

Review of IDR Inventory Control Processes and Implementation of Procedures to Minimize Future Discrepancies



Submitted by Karen Young



**A case study presentation from
the ASQ Healthcare Division:
www.asq.org/health.**

Copyright © 2009, Karen Young.
Used with permission.

Submit your own case study

to be considered for publication.

What other content would you like to see
on the Healthcare Division site? **Let us know!**



About the Organization

- Materials management division of a large university health system.
- System includes 900-bed hospital, a level-one trauma center, nine neighborhood health centers, and two medical schools.
- Materials management division mission: To meet the supply needs of the health system in the most efficient, expedient, and cost-effective manner by providing proficient, professional, and productive customer service.



The Project Team

- Champions: CEO and VP, Materials Management
- Team:
 - Certified Six Sigma Black Belt (ASQ), team leader
 - Director of operations, Materials Management
 - Inventory control manager, Materials Management
 - Information systems coordinator, Materials Management
 - Operations manager, Materials Management
 - Operations manager, Primary Vendor



The Problem

- **Business case: Inventory distribution and receiving (IDR)**
 - IDR fill rates fell to 32 percent below the minimum customer requirement of 98 percent.
 - There was no clearly defined inventory control procedure.
 - An independent audit revealed a significant discrepancy in the inventory recorded in the general ledger and the actual IDR inventory on hand.
 - The auditors recommended that management review processes related to IDR inventory control and implement procedures to decrease opportunities for future discrepancies.

The Problem (cont'd.)

- Problem statement:
 - IDR fill rates for the past three months averaged 66 percent complete for the more than 22,000 lines ordered in ProClick during that time period.
 - The top 20 percent of the “stock out” inventory items accounted for more than 80 percent of the unfilled lines.



Project Goals

- Initiate a more efficient process of tracking supplies from point of order to final distribution.
- Establish “just-in-time” inventory maintenance and delivery schedule.
- Reorganize the stockroom and identify “par” levels to adequately meet required support demands.
- Eliminate the cost of noncompliance within the Pyxis process.
- Increase fill rates for all orders received to 98 percent or better within six months.



Root Cause Analysis

- The project required the efforts of a six-member team and 12 to 15 inventory technicians and lasted approximately 11 months.
- First the team assessed the voice of the customer to determine training, cycle time, resource, budget, and service-level needs and requirements. Survey results indicated that:
 - The just-in-time process was not capable of meeting demand or demand was not accurately being captured.
 - The on-hand storeroom inventory seemed excessive considering the just-in-time process was set up to restock the Pyxis units six nights per week.

Root Cause Analysis (cont'd.)

- Next the team used “cause-and-effect” and “five whys” to help identify opportunities to optimize the just-in-time process and reduce storeroom SKUs for noncritical pipeline items. A key finding was:
 - The significant impact of “end-user” noncompliant behavior was an unexpected cause of many of the demand discrepancies.

Addressing Root Causes

Actions taken to address the root causes of the problems:

- Write standard operating procedures for key process inputs in each department
 - Conduct annual review of procedures by management and staff
 - Store each department's procedure manual on a shared drive
 - Place a copy at the work site
- Reduce storeroom inventory by 100 items every two weeks
 - Total reduction 1,154 items
 - Phase 1 reduction – 551 items
 - Phase 2 reduction – 603 items
 - Monitor vendor fill rates for each group
- ABC inventory cycle count
 - Organize and label shelves
 - Input product locations in ProClick
 - Print and update daily counts



Addressing Root Causes (cont'd.)

Actions taken to address the root causes of the problems:

- Staff development
 - Supply chain continuing education and in-house training
 - Training checklists
 - Annual competency assessment tests (open book)
- Shipment validation
 - Check shipment quantities and descriptions for accuracy upon arrival
 - Update receipt of orders in real time
 - Process discrepancies in real time
- Communication
 - Establish interdepartmental communication protocols
 - Identify cross-functional interdependencies
 - Create algorithm flowcharts
 - Use problem logs
- Measurement system
 - Monitor key performance indicators
 - Measure customer satisfaction after each service call



Return on Investment

The reorganization of Central Supply ultimately will promote an annual savings of 30–55 percent through:

- Reduction of storage of excessive inventory
- Closure of warehouse (rental fees)
- Return of leased Penske truck
- Transfer of outpatient insured patients' supplies to rotational home health agencies
- Hoarding of supplies throughout the health system



Return on Investment (cont'd.)

Project outcomes:

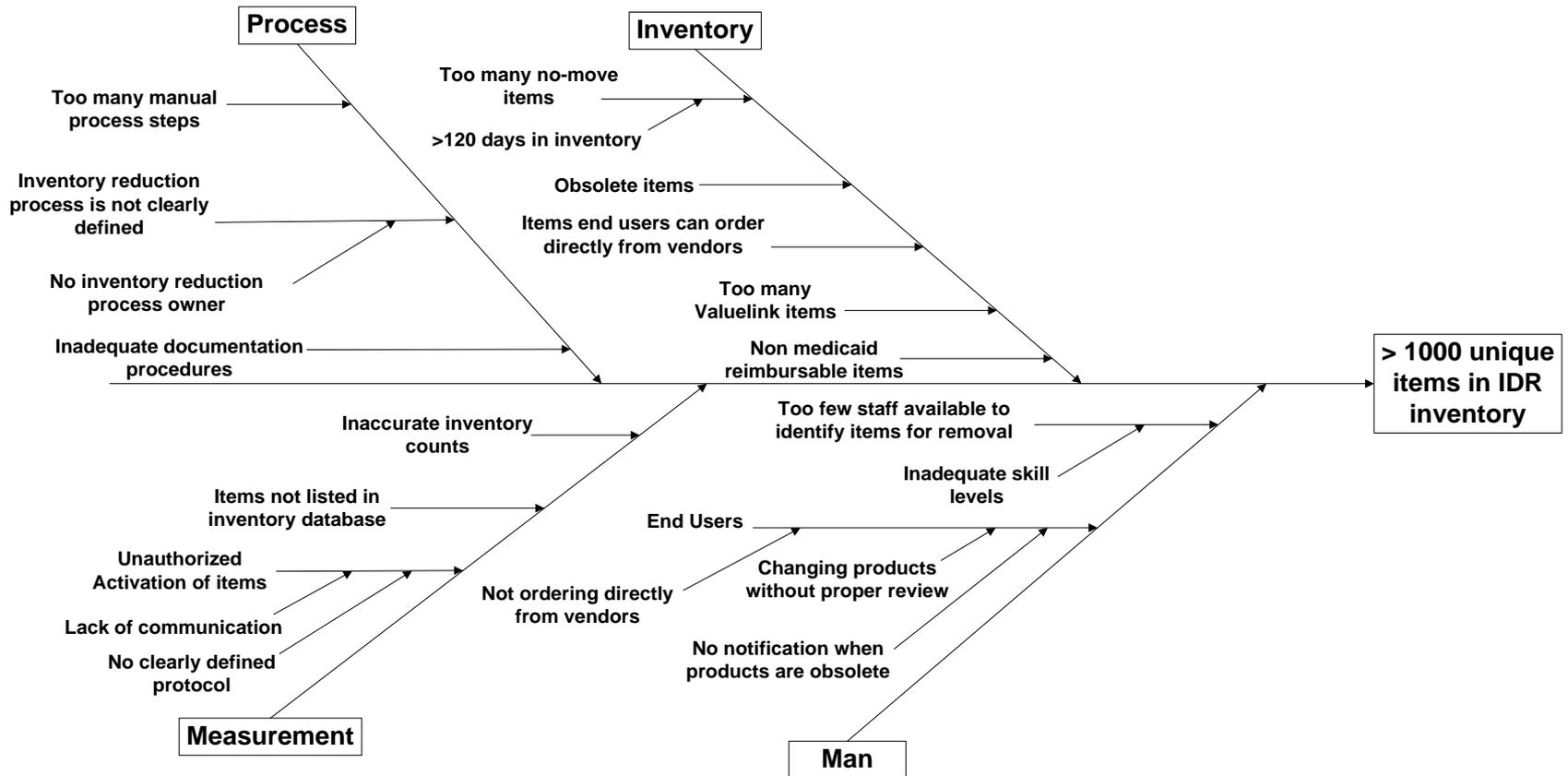
- Fill rates increased from 62 percent to 91 percent during the project life cycle.
- Inventory reduction opportunity valued at \$20,000,000.
- Lost charges due to end-user noncompliance reduced from an average of \$7,000 per day to \$2,200 per day (\$1,752,000 per year).
- Twelve-month, three-phase post-project implementation plan, including process control measurement system.



Monitoring and Evaluating Over Time

- Process performance was monitored using Median, X-bar, and S charts of “fill rates” and Pareto charts of “noncompliant” cost centers and vendors of “stock-out” items.
- A measurement system protocol was put in place to capture key process variable data.
- Metrics aligned with strategic goals, the purpose of the measure defined, success indicators identified and each metric was assigned a process owner(s).

Cause and Effect Diagram



Root Cause Analysis – Inventory Reduction

Inventory

- Why are there > 1000 unique items in the storeroom inventory database?
- Why are there too many discontinued, no-move, non-reimbursable, non-outpatient Valuelink and multiple SKU items in the storeroom?
- Why are the inventory records not updated regularly?
- Why are there no clearly defined protocols for the identification and removal of non-mission critical items from the storeroom?
- Why is there no process owner for the design and implementation of these protocols?

Process

- Why is the inventory control process inefficient?
- Why are there too many manual process steps?
- Why is there inadequate use of existing ProClick functions and other inventory control technologies?
- Why are there not more required trainings to expand staff skill levels?
- Why are there no documented competency evaluations to assess training needs and post-training effectiveness?
- Why is there no process owner for the design and implementation of a staff development program?



Root Cause Analysis – Inventory Reduction

SOLUTIONS

- **Inventory**
 - ABC Analysis cycle count
 - Reduce on-hand SKUs by ≥ 45 percent
 - Identify items for Valuelink- JIT
 - Identify items for vendor buy-back
- **Staff Development**
 - SOP manuals at the workbench
 - Quick-reference flip charts
 - Supply chain in-services
 - Training checklists and competency assessment documents
 - Regular staff meetings
- **Processes**
 - Quarterly inventory needs assessment
 - Reimbursement criteria review
 - Customer satisfaction review
 - Strengthen GHS-vendor partnerships and lines of communication
- **Approval Protocols**
 - Inventory status change authorization
 - Inventory addition authorization
 - SOP change authorization



Inventory Reduction Opportunities

PHASE 1

\$4,535,146.45 Annual dollar usage

\$1,587,301.22 Carrying costs (35%)

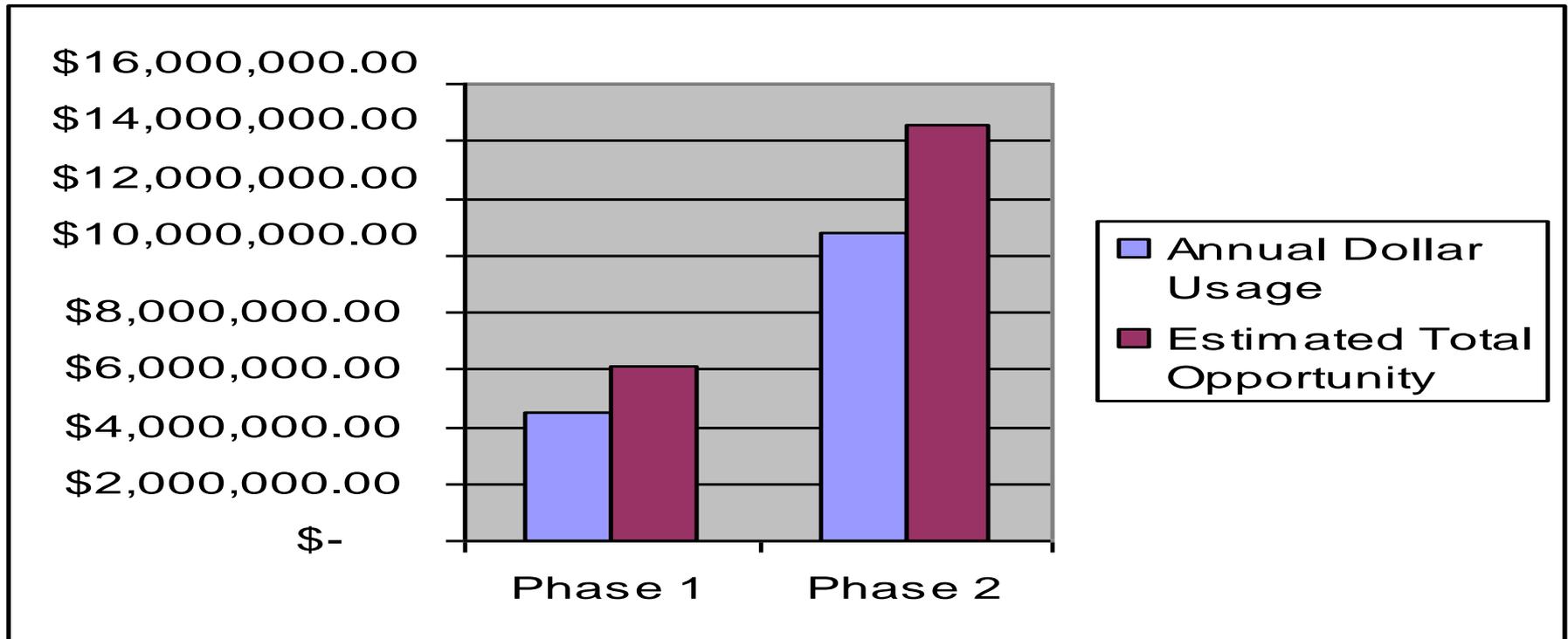
\$6,122,447.57 Inventory reduction opportunity

PHASE 2

\$10,769,648.96 Annual dollar usage

\$ 3,769,377.14 Carrying costs (35%)

\$14,539,026.10 Inventory reduction opportunity



Cost of Noncompliance

- "Invalid Patients" is a daily report detailing charges lost due to failure to reconcile temporary patients or by selecting "floor stock" as patient for chargeable items.
- "Charge Reconciliation" is a daily report detailing all transactions sent from Pyxis. This report is used to reconcile patient billing records.
- "Inventory Discrepancy" is a weekly report and is defined as any time the expected count of an item differs from the actual count. Controlling discrepancies is a central goal of the Pyxis automation team.
- All reports are transmitted to senior management and clinical managers of all areas with Pyxis stations.



Measurement System

Metric	Purpose	Success Indicator	Process Owner
1. Vendor monthly fill rate.	To determine if customer specifications are being met.	Monthly mean fill rate >98.5% and median fill rate >99.0%.	Vendor OM
2. Pareto Analysis of Unfilled Items list.	To identify problems with UOI, Par levels, ROP, or suppliers.	Monthly Unfilled Items rate <1.5%.	Inventory Control Manager /Central Sterile Manager
3. Pyxis daily compliance report.	To identify sources of end user non-compliance and associated costs.	Pyxis units with >95% compliance and <2% null transactions.	IS Coordinator
4. IDR monthly fill rate report.	To identify problems with stock outs, staffing, and suppliers.	Monthly mean fill rate >98.5% and median fill rate >99.0%.	Inventory Control Manager
5. Pyxis unit daily refill cycle time report.	To identify sources of non-compliance with customer requirements.	All Pyxis units filled by 7:00am.	IS Coordinator
6. Pyxis monthly fill rate.	To identify problems with PAR levels, triggers and discrepancies.	Monthly mean fill rate >98.5% and median fill rate >99.0%.	IS Coordinator
7. Pyxis re-order monthly report.	To monitor JIT objectives and PAR levels.	Re-order triggers <72 hours per item.	Vendor OM
8. Central Sterile monthly fill rate.	To identify problems with stock outs, staffing, and suppliers.	Monthly mean fill rate >98.5% and median fill rate >99.0%.	Central Sterile Manager

Relationships of Requirements and Capabilities

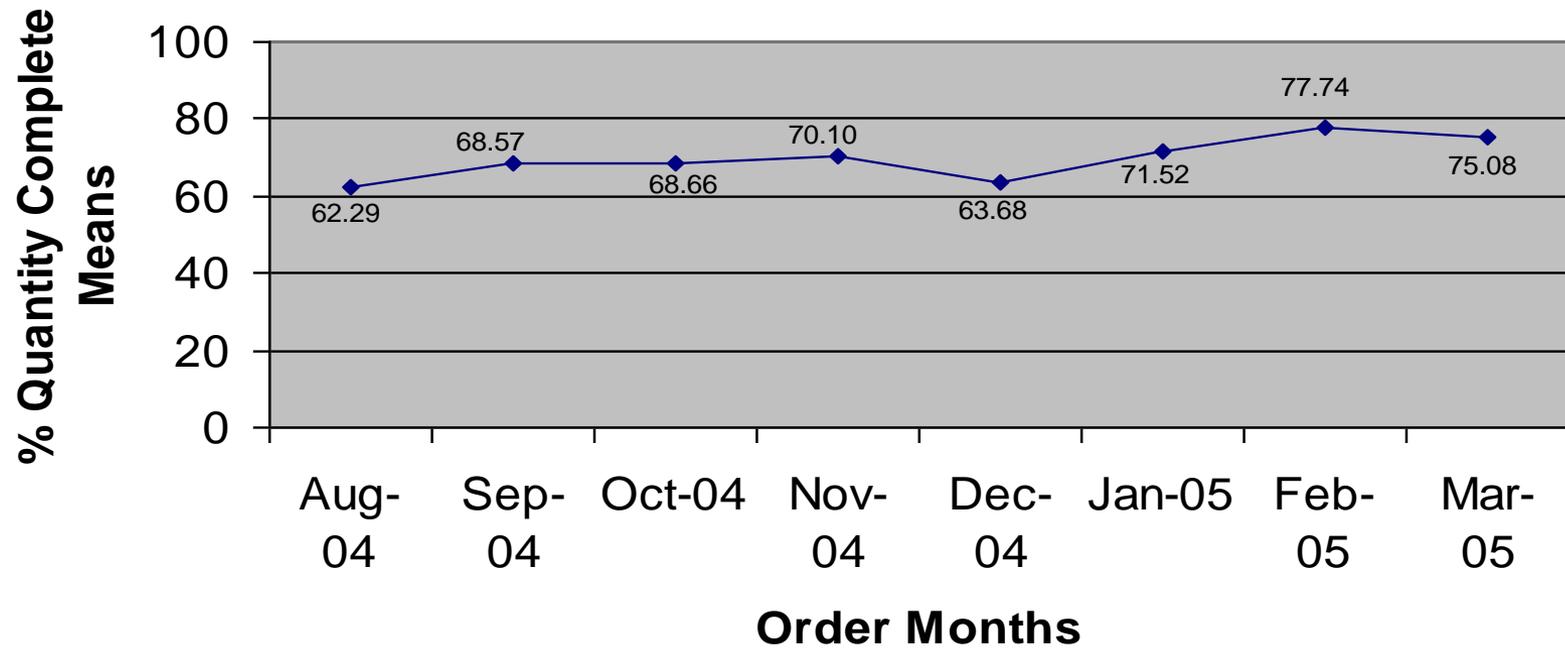
Interaction Key	
Strong Positive	PP
Positive	P
Negative	N
Strong Negative	NN

HOW WHAT									
		Create Customer Service Department	Evaluate Par Levels	Monitor and Update Product Information In Proclick	Assess Voice of Customer Quarterly	Design Cycle Count Process for Pyxis and Par Carts	Provide Inventory Usage and Compliance Reports to Customers	Re-allocate personnel	Training Programs and Competency Assessment
Adequate supplies on the units	10	3(30)	9(90)	1(10)	3(30)	9(90)	9(90)	0(0)	3(30)
Daily replenishment to par levels	8	3(24)	9(72)	0(0)	0(0)	9(72)	0(0)	0(0)	0(0)
Better customer service	7	9(63)	0(0)	9(64)	9(63)	3(21)	9(63)	9(63)	3(21)
Better emergency request response times	6	9(54)	0(0)	3(18)	9(54)	3(18)	3(18)	3(18)	3(18)
Adequate staff to handle customer needs	5	9(45)	3(15)	0(0)	9(45)	0(0)	1(5)	9(45)	3(15)
Decrease back order occurrences	4	1(4)	3(12)	9(36)	0(0)	9(36)	9(36)	0(0)	0(0)
Accurate delivery service	3	3(9)	0(0)	9(27)	0(0)	0(0)	0(0)	3(9)	1(3)
Accurate product numbers in Proclick	2	1(2)	0(0)	9(18)	0(0)	0(0)	0(0)	0(0)	1(2)
Better monitoring of supply levels	1	1(1)	9(9)	3(3)	0(0)	9(9)	9(9)	0(0)	0(0)
TOTALS		232	198	176	192	246	221	135	89

Correlation Key	
Strong	9
Moderate	3
Weak	1
No	0

Monthly Fill Rates

Materials Management Monthly Fill Rates



For More Information

- More case study presentations are available from the ASQ Healthcare Division:
www.asq.org/health/quality-information/library.
- Read healthcare case study articles from ASQ:
www.asq.org/healthcare-use/why-quality/case-studies.html.
- To find articles, books, courses, and other resources on healthcare quality, search the ASQ Knowledge Center:
www.asq.org/knowledge-center/search.

