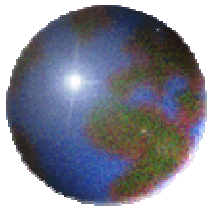


Developing an Automation Strategy to Achieve Bar-Code Readiness as well as Enhance Pharmacist Clinical Activity

Melinda C. Joyce, Pharm.D., FAPhA, FACHE
Corporate Director of Pharmacy
The Medical Center
Bowling Green, Kentucky

The Medical Center

250 Park Street
The Medical Center, Kentucky

Tele: 270-745-1000

- The Medical Center is a not-for-profit facility
- Located in south-central Kentucky
- Three acute care hospitals in Bowling Green, Scottsville, and Franklin with over 400 beds
- One long-term care facility and one long-term acute care facility – 138 beds
- Two new community retail pharmacies

The Medical Center

250 Park Street
The Medical Center, Kentucky

Tele: 270-745-1000

- Over 2700 employees
- 300 physicians on staff
- Hospital offers a full range of services
  - Cardiac services
  - Oncology services
  - Obstetrical services
  - Neonatology
  - Behavioral Health services
  - Emergency services

The Medical Center

Mission

To care for people and improve the quality of life in the communities we serve.

Vision

To be the leading integrated healthcare delivery system in South Central Kentucky and will be a major influence in reshaping healthcare.

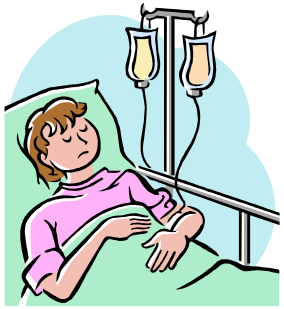
Key Initiatives of the Hospital

- Proactive approach to Patient Safety
- Strong commitment for utilizing new technologies in order to continue to be the healthcare leader in region
- Focus on patient, physician, and staff satisfaction
- Utilization of resources

Identifying Risk Points in the Medication Use Process

- Errors occur at all phases of the medication use process

- Prescribing (56%)
- Transcribing (6%)
- Dispensing (4%)
- Administering (34%)



Patient is in hospital

↓

Practitioner sees patient and writes orders

↓

Order is received in Pharmacy

↓

Pharmacist enters order into computer system

↓

Medication is either removed from ADC or dispensed from pharmacy

↓

Medication is administered to patient

↓

Patient gets well and goes home

Pharmacist Involvement

- Review all medication orders for:
  - Appropriateness of the drug, dose, frequency, and route of administration
  - Therapeutic duplication
  - Potential allergies or sensitivities
  - Potential impact of drug based on laboratory values
  - Contraindications
  - Formulary issues
- Medication resource – answer questions
- Monitoring medication use

What Else is Happening in the Pharmacy?

- Technicians are refilling automated dispensing cabinets (multiple times per day)
- First doses are being filled
- IV medications are being made
- Medications are being taken to the nursing units
- Medications that have been returned to the pharmacy need to be credited and returned to stock
- Medications are being ordered from the wholesaler and shelves are restocked
- Questions are being answered

Current Pharmacy Services

- Provide pharmacy services to all facilities
  - Three acute care hospitals
  - One long-term care facility
  - One long-term acute care facility
- Open 24 hours per day
- 12 FTE pharmacists
  - One dedicated Clinical Pharmacy Coordinator
  - Three Pharmacist Managers
  - One OR Pharmacist
- 20 FTE technicians

Current Pharmacy Services

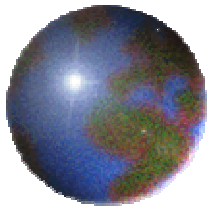
- Dispense an average of 188,000 doses per month for all facilities
- Utilize automated cabinet for dispensing with a profile system
  - No carts
  - Pharmacist must verify the medication order before the nurse can remove the medication for the patient
- Utilize Meditech for computer system

Pharmacy Issues

- Time consuming and repetitive labor intensive dispensing, checking, and distribution of medications
- Vast majority of Pharmacist time spent on medication distribution and order entry activities for multiple sites
- Limited participation of Pharmacists in clinical activities on the nursing units
- Large quantity of non-patient specific medication inventories located in unit based cabinets in each med station
- Difficulty in tracking of medication expiration dates resulting in expired medication costs

Pharmacy Issues

- Difficult to obtain bar-coded medications in unit dose packaging
- Lack of standardized bar-coded medications was delaying further automation by the nursing staff
- Medication stock-outs at remote sites necessitated expedites – having the necessary medications and quantities at the other locations
- Manual processes in filling and distribution of medications contributes to the possibility of human error



Why Implement Central Pharmacy Automation?

Pharmacy Reengineering Project had Four Main Goals:

- ***Patient Safety***
  - **Automated, bar-code based administration of medications**
  - **Direct pharmacist interventions on the nursing units**
  - **Preparation for next steps with automation**
- ***Productivity and Efficiency***
  - **Utilize the staff to their fullest potential**
- ***Inventory***
  - **Overall reduction in inventory**
- ***Leader in Healthcare***

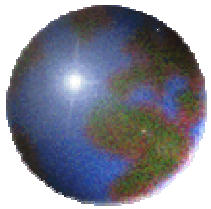
Project Goals: Other Tangible Benefits

ROBOT-Rx automated dispensing and distribution of bar-coded unit-dose medications:

- Centralizes inventory, sends patient-specific medications to floors, reduces decentralized inventory
- Increases Pharmacist time devoted to clinical patient activities in units and remote locations – less time spent in distributive functions
- Saves Pharmacy Technician time for refilling the automated cabinets to be available for other tasks

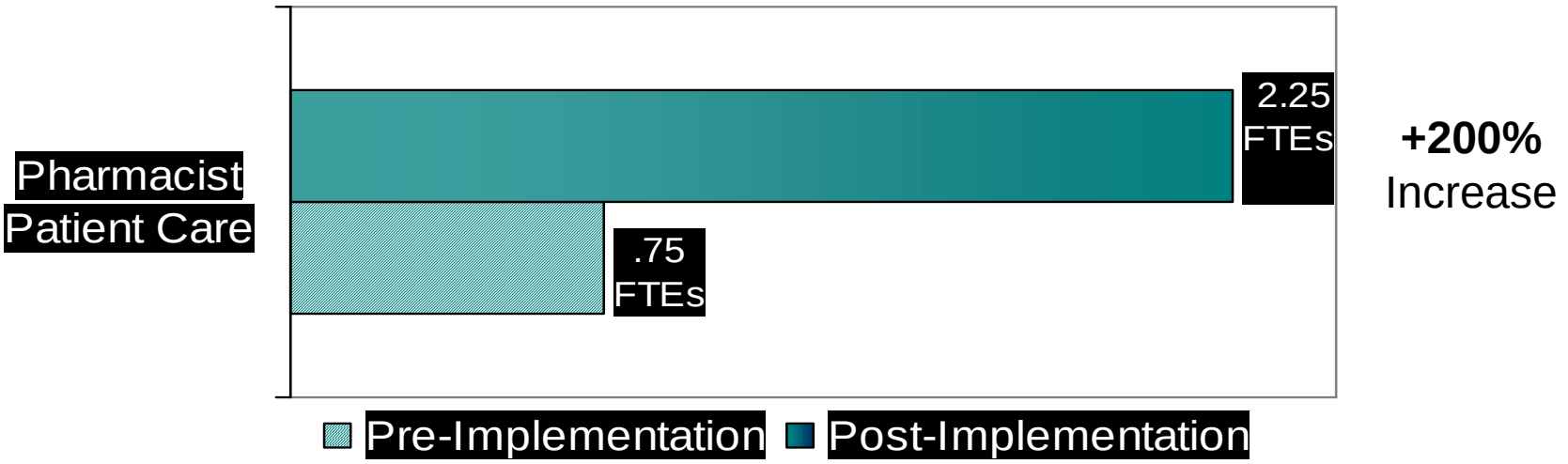
Project Goals: Other Tangible Benefits

- Minimizes expired medication write-offs by continuously rotating ROBOT-Rx medications
- Enables significant price savings by purchasing tablets and capsules in bulk, to be packaged by in-house service
- Reduces expedites to remote sites by supplying them with patient-specific medications
- Contributes to patient safety by using bar codes to verify medication filling and distribution activities



Quantifiable Benefits

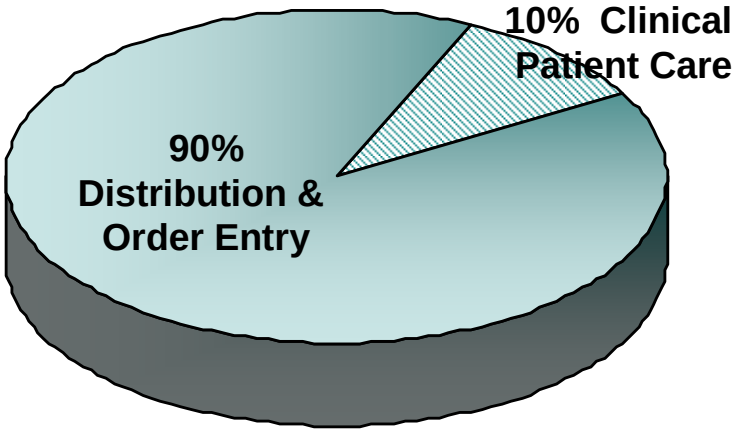
Patient Safety & Productivity

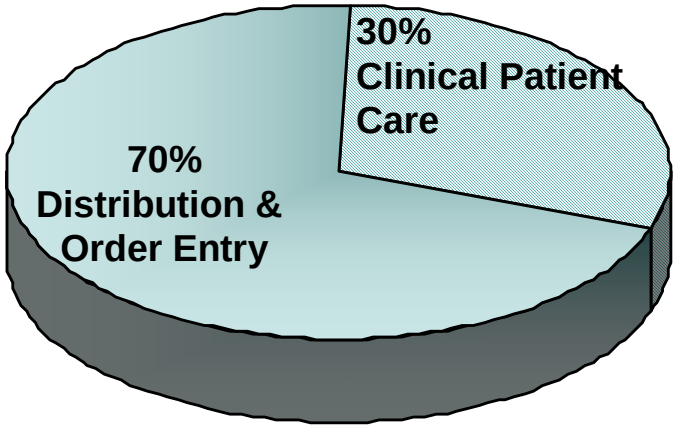


Automating the medication distribution process through use of robot, enables reallocating 1.5 FTEs of Pharmacist's time from distribution to clinical activities

Increased Pharmacist Clinical Intervention

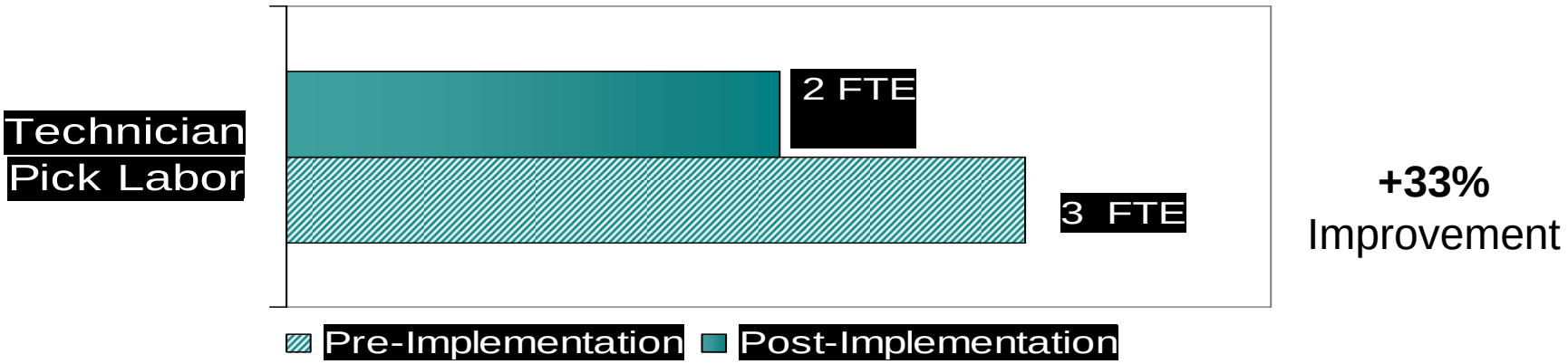
Robot and carousel efficiency in medication distribution enables significant pharmacist's time to be shifted from distribution and order entry to patient care working with physicians.





Increases patient safety
Improves drug cost efficiency
Pharmacist job enrichment
Elevates the Pharmacist within the patient care team

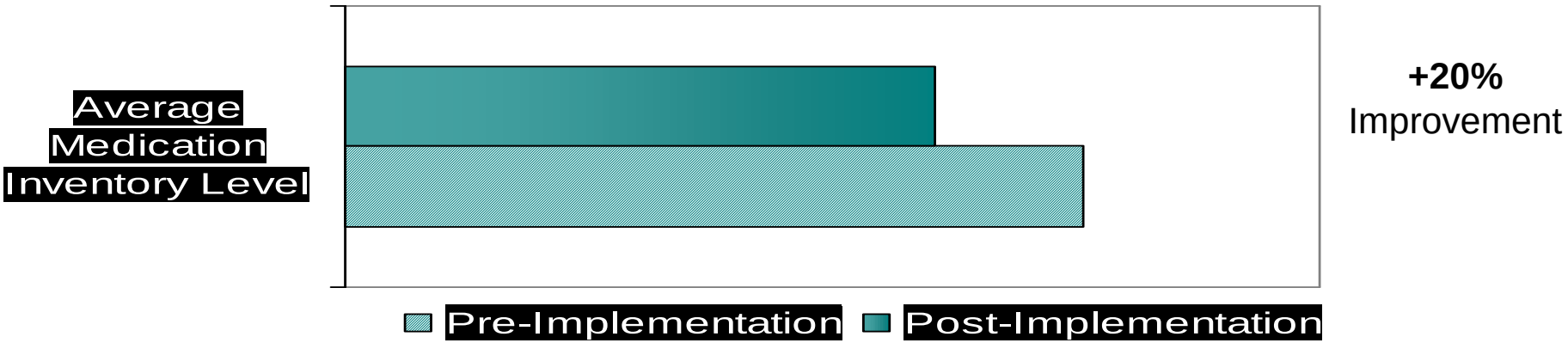
Patient Safety & Productivity



+33%
Improvement

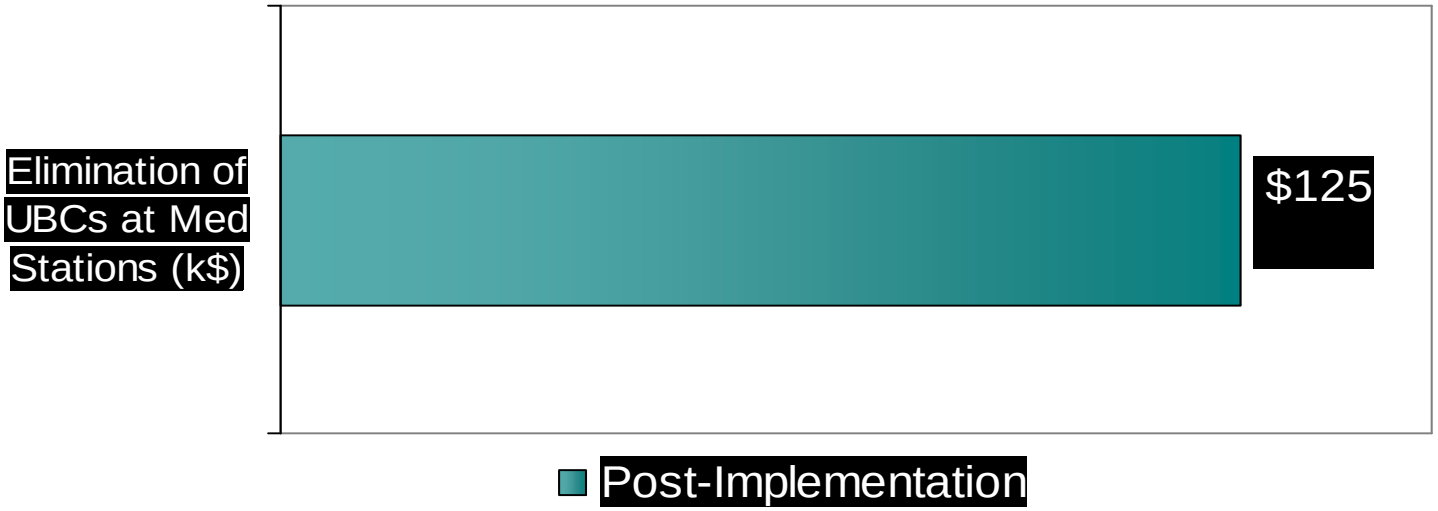
Fully automated picking by robot & the efficiency of the carousel for 80%-90% of medications reduces technician picking labor by 1 FTE

Medication Inventory Efficiencies



The robot enables a centralized hybrid distribution system vs. decentralized inventories at every medication station which enables inventory reductions of 20%, essentially JIT inventory

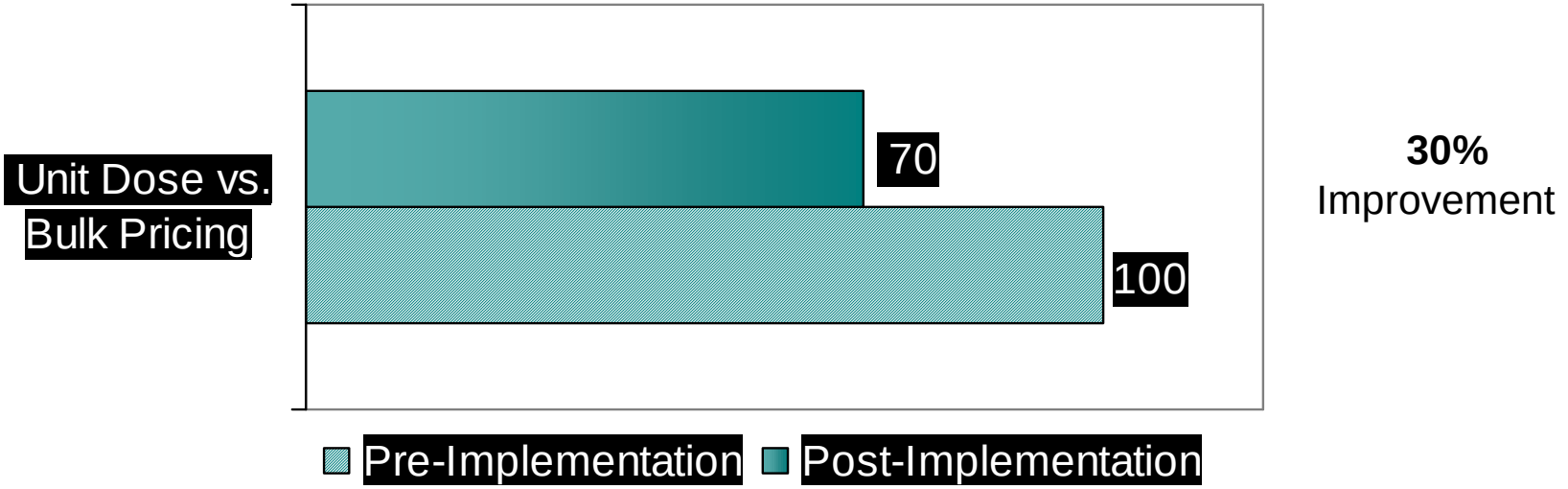
Medication Inventory Efficiencies



+$125k
Savings

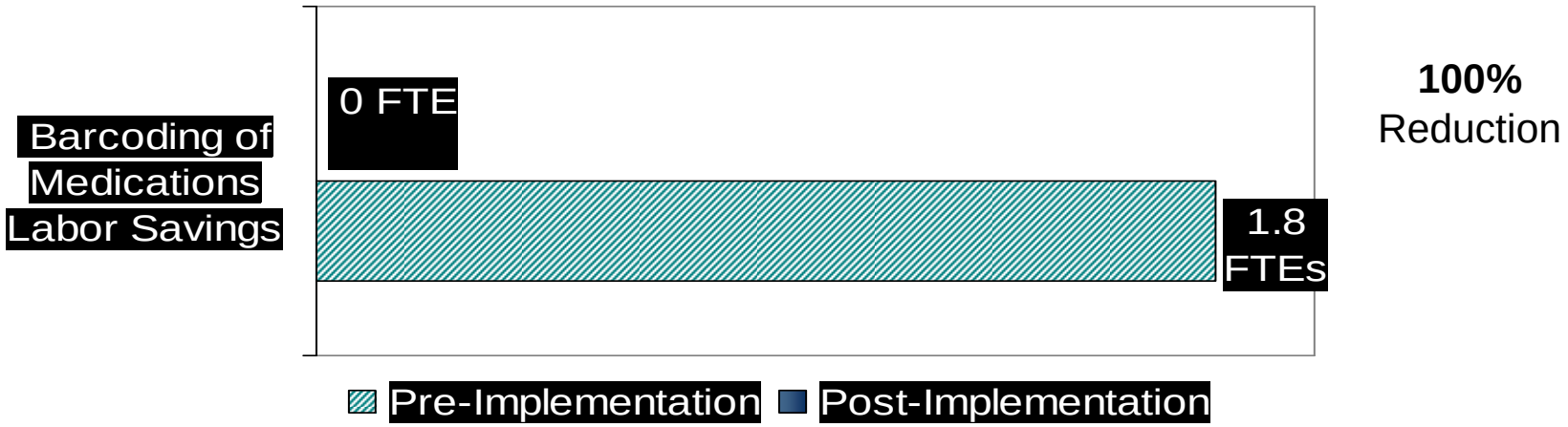
By converting from a decentralized to hybrid distribution model, overall unit based cabinets are reduced with this JIT inventory model

Purchasing & Packaging Efficiencies



By outsourcing packaging operations, medications can be purchased in bulk vs. unit dose tablets. This results in a 30% savings on the impacted medications saving $39k annually

Purchasing & Packaging Efficiencies



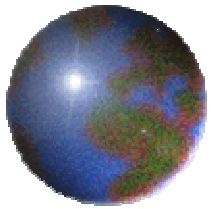
The packaging service eliminated the need to manually prepare unit dose medications which saves 1.4 FTE Technicians and 0.4 Pharmacists

Patient Safety and Financial Risk

ADEs are conservatively estimated to be reduced by 10% with the increased Pharmacist patient care activities as a result of this project. This can be especially beneficial since the hospital is self-insured.

Non-Quantifiable Benefits

- **Elevating the role of the hospital Pharmacist**
  - Job enrichment for the Pharmacist
  - Aids recruiting and retention of Pharmacists in a very competitive environment
- **Reduces risk of major medical error**
  - Decrease in potential litigation which is very important given that The Medical Center is self-insured
- **Key part of future projects**
  - The pharmacy re-engineering project enables the desired future state of going to a 100% fully bar-code system for bedside medication. Without this project, gaining this capability would have required additional expenditures. This cost avoidance is not quantified in this analysis.



Challenges

Renovation

- Pharmacy area was not sufficient to house robot, carousel, packaging operation
- Renovation had to be staged in order to allow the pharmacy to continue to function
- Required a lot of patience, dedication, and working in “less than optimal conditions” for a few months

Pharmacy prior to renovation

Pharmacy prior to renovation

Still working during the pharmacy renovation

Hmmm, this is pretty cool!

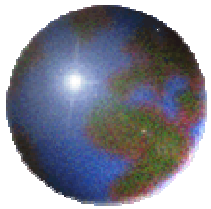
New, expanded, more open Pharmacy

New Pharmacy window in main hallway of the hospital.
Good for viewing the Robot!

Working robot and carousel

Implementation Challenges

- Hybrid System with multiple vendors and interfaces
- Close working relationship with each company as well as hospital's IT department
- Staff
  - Concern that the robot would take their jobs
  - New procedures
  - Training
  - Buy-in for success



Cost of Project

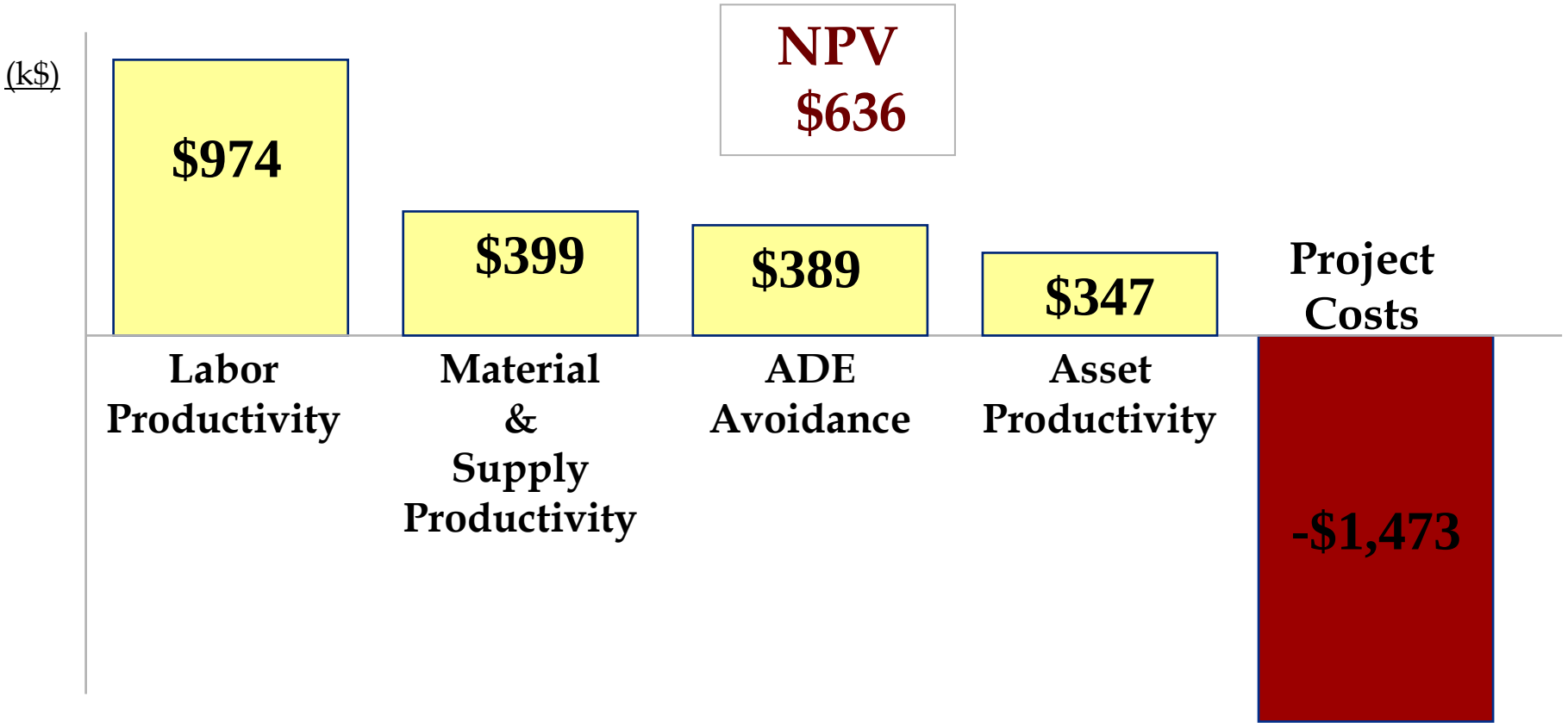
So, What Did All of This Cost?

- Equipment Costs: $1,473,294
  - Robot; MedCarousel; PakPlus
- Training and Installation: $ 108,235
- Construction Costs: $ 581,529
- TOTAL: $2,163,058

Financially Sound Project

- The financial implications of automating the Pharmacy were evaluated in detail
  - Project Net Present Value
    - Costs of the project compared to potential savings
  - Return on Investment
  - Cash Flow Projections
    - When savings could be realized
- Additional costs, such as renovation of the department were also evaluated

Project Financial Summary -- NPV (k$)



Team Decision

- Determine impact of decision on patient safety
- Need plan of where you want to go and what you want to accomplish
- Multidisciplinary approach to decision as well as implementation
- Carefully review processes to see how automation can enhance current as well as future activities
- Sound financial decision

Who Are the Key Players?

- ***Pharmacy***
  - Support and buy-in from the beginning
- ***Finance***
  - Start discussions with them early
  - Can help determine ROI, financing, budgetary impact
- ***Facilities***
  - Especially if major renovation will be required
- ***IT***
  - Help with necessary interfaces and equipment needs

Who Are the Key Players?

- ***Patient Safety Team***
  - Risk Management
  - Medical staff
- ***Nursing***
  - Will be an impact that is dependent on the level of automation
- ***Administration***

Conclusions

- Specific benefit areas regarding labor productivity, material and supply productivity, asset efficiency and improved patient care have been identified
- It will be critical to monitor the benefit areas to quantify savings
- Teamwork among the Pharmacy, Physicians, Nurses and Finance along with a strong commitment to change management has resulted in an excellent project plan and business case with reasonable execution parameters

Next Steps

- Use of bar-coding for bedside administration and verification
- Staff productivity
- Quantify projected savings
- Continuity of care/ medication therapy management projects to positively impact the healthcare of our patients

Time for Your Questions

Melinda Joyce, Pharm.D., FAPhA, FACHE

The Medical Center
Bowling Green, Kentucky