



المركز الوطني للتأهيل - إ.ع.م
National Rehabilitation Center - U.A.E
مركز متعاون مع منظمة الصحة العالمية
WHO COLLABORATIVE CENTER

Pharmacy Automation in Rehabilitation Centre

Disclosure Information

I have no financial relationship to disclose in regard of solutions presented.

AGENDA

Technology Era in Hospital Pharmacy Automation

Types and options of Hospital Pharmacy Automation

Assessment of Pharmacy automation needs

Value Based Service for Pharmacy Automation

Impact of introducing technology on staff, patient care and clinical outcome

By the end of the program

Know

the options and types of technology related to pharmacy operations in rehab setting

Promote

the awareness of using technology in pharmacy operation in rehab setting for both time and staff efficiencies toward clinical care and patient outcome

Understand

the role of pharmacy in rehab setting and the impact of using such automation to let each Substance Use Professional focuses on their key clinical tasks



Introduction

- As we entered the 21st century, there are many factors that influence the future practice of pharmacy & delivery of pharmaceutical care
- Today's health care providers are looking for new ways to improve the quality of patient care & optimize costs, while enhancing employee retention & patient satisfaction
- Technological advances have led to **automation**, which is of particular significance to pharmacists. In **pharmacy automation**, the machines used to carry out work are controlled by a computer
- It is very vital that the computer knows & responds to the purpose for which the system is executed
- Automated systems also promise extra efficiency & accuracy



Pharmacy Automation is
Introducing Technology to Achieve
the Operation Efficiencies

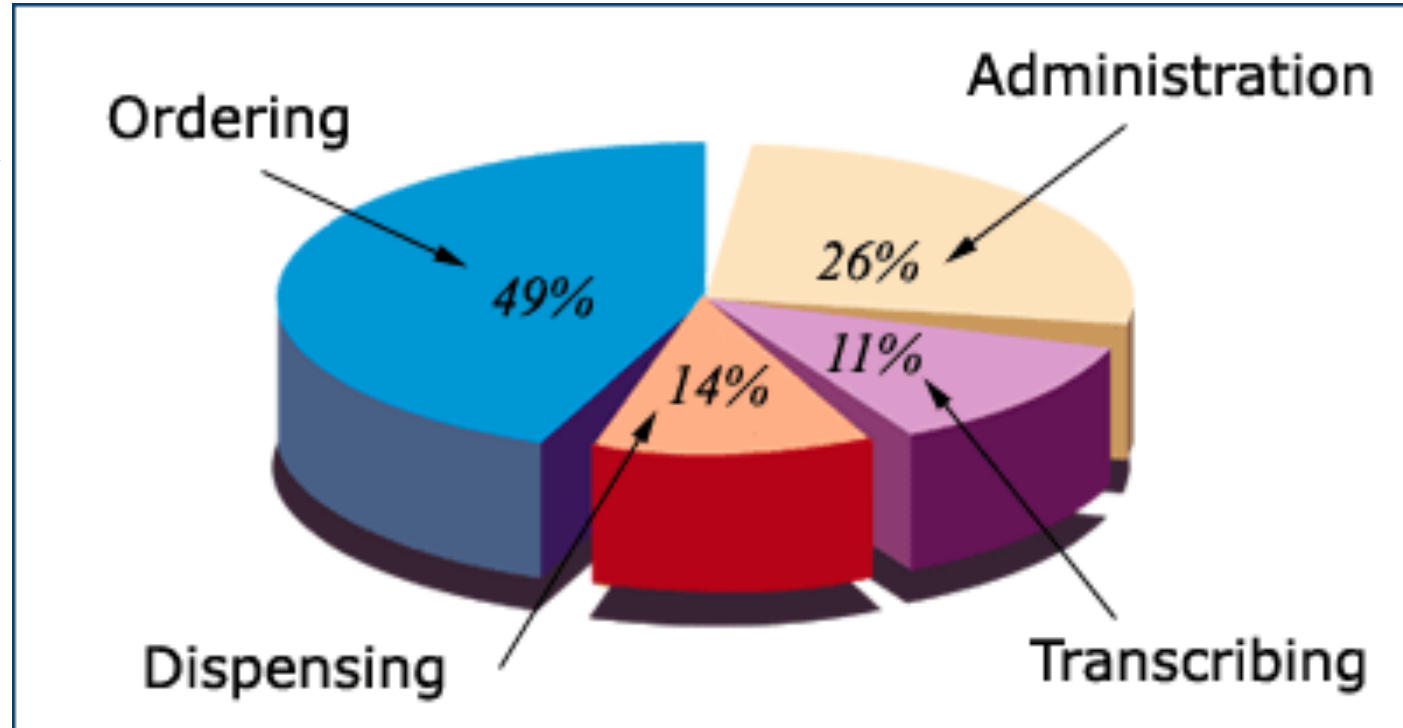
Automation will streamline the
Medication Management and
Pharmacy Operation Processes

Most Efficient Practice is Unit Dose
Decentralized at Point of care using
Automated Dispensing Cabinets

Technology Era in
Hospital pharmacy
automation

Why We Need Technology Automation

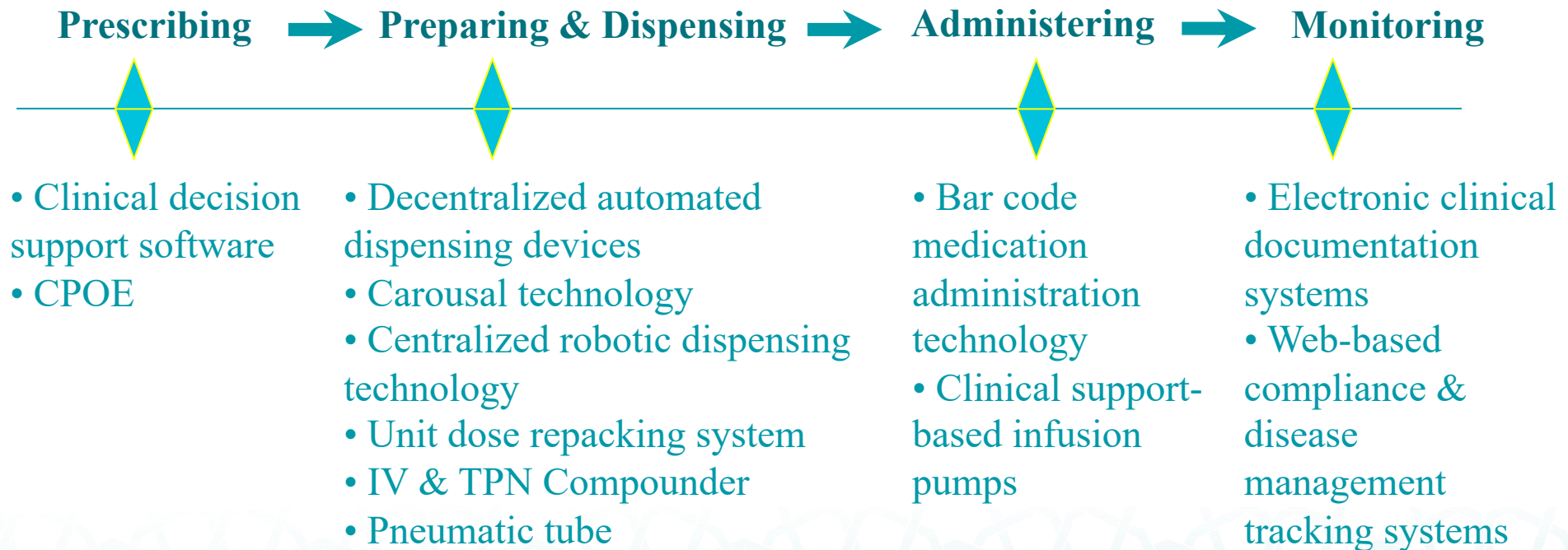
Where does the Medication Error might occur?



Medication Errors Reporting Program US 2010

The Medication Use Process and Automation

Technologies and AI should be applied throughout the medication use process



Safety features for incorporating automation in the medication use process:

- The system must have a bar code technology for drug restocking, retrieval & administration
- A system must force the user to specify a reason whenever medications are accessed or administered outside of the scheduled administration time or dosage range
- Identification bar codes or passwords must be assigned for each user
- Bar code administration systems must be able to identify & document the patient, the medication, & the person administering using the scanning technology function
- Devices are interfaced with the HIS allowing the nurse to view & access those medications that are ordered for a specific patient
- HIS and Device need electronic reminders to nurses when a medication dose is due
- CPOE are interfaced with automation devices to provide warnings about allergies, interactions, duplication & inappropriate dose at the point of dispensing & administration
- Real time integration or interfaces must exist for all steps in the medication use-process starting at prescribing, to order entry & dispensing, & through administration

Benefits of Automation

- Necessity is the mother of invention
- The demand for reliable & flexible prescription dispensing services has brought about many improvements in the area of pharmacy automation
- ADC and Robotic prescription dispensing systems are breathing new life into an industry where time is a luxury & space is at a premium
- Automation plays a role in saving time and improve patient safety
- Although in other industries automation had led to losses in jobs but in pharmacy, automation has not involved replacing people. Instead it has enabled the profession to focus on **integrated** pharmaceutical care.

Pharmacy Automation in Rehab Centre should include

Unit dose dispensing cabinets ADC:

Secure storage cabinets of handling most unit-dose & some bulk (multiple dose) medications and can handle the patient specific/own Medication

BCMA:

Bar code medication administration to ensure the right administration

CPOE:

Computerized prescriber order entry to facilitate the integration between HIS and ADC

Carousel automation:

A medication storage cabinet at Central Pharmacy with rotating shelves used to automate medication dispensing; subjected for number of lines items and ADC profile

The Major Goals From This Pharmacy Automation Technology



Decrease rate & percentage of medication errors (in all fields including: prescribing, dispensing & administration errors)



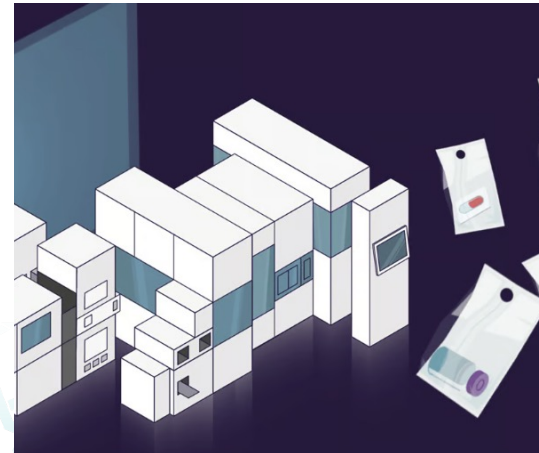
Provide pharmacists with more time to ***apply integrated pharmaceutical care*** & patient counseling

Types and Options of Hospital Pharmacy Automation

- **Decentralized Model: ADC and Prepackaging**
<https://www.youtube.com/watch?v=AJGFTst07RE>



- **Centralized Model: Unit dose prepackaging and picking Robot**
<https://www.youtube.com/watch?v=8WFIKfqJYvw>



Key Differences

Key Element	Decentralized Point of Care Model	Centralized Model
System Components	system software's manages the services in the pharmacy and ADCs located in wards.	The system is comprised of the medication packaging robot in the main pharmacy
Access to Medication	Medications are kept in locked automated cabinets with restricted access. Nurses can get medications approved by the pharmacist for patients	Medications prepared according to daily orders in the pharmacy are sent to the floors as daily patient doses
Medication Stock	The cabinets at the wards are stocked with 3-7 days of inventory (weekends, holidays included)	The Robot located at the pharmacy works with inventory that contains the hospitals max-min amounts for 3-7 days.
Duration of Access to Medication	As soon as a medication is ordered by the doctor and approved by the pharmacy they can be retrieved from the floor cabinets	Daily medication orders are made the night before. Approved requests are prepared daily for the patient by the packaging Robot
Cost Savings	20% to 35% cost saving annually	10% to 15% cost saving annually

Pros and Cons

Centralized (E.g., pillpicker in IP Pharmacy)

Advantages:

1. Proper Inventory & Expiry Control
2. No manual handling of medication during cart filling
3. Accuracy and patient safety
4. Fast processing time for filling patient specific medications
5. Minimum Checks are required by pharmacist. e.g., one check is required for 1000 doses packaged as compared to 1000 checks required for 1000 doses prepared by other automation systems
6. High level security is used from packaging till administration of drugs
7. Multitasking; it can perform packaging, preparation of UD cart, stat order processing and returns simultaneously.

Disadvantages:

1. Cost- Implementation, maintenance and consumables is high as compared to decentralized system , 12 M for the old model
2. System complexity, Less nurse satisfaction (delay in first dose)
3. 4. Huge number Staff required to deliver carts to nursing units on daily basis , 50 units, 50 carts
5. does not accommodate refrigerated items

Decentralized (E.g. Omnicell (point of care) in Nursing Units)

Advantages:

1. Easy and timely access of nursing staff to medication in a secure and accurate manner
2. Inventory & expiry control, Low cost of implementation, maintenance and operations than centralized system
3. Accuracy and patient safety, Ability to allow access to a single dose of medication
4. 60% resources can be minimized required for daily cart filling and delivery
5. Accommodates multiple dosage forms with flexible drawer configurations, Narcotic, controlled and High Alert policy (double check and signature) .
6. Access to medications is secured by user level security and after pharmacy verification
7. Less number of medication returns to pharmacy ,
8. Can accommodate refrigerated items
9. Can be customized according to medical service profile, and consumption, based on change in demand.

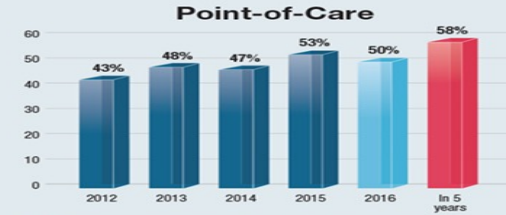
Disadvantages:

1. Frequent Filling of cabinets required resources , can be reduced if we increase the capacity/configuration for ADCs
2. More than one cabinet may be required on busy nursing units to facilitate timely administration of drugs ,
3. Note: standards shows 1 ADC with customized auxiliary can fit for 20 to 25 beds

Benchmarking data International

Medication Distribution Models

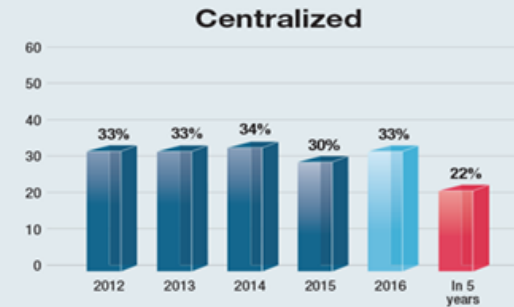
Trends in Distribution Models



▲ The point-of-care model, which is driven by high ADC usage, saw a slight contraction this year; nevertheless, it is projected to continue to expand over the next 5 years.

Medication Distribution Models

Trends in Distribution Models



▲ The centralized approach to distribution experienced a small increase this year; however, many of these pharmacy directors plan to switch to a point-of-care approach over the next 5 years.

Medication Distribution Models

Trends in Distribution Models



▲ Favored by some of the largest facilities, the hybrid model holds steady with just over one out of 10 facilities taking this approach.

NRC Case Study

Assessment of Pharmacy automation needs



Improve Medication Administration Process by the Nursing Team by Shorten the Time to Get the Medication

Improve the Medication Availability in the Nursing Units

Reduce Medication Errors & Enhancing Accuracy and Medication Safety

Improve and Automat Reports to the Department of Health and NRC

Medication Security, Ward Stock Monitoring and Inventory

Increased Stock Holding close to Patients for all Medications Needed

Primary goals for Pharmacy Automation at NRC

Assessment Rational

- The assessment was done based
 - On current drug distribution system gaps at NRC
 - Experience of effectiveness of the pharmacy automation in such setting;
- in addition to the potential of automating medication storage and dispensing processes to achieve
 - Security of medications.
 - Medications safety.
 - Control any potential diversion.

NRC data figures for Pharmacy automation

UNIT	LOCATION	FULL CAPACITY	ADC Type	NUMBER OF LINE ITEMS	Qty of ADCs
DETOX Unit – S	W4 – 2nd F - A	20	Full Size ADC with Secured Drawers	90	1
DETOX Unit - V	W4 – 2ND F - B	8	Full Size ADC with Secured Drawers	85	1
Rehab UNIT – S 1	W4 – 1ST F - A	24	Full Size ADC with Secured Drawers	110	1
Rehab Unit – S 2	W4 – 1ST F - B	20	Full Size ADC with Secured Drawers	110	1
Rehab Unit – V	W7 – 1ST - A	15	Full Size ADC with Secured Drawers	90	1
Rehab Unit – C	W7 – 1ST - B	10	Full Size ADC with Secured Drawers	90	1
Female Unit	W4 - GF	14	Full Size ADC with Secured Drawers	80	1
VIP Unit	W7	1	Table-Top ADC with Secured Drawers	15	3
Royal Unit	VILLA	2	Table-Top ADC with Secured Drawers	15	2
OPD	Male and Female Clinic	2	Table-Top ADC with Secured Drawers	15	2

Automation Requirement

Nursing units

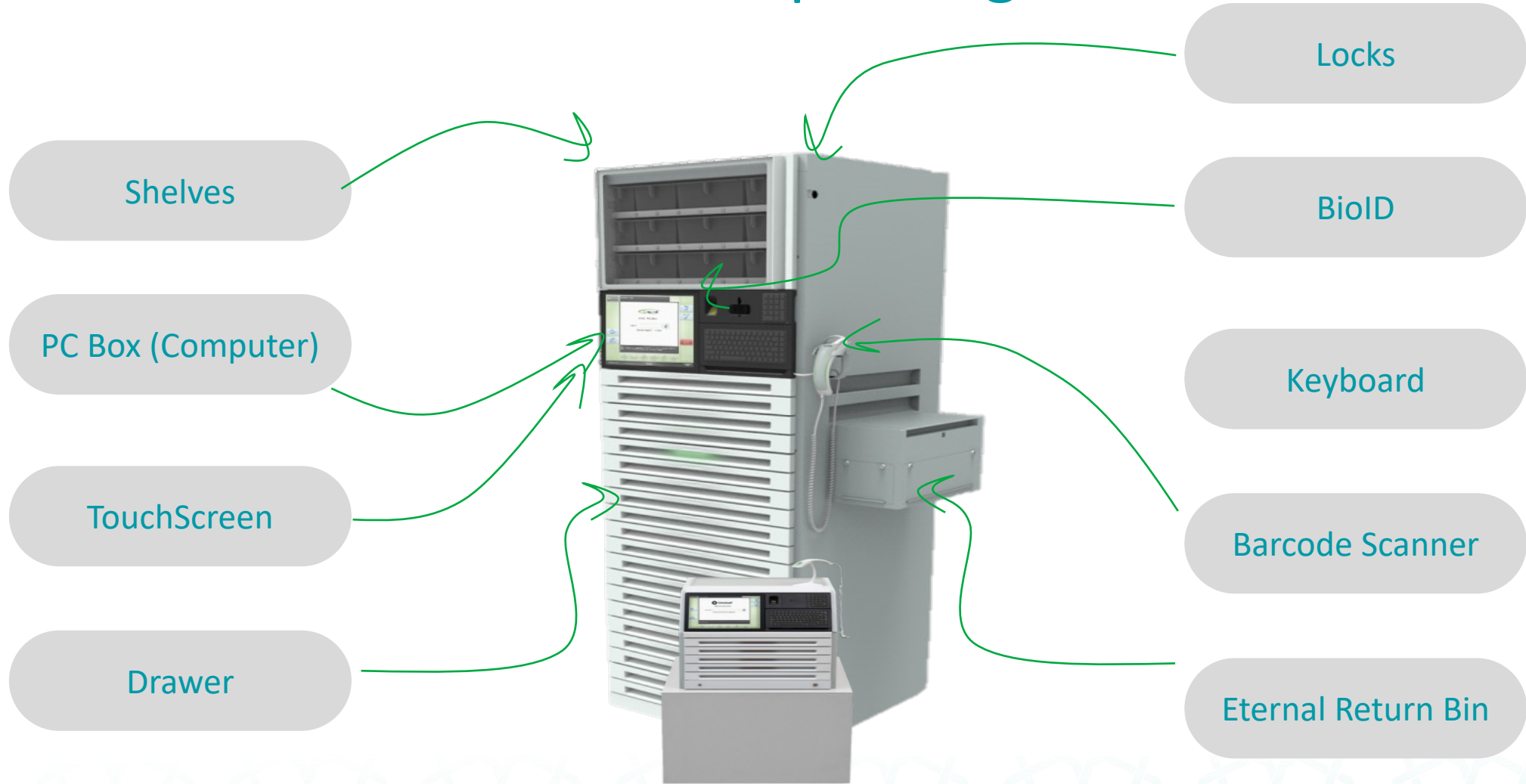
- 7 Main Full Size) ADCs with all secured drawers
- 7 Table-top (short) ADCs with all secured drawers
- 14 fridge locks

Main Pharmacy

- 1 Main Narcotic cabinet
- 7 Auxiliary Narcotic cabinets
- 2 fridge locks
- All in one prepackaging machine



Automated Dispensing at NRC



Quarter -Cell Configuration

Automated Dispensing at NRC

Guiding Lights



Different Storage Space and Security Levels



Flexlock and Remote item



Safety Stock Scanner



Value Based Service for Pharmacy Automation

Declaration:

Medication error is always under reporting in healthcare setting either near miss or those that might reach the patients; benchmarking data assure that automation will reduce the medication errors; actually NRC will implement the automation within 6 months; we may be able to present such data (before and after) once the automation commissioning achieved.

Impact of introducing technology on staff, patient care and clinical outcome

Pharmacy Automation will improve the accuracy of the dispensing process and thus will eliminate selection errors, reduce dispensing errors and improve patient safety

Automated dispensing Cabinets provide secure medication storage and accuracy on patient care units

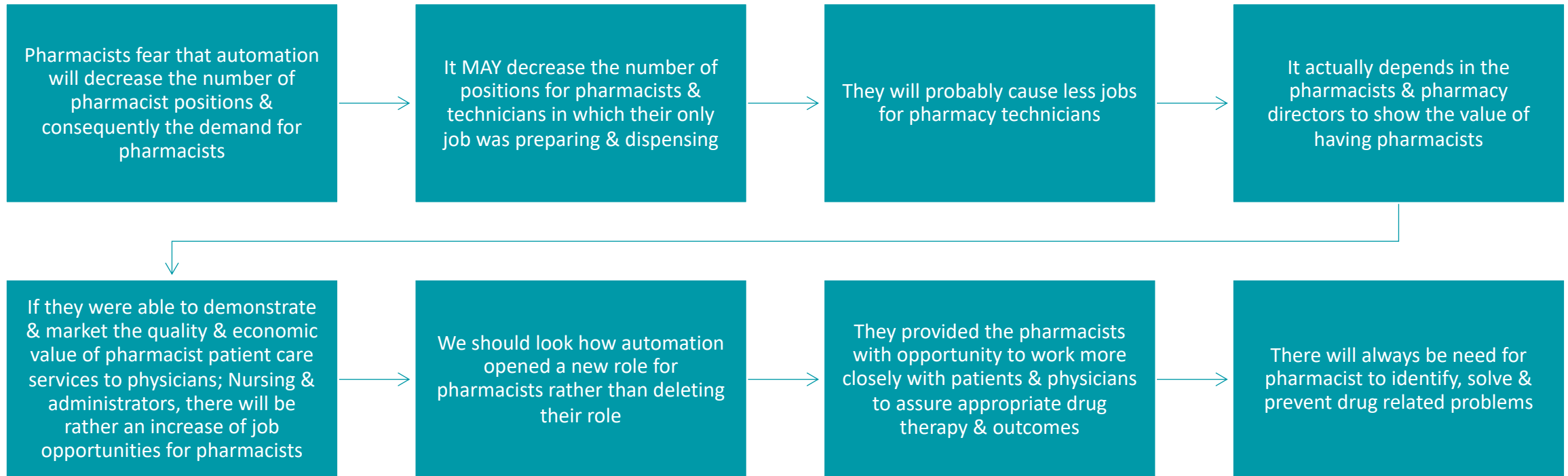
Automation will improve stock and inventory control

Time efficiency of pharmacy and nursing staff to focus more on clinical activity toward patients.

Save nursing time by eliminating the need for manual end-of-shift narcotic counts in patient care units

Optimize the total cost of medication-related activities.

Impact of Automation on Manpower Myth



Safety Issues Regarding Automation

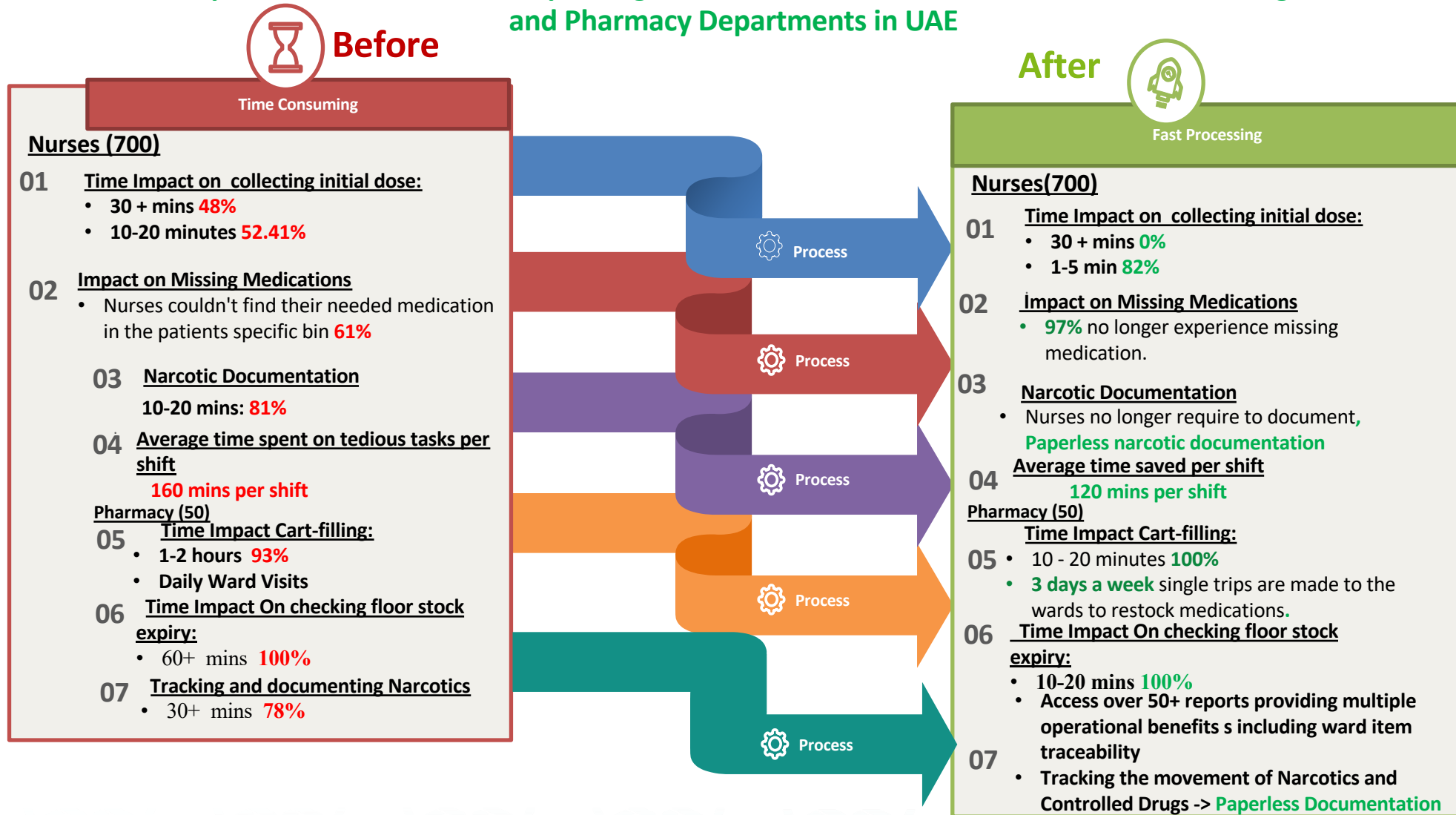
Automation have major input to reduces medication error by:

- Reducing complexity
- Simplifying & standardizing processes
- Avoiding overreliance on human memory
- Improving efficiency
- properly integration with HIS

However

- If not used properly it can produce new source of error
- Automation can instill a false sense of security leading to carelessness by health care professionals
- Implementing this technology takes years to accomplish with the need of dedicated employees
- All health care professionals & patients must understand that the technology can not completely substitute for human checking

Impact of the Automated Dispensing Cabinets on Medication Workflow for the Nursing and Pharmacy Departments in UAE



**Before the introduction of the devices, more than 80% of nurses spent between 30 mins and more on medication related tasks. With the support of ADCs, this was reduced to less than 5 minutes per day. The time savings for nurses associated with the medication related tasks equated to about full-time equivalent (FTE)."

Ref. Omnicell-UAE

Which Automated Technology Should be Selected?



- There is no right or wrong answer.
- It depends on how they are carefully integrated into the system.
- Characteristics for an ideal system you need: patient care & safety benefits, responsiveness to customer or patients needs, & cost effectiveness.
- Before implementing a technology in your facility check the advantages & disadvantages, check safety issues regarding the automation you are about to implement.
- Must always remember the importance of pharmacist role in overseeing & coordinating the use of such system, in addition to his integrated pharmacotherapy role.

In Summary

- We are entering a new era in pharmacy technology
- There is no perfect technology & all systems must be well managed to provide best outcomes
- To be successful in the future pharmacists must view automation-induced productivity & efficiency as desired goals not threats to their work
- Every change must be implemented with an understating that even good changes can create unexpected hazards



THANK YOU