The Clinically Integrated Supply Chain

Improving Safety, Traceability, and Value

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INTRODUCTION

As costs rise globally throughout the healthcare industry, hospitals must search for new opportunities to reduce cost while improving care. One important and often undermanaged area is getting closer scrutiny: healthcare supply chains. A recent study found that hospitals collectively could save more than US$25 billion a year by eliminating unnecessary supply chain costs overall.\(^1\)

In particular, clinical inventories—the stents, catheters, and various medical device implants and supplies used in operating rooms and other procedural areas—rarely take advantage of modern supply chain techniques that can reduce excess, obsolescence, and shortages.

Even more important is the need to improve patient safety. Over 18,000 class II and III medical devices have been recalled since 2012.\(^2\) In the event of a recall, most hospitals struggle to identify what they have on hand, and which patients have been impacted. If recalled, an implanted device may not need to be removed, but other follow-up care may be required for the affected patients.

Fortunately, hospitals have proven options for gaining greater visibility and cost reduction from clinical supplies while also improving safety. This white paper explains the drivers and essential steps hospitals can take to enable a clinically integrated, patient-centered supply chain.
THE COMPLEX WEB OF HEALTHCARE SUPPLY CHAINS

Inventory management in healthcare is unique and actually consists of multiple supply chains, each with individual challenges, processes, and levels of maturity as summarized below.

- **Medical/surgical.** These are low-cost, high-volume/high-velocity items used throughout the hospital, e.g., bandages, exam gloves, and patient care kits. Medical/surgical items are typically considered commodities, basic necessities for daily patient care.

- **Pharmacy.** Hospital pharmacies maintain the right levels of valuable medications and also help the departments follow complex and highly regulated processes for procuring, managing, and tracking these supplies.

- **Clinical preference items (owned).** These are typically high-cost implantable medical devices and items involved in specific clinical procedures kept on hand in the clinical department storeroom. Their purchase and use is often dictated by physicians and/or value analysis committees and managed by clinical department inventory coordinators.

- **Trunk stock/loaner trays.** These are items brought into the operating theater by the manufacturer’s rep for each patient case as requested by the physician and are not stocked in inventory, but billed for each item upon use.

- **Consignment.** These items are financially owned by the manufacturer/vendor with which a hospital or department has a consignment agreement. As part of such agreement, consigned items must be replenished to the levels defined in the agreement. The hospital pays only upon replenishment.

- **Prosthetics.** A prosthesis may be either an implant, such as a joint replacement, or removable, such as an artificial leg or hand. Orthopedic prosthetics are largely based on individual surgeon preference on a case-by-case basis. Multiple suppliers may exist across trauma, micro plating, and spinal surgery, with little history available.

- **Medical equipment.** These are assets procured for use across the hospital, or in specific clinical departments, which are subject to depreciation, such as imaging equipment and patient monitors.
THE CASE FOR TRANSFORMATION

To reap the greatest rewards, healthcare must ultimately manage these areas holistically, leveraging the expertise of clinical inventory coordinators, central procurement, and physicians. The criticality of supply chain and the need for its transformation are apparent when considering the following drivers.

Rising global healthcare costs. The need to reduce cost and waste is critical; however, administrators must balance improvement strategies with the ability to ensure the availability and high quality of medical supplies and devices.

Proliferation of new medical devices. Hospitals see a growing wave of new and redesigned medical devices that must be evaluated, procured, and tracked with the latest part numbers.

Impact on profitability. Poor inventory management directly affects hospitals’ ability to achieve their profitability and patient-care objectives. All hospitals are impacted, but those with busy surgical and interventional departments, such as catheterization labs, interventional radiology, electrophysiology, and gastrointestinal/endoscopy, are areas where the majority of supply expenses occur, and where supplies are essential to the patient-care process.

Recalls and patient safety. With the increase of medical device recalls, locating items still on hand as well as notifying patients can be overwhelming for most hospital systems. Though unique device identifiers (UDI) are a huge step forward, finding this information across multiple electronic health record systems, original orders, and stocks buried in storerooms presents tremendous safety risks.

Patient acuity. Aging patient populations bring higher volumes of chronically and critically ill people into hospitals, which must contend with more complex care plans and associated costs. To contain these growing expenses, administrators are looking to optimize supply chain for all departments.

Consumerism. In response to consumer demand for more convenient care, providers are moving closer to the patient and opening new locations that bring care into the community. Urgent care,
specialty clinics, and outpatient surgery centers help meet today’s competitive pressures, but expose new challenges for managing supplies that reside separately from primary hospital facilities.

**Figure 1: Supply Chain Across the Continuum of Care.**

**BECOMING PATIENT CENTERED**

It is important to remember that a successful supply chain transformation must keep the patient at the center of all activities.

As outlined by the National Academy of Medicine (NAM) a number of years ago, a healthcare system that achieves major gains in six key areas—safety, effectiveness, timeliness, efficiency, equity, and becoming patient centered—would be far better at meeting patient needs.

There is much evidence that supports the fact that patient-centered care improves outcomes. The opportunity exists to translate these NAM concepts directly into supply chain management, and move beyond the traditional procurement, contracting, and replenishment activities.

Supply chain is also evolving to support patients across the entire **continuum of care**. This is a strategic move by providers designed to improve access to care, and get closer to the patient with new, smaller locations that offer services usually only found in larger hospital settings. These types of facilities include urgent care, ambulatory care clinics, post-acute rehabilitation, and dialysis centers as well as home care. To become patient centered, supply chains must stretch across this growing continuum of care, as well as support each of the six areas outlined by NAM.
ENABLING THE CLINICALLY INTEGRATED/PATIENT-CENTRIC SUPPLY CHAIN

Part I) Emphasize Clinical Outcomes

Physician preference item procurement will move from a “contracts approach” to more disciplined “formulary model approach” to ensure optimal clinical outcomes and cost predictability.

<table>
<thead>
<tr>
<th>Current Contract Approach</th>
<th>Formulary Model Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate agreement for each vendor with distinct terms, definitions, changes</td>
<td>Same terms, definitions, and provisions for change for all vendor purchase agreements for formulary items</td>
</tr>
<tr>
<td>Each vendor item considered unique and evaluated separately</td>
<td>All items classified into functionally equivalent groupings; items evaluated in context of benefits as compared to equivalents</td>
</tr>
<tr>
<td>Includes full or selected portion of catalog</td>
<td>Includes only authorized items that meet evaluation criteria</td>
</tr>
<tr>
<td>Fairly “open” process for addition and conversion of new item versions</td>
<td>All items must go through new product classification and clinical value analysis</td>
</tr>
<tr>
<td>Review of purchase volume as compared to committed volumes</td>
<td>Ongoing review of utilization, cost, and outcomes at procedure and physician level</td>
</tr>
</tbody>
</table>

Figure 2: Current Contract Versus Formulary Model Approach.

Products should be grouped into functionally equivalent classifications. Within the classification, products are authorized for use based on evaluation of efficacy, safety, patient outcomes and cost-effectiveness. The impact of the formulary model for approved vendors – is that they become strategic partners.
Part II) Embrace Process Transformation

Process transformation is an evolution and takes time for an organization to mature from one level to the next, and is aspirational by nature.

Below are the major steps of supply chain transformation. This model hinges on strong leadership and governance models, but also provides the most benefit to hospitals and patients.

<table>
<thead>
<tr>
<th>Foundational</th>
<th>Optimized</th>
<th>Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Departmental</td>
<td>• Hospital wide</td>
<td>• Patient centric, value based purchasing</td>
</tr>
<tr>
<td>• Goal is to supply product</td>
<td>• Utilize outsourcing, spend analysis, and standardization</td>
<td>• Lean materials management</td>
</tr>
<tr>
<td>• Limited focus on efficiency</td>
<td>• Close collaboration between SCM and clinical teams</td>
<td>• Products selected based on clinical goals and efficacy</td>
</tr>
<tr>
<td>• Focus: Operations</td>
<td>• Focus: Cost and efficiency</td>
<td>• Incorporate improvement in clinical protocols as part of SCM process</td>
</tr>
</tbody>
</table>

- Get supplies in
- Lowest price paid
- Reduced stock outs
- Reduce cost and improve efficiency
- Reduced in-hospital operating costs
- Reduced inventory carrying costs
- Reduced lead times and stock outs
- Standardized process, tools
- Increase value through quality of care
- Reduced SCM cost across the network
- Improved outcomes and safety
- Collaborative planning and forecasting
- Formulary process approach

Figure 3: Major Phases of Supply Chain Transformation.

At the **foundational** level, the goal is simply to ensure that supplies are in stock with a focus on departmental materials management.

The **optimization** level is hospital wide, with a more strategic approach to supply chain. New approaches to predictability and control also increase collaboration between groups. This represents a huge opportunity to introduce new approaches to demand planning and optimization to reduce waste and excess.

**Transformational** is the most mature level with the goal of balancing cost controls with patient outcomes.

In summary, providers have the opportunity to evolve their supply chains and shift the focus from maintaining stock, to strategies that can impact outcomes.

Part III) Connect to Downstream Clinical Systems and Upstream Manufacturer Data

In most industries, an item is entirely managed by enterprise resource planning (ERP) and supply chain systems with a full history of procurement, receiving, movement, status changes as well as consumption. The problem in healthcare is the fundamental fact that items may be procured in ERP, but are then expensed to the clinical department, breaking the traceability and information flow.

It is important to recognize a few key points.

- The initial steps of creating, maintaining, and approving new devices loaded into the item master remains riddled with process inefficiencies that can have downstream impacts.
- Recall and traceability cannot be enabled without linkage between ERP supply chain and electronic health record (EHR) systems.
- Clinician time spent searching for clinical supplies detracts from patient care.
- Hospitals do not want clinical patient data in ERP/supply chain systems.
There is good news, however:

- Leveraging a product hub with collaboration capabilities, designed to connect to external systems and import new catalog data can greatly improve data quality in item masters.
- Recall and traceability can be enabled by using a common item number, UDI reference, inventory status codes, and encounter numbers shared between ERP and EHR systems.
- Emerging technologies, such as digital assistants, simplifies access to information while on the go, and can even invoke specific functionality.
- Using encounter numbers eliminates the need to expose any patient data.

**Part IV) Introduce Planning Techniques Used by Other Industries**

Demand planning can be defined as using historical data, statistics and experience to estimate demand for items across a time horizon. Forecasting techniques have been used for many years and in many industries to assist in the determination of how much inventory to carry and when.

Though not the focus of this white paper, these demand-planning tools require consumption history (e.g., procedural use), and then apply statistical models to address variability and improve accuracy. A modern demand-management platform provides a “statistician in a box” along with automated collaboration capabilities to derive these forecasts as well as safety-stock recommendations.

Once the planner is satisfied with the forecast, it is used in conjunction with supply planning to generate suggestions which are then actioned as purchase requisitions. This process removes the guesswork from procurement decisions, and increases the level of automation. The result can have a significant impact on reducing excess inventories in a healthcare organization, especially when used across a large number of facilities.

**Part V) Enable Patient Safety, Traceability, and Recall Efficiency**

The ultimate goal remains to have a patient-centered supply chain, which begins with ensuring patient safety. By linking all inventory transactions to a common item and UDI, a complete history exists of when and from whom the item was procured, where and when it was moved to a department, and finally the encounter where the item was used in the patient. In the event of a recall, this information allows hospitals to quickly find any remaining stock on hand, and where exactly the items are located. The transaction history also provides a list of any recalled items consumed during a patient procedure with a reference to an encounter number that protects patient privacy, and enables the medical staff to identify and locate the patient in their EHR to discuss alternatives.
TIME TO ACT

The need for increased patient safety, scale of supplies expenses and the pressure hospitals face to control costs underlines the urgency for hospital supply chain transformation. With many hospitals having low single digit operating margins, even a 10 percent reduction in hospital supply expense could significantly impact profitability.

Capability and Value to the Healthcare Supply Chain

In healthcare, it’s common to see up to 20 percent of inventory value expire on the shelves and up to 25 percent of inventory sit unused for 12 months or longer. Below is a summary of benefit areas.

<table>
<thead>
<tr>
<th>New Capability</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Connect to manufacturer product data.</td>
<td>• Reduced errors during item setup</td>
</tr>
<tr>
<td>Download new product details, clinical attributes</td>
<td>• Increased data quality</td>
</tr>
<tr>
<td>and route through internal approvals to facilitate</td>
<td>• Increased approval process efficiency</td>
</tr>
<tr>
<td>setup.</td>
<td></td>
</tr>
<tr>
<td>Track item, lot and UDI to the encounter.</td>
<td>• Increased labor efficiency</td>
</tr>
<tr>
<td>Receive devices with UDI data into a common inventory with visibility to on-hand quantities across hospital locations, as well as usage by encounter.</td>
<td>• Improved patient experience</td>
</tr>
<tr>
<td>• Reduced safety risk</td>
<td></td>
</tr>
<tr>
<td>Simplify information access.</td>
<td>• Increased patient care time</td>
</tr>
<tr>
<td>Allow nurses to find supplies while on the go by leveraging digital assistants.</td>
<td>• Improved process efficiency</td>
</tr>
<tr>
<td>Enable supply chain planning.</td>
<td>• Reduced waste, excess, and obsolescence</td>
</tr>
<tr>
<td>Create accurate forecasts based on actual consumption history, with actionable supply plans that simplify replenishment.</td>
<td>• Reduced inventories (increase working capital)</td>
</tr>
<tr>
<td></td>
<td>• Increased item availability</td>
</tr>
<tr>
<td></td>
<td>• Improved process efficiency</td>
</tr>
</tbody>
</table>

Table 1: Capability and Benefits of a Clinically Integrated Supply Chain.

HOW ORACLE SUPPORTS HEALTHCARE TRANSFORMATION

Oracle has a long and growing presence in healthcare worldwide, including payers, providers, academic medical centers, and specialty care. Oracle Cloud is the most powerful, unified cloud solution suite available today, redefining how healthcare can transform and innovate in a digital world.

LINKS FOR MORE INFORMATION

- Oracle Supply Chain Management Cloud
- Oracle Product Hub Cloud
- Oracle Procurement Cloud
- Oracle Supply Chain Planning Cloud
- Oracle Autonomous Data Warehouse
- Oracle Analytics Cloud
- Oracle Healthcare

REFERENCES
