

HOSTED BY

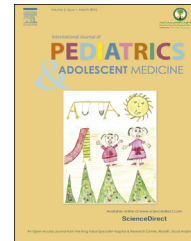


ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://www.elsevier.com/locate/ijpam>



QUALITY IMPROVEMENT

How (and why) do quality improvement professionals measure performance?



Donald E. Lighter*

The University of Tennessee, The Institute for Healthcare Quality Research and Education, 2120 River Sound Dr., Knoxville TN 37922, United States

Received 29 October 2014; accepted 20 December 2014
Available online 27 March 2015

KEYWORDS

Quality improvement;
Measurement;
Performance
improvement;
Medicare;
Shared savings;
Payment

Abstract The era of value-based care has engulfed healthcare delivery systems around the world. Pediatricians are especially challenged by constrained resources for providing care to our vulnerable population, and methods for achieving value for children through improved quality and reduced cost of care are crucial for success. This paper examines the use of measures to determine the two components of the value proposition: quality and cost. The implications for adopting Lean Six Sigma as an improvement paradigm are reviewed, and the case for using these concepts is detailed with examples of measures used in health systems in the United States and several other countries.

Copyright © 2015, King Faisal Specialist Hospital & Research Centre (General Organization), Saudi Arabia. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Measurement in healthcare

Pediatricians in nearly every country around the world are becoming even better at managing patients with fewer financial resources, and Lean Six Sigma (LSS) is approach that has been shown to be effective at increasing efficiency while concurrently improving quality. The first paper in this series [1] described the paradigm of LSS and how the approach simultaneously addresses the cost and quality of

care. This paper describes the metrics that quality professionals use to determine performance and how these measures have been translated into practice in the United States.

2. Background

A maxim in quality improvement (QI) that has been attributed to many iconic figures in the field is “You can’t manage what you don’t measure”. For physicians, that axiomatic statement is almost intuitive because one of the goals for diagnosis and treatment is to have accurate test results to determine a patient’s clinical condition and to determine what therapeutic interventions might be effective. Quality improvement professionals have the same

* Tel.: +1 865 974 1772.

E-mail address: dlightermd@cyberce.net.

Peer review under responsibility of King Faisal Specialist Hospital & Research Centre (General Organization), Saudi Arabia.

goal: to understand a process quantitatively so that worthwhile interventions might be applied to discern and improve performance. Once those interventions are applied, the QI professional uses the metric to determine the effect of the intervention, just as physicians measure the effect of therapeutic interventions by repeating a test after treatment. Then, to ensure that a process does not deteriorate into its previous state of poor performance, the QI professional monitors the measure over time and tracks the performance trend. The role of measurement in quality improvement is every bit as important as lab and imaging studies in clinical medicine.

Avedis Donabedian (1919–2000) was a Lebanese-born physician and health policy researcher at the University of Michigan's School of Public Health who is credited with the earliest work in health care quality management. The Donabedian model [2] was published in 1980 and provided the early framework for performance measurement and improvement in health care. As shown in Fig. 1, the model divided healthcare services into three major categories: Structure, Process, and Outcomes. Nearly every quality measure can be characterized by one of these classifications. Table 1 provides some examples of each of these types of measures. The measurement systems that have been developed in the United States and many other countries are organized into these three categories.

A fundamental principle in the development of effective measures can be represented as SMART criteria, which are shown in Fig. 2. These criteria provide the basis for development of effective measures for each of the Donabedian model categories and are important to ensuring that a measure will be acceptable to both providers and payers. Developing measures using the SMART criteria involves the following:

- *Specific* – the measure must address a specific goal or process step and be as narrowly defined as possible. Thus, a process metric should endeavor to encompass a single step in the process, e.g., giving a child an immunization at a well-child visit. An outcome measure is usually broader, but typically is designed to quantify an important result of care, e.g., return to full function in activities of daily living.

Table 1 Measures categorized into Donabedian model groups.

Donabedian Standardized metric category	
Structure	Availability of a computerized tomography scanner Number of hospital beds Number of examining rooms in a clinic Medication availability Staffing availability Emergency medical services equipment
Process	Beta blockers after a myocardial infarction Assessment of pediatric body mass index (BMI) Percentage of two-year old children with completed vaccinations Human Papillomavirus vaccination for female adolescents Lead screening in children Appropriate treatment for children with viral upper respiratory infection
Outcome	Death or mortality rate Quality adjusted life years Activities of daily living Complications of diagnosis or treatment Patient satisfaction

- *Measurable* – the metric must have an operational definition that clearly states the data to be collected and how that data are analyzed to create the final measure. If no data are available, then this criterion cannot be met.
- *Achievable* – any measure must have an achievable level of performance. If providers do not control a particular process, then for them, the measure and its related performance goals may not be achievable, leading only to frustration and a sense of unfairness.
- *Relevant* – metrics used in performance improvement must be relevant to those involved in the process, most often the physician and the patient or family. If the measure is deemed trivial by stakeholders, then the

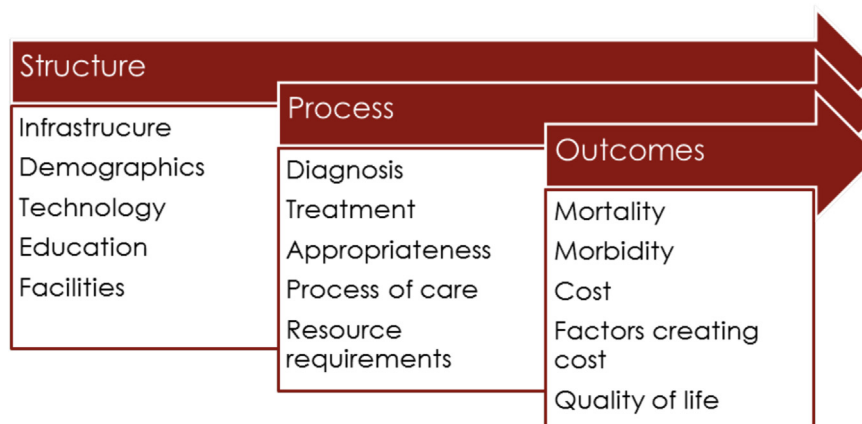


Figure. 1 The Donabedian model.

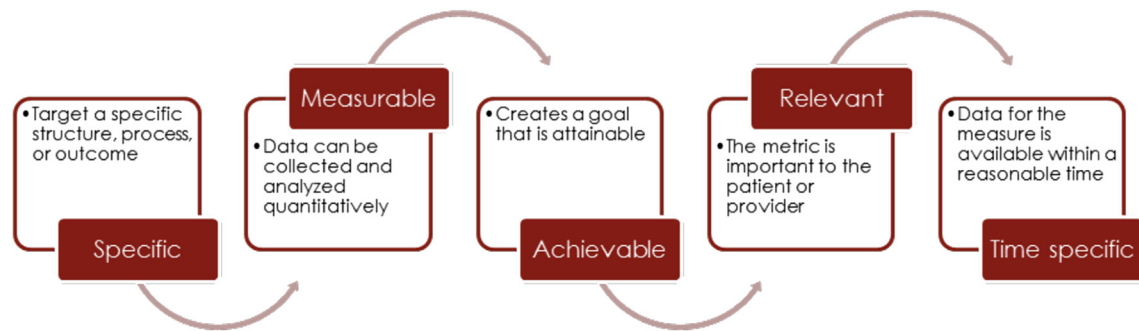


Figure. 2 SMART Criteria.

probability is high that it will be ignored by providers and patients.

- *Time specific* – measures must have time limits that are reasonable. For example, a measure that takes a year to collect enough data for analysis will likely be disregarded by stakeholders, while one that can be used daily or even weekly will garner the attention needed to promote improvement.

Using SMART criteria and the Donabedian Model, many professional organizations and payer entities have created performance metrics for healthcare that are being used daily to assess the quality of care.

2.1. Value-based metrics

A major change has occurred in the United States over the past four years since the passage of the Patient Protection and Affordable Care Act (PPACA), often called Obamacare. The concept of value-based purchasing has become important not just in government financed health care but also for commercial insurance companies. Value-based purchasing (VBP) is a concept based on the business paradigm of value, which is defined as:

$$\text{Value} = \frac{\text{Quality}}{\text{Cost}}$$

The value of healthcare services is directly related to the quality of those services and inversely related to the cost. This concept is sometimes termed the “value proposition”, and it serves as the foundation for nearly all human transactions. Thus, physicians now are being evaluated for quality, as well as cost of services, despite the argument that many providers have made for decades that health care is too complex to be measured. In fact, payers have determined that quality and cost can and will be measured, and over the past three decades payers and accrediting organizations, such as The Joint Commission, have created metrics for both cost and quality. Thus, the measures noted in Table 1 have been used for at least 20 years in the United States; some of them have been used even longer. The effect of establishing this set of measures for a growing number of diagnoses has changed the way that medicine is paid for, as well as what medical practices are deemed acceptable and appropriate. The National Quality Forum [3] (NQF) has become the central repository for healthcare measures in the U.S., and the site catalogs hundreds of

measures with their operational definitions. Most new quality measures are sanctioned by the NQF through a rigorous process of approval and updating, with the organization sponsoring the measure remaining responsible for the certification and update processes.

Although this approach to measurement of healthcare performance has led to considerable dissatisfaction among providers, it has become well established and is now serving as the basis for new payment models in the United States, such as bundled payments and capitation [4]. These payment modalities are still in their infancy in many areas of the U.S., but payers are rapidly adopting them for their insurance plans.

3. Example case study

In the United States, quality measures now have an impact on payments by private insurers or federal and state governments through Medicare and Medicaid. Some of the new payment plans for hospitals and physicians relate quality measures to either regular payments or to extra incentive payments. For example, the Medicare Shared Savings Plan (MSSP) was designed to integrate quality with cost containment through a unique approach to sharing some of the money saved by the imposition of cost targets. The MSSP program works as follows:

- A medical provider entity (e.g., an integrated care delivery network of physicians, hospitals, and other providers) is given responsibility to provide care to a population of patients within a defined geographic region.
- The payer (presently the Center for Medicare and Medicaid Services or CMS) determines a cost target for the population based on a discount from historic cost trends.
- A number of quality measures are chosen by the payer based on the diseases that are inherent in the population (i.e., the “disease burden”).
- The provider works to meet the cost target through better care management, including preventive care and directing patients to lower cost, high quality services.
- At the end of a fixed time period, currently one year, the cost of care and the performance on the selected quality measures are measured and a quality score is calculated.

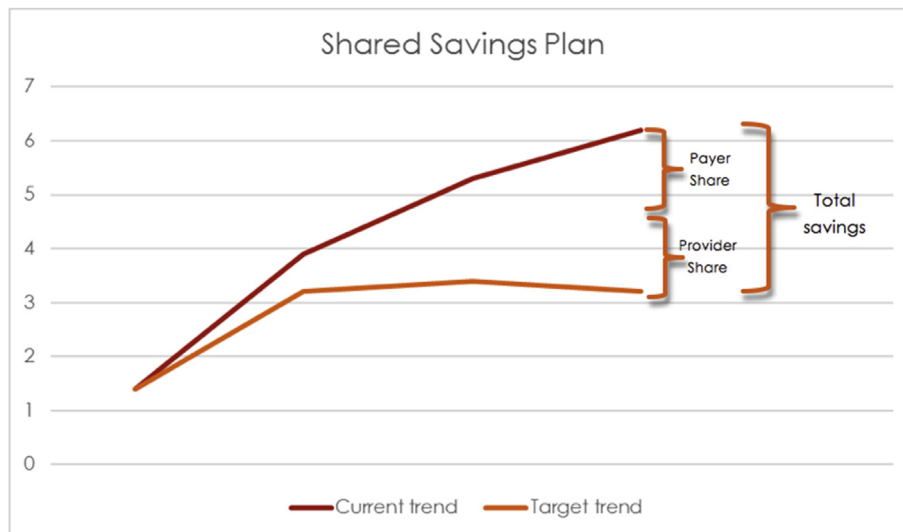


Figure 3 Shared savings scenario.

- Based on the quality metric performance, the provider shares in the cost savings with the payer up to 50–60%.

Fig. 3 illustrates this scenario. The figure demonstrates a scenario in which care for a population of patients is determined to be increasing at the trend shown in the upper line. The payer determines that the lower line is the trend that should be achieved by the physicians and hospitals providing care and selects several quality measures. The difference between the two lines is the total savings expected by the payer. If the provider group achieves the target levels for all of the selected quality measures, then the group will share 50% of the savings with the payer, which is equivalent to receiving a “bonus” payment equal to half of the savings that the group achieved. Here are some examples of numbers to illustrate how this system works:

- A population of 10,000 patients is selected at the beginning of the shared savings agreement, and the payer examines current cost trends based on historical data from the past five years of health services use by the patient population. Based on those trends, the overall cost of care is expected to be USD 10 million by period 4 of the agreement.

Table 2 Shared savings distribution based on quality measure performance.

If the percentage of measures meeting the threshold is...	The percentage of savings shared by the provider group is
50%–59%	20%
60%–69%	30%
70%–79%	40%
80% or above	50%

- The payer uses statistical approaches and the disease burden of the population to make predictions of target costs of USD 8 million at period 4, a reduction of 20% of the costs or USD 2 million.
- Based on the disease burden of the population, the payer selects quality measures for the five most prevalent conditions:
 - Congestive heart failure
 - Acute myocardial infarction
 - Pediatric asthma
 - Neonatal intensive care unit
 - Chronic obstructive pulmonary disease
- Thresholds were established for each of the measures in the five disease categories that required high level performance. The provider group’s performance on the measures determined the amount of the shared savings the group would share as shown in Table 2.
- At the end of period 4, the provider group reports its quality measure results and meet 72% of the threshold targets. From the table, that level of performance would earn 40% of the USD 2 million in savings, or USD 800,000.

Thus, quality metric performance has a significant impact on the revenues returned to the provider group. Since performance measurement has become such an important factor in the healthcare industry, a basic understanding of quality measurement is important for clinicians and physician leaders.

4. Measurement is key to delivering value

A LSS program is value based, as discussed in the first paper in this series. The Lean approach promotes process efficiency by removing non-value-added work and streamlining process flow, and Six Sigma has methods and tools that induce effectiveness, reduce errors, and improve safety. The value proposition requires that these features of LSS be demonstrated using objective metrics, which is the key to effective implementation of a LSS culture. LSS metrics are

Table 3 Efficiency and effectiveness measures.

Type of measure	Example measures
Efficiency	Turnaround time for lab results Turnaround time for x-ray procedure reports Time for pre-physician prep during office visit Cost of a procedure Time required to prepare for a procedure
Effectiveness	Accuracy of lab results Diagnostic accuracy of x-ray interpretations Complication rates from a procedure Medical error rates by physician Medication errors Immunization rates Tobacco use rates among adolescents

usually divided into two major categories: those related to efficiency and those related to effectiveness. Examples of some of these measures are listed in Table 3. A common characteristic of efficiency measures is the inclusion of time as a factor, with a goal of reducing time to the lowest possible level. On the other hand, effectiveness measures tend to be more outcome oriented and relate to safety and patient harm.

Characterizing measures by efficiency and effectiveness clearly fits into the value-based purchasing model. Cost is

linked to efficiency, while quality relates to effectiveness. LSS thus provides the foundation for achieving value for patients. Using the LSS approach, quality practitioners have the ability to address both of the key aspects of the value proposition, and this system of improvement will serve both clinicians and QI professionals with the tools and methods to achieve the high levels of performance as health care around the world moves into an era of accountable care.

Conflicts of Interest

None.

References

- [1] Lighter Donald E. The application of Lean Six Sigma to provide high-quality, reliable pediatric care. *IJPAM* 2014;1(1):8–10.
- [2] Donabedian A. *Explorations in quality assessment and monitoring: the definition of quality and approaches to its assessment*. Ann Arbor, MI: Health Administration Press; 1980.
- [3] National Quality Forum, [accessed October, 2014] at <http://www.qualityforum.org>.
- [4] Damberg CL, Sorbero ME, Lovejoy SL, Martsolf G, Raaen L, Mandel D. Measuring success in health care value-based purchasing programs: findings from an environmental scan, literature review, and expert panel discussions, Rand Corporation, [accessed October 2014] at http://aspe.hhs.gov/health/reports/2014/HealthCarePurchasing/rpt_vbp_findings.pdf.