

## Ten Early Warning Signs of Low Quality in Materials Management

*What can be measured can be managed.*

By Robert Jablonski

Materials managers are typically given two, often contradictory, quality goals: “Don’t run out of stock” and “Minimize inventory investment.” These criteria are highly subjective, so they severely limit the ability to assess materials management performance.

For example, stock-outs are of relative importance. Running out of pencils or paper clips is an inconvenience, while running out of catheters or sutures is a catastrophe. Minimum inventory levels are therefore, subjective, depending on the level of service required for each of the myriad products that flow through an institution.

Such nebulous goals do not fit the philosophy of continuous quality improvement (CQI). The basis for CQI is measurement and control: what gets measured gets managed. That’s why it’s important to evaluate not only the type and quantity of products flowing throughout a hospital, but also the quality of management of that flow.

The ten early warning signs that follow provide the first steps in both measurement and control of supply flow; watching these warning signs can be the first step toward implementing a quality improvement effort for materials management.

### 1. Inventory turnover of less than eight times per year.

Inventory turnover, or its corollary – months’ supply on hand – are important indicators of the speed of supply throughout. Fewer than eight turns, or approximately six weeks’ supply on hand, indicate the need to investigate both the level and composition of the hospital’s inventory.

This is even more true in an era in which suppliers can typically guarantee product delivery within two days for most med/surg supply items or by the next day for items in a just-in-time or stockless program.

One of CQI’s goals is the reduction or elimination of inventories wherever possible. That includes departmental and hospital-wide inventories. Inventory turnover targets should be negotiated

with each manager responsible for departmental supplies. Focusing on these targets will encourage supervisors to monitor and control the amount of supplies and equipment ordered, stored, and used.

Setting inventory level and turnover goals fosters the movement of an organization toward the total quality paradigm.

### 2. Stable or increasing supply expense during periods of declining patient volume.

There should be a fairly stable relationship between the amount of supplies consumed and the number of patients treated by a hospital. Although acuity levels and the volume of sophisticated procedures have a marked impact on the dollar amount of supplies consumed, as a general rule, supply expenses should track with the levels of adjusted patient days, adjusted occupied beds or with other patient volume indicators.

It is important to consider trends in this relationship, not monthly data points, because there is a lag between ordering and use: Supplies consumed this month may have been ordered six weeks or two months ago. Supply expense trends help to define the nature and the extent of problems to be addressed by a quality improvement effort.

Over time, these trends can be used to set controls on the levels of inventory and supply expense to correspond with varying census levels. Variations from these norms should trigger investigation and the realignment of purchasing and consumption patterns.

### 3. Absolute inventory variance greater than ten percent

Inventory variance is the measure of the accuracy of a perpetual inventory system. This is determined by taking a physical count, calculating the extension of quantities and prices, and determining overages and shortages. The resulting figure is the net inventory variance.

Net inventory variance is fine for accounting purposes – to show the dollar impact of differences in inventory value. It fails as a true measure of the quality of inventory management, however.

Any discrepancy, whether plus or minus, indicates failure to accurately monitor the level of supplies in inventory. For this reason, it's important to total the absolute value of discrepancies, and divide that by the total book value of the inventory. The resulting absolute inventory variance shows the proportion of inventory counts that are in error.

Hospitals operating in a total quality management (TQM) environment will have established goals of zero for both variances. This expectation must be communicated to those responsible for managing inventories to set the stage for continuous improvement in inventory management for both materials and department managers.

#### 4. Fill rate on routine stock requisitions less than 93 percent.

Fill rate is the key customer service indicator for materials management. It is also a barometer of the effectiveness of inventory objectives.

Fill rate is the number of line items supplied to a department divided by the total number of line items requested during the period. Its corollary is the stockout rate, or the number of unfilled line items divided by the total requested. The sum of the two ratios should be 100 percent.

Unquestionably, a 100 percent fill rate should be the goal, but anything less than 93 percent indicates problems. When the fill rate dips below 95 percent, users begin to overstock or hoard supplies; investigation of stocking, usage and reordering patterns, as well as an analysis of the ordering and stocking process, are called for in this situation.

Exercise caution in establishing safety stocks to improve fill rates, however. Increased inventory investment and carrying costs need to be balanced against the cost of stockouts.

#### 5. Average number of line items purchased per buyer per day less than 40.

This measure shows the productivity of the purchasing function – not of individual buyers. A buyer of stock items may order more than 200 line items per day, depending on the size of the hospital and the number of vendors used, while a buyer of maintenance supplies may purchase only two or three items.

This statistic can indicate the existence of too many buyers, users purchasing supplies and

equipment through unofficial channels, or insufficient documentation of purchasing activity.

A work sample of buyers' activities may help determine the number and type of activities performed by buyers in the course of daily work.

#### 6. Official inventory per adjusted occupied bed greater than \$2,000.

The level of inventory required to support the hospital's volume of patients can be estimated by dividing the official storeroom inventory (including items in central supply and distribution) by the number of adjusted occupied beds (AOB).

The value of \$2,000 represents an average across all sizes and types of hospitals and serves as a reference point rather than an absolute standard. Acuity, case-mix index or other severity of an illness measures may have an impact on the level and value of inventory. However, any time that inventory is in excess of \$2,000 per AOB, investigate the underlying reasons and look for ways to consolidate inventory.

#### 7. More than five official storage locations.

The number of official locations in which bulk supplies are stored and issued to users should be limited to maximize distribution efficiency and to provide a central access point. Ideally, there should be only one or two official storerooms or warehouses. But in general, the number should not exceed five because the costs of stocking, maintaining and distributing supplies among so many locations is normally prohibitive and presents unnecessary problems for inventory control.

We do not include nursing unit closets and ancillary department storage lockers in the term "official storage locations." However, this does not preclude the designation of previously unofficial inventories as official ones, and their control by management.

#### 8. Unlocked, cluttered storage, poor or missing bin labels.

There seems to be a direct correlation between the level of cleanliness and security in the storeroom and the accuracy of inventory management data; this pertains to the receiving dock and work area as well.

Unfiled purchasing and receiving documents left on desks or shelves, packing materials strewn about, products left in aisles or in staging areas, all contribute to inaccuracies in a perpetual inventory system. Bin labels that are missing or difficult to read frequently result in mispicks and misplaced inventory. Unlocked storage areas contribute to inventory shrinkage and "midnight requisitions". Order and security are, therefore, essential to sound materials management.

**9. Purchasing, receiving and invoice verification not performed by separate departments or individuals**

For control purposes, different departments and/or individuals should perform purchasing, receiving and invoice-matching functions. This ensures appropriate checks and balances to limit the opportunity for misapplication of hospital resources. Additionally, the separation of tasks adds to control and feedback points to the distribution system, giving management more opportunities to identify and correct errors before they get out of hand.

**10. Absence of target inventory levels, in total, per bed or per patient day**

Management of any process requires control limits – a range of values within which the output of the process must fall. Inventory management requires both upper and lower control limits. The lower level is commensurate with fill rates in the high 90 percent range, the upper level represents over-investment in supplies. Management must establish values for these inventory levels and communicate them to the employees responsible as part of their performance appraisal.

These targets need to help fulfill the requirements of high-quality patient care and fiscal responsibility. The appropriate inventory level can be calculated or estimated based on current and/or historical usage patterns and trends in patient volume.

The data required to use these ten early warning signs should not be difficult to obtain. The inability to obtain such data is itself a measurement of the adequacy of materials management information and can be construed as an additional warning sign.

In addition, an effective assessment of materials management includes qualitative information as well as quantitative. It requires going to the storeroom or warehouse, visiting nursing units and other user departments, and conferring with clinical staff about the adequacy of the supplies they receive and the effectiveness of distribution channels.

There is no substitute for good materials management. The efforts of the best-run programs and departments in a hospital can be completely offset by the failure of materials management to provide the appropriate supplies, at the right time, at the right place, in the right quantity and at the right price. Low-quality performance in materials management can sap the morale of the hospital's clinical staff.

Hospitals that excel in providing both patient care and bottom-line results also excel in managing the purchasing and distribution functions, as well as meeting the needs and expectations of the communities they serve.

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