Case Study – Massachusetts General Hospital: *Inventory Management*

Keeping Count

Automated tracking can simplify the costly numbers game of inventory management in interventional radiology.

With pernicious reductions in Medicare reimbursement and declining payer rates, today's volatile health care climate is forcing hospitals to curb costs and manage expenses, even as they attempt to stay abreast of technological advances.

Whether in a small community hospital or a major urban academic medical center, interventional radiology departments have felt this pressure. As a result, hospitals are looking to radiology administration to manage its costly inventory of specialized medical devices, equipment and supplies. Fortunately, they're finding that automated, dynamic inventory tracking and management can help—so much so that it's fast becoming a priority for most radiology departments.

Having begun as one of several modalities within radiology, cardiovascular-interventional radiology has transformed its scope of practice from a principally diagnostic service to a division providing mostly therapeutic procedures. With advances in cross-sectional modalities (MR, CT, ultrasound) to visualize vascular anatomy, traditional diagnostic angiography is being displaced by less invasive methods—with the exception of interventional catheter-based therapy, a growing volume of business for these areas. With the displacement of cheaper diagnostic studies, the increasing volume of interventional cases has boosted supply budgets in recent years. Another area of concern: leveraging new technologies and pioneering research/development against these rising costs. Typically, cost-containment strategies focus on the interventional areas, which comprise most of the radiology supply budget.

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Objectives and solutions

Any institution facing this challenge likely has traditional inventory management problems. For instance, objectives for managing non-stock supplies include:

- reducing on-hand stock value,
- decreasing the need for physical space,
- creating a manageable database that generates reports based on inventory utilization, and
- using utilization data to help physicians decide what to keep in the department.

Having experienced these pressures, the vascular radiology division at Boston's Massachusetts General Hospital needed some high-tech solutions. Like most large interventional departments, MGH's vascular radiology department had to maintain a large array of equipment, supplies and devices to accommodate its wide variety of patients and attendant pathologies. Historically, this division grappled with expired stock, insufficient space for existing stock, "bulk" purchasing patterns to achieve savings, a high incidence of unused inventory and virtually no operational data to examine utilization patterns. Monitoring inventory levels and ordering supplies was a labor-intensive process, and low-level supplies often weren't identified in time. The hospital needed effective inventory management to focus on the front end.

In October of 2000, the department implemented an inventory management program that enabled the staff to solve these problems. This program uses an automated, online patient and inventory tracking system sponsored by the Society of Cardiovascular and Interventional Radiology. With the system, a centralized database maintains patient demographic information and procedure-specific encounter data, including services provided, operators, inventory utilization, and billing and coding data. The program resides on either a centralized PC that uses handheld computers to gather data, or on a PC

network with department-wide workstations. The system oversees four major functions: inventory management, patient and clinical QA, scheduling and billing.

Automation implementation

To get started, MGH implementation team designed training requirements, organized the systems integration into the operation, and created quality assurance processes. Following system installation, all staff—including physicians, technologists, nurses and support staff—underwent mandatory on-site training and education. Throughout the first quarter of the 2001 fiscal year, patient encounters were tracked without inventory information as an introduction to the system's functions. All patient encounters were tracked to provide technical and professional operations with a manageable database for generating quality assurance reports. These clinical data included complication analysis, service activity analysis (volume based on procedure type, resource, physician operator), outcomes analysis and dosage analysis (fluoroscopy time, contrast, skin dose in Gy/cm2).

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The tracking system's advantage is its specific knowledge of clinical practice within vascular/interventional radiology. It maintains consistency with the QA documentation requirements enforced by multiple authorities, and is updated to reflect changes in these requirements and compliance issues. It has extensive search capabilities and collects/presents data to assess clinical competence for all personnel levels. The system's capabilities also simplify patient scheduling and follow-up. In a training program, the system allows clinicians to track data to document adequate experience for all trainees.

Data supporting the inventory management function was entered and enabled in January 2001. The program used the manufacturer's bar code to identify the product on its register. The system recognized 80 percent of the department inventory; the 20 percent that accounted for smaller vendors and/or new technology had to be created and entered manually.

Once recognized by the system, each product received a dollar value based on purchase price. The system can maintain records of vendors, list prices, discounts and special purchases, as well as automated product catalogues updated over the Internet.

Before activating the inventory-tracking function, the staff designated an on-hand inventory count and conservative par level for each product, permitting the system administrator to evaluate the status of any items needing replenishment. When the department receives the items, each shipment is also "received" into the system. As each item is opened, used or consumed, the technologist scans the item's bar code and applies a quantity. The entire system is merely an efficient tracking of debits and credits (receivings vs. utilization).

After a three-month data acquisition period, the department was able to review utilization patterns of the inventory stock, facilitating data-driven decisions on department needs. The conservative par levels were tightened, and the database provided a one-time glance at the entire inventory selection. A single person, producing dependable standardized reports, replaced a labor-intensive method of manually assessing inventory levels. These reports reflect any products below the set par levels and can be sorted by product type or vendor. In addition, the reports can be loaded with a predetermined standing purchase order for each vendor, and used as an actual order requisition to be faxed directly to the vendor.

Outcomes

In January of 2001, the department produced between 70-90 purchase orders through the hospital's purchasing department. In September, the ability to load summary POs into the system reduced that number to 15. Because of efficient par leveling, ordering patterns reflect more of a "just-in-time" system where products that dip below par level are

re-ordered and arrive the next day. Exhibit 1 demonstrates the system's effect on the division's monthly receivings (red line indicates budgetary margin).

In building the FY 01 budget, the department dedicated to decreasing the supply budget by $174,000 because of the initiative. As a result, the automated and dynamic inventory tracking has helped the division realize a $150,000 YTD supply budget savings for fiscal year 2001. The department ordered less overall inventory, yet at the same time, was able to increase its array of available stock. By reordering used items, the department could increase the availability of each product size and type, and reduce items sitting on shelves. Administration could also assess the monthly status of on-hand inventory by reviewing and evaluating certain reporting functions. As Exhibit 2 shows, on-hand stock value fell by $174,222 throughout fiscal year 2001.

Several factors influence the system's ability to efficiently track supplies. For instance, as product tracking progressed, the detrimental attention and support of the technologists became a key factor. When lending products to other divisions within radiology and to other departments (i.e., surgery, cardiac cath), what was once a "free-for-all' with little communication became a tight, information-driven system providing information on how products can be reimbursed to the division that expensed them.

Another important advantage was the system's ability to assign "charge codes" to each product. With the implementation of pass-through codes from the Centers for Medicare & Medicaid Services, the billing systems of many facilities lacked the customization to identify individual or category pass-through codes. Our system allowed the department to assign a pass-through code and maintain a manageable data file for future changes and modifications.

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The operational data from the system's reporting functions allowed administration to evaluate unit costs from several considerations. Once data is acquired, costs can be evaluated by operator or procedure type. Radiologists received data on their own utilization patterns, which in turn spurred regular departmental product review sessions. These sessions allowed the physicians, administration and technical staff to evaluate a specific product (i.e., stents, balloons, etc.) and decide on consolidation, product elimination/addition, and the trial and evaluation status of new products.

In addition, monthly reports allowed administration to evaluate the dollar value associated with items above the maximum par level. That way, administration could look at products that needed to be used or returned to the vendor for credit or needed products. As shown in Exhibit 3, the department's overstock decreased by $143,922 throughout fiscal year 2001 in the third and fourth quarters.

Taking stock of the future

At MGH, vascular radiology's strategic plan for fiscal year 2002 includes working with hospital vendors to enable the software's e-business applications to use the inventory management system as a "virtual inventory manager." Having our system communicate with a vendor's online ordering system would allow us to create an automatic ordering process. With effective inventory management, we can balance the needs of product availability to maximize patient care with efficient financial management.

Because of the product complexity in interventional radiology and the growing availability of technology alternatives, the wrong quantities of the wrong items often land on the stock shelves of interventional departments. With this inventory management program, MGH's vascular radiology division maintains its own par level security, ordering directly through its vendors to relieve the need to maintain a large level of on-hand stock. This system allows us to evaluate cost patterns

and product utilization patterns to make cost-effective decisions based on accurate financial data. In short, we can rely on this system to keep an accurate count—and take stock in a future of smooth-running, reliable inventory management.

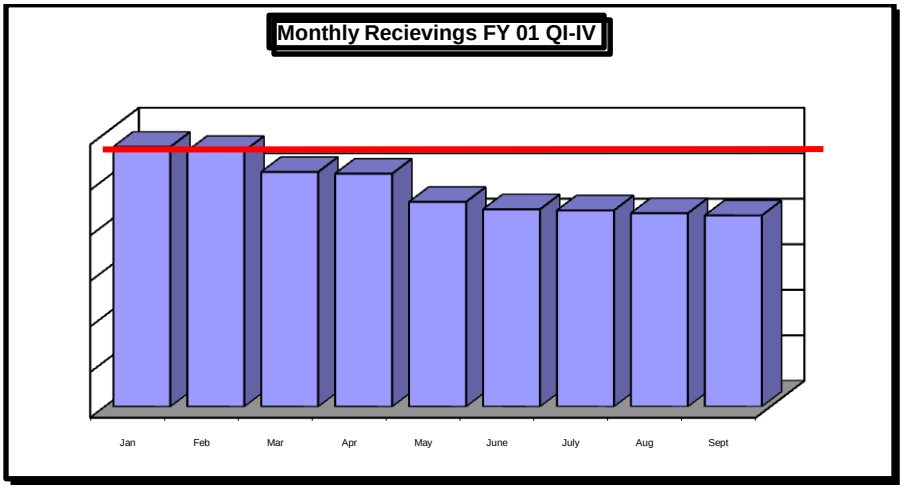

Exhibit 1

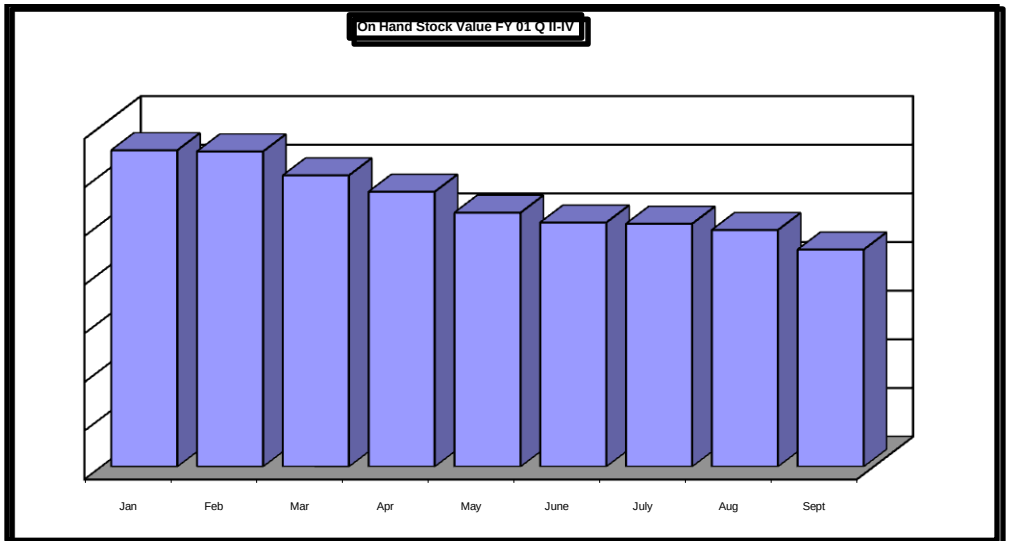

Exhibit 2

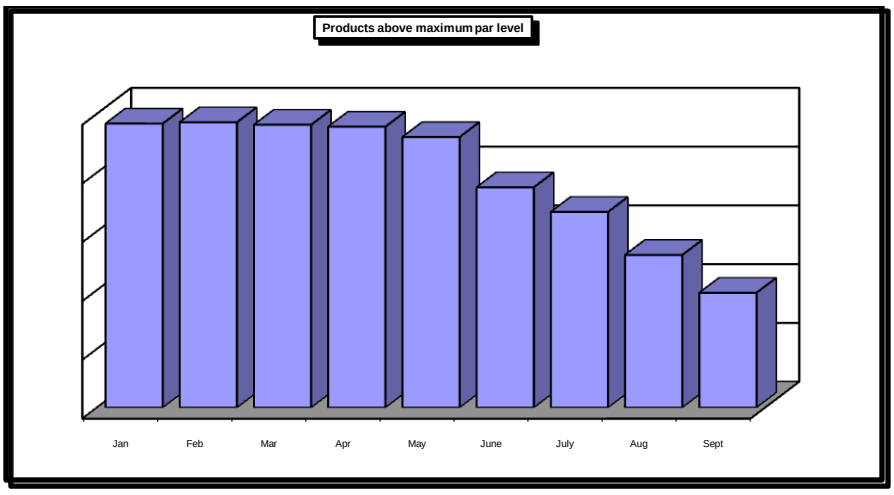

Exhibit 3

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