Behind the Scenes of Inventory Management: A Generalized Approach

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Presentation Outline

- Background Information, Motivation
- Project Process
  1. New Item Requests
  2. Inventory
     1. 5S
     2. Signage
     3. Comment Board
     4. Determining When to Order
     5. Item Cards
     6. Expired/Excess Items
     7. Returning Items
  3. Obsolete Items
- Lessons Learned, Conclusions and Future Research
Background Information

- Project was conducted with the Logistics Department at VA Boston Healthcare Systems Logistics
- VABHS Logistics is responsible for three different campuses
  - Jamaica Plain; West Roxbury; Brockton
- Primary location was at the West Roxbury campus
- Some process improvements affected all three campuses (after completion of project, results will be spread to other VABHS campuses)
Project Motivation

- Inventory management system in West Roxbury VA Operating Room was inefficient and hard to decipher
  - Little to no tracking of inventory usage
  - Item locations and stock levels are unknown
    - If an item is fully depleted, no indication the item should be located there
    - Reordering occurs because items “look” low
    - Recalls would be an issue due to not knowing if an item was in inventory or where all of that item was
  - Inventory Manager key to operations
    - Item locations may be unknown (Multiple storage locations)
    - Item stocking level status unknown (Out of stock versus misplaced)
    - Order statuses unknown
Project Motivation

- Old solution was over-stocking
  - Items ordered by the case
  - Multiple rooms and locations needed to be used for items
- Due to lack of up-to-date inventory information, existing supplies expired on the shelf, while orders were placed for the same supply prematurely
  - No measurement of how many or what dollar amount of items were expired
  - No indication of items that may have been used that were expired
  - No measurement or cost analysis on overstocking
- Many parties are responsible for keeping all locations stocked
- OR Staff pulls items and returns them to wrong locations or returns them after the Inventory Manager decides more should be ordered
Project Pros and Cons

- **VA Contracted Items**
  - Contracted vendors have a low lead time
  - Not all items are on contracts that should be

- **GIP (General Inventory Program)**
  - Developed in the early 1980s
  - Difficult to integrate with other software and reports are difficult to interpret
  - Not authorized for other software purchases

- **No central warehouse for supplies**
  - Each campus manages their own supplies
  - In some cases, there are primary inventories for a specialty or clinic (i.e., Surgery) that also independently manages supplies
  - Multiple levels of management
Project Introduction

Life Cycle of An OR VA Product

1. New Item Identified
2. CPRC Approval
3. Product Added
4. Product Replenished
5. Item Obsolete
1. New Item Requests (1 of 6)

- National mandate to create CPRCs (Clinical Product Review Committees)
  - Consists of 32 different people who come from multiple departments
  - All products must be approved before purchasing (unless emergent)
  - In December 2012, a new item was requested around every 1.6 days with significant batching (two days had 5 or more requests)

- Considerable burden to Logistics staff
  - InfoPath forms emailed to one person
  - Each form had to be reviewed to determine next steps in the process; no way to easily determine where each request was at in the process
  - After approval, no way to extract the data from the forms

- No visibility to requesting customer
1. New Item Requests (2 of 6)

- Development of a more robust InfoPath form with SharePoint
  - General Request Information
  - Service Information
  - Reason for New Equipment
  - Applicable Subcommittees
  - Item Information

- New form had required information fields.
1. New Item Requests (3 of 6)

- Solution was to integrate a more robust InfoPath form with SharePoint
  - Automate as many processes as possible
  - Make it visible to the customer and Logistics staff

- Only Logistics staff can access InfoPath forms after submission
I. New Item Requests (4 of 6)

- Five different statuses for each request
  - Subcommittee Voting
    - Logistics staff can monitor if something is stuck in a subcommittee
  - Ready For CPRC Vote
    - Logistics staff know this is ready for email out for voting
  - CPRC Voting
    - Customer knows that feedback from CPRC is being generated
  - Approved (or Not Approved)
    - Approved items are listed on the SharePoint site and the customer is automatically notified of the decision
    - Reason for non-approval given in the email
I. New Item Requests (5 of 6)

- **Previous Process**
  - Manually managed by process owner at all steps
    - Kept all submitted forms in email
    - Had to determine where to send the form next at all steps
    - Took screenshots of filled out forms and emailed them out
  - Users saved old forms to desktop and filled them out
  - No ability to quickly review old forms
  - Took process owner around 30-40 minutes per form
  - 5 – 10 hours per week

- **Current Process**
  - Process owner only needs to email out final voting to committee
  - Users navigate to a central SharePoint site to find form
  - All forms are kept in a SharePoint folder with export capabilities
  - Takes process owner 5 – 10 minutes per form
  - 1 – 2 hours per week
I. New Item Requests (6 of 6)

- Lessons Learned / Observed Best Practices
  - Start small with any testing of a new electronic process
    - A lot of manual re-entry of forms in the beginning
  - Don’t wait for perfection. Something is better than nothing – incremental changes can propel major breakthroughs
  - Design of a form is a difficult skill to master. Learn about and apply human factors and human-computer interaction tools and skills.
2. Inventory
2. Inventory (Before Photos)
2.1 5S (1 of 2)

- **Sorting**
  - Items had multiple locations which were not always restocked
  - Condensed all items to one location
  - Re-assigned the rooms
    - Main Inventory Room (Blue Room) stayed the same
    - Delivery Room (Orange Room) became excess storage
  - Added dividers to the shelves
  - Moved some specialty items to a different location

- **Setting in Order**
  - Taught Supply Technician about FIFO
  - Established standard placement techniques
    - Apply stickers to hard to read items
    - Place boxes so they are easy to grab
  - Removed all items from corrugated cardboard to satisfy regulations
2.1 5S (2 of 2)

- **Shining**
  - Removed all end-cap buckets to improve movement
  - Relabeled all shelves and carts with a number for carts and a letter for shelves to make identification easier
  - Removed bulky plastic shelving and exchanged it for wire shelving

- **Standardizing**
  - Established work-flow for replenishment and posted in work area
  - Created labels so items did not end up in wrong location
  - Created bin to capture any items for which OR staff does not know location

- **Sustainment**
  - Standard Work documents built for maintenance of procedures
2.2 Signage

- Developed standard naming convention for shelves
  - Top Shelf = A, Next Highest = B, …
  - Numbered all carts 1 – 40
  - Refer to item locations as 1-A

- Signage for not putting items on top shelf
  - Cut to fit a variety of shelf sizes
  - Satisfies fire code regulations
2.2 Comment Board

- Established a comment board to gain insight on what OR Staff needed
- Evolved into a location communication tool
- Comment board is switched out after it is full but all comments are recorded for posterity
2.3 Determining When to Order

- **Old Practice**
  - Inventory Manager walked around and decided based on visual inspection of which items appeared to be running out or they received a request from OR Staff after an item was out

- **Constraints on Replenishment**
  - Cannot change inventory management software (GIP)
  - Cannot incur a lot of cost to set it up
  - Time is limited for staff to determine when to order
  - In healthcare, stock-outs are often much more costly than over-stocking
  - Over 600 unique items in Blue Room alone
  - Communication barrier between OR Staff and Logistics Staff
    - Medical names for items are not always what is on the box
    - Physical inventory only done once a year and requires several days
2.4 Item Cards

Image of the item allows for quicker identification by OR staff and reduces packaging issues.

Descriptive name from manufacturer makes sure it is the right item.

Location of the item makes sure no items are moved without approval.

Reference number is the item manufacturing number for reordering.

Internal software identification number.

Barcode to easily count items by scanning the label for every item present.
2.4 Item Cards

- Created VBA software to make item cards automatically after information is input to an Excel document.
- User types in the item location, the product description, the reference number and the IMF into a workbook.
- User uploads a picture of the item and of the barcode with the reference number as the name of the file to a folder.
- User runs a macro which generates cards for all items input in a separate folder.
- Prints out to templated paper which has 3 x 5” punch out sections.
- Cards are put in a clear plastic sleeve and connected to shelf with alligator clips.
- Entire process is contained inside an easily transferrable file folder.
2.3 Determining When To Order

- Portable laptop with scanner now used to do physical counts
  - Approximately 1.5 minutes per cart; Blue Room done in around an hour
- Physical counts can now be done on a recurring basis
  - Improve knowledge of what is currently in the inventory
    - When we started, no knowledge of what was in the room
  - Allow for better setting of par levels
    - Current method is to buy to fill the space allocated for each item
    - Can adjust space allocated accordingly (no data prior to this)
  - Item cards can easily be spread to all areas of the OR including other facilities
    - Facilities will know how much of each item everyone has
    - Possibility of looking into pooling resources
2.5 Expired/Excess Items (1 of 3)

- Expired/Excess Items
  - Prior to this project, no consistent tracking of how many items were Expired or Excess
  - Cost of overstocking was hidden
  - SharePoint list was created to monitor what items were expired/excess

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<th>Description</th>
<th>Item Master File Number</th>
<th>Part Number</th>
<th>Quantity</th>
<th>UNIT OF ISSUE</th>
<th>Location</th>
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</table>
2.5 Expired/Excess Items (2 of 3)

- **Process**
  - Expired/Excess Items require coordination between Inventory Manager and Supply Technician
  - Process posted in work stations and progress monitored on SharePoint
2.5 Expired/Excess Items (3 of 3)

- Process established, but how do we identify items?
  - Excess is through Inventory Manager or Supply Technician
  - Expired can be identified by Inventory Manager or Supply Technician, but what does OR staff do with an expired item if they pick it for a surgery?

- Created expired bin
  - Eliminate “disappearing” expired items
  - Instructs how to identify expired items
  - Date of expiration updated with correct month and year
2.6 Returning items

- OR staff occasionally pulls excess items for surgery (or the wrong item)
- OR staff does not always know where an item should go
  - Want to eliminate any issue of misplacing an item
  - Reduce any nurse time spent searching for an items location
- Created “Where Does It Go” bin
  - Supply technician restocks items in the bin during down-time
3. Obsolete Items (1 of 3)

- Occasionally items are no longer needed
  - Requesting doctor leaves the OR
  - New item replaces the old item
  - Surgery becomes obsolete

- Previously handled by word of mouth
  - Issue because of non-traditional usage by different departments
    - Throat gauze used by gynecological surgeons
  - No way to identify when/what items have been made obsolete
    - Non-frequent surgeries could be negatively impacted
  - No method of tracking buy-in or accountability
3. Obsolete Items (2 of 3)

- Used a combination of analog submission, InfoPath and SharePoint to establish a comprehensive process for obsolete items

- Email is automatically generated for all transfers and a backup copy is saved to a SharePoint site
3. Obsolete Items (3 of 3)

- Newsletter campaign to stress importance of voting on the obsolete items
- Obsoletion of items reduces strain on Inventory by eliminating the need to order and monitor no longer needed supplies.
4. Lessons Learned

- Communication is key when dealing with a “complex” inventory
  - The staff who stocks the item is not the staff who pull the items
  - Any OR staff can pull supplies

- Make processes for the position not the person
  - Benefit of having great staff is that sometimes information that should be explicit was left unsaid and undocumented
  - Work had to go into making sure process was easily sustained

- Small changes can scare people
  - Cleaning the room (without altering locations) caused complaints that OR staff could not find items
  - Began posting the project plan to ease worries that changes would impact their ability to find supplies
4. Conclusions and Future Work

- Inventory management begins before par levels, EOQ models and demand forecasting
- Started with a “black box” that over-ordered to make up for its lack of information and shined a light on it
- Future Work
  - Setting correct par levels
  - Forecasting item need based on surgery type and previous demand
  - Determining steady state of number of items in the OR
    - Uncertainty surrounding when a new item will be requested and when an item will become obsolete
    - Determine optimal space allocation and if any interventions could help reduce the space necessary to effectively function
Questions?

Thank you
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