



# The Role of Automation in Managing Inventory

*Micro-control for Maximum Benefit*

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October 23, 2014

# Sources of Benefit for an Automated Supply Solution

- Reduced Inventory
- Reduced Consumption
- Reduced Labor
- “Neat and Tidy”



# The Language of Optimisation

- Inventory turns
- Days of stock on hand
- Cost of Capital
- Economic Order Quantity
- ABC Analysis

# Economic Order Quantity

The optimum (most financially advantageous) order quantity taking into account such factors as

- Purchase price
- Ordering price
- Inventory holding cost
- Labor cost

$$Q = \operatorname{argmin}_{q=\delta+1.. \infty} \left( \frac{1}{2} (q - \delta - 1) H + ZP(q) \right)$$

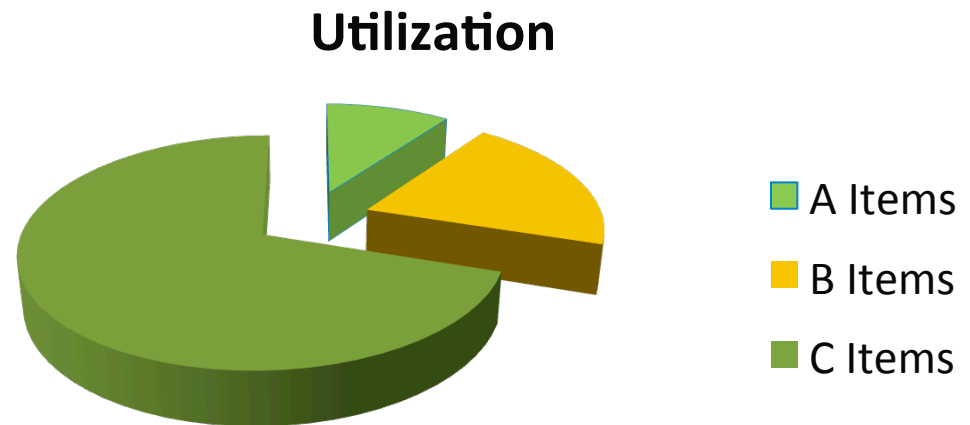
$$Q = \sqrt{\frac{2D_y S}{H_y}}$$

$$C(q) = RH + \frac{1}{2} (q - \delta - 1) H + ZP(q)$$

# ABC Analysis

Technique for segmenting inventory by importance relative to demand and/or cost

- A – Most important, most tightly controlled
- B – Less important, less tightly controlled
- C – Least important, least tightly controlled



# Micro-Control for Maximum Benefit

Using advanced automation technology to permit the application of Best Practices in inventory management and control at the *individual item-location basis*.

ED



ICU



Maternity



Surgery



# Designing a Supply Solution

Your first impression  
will be wrong!





# Designing a Supply Solution



1. Get a list of products
2. Determine re-order frequency
3. Determine anticipated use per re-order period from **Nurses**
4. Identify high-use items from **Nurses**
5. Determine high cost items
6. Make a best-guess ABC analysis from the data provided
7. Ignore current stocking levels!



# Restricting Access to Supplies When Required



OmniCenter -- CONSOLE -- OmniCenter 18.0 Demo

File Edit Security Utilities Help

### Users - View

**General Information**

User ID: JSR Omni User Type: Omnicell Tech  
User Name: John Rosen Server Access: 9 - Senior Omnicell Tech  
Password: \*\*\*\*\* FP Registrar: Yes FP Exempt: ☐  
Language: Eligible Witness: ☒

☐ Server ☒ OmniSupplier Privileges ☐ Item Access ☐ OmniSupplier Access ☐ Assigned Patients  
☐ Smart Mobile Cart ☐ User Biometrics ☐ CSM Roles

Override MO: Yes

Acc Restrict Itm: ☒  
UD Access: ☒  
Web Access: ☒  
PSB Transfer: ☒  
My Items Access: ☐  
PCR Access: ☐

**Zone Access**

Med/Surg: ☒  
Pharmacy: ☒  
Respiratory: ☒  
User Defined 1: ☐  
User Defined 2: ☐

Mag Card ID:

**Record**  
20 of 36  
Commands: 0  
Messages: 0  
View

Modify  
Delete  
Copy  
Add  
Print

09/07/2014 9:36 AM Omnicell John Rosen Log off

# Remote Items vs. Open Supply



## Use Open Supply Only When

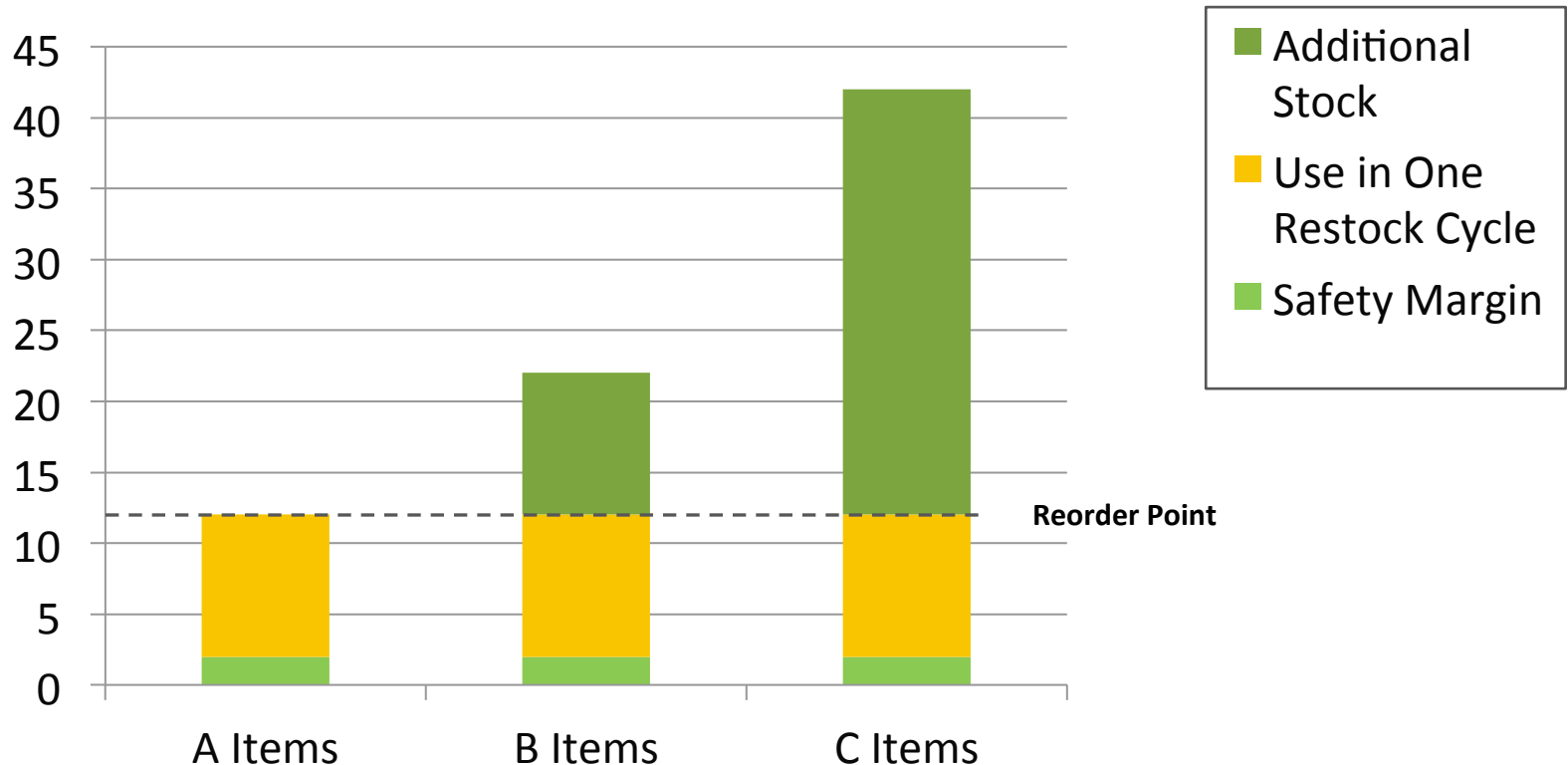
- A closed system is not feasible due to item count or size
- The number of people accessing the Open System is very small
- Compliance is assured

# Electronic Supply Interfaces

- ORD - Orders
- ASN – Advance Ship Notice/Dispatch Notice
- IMU – Item Master Update
- IRC – Item Restock Complete (Receipt)
- REQ – Request Inventory On-hand Levels

# Achieving the Benefit – Inventory Reduction

- Rationally balance Just-In-Time vs. Just-In-Case (Safety Margin)
- Base stock levels/reorder frequency on EOQ and ABC analysis



# Achieving the Benefit – Inventory Reduction

- Periodically make adjustments based on
  - Increased confidence in the technology
  - Seasonal adjustments in usage

## Par vs. Usage Report

Total Qty Used in Period  
Total Transaction Days  
Average Use in Period  
Average Use Per Transaction Day  
Max Use in One Day  
Min Use in One Day  
If Inactive, Last Date Used



# Achieving the Benefit – Sample Inventory Reduction

## Omniceil Hospital Par vs. Usage Analysis - Expected Owned Inventory Changes

61 Days of Data: 5/1/2007 through 6/30/2007

Supplier ID	Current Par Value of Inactive Items	Value of Inactive Items Above Par	Inactive Item Opportunity (1/2 B + C)	Current Par Value of Active Items	Total Current Value	Recommended Par Value, Active Items	Probable Decreases (Excess Stock) - Active Items	Probable Increases (Inadequate Stock) - Active Items	Expected Inventory Value Change	Percent Change
ORVIR1	\$1,838	\$2,255	(\$3,174)	\$56,525	\$60,618	\$24,739	(\$31,786)		(\$34,960)	-57.7%
ORVIR2	\$4,195	\$451	(\$2,549)	\$18,282	\$22,928	\$12,923	(\$5,359)		(\$7,907)	-34.5%
ORVIR3	\$10,214	\$2,047	(\$7,153)	\$19,455	\$31,715	\$11,907	(\$7,548)		(\$14,701)	-46.4%
ORVIR4	\$264,633	\$31,539	(\$163,855)	\$228,411	\$524,583	\$175,265	(\$53,146)		(\$217,001)	-41.4%
ORVIRSTRM	\$213,825	\$24,795	(\$131,707)	\$144,781	\$383,401	\$120,076	(\$24,705)		(\$156,412)	-40.8%
OSRHS809A	\$4,715	\$361	(\$2,718)	\$20,541	\$25,617	\$6,078	(\$14,463)		(\$17,181)	-67.1%
OSUDNLD	\$1,166	\$627	(\$1,210)	\$21,765	\$23,558	\$10,210	(\$11,555)		(\$12,765)	-54.2%
OSUDNLD1	\$5,022	\$1,560	(\$4,071)	\$5,267	\$11,849	\$2,484	(\$2,783)		(\$6,854)	-57.8%
OSUDNSIA	\$193	\$76	(\$173)	\$7,459	\$7,728	\$4,925	(\$2,534)		(\$2,706)	-35.0%
OSUDNSIB	\$1,502	\$38	(\$789)	\$26,969	\$28,509	\$20,383	(\$6,586)		(\$7,375)	-25.9%
OSUDNSID	\$5,387	\$2,656	(\$5,349)	\$31,865	\$39,908	\$12,942	(\$18,923)		(\$24,273)	-60.8%
OSUDNSIE	\$4,484	\$480	(\$2,722)	\$8,936	\$13,900	\$3,298	(\$5,638)		(\$8,360)	-60.1%
OSURH11E1	\$1,552	\$931	(\$1,707)	\$8,980	\$11,463	\$4,911	(\$4,069)		(\$5,776)	-50.4%
OSURHMI	\$2,962	\$562	(\$2,043)	\$22,001	\$25,525	\$9,750	(\$12,252)		(\$14,295)	-56.0%
<b>Total</b>	<b>\$521,687</b>	<b>\$68,377</b>	<b>(\$329,221)</b>	<b>\$621,237</b>	<b>\$1,211,302</b>	<b>\$419,891</b>	<b>(\$201,346)</b>	<b>\$0</b>	<b>(\$530,567)</b>	<b>-43.8%</b>

# Achieving the Benefit – Consumption Reduction (recurring)

- Control for diversion
  - Track supplies to patient - Floorstock report
  - Null transaction report
  - Utilization by User report
- Reduction in expiry losses through inventory reduction
- Best practice utilization through comparative analysis (care giver vs. care giver)
- Cost-of-capital reduction as a recurring savings

# Achieving the Benefit – Labor Reduction

- **Ordering** – Who counts? How often? How long does it take?
- **Stocking** – Who stocks? How often? How long does it take?
- **Stock-take** – Who counts? How often? How long does it take?
- **Accounting** – Three-way match program (optional)

# Manually Count Open Par Locations

Now that's  
**Smart.**

# Manually count Count Open Par Locations

Now that's  
**Smart.**

Manually Count Open Supply Locations		Perpetual Inventory Closed Locations	
Step 1	Travel to Customer Location		
Step 2	Count and record items that appear low		
Step 3	Key needed items into MMIS		
Step 4	Generate Picklist in Warehouse Sequence		
Step 5	Pick Items	Pick Items	
Step 6	Deliver Items	Deliver Items	
Step 7	Put Items Away	Put Away Items including Non-Stock	
Step 8	Repeat Delivery and get signatures for Non-Stock		
Benchmark time <b>50 minutes per 50 Items Restocked</b>		<b>5-6 Minutes per 50 Items Restocked</b>	

# Use a Scanner to Count Open Par Locations

Now that's  
**Smart.**

Barcode Inventory Open Supply Locations		Perpetual Inventory Closed Locations	
Step 1	Travel to Customer Location		
Step 2	Scan and enter quantity for items that appear low		
Step 3	Upload		
Step 4	Generate Picklist in Warehouse Sequence		
Step 5	Pick Items	Pick Items	
Step 6	Deliver Items	Deliver Items	
Step 7	Put Items Away	Put Away Items including Non-Stock	
Step 8	Repeat Delivery and get signatures for Non-Stock		
Benchmark time <b>40 minutes per 50 Items Restocked</b>		<b>5-6 Minutes per 50 Items Restocked</b>	



## “Neat and Tidy” – a Financial Benefit?

*“The business case also assumed clinical time would be saved by reducing picking time from an estimate of **63 seconds** to a target of **17 seconds**. Data from Smart Store shows that across the 103 live systems the actual average picking time is **20.43 seconds** and so broadly in line with the business case estimate which equates to an estimated **101,000 hrs** [annually] saved once the system is fully rolled out.”*

*Smart Store Project Benefits Realisation – Initial Findings  
David Lawson, Director of Procurement  
1 September 2009*

## Does It Work?

- **Bassetlaw Hospital** (UK) identified an inventory reduction potential of 43% in one theatre and anaesthetic room during a trial as well as an annualized time savings of 733 hours.
- **Milton Keynes Hospital** (UK) – a “well run” radiology department identified potential inventory savings of 20% in non-moving and slow-moving inventory.
- **Countess of Chester Hospital** (UK) identified a consumption reduction of 23.4% per patient in theatre supplies and an annualized savings of 832 labor hours.

## Does It Work?

- **Guy's and St. Thomas' Foundation Trust (UK)** full house implementation identified after 9 months:
  - 100% Return on Investment from inventory reductions alone.
  - Approximately 4 to 8 hours of labor savings per Operating Theatre per week in clinical time not having to manage supply ordering
  - Accurate Patient-Level-Costing achieved for 97% of utilization

# What Can Go Wrong?

- Inadequate nurse involvement
- Inadequate setting of expectations regarding requirement for staff engagement during installation
- Failure to properly position the project as a workflow re-engineering activity
- (Sometimes) Inadequate bulk-break process to support Low-Unit-of-Measure
- The Knowing – Doing Gap\*

\* *by Jeffrey Pfeffer and Robert I. Sutton, Harvard Business School Press*

# Questions

