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Finance & Alternative Data Sets in the Supply Chain

A BEST PRACTICE GUIDE

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Understanding total costs is essential to managing any aspect of a hospital successfully. Supply chain represents a significant portion of hospital expenditures (second only to payroll) and must take responsibility for evaluating its performance compared to the organization's financial goals. When evaluating total costs, it is important to tie costs to the actual hospital "products"—namely, patient stays. Hospital finance departments are increasingly classifying patient stays as a mixture of clinical conditions and the treatment provided for those conditions. For every hospital product (patient stay/clinical condition/treatment), there is supply consumption. The supply chain is responsible for the components of total supply expense.

Hospital finance is complicated and multi-layered. Therefore, it can be very challenging for a health system to assess whether reimbursement covers the cost of treatment on a patient level. There are a variety of reasons for this, including the fact that not every supply used to treat a patient is associated with the patient encounter. This makes the supply chain's ability to tie actual supply costs to revenue difficult and often fruitless.

Health systems always aim to provide the highest quality of care. In a value-based environment, it is also in their best financial interest to do so. The metrics that are traditionally used to evaluate supply chain—principally *supply expense per adjusted acute discharge*, *supply expense per adjusted acute patient day*, *supply expense as % of net patient revenue*, and *supply expense as % of total operating expense*—do not accurately measure supply chain efficacy because they depend on factors outside the sphere of supply chain. Further, whether used as a single metric or as a component of a larger dashboard, these metrics don't address a facility's effectiveness at improving quality and outcomes. In fact, inaccurate conclusions may be reached about an organization's performance by using only the current metrics (and only focusing on the cost component). A facility perceived as a high performer may be achieving success at the expense of quality and outcomes. Similarly, an institution perceived as a high-cost, low performer may be doing so in order to achieve higher quality and, consequently, better outcomes.

Clearly, a different method of measurement is required. Familiarizing the supply chain with alternative data sets that identify the correlation between supplies and clinical outcomes, thus providing greater clarity about which supply chain areas can strategically

contribute to improved organizational performance in a value-based environment, is an essential step toward operating at the intersection of CQO: all costs associated with care, quality of care delivered, and financial outcomes driven by exceptional patient outcomes.

The Components of Total Supply Expense
(under supply chain purview)

1. Cost of supplies/services: Ensuring that (wherever possible) supplies are covered under a contract, ordered on a PO, and ordered at the lowest price.
2. Availability of supplies: Ensuring that the necessary products are available for use when needed and that inventory levels are at optimal levels to minimize stock-outs, shrinkage, and obsolescence.
3. Quality of supplies: Ensuring that the products used by the facility are the appropriate quality for their intended use.
4. Identifying the impact of supplies on patient care.

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Familiarize the supply chain with a new suite of metrics

New data sets should be used to evaluate the effectiveness of the supply chain in addressing organizational cost, quality, and outcomes. Each metric should be chosen based on a clinical condition that is strongly influenced by the use of supplies. While a lack of data has historically been a barrier to developing these types of metrics, the data collection infrastructure and reporting mechanisms that the CMS has encouraged hospitals to adopt a new platform to use for these purposes. For example, if relevant data related to central line-associated bloodstream infections (CLABSIs) is already being collected by quality and infection control personnel, the supply chain can also use this information to evaluate how products may be affecting the outcomes of those procedures.

Examples of clinical conditions and outcomes where supply chain may have an impact include the following:

- Reduction in catheter-associated urinary tract infections (CAUTIs)
- Reduction in all pressure ulcers (Stage III and IV)
- Reduction in vascular catheter-associated infections (CLABSIs, etc.)
- Reduction in surgical-site infections (e.g., following bariatric surgery, certain orthopedic procedures, and mediastinitis after coronary artery bypass grafting)
- Reduction in certain types of falls and trauma
- Foreign object retained after surgery
- Medication errors
- Patient death or serious injury associated with the use of contaminated drugs, devices, or biologics provided in the healthcare setting
- Patient death or serious injury associated with the use or function of a device in patient care, in which the device is used for functions other than as intended
- Patient death or serious injury associated with unsafe administration of blood products
- Patient death or serious injury associated with the use of restraints or bedrails while being cared for in a healthcare setting

Because these metrics evaluate outcomes that span multiple patient types, it may be appropriate to segment outcomes by patient care unit (e.g., critical care, medical/surgical, cardiac), patient type (surgical, medical, etc.), or specific procedure. This may require sub-reports.

The best way for the supply chain to collect this information is to build a link between its data (through a materials management information system or enterprise resource planning system) and the organization's electronic health record. This provides the supply chain with a better method for extracting and analyzing data to drive evidence-based purchasing decisions.

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Monitor the quality of new product alternatives

It is important to monitor the quality of new product alternatives to determine if they are of equal or better quality than the products being used (e.g., reduce infections, reduce length of stay, are easier for clinicians to use). For example, while the use of a silver alloy urinary (Foley) catheter may reduce the incidence of CAUTI, it is important to monitor its failure rate and compare it to historical silicone or latex catheter failure rates. This could be monitored through the measurement of an "input divided by output" metric intended to calculate the yield (failure) rate per outcome. In the example of CAUTI, this could be calculated as follows:

(silver catheter use ÷ discharges where urinary catheter was inserted) – historic rate (non-silver catheter use ÷ discharges where urinary catheter was inserted).

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Evaluate performance and create dashboards

Traditional methods of analyzing supply chain metrics focus on a comparison of a facility's performance against a peer group to determine whether they are performing favorably or unfavorably. While it is valid to compare performance against peers, organizations should first aim to trend performance internally (due to the early stages of the metrics being proposed). Once the criteria for determining peer groups have been decided and the guidance for determining the appropriate source of underlying data has been decided, then it may be appropriate to evaluate the organization against its peers.

Evaluating a hospital's performance against itself can be accomplished in the following manner.

Incident Rate

Establish a lower (where the hospital wants to be) and upper (the highest level that the hospital is willing to accept) boundary of performance. The lower boundary should be the targeted incident rate set by the facility. In the case of a never event (medical errors that should never occur), such as a foreign object retained after surgery, the target may be zero. However, in the case of less serious outcomes, such as a CAUTI, a value that is low but higher than zero may be appropriate. The upper boundary should be the highest acceptable incident rate a facility is willing to accept. This may change over time as new products and procedures are introduced into the process. The performance during each period is relative to the upper and lower boundaries.

- *performance > upper boundary:* Red
- *performance < upper boundary but > lower boundary:* Yellow
- *performance ≤ lower boundary (performance = lower boundary where the lower boundary is zero):* Green

Cost Measures (Output Measure and Opportunity Cost Per Outcome):
The measures can be compared against historical averages to gauge performance, such as the average of three preceding months.

- *performance > x% average preceding 3 months:* Red
- *performance ≤ x% average preceding 3 months:* Yellow
- *performance < average preceding 3 months:* Green

It is important to recognize—and make clear to internal stakeholders and leadership—that even for outcomes that have a supply component, supplies are just that—*a component* that can contribute to the success or failure of an outcome. The human element, such as how the supplies are being used in accordance with evidence-based best practices, should be considered the chief driver in quality and outcome improvement. To this end, a multidisciplinary team that holds all stakeholders accountable should evaluate outcomes-based metrics. In addition to supply chain, this team

Hospital-Acquired Catheter-Associated Urinary Tract Infections (CAUTIs)

Let's use the example of CAUTIs to demonstrate how the supply chain can use alternative data sets to analyze the relationship of supply costs to quality and outcomes.

OUTPUT MEASURE

Output measures are the prevalent metrics that are used to evaluate supply chain where supply expense is compared against a measure of volume, such as ***adjusted acute discharges*** or ***adjusted acute days***. While this metric should not be the only measurement, it is a useful indicator in a larger evaluation. The output metric in this example would be ***supply expense per discharge where a urinary catheter was inserted***. Under the current method of evaluating this metric, optimally it should be as low as possible, with an expected downward trend over time to reflect performance improvement. But when accounting for quality and outcomes, this metric may increase, decrease, or remain unchanged over time. The best case scenario is when quality and outcomes measured are optimized.

OUTCOMES/OUTPUT MEASURE (INCIDENT RATE)

This metric measures the undesired outcome against the potential population that could experience the outcome. Continuing with our example, we would use ***number of CAUTIs ÷ discharges where urinary catheter was inserted***. This metric would provide a rate of undesired outcomes, which are expected to trend downward over time, with the ultimate goal being a zero rate of occurrence.

OPPORTUNITY COST OF OUTCOMES MEASURE

This metric measures the monetary impact associated with the undesired outcome. This impact may either be an increase in cost (the cost associated with additional procedures, longer average length of stay, etc.) or decrease in revenue (penalties, denied claims, outlier payments, etc.). For the CAUTI example, calculate ***cost of outcomes + penalties ÷ incidences of CAUTI***. Once again, a downward trend would be expected over time, optimally with a zero opportunity cost.

should include clinical and operational leadership as well as physicians, nursing, quality, and infection control personnel.

In order to provide key facility stakeholders with a more comprehensive view of performance across all of the outcomes being monitored, metrics can be summarized as an executive dashboard. The average performance for the two cost measures noted (*supply expense per volume* and *opportunity cost per outcome*) can be combined to calculate a consolidated cost measure evaluation. Given the larger financial impact associated with outcomes versus supply expense, it may be desirable to calculate a weighted average of the two metrics, giving higher weight to the *opportunity cost per outcome*.

Combining the incident rate and cost metrics determines if a facility is highly effective, moderately effective, or ineffective. The overriding metric is the incident rate. A facility scoring green in the incident rate category is deemed to be highly effective. The degree to which it is highly effective is determined by its performance in the cost metric. Thus, a facility could be highly effective based on their outcomes, but in the third degree of performance based on their cost metrics. Ideally, facilities want to have a low incident rate while also being a low-cost provider. However, it may be necessary to increase costs to achieve these outcomes. The worst-case scenario is having poor outcomes (ineffective) while also being a high-cost provider.

The significant shift is that cost is no longer the sole factor in evaluating the supply chain. Cost still plays a role, but it is a secondary role. The outcome becomes the primary object of the evaluation. In the past, measuring supply chain performance focused on production, be it patient days or discharges (with a concentration on the cost per). The supply chain tried to reduce cost at every turn, with less emphasis given to the quality of the production. By adding this new gauge, a new point of emphasis has been created between the clinical operation and the supply chain, with the understanding that changes in the supply chain may be necessary to create improvements in quality. The impact on supply expense per may be unknown under this methodology, but there should be a reduction in total cost per.

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