j) | _____ | _____ | _____ |

3. Group and moderator to select from the above list of planned purchases for the group effort below. The best choice will probably be a pharmacy technology with multi-disciplinary impacts or involvement.
4. For the selected purchase, ask the group to complete the following:
 - a) Identify three Key Value Drivers
 1. _____
 2. _____
 3. _____

b) Identify a Key Performance Indicator for each KVD & how measured

| KPI | Metric |
|--------|--------|
| 4.a.1. | _____ |
| 4.a.2. | _____ |
| 4.a.3. | _____ |

c) Identify top 3 expected cost savings & estimate from volume, value, etc.

| Describe expected savings | List calculated savings |
|---------------------------|-------------------------|
| 1. | _____ |
| 2. | _____ |
| 3. | _____ |

d) Determine ROI from #2 and the total from 4c

ROI = ----- = _____%

e) Identify key executive positions and stakeholders to convince

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

f) Identify five suggested tactics to sell this technology to executives and stakeholders

1. _____
2. _____
3. _____
4. _____
5. _____

Table Moderator: Please turn in a completed copy of this form for speaker.

THANKS FOR PARTICIPATING!!

ICHP 2011 Annual Meeting
Pharmacy Technology Session
Building a Business Case and Selling Your Automation Plan
Dave Hicks, PharmD

Post Test:

1. Which of the following are correct reasons for developing a pharmacy automation plan?
 - a. Identify technology needs to help achieve organizational goals.
 - b. Select best technology products
 - c. Define future capital funding needs
 - d. Coordinate needs and timing with IT, facilities, nursing, etc.
 - e. Facilitate pharmacy resource planning

2. Which of the following occur in business process mapping?
 - a. A visualization of the flow of supplies, information, or service to a customer is prepared
 - b. Tasks are quantified
 - c. Task value is determined
 - d. Times are quantified

3. Which of the following describe methods for determining the economic value of automation?
 - a. Return on Investment
 - b. Internal Rate of Recovery
 - c. Net Present Value
 - d. Technology Cost of Ownership

4. Organizational support for pharmacy automation can be enhanced by
 - a. Developing a C-suite champion for your projects
 - b. Making lots of requests to improve your odds of approval
 - c. Chartering a multidisciplinary team of key stakeholders to help select the desired technology product
 - d. Quantifying the expected impact on cost or safety.

IV Room Automation

Striving for Fact-based Practice

Jim Lund, Pharm.D., M.S.
 Manager, Pharmacy Sterile Preparations
 Department of Pharmaceutical Services
 University of Chicago Medical Center
 Chicago, IL

Conflict of Interest Declaration

- Nothing to disclose
- No relevant financial relationships exist
- *Any opinions expressed are those of the speaker*

Outline

- Current practice in the IV room
- Automation solutions
 - IV Robotics
 - Automated Workflow Management Software
- Advantages and limitations of systems
- Challenges associated with implementation

Learning Objectives

- Review automated solutions available for sterile product preparation
- Recognize the differences between various IV room automated solutions
- Discuss the potential benefits and drawbacks of implementing automated solutions in the IV room
- Recognize the limitations of automated solutions for sterile product preparation

Learning Objectives

- Identify at least two major challenges that could be experienced when implementing IV room automation
- Describe how automated solutions for sterile product preparation may impact pharmacy practice at your institution

Advances in Technology

- Many technologic advances experienced across all areas of the medication use process
 - Unit dose packagers
 - Dispensing robots
 - Medication carousels
 - ADCs
 - BCMA
 - Smart pumps
 - CPOE
 - eMAR
- What about the IV room?
 - TPN compounders
- Is this concerning?

Concern in the IV Room?

- **Round Table Discussion**
 - Are you concerned with practice in your IV room?
 - What concerns do you have?
 - What is *most* concerning?
 - Do you have plans to address these concerns in the immediate future?

Concern in the IV Room

- High-risk medications
- Critical need for IV medications
- Almost entirely manual preparation
- Risk of harm to employees
- Compliance with USP <797>, TJC, OSHA
- High expense medications

Evidence Supporting Concerns

- **Flynn EA, et al. AJHP (1997)¹**
 - Observational study of five U.S. hospitals (400-815 beds) examining error rates in IV admixture compounding
 - Mean error rate of 9% (range 6%-10%)
 - 2% of errors identified as clinically significant
 - Wrong dose (>5% error) was most common error
 - 69% of observed errors
 - Other errors included wrong base solution, drug omission, improper reconstitution, unauthorized drug inclusion, improper aseptic technique

Evidence Supporting Concerns

- **Cousins DH, et al. (2005)²**
 - Observational study of hospitals in Europe
 - IV preparation error rates varied from 1% to 49%
 - Deviation from proper aseptic technique common
- **Wirtz V, et al. (2003)³**
 - Observational study of three hospitals in Europe
 - Preparation error rates of 22%, 23% and 31%
 - Most common errors were incorrect dose, drug omission
 - Majority of errors determined to be moderate to severe
 - Deviation from proper aseptic technique common

Evidence Supporting Concerns

- **Taxis K, Barber N. (2003)⁴**
 - Observational study at a hospital in the UK observing preparation of IV drug doses
 - Preparation error occurred in 7% of doses
 - Wrong drug
 - Wrong solvent/diluent
 - Incorrect dose
 - Drug omissions
 - Authors concluded: at a 400 bed hospital with 300 IV doses administered daily, at least one patient will experience a potentially serious error every day
- Concern is justified!

IV Medication Errors - Consequences

- If medication error is detected in pharmacy
 - **La Ex-Cleveland pharmacist gets 6 mos. in fatal chemo dose**
 - **Fir** Associated Press
Published: August 14, 2009 - 12:12 PM
 - **If me** CLEVELAND: A former Ohio pharmacist has been sentenced to six months in jail and six months of house arrest in the death of a toddler given an incorrect tumor treatment. **macy**
 - **Produce waste**
 - Financial waste
 - Potential for severe harm to patient
 - Implications for technicians or pharmacists?

Pharmacist Verification



Post-production IV admixture checks less than ideal

“Given that IV production errors can result in serious medication errors, new IV robotic preparation systems and workflow management systems are highly welcomed technologies”⁵

Faith-based practice? → Fact-based practice?

Automated Solutions

- IV Robotics
 - IntelliFill® i.v. [Baxa Corporation]
 - RIVA [Intelligent Hospital Systems]
 - i.v.STATION® [Health Robotics]
 - i.v.STATION® ONCO
 - TPNstation™
- Workflow Management Systems
 - DoseEdge® [Baxa Corporation]
 - i.v.SOFT® [Health Robotics]

Automation Considerations

- Benefits
- Installation requirements
- Training requirements
- Support and maintenance
- Vendor
 - Reputation, history, vision, organizational direction
 - Customer service
- Costs
 - Capital purchase
 - Installation costs
 - Service and maintenance costs
 - Ongoing expenses

Automation Considerations

- What benefits do you want to derive?
 - Patient safety
 - Employee safety
 - Operational efficiency
 - Regulatory compliance
 - Financial gain
- Important to assess and define goals prior to evaluating technologies!

IV Robotic Benefits

- ISO Class 5 or better air quality
- Bar code technology
- Gravimetric verification of doses
- Labels final container
- Archived electronic audit trail of prepared doses
- Batch mode and patient-specific capabilities (HL7 or label stream)
- Reduce exposure to hazardous compounds?

IntelliFill® i.v.



IntelliFill® i.v.

- Baxa Corporation
[USA]



- **Footprint:** 11' x 3.6'
- **Ceiling clearance:** 8.5'
- **Recommended operational footprint:**
14' 5" x 11' 4"
– Approximately 163 sq. ft.

IntelliFill® i.v.

- **Products:** 12mL Terumo syringe
 - Syringes loaded in robot on bandolier
 - Syringes require no needles
- **Rates:** Up to 600 doses per hour (reservoir)
 - Common: 400 doses/hour (reservoir), up to 120 doses/hour (vials)
- **Sources:** Vial sizes 5 mL to 100 mL
IV bags up to 3 Liters
- **Storage:** Up to 1500 vials; 6 bags

IntelliFill® i.v.

- **Integration:** Label stream parsing
- **Reporting:** All data are available to Crystal Reports; reports can be customized
- **Labels:** Customizable, support barcoding, can print colored labels (only black ink)
- **Other Notes:**
 - Cleaning can take a while (1 hr)
 - Niche for making small-volume syringes, batches

RIVA



RIVA

- Intelligent Hospital Systems
[Canada]



- **Footprint:** 5' x 10'
– 11 sq ft vestibule
- **Ceiling clearance:** 8'
- **Recommended operational footprint:** 13' x 14'
– Approximately 182 sq. ft.

RIVA

- **Products:** Bags (25 mL to 1000 mL)
Syringes (1 mL to 60 mL)
- **Rates:** Up to 50 doses per hour
- **Sources:** Vial sizes 2 mL to 100 mL
IV bags 25 mL to 1000 mL
- **Storage:** Dependent on rack configuration
 - Up to 24 storage racks (bags, vials, syringes, caps)
 - Each rack could hold 8-20 vials, 4-10 bags
 - Hypothetically, could hold over 400 vials or 200 bags

RIVA

- **Integration:** Label stream parsing
- **Reporting:** Provides a number of standard reports via Crystal Reports
- **Labels:** Customizable, support barcoding
- **Other Notes:**
 - Cleaning can take a while
 - Can be used to make hazardous medications
 - Can produce “intermediary bags” for dilutions
 - Uses UV light sterilization for vial tops

ivSTATION®



ivSTATION®

- Health Robotics
[Italy]



- **Footprint:** 3.3' x 3.3'
- **Ceiling clearance:** 8'
- **Recommended operational footprint:**
5.8' x 7.5'
– Approximately 44 sq. ft.

ivSTATION®

- **Products:** Bags (50 mL to 1000 mL)
Syringes (1 mL to 60 mL)
Glass vials (up to 100 mL)
- **Rates:** 40 to 60 doses per hour
- **Sources:** Drug vials 1 mL to 100 mL
Diluent solutions from 1000 mL bags
- **Storage:** 42 syringes
28 vials
25 IV bags

ivSTATION®

- **Integration:** HL7 interface (multi-protocol gateway)
- **Reporting:** Internal reporting tool provides a number of standard reports
 - Available module (ivSOFT Cube) allows for custom reports, statistical analysis, projections, custom formulas, etc.
- **Labels:** Customizable, support barcoding, black ink
 - Additional label module allows for colored labels, colored ink, images, etc.
- **Other Notes:**
 - Tamper-evident caps on syringes
 - UV-lamp sterilization (in addition to manual cleaning)
 - Can easily integrate with other Health Robotics applications/modules (IV Room of the Future)

ivSTATION® ONCO



ivSTATION® ONCO

- Health Robotics
[Italy]



- **Footprint:** 3.3' x 4.9'
- **Features:**
 - Hazardous medication handling, disposal
 - Exhausted to outside environment

TPNstation™



TPNstation™

- Health Robotics
[Italy]



- **Footprint:** 3.3' x 3.3'
- **Features:**
 - 32 ingredient channels
 - Labels bags during preparation
 - Can hold up to 15 TPN bags at once
 - Interfaces with hospital information system
 - Completely enclosed ISO Class 5 environment

IV Robot Comparison

| | IntelliFill® | RIVA | ivSTATION® | ivSTATION ONCO™ |
|---|--------------|----------------------------------|------------|-----------------|
| Footprint* | 40 sq. ft. | 50 sq. ft. (70 w/ vestibules) | 11 sq. ft. | 16 sq. ft. |
| Operational footprint* | 163 sq. ft. | 182 sq. ft. | 44 sq. ft. | 55 sq. ft. |
| Syringes | 12 mL only | 1-60 mL | 1-60 mL | 1-60 mL |
| IV Bags | No | 25-1000 mL | 50-1000 mL | 50-1000 mL |
| Hazardous Meds? | No | Yes | No | Yes |
| Interface? | Label stream | Label stream | HL7 | HL7 |
| Production rates (per hour; from vials) | 120 | 50 | 40-60 | |

*Approximate values

IV Robot Challenges

- Drug/dose calibration
- Specific gravity
- Integration with PIS/CIS
- Training
- Other considerations:
 - Downtime procedures
 - QA processes, BUD testing (if desired)
 - Environmental monitoring
 - Hidden costs (consumables, remodeling)
 - Changing culture

Workflow Management Systems

- **DoseEdge®** [Baxa Corporation]
- **ivSOFT®** [Health Robotics]
- Others
 - ChemoCato – European software application
 - CIS Vendors?
 - Epic
 - Cerner (reseller of Baxa DoseEdge® application)

Workflow Management Systems

- **Concept**
 - Manage and facilitate the manual workflow that exists in compounded sterile product preparation
- **Process**
 - Orders “received” by workflow application
 - Orders presented to technician (at workstation)
 - Priority level, batches by medication
 - Walks technician through the compounding process
 - Requires bar-coding verification
 - Image capture of compounding steps
 - Verification of process by pharmacist (remote)
 - Orders tracked, electronic audit trail archived

Workflow Management Systems

- **Advantages**
 - Can be implemented in any existing manual workflow
 - Chemo compounding
 - Non-hazardous compounding
 - TPN compounding
 - Can be used in current compounding environment
 - Cheaper, smaller alternative to IV robotics
 - Provides a number of the same advantages of IV robotics

Workflow Management Considerations

- **Benefits**
 - Manages workflow (prioritize doses, group doses by drug)
 - Barcode verification of product selection
 - Image capture of compounding steps
 - Provides label only for dose being prepared
 - Remote verification abilities
 - Electronic audit trail
- **Challenges**
 - Slows manual workflow – introduces additional steps
 - Change in processes
 - Training

Workflow Management vs. IV Robots

| | DoseEdge® | ivSOFT® | Robots |
|---|--------------|---------------|--------|
| Integration | Label stream | HL7 interface | Varies |
| Barcode-driven | Yes | Yes | Yes |
| Visual image capture | Yes | Yes | Yes |
| Label prepared for product | Yes | Yes | Yes |
| Electronic audit trail | Yes | Yes | Yes |
| Gravimetric verification of dose | No | Yes | Yes |
| Visual recognition of source product | No | Yes | Varies |
| Fully automated preparation | No | No | Yes |
| Hazardous medication preparation | Yes | Yes | Varies |
| Safer compounding environment | No | No | Yes |

Automation Implementation *Keys to Success*

- Define goals of project
- Perform comprehensive review of available solutions
- Involve all stakeholders
 - Technicians
 - Pharmacists
 - Administrators
 - IT/IS representatives
- Identify expected benefits and results achieved
- Evaluate resources required for successful implementation
- Training – initial and ongoing
- Ongoing assessment of results

Implementation Plans

- **Round Table Discussion**
 - Would you implement automated solutions into your compounded sterile product operations?
 - Which solutions would you implement?
 - What would be your proposed implementation plan (chronology)?
 - How would you design your business case?
 - What road blocks would you anticipate?

IV Room Automation at UCMC

- Project goals:
 - Automate the preparation of the *majority* of sterile products
 - Implement IV robotic technology as well as workflow management system
 - Initially implement one robot - **proof of concept**
 - Batch mode
 - Add additional robots to serve additional needs
 - Additional batches
 - Patient-specific doses
 - Chemo preparation
 - TPN preparation

IV Room Automation at UCMC

- Vendor selection – Health Robotics
 - Small footprint of automation solutions
 - Flexibility of doses
 - Organizational vision
 - Commitment to automation and robotics
 - *IV Room of the Future*
 - Number of installs (international)
 - Integration of multiple solutions on single platform
 - ivSTATION®, ivSTATION® ONCO, TPNstation™, ivSOFT®
- Risks: small, new to U.S. market, foreign vendor

IV Room Automation at UCMC

- Business Case
 - Built on a foundation of safety and financial return
 - Accuracy of doses
 - Patient/employee safety
 - Cost savings
 - Operational efficiency
- Projected ROI
 - Phase I: Initial test products (outsourced) – *proof of concept*
 - Savings of approximately \$115,000 annually
 - Projected savings of \$200,000 annually once fully operational
 - Phase II: Additional products (outsourced narcotics)
 - Estimated savings of approximately \$200,000 annually

IV Room Automation at UCMC

- Current operations
 - ivSTATION
 - ivSOFT

IV Room Automation at UCMC

Challenges and Lessons Learned

- Drug selection during test phase
 - Balance of financial return vs. operational efficiency
 - Drug shortages
- Specific gravity values, BUD testing
- IT/IS Department
 - Secure network connection
 - Interface creation
- Training
- Culture
 - Workflow change
 - Dispel fears of technicians

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Post Test:

1. Which of the following technologies is not an automated solution for use in compounding sterile preparations?
 - a. IntelliFill® i.v.
 - b. RIVA
 - c. ivSOFT®
 - d. PACMED
 - e. DoseEdge®

2. Which of the following technologies is not an IV Robotic device?
 - a. IntelliFill® i.v.
 - b. ivSTATION®
 - c. RIVA
 - d. ivSTATION® ONCO
 - e. ivSOFT®

3. Which of the following is not a benefit of IV Robotic solutions for use in compounding sterile preparations?
 - a. ISO Class 5 or better air quality
 - b. Perpetual inventory management
 - c. Archived electronic audit trail
 - d. Bar code medication selection verification

4. Which of the following may be a challenge in implementing automated solutions in the IV room?
 - a. Coordinating efforts with IT department
 - b. Obtaining specific gravity values of medications
 - c. Creating a business case for investing in the technology
 - d. Training employees on new technology
 - e. All of the above

5. Which of the following is not a benefit of workflow management systems in the process of compounding sterile preparations?
 - a. Fully automated preparation process
 - b. Archived electronic audit trail
 - c. Manages workflow of doses to be prepared
 - d. Bar code verification of product selection