Measuring a Healthy Hospital: Metrics-Based Tools for Improving Operational Performance

Balanced scorecard, Six Sigma, and other metrics-based tools for total quality management are being implemented by an increasing number of hospitals as part of a more holistic approach to quality management.

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Spiraling medical costs, declining insurance reimbursement rates, skilled labor shortages, rising health care utilization by an aging population, and mounting consumer activism have been driving hospitals to adopt more methodologically rigorous management tools in order to evoke new efficiencies from complex health care operations. As Paul Mango and Louis Shapiro of McKinsey & Company argued in a 2001 report, hospitals are essentially a commodity business and therefore need to compete on the basis of operational efficiency.

Critical to improving business performance is the availability of robust and timely performance metrics. The balanced scorecard, Six Sigma, and other in-house, metrics-based, quality management programs have been implemented by a growing number of health care organizations. Common to these programs is a more holistic approach to performance that recognizes organizational interdependencies, and in turn requires both nonfinancial and financial measures of performance.

Unifying Metrics for Real-time Operations

The metrics movement in hospitals is still quite young. Most hospitals have not yet taken steps to unify access to existing metrics through a single dashboard application, or to automate the distribution of data to relevant individuals for appropriate action. While data for industry certifications (JCAHO, ANCC, etc.) and for patient satisfaction – as well as for overall financial performance – are regularly collected, they typically remain locked up in information silos that prohibit convenient, real-time access through a single application.

As cost and competitive pressures continue to intensify, hospitals will need to implement and unify a wider array of performance metrics in order to achieve the efficiencies of what Gartner Research calls the real-time enterprise (RTE). The core principles of the RTE emphasize acquiring relevant information as soon as it is available and then distributing it to the correct personnel resources and automated processes at the right time.

In this early stage of the metrics movement, hospitals are focusing their performance metrics programs on those areas generating the most significant operational challenges or having the most direct impact on the revenue cycle. Areas like scheduling, registration, admitting, claims, and billing have drawn the most attention because they profoundly affect workflow, patient volume, utilization, and ultimately income.

Just in the area of revenue cycle management (RCM), Gartner predicted in February 2003 that “40 percent of care delivery organizations that fail to implement critical RTE transformations by 2006 will struggle to retain viability as businesses by year-end 2008.”

In the area of scheduling, utilization rates of equipment and personnel have seen double-digit percentage increases as a result of metrics-based process improvements. At many hospitals, more efficient scheduling has also produced measurable improvements in physician and patient satisfaction. In other areas, new processes for measuring the causes of claims denials have helped increase annual revenues by tens of millions of dollars in some large hospitals.

Performance Metrics: Balanced Scorecard and Six Sigma

Two prominent approaches to organizational performance, the balanced scorecard and Six Sigma, provide insight into the need for more comprehensive performance metrics that support a more holistic approach to health care delivery.


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In health care, the balanced scorecard’s emphasis on these four broad areas of performance allows managers to assess intangible assets that affect the organization’s bottom line, such as staff skills, clinical processes, patient satisfaction, and loyalty. The balanced scorecard offers a way to measure an organization’s performance against its strategic objectives while focusing on building capabilities to achieve these objectives. Additionally, it encourages behavioral changes aimed at achieving corporate strategies.

Six Sigma also has found a solid foothold in health care. Developed in the 1980s by Motorola to improve product reliability, this quality management program was embraced by a number of manufacturing and retail companies in the 1990s after Motorola released its proprietary control. Service industries, including health care, have been the latest to leverage this technique for improved operational performance, with a number of hospitals launching Six Sigma programs since about 2000.

Like the balanced scorecard, this approach to total quality management takes a broad view of organizational health. It focuses on any critical to quality (CTQ) factor – whether financial or nonfinancial – that may impact profitability, cash flow, or meeting customer needs and expectations.

Six Sigma has a much more finely tuned statistical methodology than that of the balanced scorecard. The goal of Six Sigma is to reduce variations in a given process, thereby reducing process or product defects. The technique relies on three core measures:

- **Defects per million opportunities (DPMO)** – ratio of defects in a repetitive process, like number of denials per million insurance claims submitted;
- **Error-free yield (EFY)** – percentage of iterations of a repetitive process free of defects; and
- **Sigma level** – Sigma is the statistical symbol for standard deviation (Φ) from the mean value of a measurement. The higher the sigma level, the lower the defect rate.

At Six Sigma, the defect or error rate is 3.4 per 1 million opportunities. Most hospitals tolerate much higher defect rates in their numerous processes, whether in patient registration, billing, claims processing, materials management, and even clinical processes. In many hospitals, for instance, the claims denial rates (what might be considered as defect rates) are commonly over 5 percent and can reach as high as the double digits.

As Samuels and Adomitis observed in a 2003 *Healthcare Financial Management* article, hospitals would be ecstatic with an overall error rate of 5 percent, or about 3.25 sigma, an unacceptably costly level in other industries. Indeed, a 2003 report by the Centers for Medicare and Medicaid Services estimated that approximately 5.8 percent of the 1 billion claims paid in 2002 contained errors, representing a total estimated value of $11.6 billion.

The very large numbers of transactions and processes in health care – including about 4 billion transactions just for insurance claims – endow even incremental improvements with the potential for significant returns on investment. According to a 2003 Gartner Research report, merely including medical necessity checking in new implementations of enterprise scheduling, for instance, allows full return on the investment in less than 12 months in most cases.

The scope of Six Sigma programs can be very narrowly focused. While the balanced scorecard is designed around the inclusion of four critical areas of performance, Six Sigma techniques can be applied to any process, no matter how small. Nevertheless, the two techniques emphasize the importance of performance interdependencies that impact the overall financial health of organizations. Also, they both share the common concern with total quality improvement for the organization, its customers, and employees.

Both the balanced scorecard and Six Sigma require substantial amounts of data, although the latter may require significantly less data depending on the focus of the specific program. Satisfying these data requirements means building a data warehouse of clinical, operational, and financial information that can capture ongoing performance metrics.

Additionally, some sort of statistical reporting and analysis tools are required to translate the performance data into action-
able information. Such reporting and analysis should be automatically generated on a regular basis – ideally, on a real-time basis – for continuous quality improvement.

Current and Planned Use of New Metrics-Based Tools

Though the new metrics movement in hospitals is relatively young, there is mounting evidence that performance measurement tools are solidly established in numerous hospitals and that they will be implemented by a growing number of additional hospitals going forward.

Survey research sponsored by Per-Se Technologies and conducted by Porter Research in 2004 shows that a majority of hospitals are already using some sort of metrics-based quality management tool. The research focused on four groups of hospital executives and administrators: CIOs and CFOs, directors of patient/OR scheduling, staff scheduling, and patient accounts/business office.

Respondents were asked which of the total quality management tools their hospital was using or planned to implement. The responses of all four groups taken together show that more than a quarter (28 percent) of hospitals are currently using the balanced scorecard, with another 5 percent planning to implement it going forward (see Figure 2). Additionally, 20 percent currently use an in-house system as their total quality metric tool, while another 14 percent are using Six Sigma.

Looking just at the responses of the CIOs and CFOs, 67 percent of this key group of decision makers either currently use or plan to implement balance scorecard programs, while an additional 29 percent report using an in-house system as their total quality metric tool.

The popularity of the balanced scorecard as the tool of choice reflects the fact that it was developed and promoted from the start for universal application regardless of industry or organizational type. In health care, the balanced scorecard has been particularly embraced on the clinical side as a tool for measuring and improving the quality of care. Six Sigma, in contrast, was long perceived (inappropriately) as uniquely suited to manufacturing processes.

Part of the explanation for this increasing interest in new operational performance metrics is the recognition that profitability cannot be achieved by cutting service levels. The demand for higher quality in both treatment and overall customer service means that cost pressures will continue to increase, a fact that is not lost on industry executives. In the 2003 HIMSS Leadership Survey, for instance, more than 50 percent of respondents in each of the three groups surveyed (CEOs, CIOs and CMOs) identified cost pressures as one of the top business issues facing health care within the next two years.

The survey research conducted by Porter Research shows a similar pattern among the CFOs and CIOs interviewed. Approximately 44 percent of respondents specifically cited concern over being able to provide health care services without losing money as their greatest financial challenge. As one CFO of a mental hospital in Colorado put it: “My biggest challenge is trying to provide good health care and being able to afford it on my end. It becomes a dilemma for us on how well we can provide health care to our patients.”

Notably, more than three-quarters (78 percent) of the CFO and CIO respondents in the Porter survey said that their hospitals had specific RCM programs in place. This high proportion of hospitals focusing on RCM is a clear reflection of the need to develop new ways – other than reductions in service levels and cost cutting – of generating profits. Importantly, many RCM programs rely on both nonfinancial and financial performance data to eliminate faulty procedures that negatively impact profits.

Challenges to Implementing New Metrics

The search for cost savings and quality improvement in health care delivery has been moving into new terrain over the past few years. Tools and techniques developed for other industries, as well as for health care specifically, are winning growing acceptance among hospitals. The holistic approach to quality management embodied in these techniques has required new metrics of both operational and financial performance. The use of more inclusive sets of financial and nonfinancial metrics for measuring the health of hospitals is here to stay and will become pervasive among hospitals over the next few years.

New, more robust metrics are the foundation for keeping hospitals healthy. But, executives will increasingly feel the need for a metrics dashboard that sits on top of this data foundation. Such a dashboard will allow executives to check a range of measures on a real-time basis, and to receive regular alerts for immediate action. Robust metrics + real-time access = a healthy hospital.