Optimizing Medication Distribution using Automated Dispensing Cabinets

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Conflict of Interest Declaration

• I have no actual or potential conflicts of interest in relation to this presentation or activity to disclose

Learning Objectives

• Describe the major types of medication distribution models
• Review the primary functionality of automated dispensing cabinets and their impact on pharmacy operations
• Explain the methods and metrics that can be used to monitor and optimize the medications available within an automated dispensing cabinet

Challenges in Pharmacy

• Resource management (Human and Financial)
• Internal and external pressures
  • Deliver excellent care AND manage resources efficiently
• Target distribution models for efficiency
• Timely and accurate medication delivery
• Leverage automation and technology to support patient care services

Audience Pre-Test Assessment

A. ADCs have been shown to increase rates of medication errors
B. ADCs are designed for automated, decentralized medication dispensing in a variety of settings
C. ADCs do not facilitate unit dose medication distribution for end users
D. ADCs are decreasing in prevalence in health-care organizations throughout the country

Pharmacy Automation and Technology

• Advancements in medication management technologies
  • Unit dose medication packaging
  • Pharmacist led medication dispensing
• Automated dispensing cabinets (ADCs)
  • Minimize medication errors
  • Maximize patient safety
  • Inventory accountability
  • Nursing/Patient satisfaction
Medication Distribution Models ³,⁴

<table>
<thead>
<tr>
<th>Distribution Model Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized Model</td>
<td>&quot;Cart-fill model&quot;</td>
</tr>
<tr>
<td></td>
<td>- Pharmacist checks a patient specific product</td>
</tr>
<tr>
<td></td>
<td>- Product is delivered to a patient cart or room</td>
</tr>
<tr>
<td>Decentralized Model</td>
<td>&quot;Cabinet model&quot;</td>
</tr>
<tr>
<td></td>
<td>- Pharmacist checks a non-patient specific product</td>
</tr>
<tr>
<td></td>
<td>- Product delivered to an automated dispensing cabinet (ADC)</td>
</tr>
<tr>
<td>Hybrid Model</td>
<td>Combination of both centralized and decentralized</td>
</tr>
</tbody>
</table>

Evaluating Medication Models ¹,³,⁵

- No one-size-fits-all approaches
- Factors to take into consideration
  - Costs of automation/technology
  - Nurse : Patient ratios
  - Inventory demands
  - Pharmacy labor costs
  - Medication security

What medication distribution model is currently in use at your institution?

A. Medication distribution without the use of any ADCs
B. Hybrid model (centralized and decentralized)
C. Centralized, cart-fill only model (all patient specific doses)
D. All medications from the ADCs, no cart-fill

Growth of Decentralized Models ⁶,⁷

- In 2011, 60% of hospitals had a centralized distribution system
- 73.9% reported a centralized model in 2005
- 89% of respondents to an ASHP survey in 2011 used ADCs
- Compared to 49% or respondents in 1999
- Evidence of ADC growth in the future

Benefits of ADC Optimization ²,³,⁸

- Primary goal = enhance operational efficiency
- Hybrid models are highly dependent on ADC usage
- 70-90% of all medication doses (unit dosed) administered
- Optimization typically revolves around:
  - Stocking frequently used medications
  - Removal of unused medications
  - Improve refill and stock-out workflows
  - Proper placement of inventory

Audience Discussion

- Find a partner next to you and take a minute to discuss how ADCs at your institution are managed on daily basis. Do you have staff designated to maintenance and report analysis of your ADCs?
Targets

- Reporting
- Drawer Configuration
- Medication Removal
- Par Levels / Refills
- Restocking
- Stock-Outs
- Medications with Active Orders
- Dispensing Data
- Expirations
- End User Satisfaction

Reporting / Data Collection

- Designated staff for running reports from a database
- Pharmacy dashboards
- Canned reports
  - Accurate and reproducible
- Analysts to perform data analysis
- Tackle optimization in a phased approach
  - Patient care units
  - Service lines
  - Floors

Drawer Configuration

- Locations decided with the end user in mind
- Consider ideal ergonomics and frequency of use
- Top and bottom drawers should hold slow-movers
- Stock fast movers and larger medications primarily in waist-height drawers
- Controlled substances near eye-level heights for accuracy in counting
- Organize layout to minimize the number of steps

When are medications removed from the ADC at your facility due to non-utilization?

A. After 30 days
B. After 60 days
C. After 90 days
D. There is no set timeframe to drive this activity

Medication Removal

- Patterns of use reflect unit based needs
- Determine the best interval for the department
  - 30 days
  - 60 days
  - 90 days
  - 120 days
- Considerations for standard stock items
- Reduce expirations, improve organization and space availability

Par Levels / Refills

- Day supply emphasis
  - 1-3 day minimum
  - 6-9 day maximum
- Major considerations
  - Average daily dispenses
  - Delivery turnaround time
  - Size and shape of medications
- High Vend: Fill ratio – increase vends, decrease refills
- Weekly refills for low-cost drugs without short dating
- Centralized storage should drive refill quantities
Restocking 4,5,10

- Monitor technician workload to ensure efficiency
- Reports to show time taken to complete a restock
- Consistent delivery schedules
- Even distribution of workload based on cabinet demands
- Balance restock frequencies with the risk of expirations

Stock-Outs 2,3

- Canned reports to stock-out rates specific to each drug at each machine
  - # of stock-outs / total number of dispenses
  - Goal stock-out percentage of less than 1%
  - Indicates the management of changes in usage based on inventory levels
  - Review stability in stock-out rates and turn around times for consistency

Medications with Active Orders

- Database search to show which medications have active orders and are not loaded as a common stock item
- Filter reports for ease of manipulation
  - Patient care area
  - Unit dose, bulk, compounded, short expiration, fridge meds
  - Controlled substances
  - Frequency of reporting determined by staffing levels
  - Inventory adjustments made accordingly

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Dispensing Data 2,10

- Review previous dispensing and ordering patterns
  - EHR data
  - Historical ADC dispensing data
  - Centralized data (medication carousels or cart-fill)
  - Doses dispensed from central per patient day
- Monitor prescribing trends
  - Seasonal patterns
  - Annual patterns
  - Immediate access to critical medications
  - Eliminates transport time from pharmacy

Expirations 2,3,10

- Emphasize accurate expiration date tracking at the ADC
- Track which drugs expire
- Can also be used to update par levels
- Decrease in average number of expirations post-optimization
End User Satisfaction \textsuperscript{1,11}

- Impact of ADCs on nursing satisfaction is inconsistent
- Unit based surveys
- Daily huddles
- Assess end user satisfaction regularly
  - Pharmacy personnel responsiveness
  - User friendly physical layout
  - Accurate filling processes
  - Medication administration without delay
  - Order verification turn around times
  - Wait times for cabinet access

Summary \textsuperscript{10,11}

- Various optimization methods create efficiency
- Identify meaningful end goals
- Initiate a phased approach
- Plan – Do – Check – Act (LEAN Methodology)
- Measure the impact of implemented changes
- Share your success stories!

Audience Post-Test Assessment

- Which of the following statements is true in regards to the use of automated dispensing cabinets (ADCs)?
  
  A. ADCs have been shown to increase rates of medication errors 
  B. ADCs are designed for automated, decentralized medication dispensing in a variety of settings 
  C. ADCs do not facilitate unit dose medication distribution for end users 
  D. ADCs are decreasing in prevalence in health-care organizations throughout the country

Which of the following statements are true?

A. Historical dispensing data cannot be used to determine cabinet inventory 
B. Standard stock medications should be removed from the ADC if they show up on expiration reports 
C. The electronic health record (EHR) can be used to facilitate optimization and ADC utilization 
D. All of the above statements are true

Which of the following statements are true?

A. ADC restock delivery schedules should be consistent for optimization efforts 
B. Proper distribution of cabinet workload does not have an effect on restock times 
C. Expiration of medication are not affected by restock intervals 
D. Database reports are unable to help quantify restock times at each ADC

Which of the following are effective methods to drive ADC optimization?

A. Ensure proper drawer configuration for the end user 
B. Remove unused medications on a regular interval 
C. Increase vend : fill ratios on medications 
D. Reduce stock out rates 
E. All of the above
A pharmacy operations manager has been assigned to improve ADC utilization for the hospital’s cardiac ICU. The first task identified is to review 6 months of medication administration data to identify which high demand medications are not currently stocked in the cabinets. Which of the following optimization methods is this review an example of?

A. Par Levels  
B. Stock-outs  
C. Expirations  
D. Dispensing Data

References


Questions/Comments

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