

# The Business Case for Health-Care Quality Improvement

Stephen J. Swensen, MD, MMM,\* James A. Dilling, BSIE, CMPE,† Patrick M. Mc Carty, BS,‡  
Jeffrey W. Bolton, MBA,§ and Charles M. Harper, Jr, MD§

**Abstract:** The business case for health-care quality improvement is presented. We contend that investment in process improvement is aligned with patients' interests, the organization's reputation, and the engagement of their workforce.

Four groups benefit directly from quality improvement: patients, providers, insurers, and employers. There is ample opportunity, even in today's predominantly pay-for-volume (that is, evolving toward value-based purchasing) insurance system, for providers to deliver care that is in the best interest of the patient while improving their financial performance.

**Key Words:** quality, value, business case, systems engineering

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There is a business case for quality improvement programs primarily because “Quality, cost, value, speed, and trust are intrinsically interlocked and tightly coupled.”<sup>1</sup> Quality improvement programs have not spread as rapidly as possible throughout hospitals and medical centers. Perhaps one reason is that there is an unclear understanding of the financial benefit to the institutions themselves beyond the benefit to patients and society.<sup>2</sup> One of the primary reasons that the health-care business sector has not rapidly embraced quality improvement methodology is the misunderstanding that there is not a business case that can be made for it.<sup>3</sup>

Most published articles do not address the business case or the costs involved in implementing quality improvement programs. In fact, less than 1% of published articles contain substantial cost or outcomes related to investment in quality improvement.<sup>4</sup>

Quality care has negligible waste from process inefficiency, overuse, or preventable harm. Quality (i.e., optimizing patient outcomes, safety and service) is a critical priority that is aligned with the best interests of the patient and stands alone in its own right. There is a moral imperative for improving the safety, reliability, and service of the care given without regard to any financial considerations.

Our objective is to make the case that pursuit of optimal quality and improved patient outcomes are also an effective health-care business management strategy for fiscal well-being. The primary source of financial return comes from the disciplined removal of waste with systems engineering techniques. There are 3 primary forms of provider-related health-care waste. They are process inefficiency, overuse, and preventable harm waste. As much as 40% of health-care dollars spent is waste.<sup>5</sup>

From the \*Department of Radiology and †Administrative Services, Mayo Clinic, Rochester, Minnesota; ‡Financial Planning and Analysis, Mayo Clinic, Scottsdale, Arizona; and §Administration, Mayo Clinic, Rochester, Minnesota

Correspondence: Stephen J. Swensen, MD, Department of Radiology, Mayo Clinic, 200 First Street SW, Rochester, MN 55905 (e-mail: swensen.stephen@mayo.edu).

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Patient-centered care is delivered with processes that have negligible waste. Driving out waste reduces costs. High reliability performance helps build reputation and enhances employee engagement. Employee engagement increases patient satisfaction, which also drives positive financial performance.

Most quality improvement expenses are viewed as a response to regulatory and accreditation agencies. In that context, most are still seen as an expense with little or no return on investment. They are viewed primarily as a required cost of doing business.<sup>6</sup>

Most medical centers and hospitals have supported quality work only to the extent required for compulsory external reporting and accreditation. As a whole, “the compulsories” are an expense and have limited positive return on investment. Funding for these basic quality activities often conflicts with decisions to expand profitable service lines or accelerate work on improvement of business administrative support processes. The landscape is changing rapidly and favorably with the evolution of value-based purchasing programs and reimbursement models based on outcomes such as hospital acquired conditions (e.g., central line associated bloodstream infections, catheter associated urinary tract infections, venous thromboembolism, readmissions). Generally, only when investment beyond the compulsories is made do organizations find ongoing significant and meaningful improvement in reliability and a return on investment. Herein lays the health-care business case for quality improvement.

We present the business case for quality through the lens of an academic multispecialty group practice with 56,000 colleagues in 5 states. The work to facilitate expert agreement on common care process models and then spread them to our 22 hospitals is the basis for both improved patient and financial outcomes.

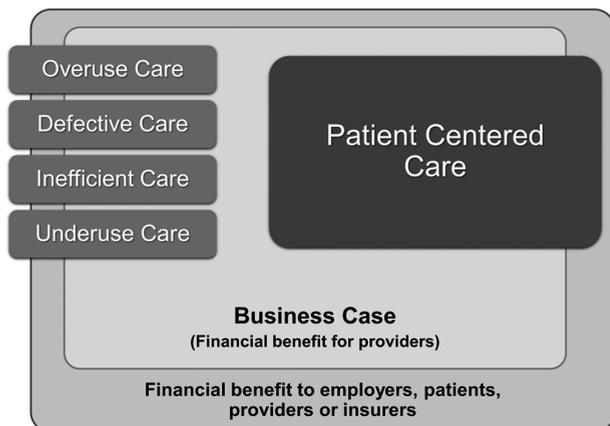
We frame the discussion by first noting the 4 financial beneficiaries of health-care expenditures. The business strategy is then built on 4 fundamental organizational interests: the needs of patients (where we distinguish between waste and cost), organization reputation, esprit de corps, and financial return sufficient to maintain state-of-the-art medical practices (where we elucidate the calculation of hard dollar and soft dollar savings).

## METHODS

Four groups benefit directly from quality improvement: patients, providers, insurers, and employers. In contrast, providers or insurers may benefit, whereas patients often experience difficulty when volume-based reimbursement leads to overuse of high margin services and underuse of low margin care, resulting in lower quality, less safe, inefficient care. With today's reimbursement systems, the business case for quality improvement involves a sizable subset of overuse, defective, inefficient, and underuse care (Fig. 1).<sup>3,7</sup>

From a broad national or regional perspective, there is little evidence to support an assertion that clinical quality improvement delivers bottom line results. This is because of the large fixed costs inherent in health-care delivery and the observation that clinical quality improvements, in large part, create additional

### Quality Improvement Beneficiaries



**FIGURE 1.** Employers, patients, providers, and insurers are all financial beneficiaries of quality improvement. Overuse, defective, inefficient, and underuse care is not patient centered but is most often reimbursed so of financial benefit to providers. The business case for reducing overuse and underuse care lies with self-insured employee populations and capitated plans. The business case for reducing inefficient care is derived from the financial margin benefit of reducing variation, defect, and waste. Reducing defects of care almost always improve business bottomlines, even if the defective is reimbursed.

capacity.<sup>8</sup> However, from a business perspective (Fig. 1), clinical quality improvement can deliver net operating income if managed appropriately and if there is sufficient patient demand to fill the capacity generated by systems engineering work, which creates new capacity within the fixed cost structure of bricks, mortar, and personnel. Although growing volume and increasing revenue are typically central to the business case for clinical quality improvement, we must understand that there are also financial dividends from reducing defective and overuse care.<sup>9</sup> Furthermore, improvements in safety have the additional dividend of lowering professional liability costs.<sup>10</sup>

There is widespread opportunity across health care to invest in quality improvement that is aligned with patient interests and also positively affects an organization's bottom line. The business case for reducing overuse and underuse care lies primarily with self-insured employee populations and capitated plans. Reducing inefficient and defective care almost always improves the financial bottom line, even if the poor quality episode is reimbursed.<sup>11</sup>

The net present value from direct medical savings alone for employers with programs addressing disease management for chronic conditions, such as asthma, heart disease, and diabetes, are often positive. These are examples of the primary beneficiary of quality improvement being an employer and patients.<sup>12-14</sup>

There are many opportunities to improve the value of health care in this country that do not make financial sense for the business entity, although they would for society. Overuse of resources is the flagship example given in that overuse is consistently reimbursed under the current fee for service model. Moreover, not every quality improvement effort yields a positive financial return. However, we make the case that a well-balanced portfolio of improvement work (beyond the compulsories) makes ethical and business sense for all provider organizations.

### RESULTS

Health-care provider organizations have 4 fundamental interests:

- the needs of patients,
- reputation,
- esprit de corps, and
- financial return sufficient to maintain state-of-the-art medical practices

These 4 complementary interests comprise the quality business strategy and attention to the four of them is paramount for long-term success. None is sufficient alone; accomplishment within each is requisite for a business to thrive.

Quality in health care has always been viewed as a prerequisite to excellent patient care yet we know it varies dramatically across the country. Historically, most quality departments or functions have focused predominantly on achieving accreditation and meeting regulatory reporting requirements. In the 1980s and 1990s, health-care institutions started to introduce more engineering principles and process improvement activities, but many abandoned these efforts as they did not achieve a return on investment. They were largely outside the core operations of the enterprise. Improvement in health-care quality should pay dividends similar to those accrued in other industries: greater market share, lower cost structure, and command of higher prices. If a business acts to focus on the patients' interests, their reputation, and the engagement of their workforce, financial fitness necessarily follows in a synergistic interrelationship. We contend that there is a solid business case for quality based on these 4 pursuits.

### The Needs of Patients

Quality care is appropriate, safe, and efficient. It is also part of our professional, ethical, and fiduciary responsibility. Variation, waste, and defects of care cause harm and cost money. Some waste (e.g., overutilization) and defects (e.g., incremental payment for extended lengths of stays from preventable complications) are reimbursed in fee-for-service systems. Although "profitable," this care consumes capacity and capital to build greater capacity that could be more appropriately used. The examples discussed below demonstrate that reducing waste, variation, or defects delivers better care while improving financial performance across the care delivery system.

### Waste Versus Cost

A fundamental principle of the business case for quality is based on the premise that there is not a tradeoff between productivity and quality if the right approach to removal of waste is taken. It must be understood that there is an important difference between cost and waste. If we simply remove workers from or increase workload in an area to reduce costs, quality almost always erodes. On the other hand, if we systematically remove non-value added work from a process as we look to streamline it, quality goes up as cost goes down, and value is improved.

There are 3 primary forms of provider-related health-care waste. They are process inefficiency, overuse, and preventable harm waste. The best interests of the patient are clearly to reduce waste (i.e., an experience that wastes time, an exam that has negligible benefit, or one that injures a patient is incongruous with professional fiduciary responsibility). As much as 40% of health-care dollars spent in this country is waste.<sup>5</sup> Although there is some overlap between these categories, it is

useful to view them separately to understand the full spectrum of improvement opportunities within this framework.

### Reducing Process Inefficiency Waste

Process streamlining is congruent with patient interests. It drives out variation and consistently yields a return on investment. The following examples illustrate the wide-ranging possibilities. The gains realized, although in large part from reducing variation, also include elements of waste and defect mitigation like most systems engineering improvement work.

### Orthopedic Surgery

A multi-disciplinary team of orthopedic surgeons, anesthesiologists and quality improvement analysts at Mayo Clinic set out to improve the care of patients undergoing primary hip and primary knee replacement. Their work resulted in substantial changes in preoperative care, scheduling, staffing within the operating suite and postoperative care to reduce non-clinically warranted variation and waste.

At the beginning of the work, Medicare reimbursement margin for primary hip and knee arthroplasty replacement surgery was negative for all cases and surgeons. Through the use of lean methodology, including value stream mapping, a standard approach that optimized patient outcomes was obtained. At the end of the project, all orthopedic surgeons had standardized to an agreed upon best care process model (e.g., order sets, prostheses, patient education, materials, medications, preoperative, intraoperative, and postoperative flow), and all surgeons had break-even or positive margins.

We used an internally developed standardized managed diffusion system to successfully spread the care process model to all of our sites with annual savings of approximately \$2.6 million. Beyond these primary reductions in cost, there have been meaningful quality improvements including a 40% reduction in blood product utilization and reduced infection rates. Over the year of improvement work, the average length of stay went from 3.8 to 2.7 days, with a decrease in hospital readmissions from an average of 3% to 2.6%. Staff satisfaction improved with no negative effect on patient satisfaction.

### Cardiovascular Outpatient Clinic

A physician-led multidisciplinary team undertook similar work that yielded a \$2.3 million net savings. The 6-month lean production work in the Mayo Clinic Cardiovascular Health Clinic resulted in 7 improvements: 1) physician fill rates increased from 70% to 92%, 2) cancellations and no-shows decreased from 30% to 10%, 3) high financial yield patients increased from 150 to 200/month, 4) wait time for access to appointments fell 91% from 33 to 3 days, 5) face time with care providers increased from 240 to 285 minutes, 6) process steps were reduced from 16 to 6, and 7) adequate material available to proceed with patient care increased from 5 to 65%. The devoted resources yielded a 5:1 return on investment.

Numerous other initiatives have been completed that demonstrate similar success. To offer a variety of areas where these approaches are applicable, we also note the following:

- Increased throughput on CT scanners: This project performed at Mayo Clinic in Arizona improved equipment utilization, reduced staff required, and improved patient throughput for an annual savings of \$770,000. Additionally, a one-time capital purchase of an additional CT scanner (\$900,000) was avoided.
- Cardiovascular Surgery and Anesthesiology: A rapid recovery pathway was created in cardiac surgery that included integrated standardized electronic order sets for postoperative

hospital care (including ventilator weaning protocols). The standardized care processes “automatically” advance patients through milestones of care. Intraoperative protocols were also standardized and streamlined. This resulted in reduced length of stay in the intensive care unit and hospital (11% shorter) and a savings in operating room staffing (to match work load) by more than 30%, from 88 to 64 hours per day. There was a reduction in the reoperation for bleeding by approximately 30% (1.69 to 1.19%). The systems engineering work has demonstrated an annual savings of approximately \$8 million (approximately 5% cost per case for the overall cardiac surgery service line). In addition to the ROI from reducing process efficiency waste, an additional savings came from reduction of blood product overuse. Collaboration between cardiovascular surgery and anesthesiology resulted in an evidence-based algorithm that reduced blood component transfusions by 57%.

### Reducing Overuse Waste

Overuse is a substantial problem when we look at the harm done to patients. It includes not only the direct cost but also the cost of patient inconvenience (e.g., time off work) and the risk of unwarranted interventions, including unnecessary exposure to ionizing radiation from some imaging tests. In addition, incidental findings of no consequence further multiply the risk and cost by leading to unwarranted tests and procedures while generating tremendous anxiety for patients. Reducing overuse is aligned with the best interests of the patient.

Appropriate utilization of medical resources is ethical and saves money for the health-care system. In today's environment, the savings most often go to the insurers. Increasingly, there are financial rewards for addressing overuse (e.g., DRGs, ACOs, capitation, employees' plans). Overuse is encouraged by fee-for-service reimbursement. It must be addressed systemically with payment reform, but there are ample opportunities that providers can address and benefit from today (e.g., The American Board of Internal Medicine Foundation *Choosing Wisely* program to help physicians improve stewardship of finite health-care resources).<sup>15</sup>

### Provider-insured Employee Plans

Improvements in ambulatory and primary care outcomes clearly have societal value and financial benefits. The business case is most often clear for employed populations and those in a capitated environment. Substantial gains can be made from superior chronic disease management and use of generic drug prescriptions.<sup>16</sup> Although the ethical case is strong, the business case in today's reimbursement environment is, for the most part, absent beyond self-insured populations of medical centers. Improving preventive care in chronic disease management based on evidence has been shown to lower costs by improving care, reducing emergency room visits, and lowering hospital admission.<sup>17</sup>

Virginia Mason Medical Center has demonstrated the economic case for improvement. Development of a clinical low back pain value stream dramatically reduced waste and delays for patients. Overall waiting times decreased from more than a month to 1 day, and fewer patients received MRI scans. Patient satisfaction and return to work time improved. Clearly, there is a societal case for this substantial improvement work. There was not a business case until health-care center leadership negotiated a better reimbursement plan from the employer for physical therapy.<sup>18</sup>

Provider employee plans are the logical first place to demonstrate that waste reduction improves care while strengthening

the financial position of the business. Self-insured employers can realize impressive gains from quality improvement. Advocate, Inc. demonstrated \$6M annual savings by instituting programs to improve diabetes and asthma care, and to screen for depression in employees with coronary artery disease.<sup>19</sup>

In a pediatric population complex care coordination improvement work at Mayo Clinic has increased parent satisfaction and decreased overall costs 51% (saving approximately \$1 million annually). These savings have been realized by providing ready access to advice and nonvisit care options for patients with complex diseases and high potential for hospitalization and utilization of tertiary care services. The project utilized nurses as care coordinators and navigators for children and their parents. Their duties included proactive phone calls to check a patient's status and provide reassurance, managing home care support, care conferences involving community, and subspecialty partners to optimize care and acting as a liaison to expedite care when needed.

### Reducing Preventable Harm Waste

Strategic proactive efforts to reduce adverse health-care events obviously benefits patients but also yield a financial return on investment. Based on 2442 hospitalizations with an adverse event, the mean incremental cost of treating patients with an adverse event at Mayo Clinic was \$26,851 (95% confidence interval, \$22,905–\$30,561). The mean incremental length of stay was 8.6 days (95% confidence interval, 7.4–10.0).<sup>20</sup>

In the Department of Veteran Affairs, the costs of adverse events have been tabulated. Falls that resulted in fractures cost approximately \$30,000. Adverse events from drugs cost approximately \$5000 per episode. Hospital acquired nosocomial infections cost a minimum of \$5000 per event. Hand hygiene and fall prevention programs have been shown to have a positive return on investment.<sup>21</sup>

Improving inpatient efficiency and standardization in most reimbursement climates hits the triad of social, financial, and business case positive return on investment. For example, the Covenant Health System, a 5-hospital integrated system in Lubbock, TX, found a 4:1 return on investment from a \$3M upfront payment in their clinical integration work with their 310 physician network. The primary sources of return on investment for the 22 measure hospital efficiency contract were decreased length of stay, fewer catheter associated urinary tract infections and reduced ventilator associated pneumonia cases.<sup>19</sup>

Similarly, work to drive out practice variation in intensive care units at Intermountain Health Care resulted in a 2-fold increase in intensivists productivity after systematic implementation of a sepsis bundle. At the same time, mortality decreased significantly.<sup>22</sup>

### Pneumonia

Work at our organization to streamline and standardize the treatment of pneumonia patients admitted through the emergency department reduced the average cost per case by 4.9% or \$446. The average length of stay decreased 0.3 days. Most importantly, this work resulted in a significant reduction in readmission rates and disease-specific mortality. (Personal communication, James Naessens, ScD, unpublished internal data.)

### Infections

The Greenlight Program has shown the hard dollar financial impact of reducing infections.<sup>23</sup> At Mayo Clinic, an understanding of the approximate average costs associated with infections combined with investments in reducing their

frequency has saved approximately \$2M annually. Our surgical site infections average \$29,754, our central line associated bacteremias average \$22,308, ventilator pneumonias \$15,882, *Clostridium difficile* from hospital transmission \$8218, and catheter associated urinary tract infections \$2799. Hard dollar, attributable, activity-based accounting costs firmly document the real costs.

In 2010, our improvement work resulted in a 15% lower hospital infection rate. This improvement was driven predominantly by reductions in central line-associated blood stream and 1 infections. For both of these, we have formally diffused a uniform care process model to all of our 22 hospitals.

### Central Lines

Our work with central line placement has created tremendous value for patients and our institution. An enterprise multidisciplinary team of experts was directed by the Mayo Clinical Practice Committee to create a care process model for placement and maintenance of central lines, including mandatory education and training materials. The approved care process model has been diffused to all 22 hospitals and training requirements have been incorporated into the credentialing and privileging system for all providers. The guideline includes mandatory simulation-based competency outcome training for any resident or fellow who will place a line. Simulation-based education for this procedure has been shown to be cost-effective with a 7:1 financial return.<sup>24</sup>

The central line insertion guideline, like all of our Care Process Models, is available in a single Web-based tool, Ask Mayo Expert, which providers can access at any time. Ask Mayo Expert is the core repository for our Clinical Knowledge Management System where standardized Mayo vetted clinical information is stored and easily retrieved by point of care provider searches. It is also used to push information to decision support systems that are integrated into the workflow of the practice. Our work to create and diffuse a central line care process model decreases infections and complication rates of placement. It also saves money. Concerted efforts have led to a 50% reduction in central line infections over the last 3 years. At approximately \$30,000 per infection, we have saved \$1M annually from cost avoidance.

The moral imperative to provide safe care justifies all efforts to reduce infections. However, even when health-care institutions are paid for hospital acquired infections, there is still a business case for infection reduction. In any given quarter, a hospital bed could, on average, be filled with 6 patients with a hospital-acquired infection or 18 patients without one. Facility utilization benefits far outweighed the revenue from treating the infection.<sup>11</sup>

### Malpractice

Malpractice rates are a manifestation of event frequency. Reduction in the frequency of adverse outcomes is associated with fewer malpractice claims.<sup>10</sup> In the last 6 years our professional liability exposure has decreased. It is possible that this resulted from higher quality care.

We define quality as the composite of outcomes, safety and service. A fundamental aspect of good patient service is interpersonal interaction. A recent study showed that more than 80% of patients did not know their physician's name.<sup>25</sup> This finding has ramifications both for communication of care plans and the likelihood that they are followed through by patients because of communication challenges. But it also has ramifications for malpractice claims. If you have a trusting relationship, a law suit is less likely; and if there is a settlement, it is likely to be lower.

Proper communication of adverse events with harm to patients substantially lowers claims from lawsuits.<sup>26</sup>

### Venous Thromboembolism Prophylaxis

Venous thromboembolism (VTE) prophylaxis reduces the risk of deep venous thrombosis and pulmonary embolism. In 2008, a 100-day quality project team was charged with improving our VTE prophylaxis practice. As a result, 98.4% of patients now have a timely decision made about VTE prophylaxis. According to a “VTE lives saved calculator,” this work saved approximately 6 lives per year from a fatal pulmonary embolism and prevented 93 VTE events. Given that the average cost of a hospital-acquired pulmonary embolism is about \$16,000 and a deep venous thrombosis is about \$9000, the savings total \$1,051,830 from the prevention of these primary events. This estimate does not take into account the cost of repeat hospitalizations.<sup>27,28</sup>

### Infrastructure Investment

Investments in infrastructure can contribute to the business case for quality improvement.

For example, we had a low frequency of defects in our very high volume specimen labeling practice. A cross-functional team achieved reduction in mislabeled or unlabeled specimens that resulted in less rework and staff savings. It also reduced undetected errors leading to less exposure to legal fees and settlements. A \$867,000 investment in label printers for inpatient and outpatient rooms was made. The large savings were in full time equivalent (FTE) labor expense, including 4 FTEs that were previously performing relabeling and partial FTEs for lab assistants and cytologists dealing with errors. This conservatively rolled up to annual savings of \$288,000. The impact of avoided patient harm on Mayo Clinic’s brand is not quantifiable.

In the high volume specimen labeling gastrointestinal endoscopy practice, we use radiofrequency identification devices in order to streamline work and reduce labeling errors. We found a reduction in transcription errors from 9% to 0.002%, a weekly reduction of assistant time in anatomic pathology for case set up of 44 hours/week and a weekly savings of 17 hours in the breakdown of cases following sign out. In a practice that does over 20,000 cases per year, these savings are substantial. Staff physician effort constituting hard stop resolution saved many hours per week and over \$100,000 per year across our practice.

The proper implementation of computerized physician order entry infrastructure can reduce costs considerably. A report from Brigham and Women’s Hospital showed that an \$11.8 million upfront expense led to annualized savings of \$28.5 million. The primary drivers of the savings included renal dosing guidance, nursing time utilization, specific drug guidance, and adverse drug event prevention.<sup>29</sup>

Similarly, bar coding in our experience has substantially reduced medication errors that reach the patient and savings related to those events. Reported savings from a \$2.24 million investment were \$3.49 million annually.<sup>30</sup>

## REPUTATION

There are solid relationships between quality, customer satisfaction, and economic returns as measured by both analytical and empirical work. There is a strong relationship between customer satisfaction and net present value.<sup>31</sup> Steps taken to improve quality and staff satisfaction should enhance an organization’s reputation. Reputation should improve patients’ perceptions and increase demand, as well as create a potential premium on pricing

that enhances organizational revenue. The rapidly growing public reporting of outcomes, safety and service data (e.g., HHS.gov hospital compare) is a potentially important driver of reputation long term.

Although many believe an organization’s reputation or brand cannot be accurately measured, all would agree it is valuable. Customer satisfaction is a key driver of reputation. The market’s expectations of a business’s quality positively affect customers’ overall satisfaction. The positive impact of quality on customer satisfaction, in turn, affects profitability.<sup>31</sup> Quality programs that successfully implement process change consistently show improvements in customer satisfaction, profitability and market share.<sup>32–44</sup> The public reporting of patient satisfaction via Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) is a positive reinforcer of the business value for improving patient experience.

There is a strong relationship between business unit level employee satisfaction and engagement with the outcomes of improved customer satisfaction, productivity, employee turnover, employee accidents, and profit. There is widespread evidence that employee engagement and satisfaction are related to meaningful outcomes at a magnitude that should support and justify funding for appropriate germane improvement activities.<sup>45</sup> We have demonstrated that a comprehensive department-based 7-pronged improvement model using provider-specific data can improve patient-reported experience.<sup>46</sup>

Process work that improves satisfaction and reputation has important and real market implications. The magnitude of these implications is magnified in the current climate of physician shopping by patients and public reporting on health-care quality.

## ESPRIT DE CORPS

Esprit de corps (i.e., the spirit of group members inspiring enthusiasm, devotion, and strong regard for the honor of the association) is a measurement of employee engagement. Employee engagement is a powerful driver of productivity, profit and customer satisfaction.<sup>45</sup> There is evidence to support service quality with profitability.<sup>47</sup>

Employee engagement is in part related to a belief that one is working for an organization that provides superlative care, which in turn connects with organizational reputation. More than salary, meaningful work is a top job satisfaction correlate.

At Mayo Clinic, our process of capital, operational and human resource allocation is tightly linked to process and system improvement. Our toll gate of resource allocation is to “Allocate no new resources to an unexamined process.” We have also recognized the value of assuring our staff that their jobs will not be at risk if they participate in an improvement initiative in their area. Few staff willingly go into an improvement initiative with enthusiasm if they feel their job is at risk. We actively practice and communicate approaches that achieve identified reductions over time through attrition or reassignment (with additional training if necessary). Trust among staff and leadership is critical if progress is to be made and esprit de corps is to be maintained.

Employee engagement contributes positively to relational coordination and other measures of teamwork. Defects in hand-offs and communication are an important contributor to a large portion of sentinel events in this country. There is a strong case for growing employee engagement, teamwork and relational coordination not only because it induces greater productivity, but also because it reduces defects of care. It, therefore, has a return on investment both from productivity gains and event reduction results. We are confident that work to augment multidisciplinary

teamwork, relational coordination, and improved handoffs better serves our patients and delivers a financial ROI via fewer errors and greater productivity. It is difficult to accurately quantify most of these gains. We believe they are real and part of the business case, although we cannot confidently attach hard or soft dollar savings to them.<sup>48</sup>

In 2005, we started our Quality Academy as a means of educating our workforce on the tools, resources, and models that can be used to improve care. Beyond the improvement work and training, it has served as a very effective employee engagement vehicle. Our approach is a balanced industry-validated value creation system. We are not focused on a single improvement tool.

Our long-term strategy for continuing to realize the business case for quality is building both behavioral and systems competency among all of our staff. Today, we now offer 30 different courses, which include focus areas such as Lean Sigma, Rapid Cycle Improvement, Change Management, Queuing Theory, 5S, and Statistical Process Control. We offer a TEAM's Training Program where multidisciplinary teams with a formal charter can enter a 100-day period of didactic training, coaching, and mentoring. This training includes 8 face-to-face meetings with their team and our quality improvement analyst faculty.

We have a Quality Fellows Program that includes staff recognition at the bronze, silver, gold, and diamond levels that roughly equate to the American Society for Quality's yellow through master black belts. Course work and testing, either online or in person, has catalyzed now over 19,000 of our 56,000 staff to reach a level of systems competency as recognized by the Quality Fellows Program. A significant unintended dividend of the whole experience is the esprit de corps boost we achieved by recognizing staff for their work to become certified and engaged in improving their work environment. Leadership structures and systems like the Quality Academy help ensure that there is organization-wide awareness of patient safety performance gaps and direct accountability of leaders for those opportunities.<sup>49</sup>

## FINANCIAL RETURN SUFFICIENT TO MAINTAIN STATE-OF-THE-ART MEDICAL PRACTICES

When we began to accelerate value creation work, our organizational leadership supported it because it was aligned with the needs of the patient. It was not adopted for financial reasons. In fact, many viewed quality improvement as an important, large, and mission-critical, but necessary, expense. We partnered with our Department of Finance colleagues to create a templated soft and hard dollar analytical model (Table 1) to determine the financial returns from our outcome, safety, and service improvement work. We felt it was critical that the analysis was led by our finance team to ensure objectivity. Today, our value creation work is widely viewed as part of our business strategy and not just as an important expense.

### Calculation of Hard Dollar Versus Soft Dollar Savings

The business case for quality improvement is composed of several different attributes that include hard and soft dollar financial ROI that accrue from a reasonable rate of discounting from avoided costs, reduction of losses, or an increase in productivity. We track our financial ROI with a structured tool with criteria established for the independent analysis of financial return on investment (Table 1). The financial analysis involves the monitoring of investments and distinguishes hard dollar

from soft dollar savings. They, in general, accrue from eliminating waste, productivity gains, and reduced length of stay. Hard dollar savings have these general attributes: 1) the effect on cash flow is definite; 2) the effect on cash flow is readily quantifiable; 3) the timing tends to be near-term, that is months; and 4) hard dollar savings tend to have transaction-based evidence supporting their documentation (e.g., realized cost reductions, reduced hospital length of stay). Soft dollar savings come from improvement work that increases capacity, raises productivity without associated staff reductions, creates future cost avoidance, or lowers malpractice costs.

The vast majority of our initiatives were selected because of the opportunity to improve care, not financial return. The value equation we use is as follows: Value = Quality/Cost over time. Distinguishing "numerator-intensive" from "denominator-intensive" work in a sense is artificial because our systems engineering approach, and the tools deployed are the same. Furthermore, work on one part of the value equation necessarily affects the other part, usually in a positive way.

The incremental out-of-pocket centrally administered investment has averaged roughly \$3.5 million over the past 6 years. It was used to grow the quality analyst staff, establish the Quality Academy and support the resource needs of selected projects. It should be noted that much of the improvement work that we have done over the last 6 years did not have a substantive financial return on investment (although it did improve the reliability of our care). However, the balanced portfolio of our work did.

Every effort is made to estimate revenue impacts, but we have found this to be the most challenging part of the financial analysis. A gain in efficiency can prove to be very positive in a capitated environment. However, the same improvement can negatively affect the revenue stream in another patient with fee-for-service reimbursement. Our goal remains to improve patient value, and we are confident that financial gains will follow with this focus.

Our current rolling 3-year average return is \$46 million. Our recent experience has shown annual hard savings in the \$15 to 20 million per year and soft savings of \$25 to 30 million per year. The ROI calculation takes into account the annual cash flow impact of an asset divided by the cost of the asset and use of an annual cost of capital number that reflects and takes into account the time value of money. Based on our performance, we can confidently and conservatively expect to harvest at least a 5:1 return on investment for value creation work. With disciplined diffusion and measurement efforts, these savings can be sustained and cumulative. If we are able to sustain the improvement gains, then the 3-year rolling average underestimates the true financial value to the organization. Most system engineering efforts result in process changes that yield dividends for as many years as an organization can sustain them. They are usually not just 1-year gains.

Our conservative financial analysis does not include any projects that had a return on investment of less than \$100,000. We also did not calculate financial dividends accrued by any other party (i.e., much of our work clearly saved money for insurers, patients and/or employers). We solely looked at hard and soft dollar return to our institution.

Evolving reimbursement methodologies are starting to change the landscape. Approximately \$1.7B will be involved in the Medicare zero-sum game hospital value-based purchasing program when it is fully deployed. Value-based purchasing and other pay-for-performance reimbursement models may become a significant dividend supporting the business case for quality. The growth of payment for the value of health-care delivered instead of the volume only serves to augment the solid business

**TABLE 1.** Quality Financial Impact Guidelines for Determining "Hard" Versus "Soft" Financial Impact**Conceptual Overview**

**Hard Impact** has these general attributes:

1. Effect on "cash flow" is definite.
2. Effect on "cash flow" is readily quantifiable.
3. Timing tends to be "near term" (i.e., months, maybe even a year or two depending on project scope, duration)
4. Items tend to have transaction-based evidence.

**Soft Impact** has these general attributes:

5. Effect on operations is identifiable; however, cash flow is indirectly impacted.
6. Effect on "cash flow" is indefinite or not quantifiable.
7. Timing tends to be "long term" (i.e., may require a year or two, or more, before cash flow impact is realized).
8. Long-term impact is likely realizable. If not realizable, ignore.

**Some Examples****Infrastructure (usually multiple years of service)**

9. Equipment to be acquired (capital \$)
10. Equipment presently in place but not needed in future (to be sold on market)
11. Software and related costs (i.e., to make operational)
12. Space (additional or reduced square footage)
13. Remodeling (e.g., to tailor space to its intended usage)
14. Defer capital expenditure (impact is the investment opportunity)

**Capacity (productivity)**

15. Free up additional capacity (potential increased patient volume and related revenue)

**Revenue**

16. Direct increase/decrease in reimbursement
17. Increased revenue because of increased capacity without adversely impacting margin

**Contractual Services**

18. Increase or decrease in contract programmers, consultants, others not on Mayo "payroll"
19. Increase or decrease in maintenance contracts
20. **Malpractice cost avoidance (includes legal, settlements, etc.)**

**Supplies (usually consumed in days, weeks, or possibly months)**

21. Increase or decrease in equipment (expensed, minor \$ each)
22. Increase or decrease in supplies (used in "day-to-day" operations)

**Staffing/human resources**

23. FTE increase or decrease from existing levels, that is, with firm commitment to increase or decrease FTE
24. FTE reduction from existing levels with "redeployment" to other activities
25. FTE avoidance (future)
26. Effort savings across multiple jobs/persons, with no FTE reduction
27. Employee days away from work
28. Project effort (existing staff, "quality is everybody's job")

**Hospital inpatient impacts**

29. LOS increase or decrease with NOI impact (variable expense)
30. LOS increase or decrease with unclear or no NOI impact
31. Readmissions - revenue impact
32. Readmissions - expense impact (variable \$)

	Hard	Soft	Neither
9. Equipment to be acquired (capital \$)	X		
10. Equipment presently in place but not needed in future (to be sold on market)	X		
11. Software and related costs (i.e., to make operational)	X		
12. Space (additional or reduced square footage)		X	
13. Remodeling (e.g., to tailor space to its intended usage)	X		
14. Defer capital expenditure (impact is the investment opportunity)		X	
15. Free up additional capacity (potential increased patient volume and related revenue)		X	
16. Direct increase/decrease in reimbursement	X		
17. Increased revenue because of increased capacity without adversely impacting margin	X		
18. Increase or decrease in contract programmers, consultants, others not on Mayo "payroll"	X		
19. Increase or decrease in maintenance contracts	X		
20. Malpractice cost avoidance (includes legal, settlements, etc.)		X	
21. Increase or decrease in equipment (expensed, minor \$ each)	X		
22. Increase or decrease in supplies (used in "day-to-day" operations)	X		
23. FTE increase or decrease from existing levels, that is, with firm commitment to increase or decrease FTE	X		
24. FTE reduction from existing levels with "redeployment" to other activities		X	
25. FTE avoidance (future)		X	
26. Effort savings across multiple jobs/persons, with no FTE reduction		X	
27. Employee days away from work		X	
28. Project effort (existing staff, "quality is everybody's job")			X
29. LOS increase or decrease with NOI impact (variable expense)	X		
30. LOS increase or decrease with unclear or no NOI impact		X	
31. Readmissions - revenue impact	X		
32. Readmissions - expense impact (variable \$)	X		

This table was not adapted from any other known guideline. Colleagues in the Department of Finance settled on the final guideline through a collaborative series of meetings with Quality Management Service's leaders.

cases that are inherent in the improvement of reliability of processes and systems of care.

**DISCUSSION**

Businesses that invest in their patients' interests, their reputation and the engagement of their workforce will ascertain a measurable financial return on investment. Care that is delivered with processes that have negligible waste is ideal and aligned with professional obligations to serve patients. Driving out waste reduces costs. High reliability begets a good reputation

and enhances employee engagement. Employee engagement increases customer satisfaction which drives positive financial performance. It makes sense, and it works.

Improvements in reliability with financial dividends do not happen automatically. In fact, there is much evidence of failed quality programs. Successful quality programs require a balanced approach of engineering, cultural change, infrastructure support, and disciplined execution.<sup>50-58</sup>

Leatherman et al.<sup>3</sup> noted 5 impediments to realizing the business case for quality in health care: (1) consumer's inability to perceive quality differences; (2) displacement of payoffs in time

and place; (3) disconnection between consumers and payers via administrative pricing; 4) failure to pay for quality, while paying for defects, and 5) uneven access to information among clinicians. These 5 impediments are real but not a reason for inaction. We have laid out a strong business case and highlighted the ample opportunities within every institution to focus on improving the outcomes, safety, and service of our patients.

## CONCLUSION

The business case for health-care quality improvement can be realized today. Despite serious issues with misalignment of financial incentives, a balanced portfolio of work to streamline processes and reduce defects benefits the bottom line. The beauty of the business case for quality is that it starts and ends with the best interests of the patient.

The business case enables leaders to garner sufficient resources to deliver more reliable care. Quality is an enlightened strategy, not an expense.

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**TMIT**

3011 North IH-35  
Austin, TX 78722  
(512) 473-2370

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