Achieving Healthy Material Management

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How to manage and maintain a streamlined, efficient supply chain within a hospital or healthcare system

The case and mission

One of the many hidden challenges in hospital systems is to ensure that all required supplies are available at the right time, in the right quantity and in the right locations. To secure uninterrupted patient care and make sure that items are readily and easily available, clinical care staff invest significant manpower in a wide range of material management tasks, including purchasing, stocking, searching and counting inventories. An optimum supply chain which utilizes modern technology and centralized distribution will help to minimize costs throughout the medical system and improve access to care. This article examines how to go about achieving this.

The need for change

A typical situation: a patient admitted to the ED requires immediate care. Physicians, nurses, and techs use up considerable supplies in an attempt to diagnose the issue. More than often, these supplies are pulled from cupboards, storage carts, and/or supply rooms around the unit. If the required item is not found where expected, frenzied "hunting and gathering" begins. The criticality of the diagnosis and experience of staff usually determines the extent and length of the search performed. In an effort to play safe and avoid a repeat situation, staff often call the stockroom to request even higher quantities of the items in question. These are then "hidden" in certain places throughout the unit by individual staff, without the general knowledge of other colleagues, to prevent intercollegial "pilfering". Over time, inventory levels increase in multiple storage locations and no one knows exactly how much of what is stored or where. The storeroom orders and stores more of these products to replenish all internal "stockpiles". However, inventory visibility is limited or non-existent and supplies occupy valuable hospital space. Although, at the end of the year, inventory reconciliation does reduce these stocks to a certain amount, this then causes knock-on shortages later on, which fuel the vicious cycle from anew. Multiply this process and cycle across the different departments and chaos is programmed,

fired on by the behind-the-scenes work of the materials group to safeguard an uninterrupted service to all units.

Why does all of this happen? What are the drivers behind inconsistency and waste? How can this behavior pattern be minimized?

Optimizing your healthcare system's materials management can only be a single step in a comprehensive supply chain initiative but it remains a vital one. The first and most important task is to streamline supply processes in order to understand inventory behavior and create visibility. An efficiently managed and traceable supply chain enables the hospital to boost patient satisfaction, quality of care, ease of access and, as a result, positive returns.

Challenges faced by clinics

Many hospitals try to maintain an internal hub-and-spoke model. They have a central warehouse (the hub) for daily purchasing, goods receipt, put-away, counting, and picking for delivery. This then supplies multiple storage locations (spokes) of varying size and type (cupboard, cart, bin, desk etc.) which employ random methods of requesting refills. Eliminating these different "spokes" and replacing them with a supplier to point-of-use distribution model promises to enhance supply chain efficiency. However, before this can be implemented, we need to thoroughly understand the strengths and weaknesses of the current material management situation. Common issues include:

High spend with zero accountability and control:

State-of-the-art inventory management systems which automate the inventory reconciliation and visibility process remain a scarcity in the healthcare industry. The amount of work performed by material management groups to maintain correct par levels and avoid supply shortages at hospitals is monumental and often archaic. Spending is generally controlled anecdotally and based on legacy comfort levels. With physical inventory checks not being made on a regular basis throughout the year, there is no actual knowledge of how much inventory value exists at a single point in time.

Poor inventory visibility due to lack of data systems and capturing:

It is virtually impossible to easily trace product usage and inventory levels are usually much higher than actually needed, thus creating an undesirable cost burden.

Manually driven processes:

On-hand stocks are usually controlled manually by sending waves of material management staff around the clinic each day, to count individual products and generate the orders needed to keep stocks replenished for that day. Par levels are therefore rough estimates consisting of a "best guess" or visual scan. The time required to complete these activities on a daily basis necessitates a large labor force to speed up data turnaround.

Lack of tools and standard work processes:

If the patient census spikes or changes behavior, the quick fix is to call the storeroom and have the supplies delivered to where they are depleted. As this occurs frequently and without a forecast, locations are commonly overstocked to ensure that staff have all materials readily available, to prevent reactionary calls and "fire-fights". Because patient care is the first and main concern, individual departments have developed their own contingency methods to mitigate the risk of inventory shortages. Acting as the "supplier" to these internal customers, the material management group usually complies with departmental requests and has little or no visibility to validate the actual usage within that department. The result is a multitude of hidden processes that foster the growth of inventory and special handling procedures. The larger a hospital system is, the more disparate the methods of operation become.

Tackling the challenges

The operational excellence methods used to discover the best inventory control system and distribution model within a hospital or healthcare network range from simple and inexpensive to complex and costly. Decisions in favor of any one approach require that the issue is tackled across the board by supply chain and clinical leadership. Four of the elemental concepts which form a foundation for continuous improvements are illustrated below:

5S

5S is one of the fundamental principles of a lean environment; therefore a very critical step towards an effective materials management system. 5S is a principle of waste elimination through workplace organization.
The fives "S"s stand for:

■   Sort: The basic housekeeping step of sorting a work area/storeroom/par location/etc. to remove all unnecessary items unrelated to the function of that area. For example, a medical supply room should have all the materials required to replenish the area(s) assigned to it. It does not need to stock printer cartridges or old IV pumps. These are considered to be "waste" for that specific area.

■   Set: Once all waste has been removed, the remaining items need to be organized. "Setting" covers the grouping of supplies by type or amount of usage and labeling/assigning a specific location for them. This step has only been completed once the area has become self-explanatory; anyone should be able to enter this work area and understand what goes where.

■   Shine: Now that the unnecessary items and materials have been removed and everything has an identified, assigned location, it's time to clean the area to establish the baseline expectation. This baseline describes the basic layout which this area should maintain so that when some-

thing is out of place or an unrelated item comes into the area, it can be easily identified and removed.

■   Standardize: This step involves educating staff about the new work area and replicating this throughout a unit/department/system.

■   Sustain: In order to maintain the benefits and efficiency created from an effectively designed work area, audits must be performed to ensure and enforce compliance with the baseline expectations.

Par Level Balancing

Par level balancing, aka inventory level balancing, is the process of matching stock levels to actual demand. Instead of using anecdotal "gut-feeling" logic to determine the right amount of supplies, par level balancing uses actual consumption data. This data should be captured over at least 12 months to visualize any seasonal or cyclical patterns. The process of setting par levels should be a cross-functional effort between the materials management and clinical staff, and should consider lead times, usage unit-of-measure, service level expectations etc.
Par level balancing and 5S can be performed simultaneously to expedite the implementation. However, par level balancing is highly data intensive and time consuming, due to the many thousands of items that typically need to be examined. Furthermore, if there is no electronic data, the process can be even lengthier as information will need to be gathered from the manual paperwork.

Consolidating storage locations

5S often reveals multiple storage locations for the same item. As par balancing is performed parallel to this, it is vital to define the cause for duplicate (or multiple) stocks if the right par level at the correct location is to be achieved. Unfortunately, some storage locations are a direct result of "hoarding" by clinical staff and nurses to hedge against the risk of supply shortages.

These excess supplies pose an unnecessary cost burden when items expire and/or get recalled. Therefore, an accurate inventory location list, clearly documented unit needs, and replenishment times (i.e. when can the unit be stocked without interrupting regular operations) is paramount when consolidating storage locations.

On the other hand, eliminations of multiple stores should never sub-optimize the holistic supply chain by putting a strain on particular areas. The goal is to carefully analyze the cycle of unit need, material flow and replenishment, and manpower requirements in order to arrive at the optimum balance. Teaming with clinical staff from the various departments and nursing units is the most effective method for arriving at the best decision. Although this task should become an integral part of the continuous improvement focus at the hospital, the initial cuts should not go too deep as this could foster supply hording, leading to higher costs and making the change procedure more difficult to realize.

Automation & Technology

Leveraging technology to automate material management activities not only provides inventory and data visibility but also promotes far-reaching changes to the whole supply chain system, with great potential for future benefits and efficiency improvement.

Understand Consumption

First and foremost, we need to know and understand the product usage throughout the clinic. Consumption velocities and quantities must be defined for all areas of the hospital, to ensure that we are reflecting patient needs and not just staff behavior.

Define the Technology

There are several technology solutions available for monitoring and controlling inventory. The hospital infrastructure, both data and logistics, will weigh heavily in the choice of which solution to pursue. Another key decision point is how the specific technology will interface with the current ERP and billing systems.

RFID (Radio-Frequency Identification)
Uses a tag applied to each product and an extensive monitoring system to track the movement and consumption of supplies. The main benefit of this system is that it is hands-free and requires no human intervention throughout the product usage life-cycle. A major drawback is that the RF tags add an additional cost to each of the products and the capital requirements for the system infrastructure are substantial.

Bar codes
Uses an applied bar code (defined by the system) to track and monitor product usage. Although the cost to implement is cheaper than the RFID system, this approach relies on human input, the activity of scanning each item as it is picked/replenished/consumed. This typically places responsibility on the clinical staff.

ARS or Automated Requisition Systems
This system uses bins and scales to determine how much of a product is in a specific location and automatically increments/decrements the ERP system as the product is moved. No human interaction is needed (unless for billable products) as the scales are programmed with each product's weight. This system is comparatively inexpensive, similar to bar codes, and changes

can be made quickly. However, it does require human monitoring and product accuracy. For example, if a 2x2 gauze pad is placed in the 4x4 bin, the system will only know the weight and not the product type.

ADM or Auto Dispensing Machine
Cabinets similar to Pyxis systems offer more security than other systems, but are a high cost solution with limited storage space.

Kanban
A concept related to lean and just-in-time (JIT) production, where a signal triggers a pull system action. Historically, paper or stock cards are used as the signal when an item is needed. As a bin becomes empty, this card becomes visible and is taken by a material handler and used as the order for that specific location and item. Unfortunately, there is significant manual resource needs to ensure cards are correct, updated, and are replaced if lost.

All these solutions can interface with ERP systems to provide inventory data and visibility throughout a hospital. Apart from the wealth of knowledge available from data visibility, the main benefit is eliminating the need for material management and clinical staff to track and manage inventory; this is now performed autonomously in real-time.

How the ERP System works:

Finance Resource Management (FRM)

Manufacturing Resource Planning (MRP)

Supply Chain Management (SCM)

ERP System

Customer Relationship Management (CRM)

Human Resources Management (HRM)

The benefits of changing in the long run

Applying the above methods as part of a holistic supply chain program will generate far reaching and multi-dimensional benefits. Ensuring that hospital staff have what they need, in the quantities they need, when and where they need it enhances care and patient access, while lowering costs. This process abolishes variability and creates standardization, which then, in turn, increases staff and patient satisfaction, while eliminating the daily chaos of non-value added activities, such as supply searches. Staff enjoy more face time with patients, which boosts patient satisfaction and enables nurses to spend more time on patient-specific activities like charting and discharge coordination, ultimately reducing a patient's LOS. In conjunction, par level balancing and automation technology provides greater control over inventory utilization and money spent by enhancing the visibility of usage and reducing on-hand product levels without jeopardizing quality of care standards.

Visibility and control of hospital materials opens the door for more opportunities up the supply chain. Leveraging a centralized distribution system can minimize the amount of warehousing activities taking place within a hospital. Point-of-use deliveries to the hospital dock can be made instead of sorting and picking from the hospital warehouse. In larger healthcare systems, the benefits increase by optimizing labor within the warehouse to include picking point-of-use containers for multiple hospitals concurrently. In this case, hospital material management only needs to replenish the storage fronts. It is possible to achieve total supply chain automation at hospitals by eliminating counting and picking.

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