

Lean Healthcare SHIP Lean Training & Mini- Project



RE-THINKING HEALTHCARE
IMPROVING PATIENT CARE THROUGH DESIGN

Issues and Challenges in Health Care Today

No other industry places as high a premium on quality of service as health care. Leading companies in other industries often boast that their service quality differentiates them from competitors. But only in health care does quality of service have a direct impact on the health and safety of those served. Indeed, service quality that does not meet the minimum required standards of health care providers can mean the difference between life and death.

Given the essential requirement of quality of care in the health care industry, one would reasonably expect health care providers to lead the way in initiating and maintaining effective quality management systems. In fact, health care industry leaders have worked for decades to improve patient care through a myriad of quality programs. Unfortunately, many of these quality improvement efforts have fallen short of expectations.

One measure of this shortfall is the human and financial cost from deaths and illnesses attributable to medical errors. According to one study, approximately 200,000 Americans die each year from preventable medical errors and facility-acquired illnesses, at a direct cost of nearly \$20 billion. In addition, the broader economic impact from medical errors may well approach \$1 trillion annually when lost economic productivity due to death or illness is calculated.

The health care environment is also increasingly unsafe not just for patients but for health care workers as well. In 2011, one of out every 20 full-time U.S. health care workers experienced a nonfatal injury or illness, an incident rate second only to workers in agriculture, forestry, fishing and hunting occupations.

During that year, health care workers reported more than 631,000 incidents of injuries or illnesses in connection with their work. One estimate puts the cost of worker injuries and illnesses in the health care workplace at over \$10 billion annually.

These and other statistics clearly illustrate the human and financial consequences when health care institutions fail to consistently deliver the highest possible quality of care to patients. They also highlight some of the inherent limits in health care's traditional approach to quality improvement. These limits include: a reliance on a host of individual projects, rather than a coordinated system-wide approach to quality improvement; a quality strategy formulated and handed down from senior management without input from the employees responsible for service delivery; and the failure to properly align an institution's approach to quality improvement with its mission and strategy.

The American health care industry is currently undergoing an unprecedented transformation, as health care providers are actively engaged in efforts to bring their practices into compliance with the requirements of the 2010 Patient Care and Affordable Care Act. As a result, health care providers are under pressure to increase access and reduce costs while improving the quality of patient care.

Successfully overcoming the limitations of legacy quality programs while also addressing today's challenges requires new approaches to quality improvement, approaches that can directly lead to better quality of care through improved work flow and increased operating efficiencies.

The Origins of Lean Principles

Modern quality management programs are rooted in pioneering research conducted more than 100 years ago by Americans Frederick Winslow Taylor and Walter Shewhart. Taylor focused on studying existing workflow processes, experimenting with alternative processes that removed unnecessary or inefficient activities and adopting those processes that resulted in consistent production quality and improved worker productivity. Shewhart was the first to implement statistical process control, a quality control method in which data are regularly analyzed in order to identify anomalous production patterns.

Many of the efficiency assessment methods championed by Taylor and implemented by automotive icon Henry Ford in the U.S. were studied by manufacturers in other countries, including Sakichi Toyoda, a Japanese entrepreneur and textile manufacturer. Toyoda's efficiency investigations were later applied by his son, Kiichiro Toyoda, the founder of Toyota Motor Corporation, initially in the 1930s and especially in the late 1940s and 1950s. Around the same time, Edwards Deming, an advocate of Shewhart's quality control theories, was invited to Japan by the Japanese Union of Scientists and Engineers to train engineers and managers on statistical process control methods.

Deming later worked with a number of Japanese corporations and lectured extensively in Japan, resulting in the widespread application of these principles. At Toyota, it is Taiichi Ohno who is widely credited with developing the Toyota Production System (TPS) in the 1950s and 1960s. Based largely on Shewhart's and Deming's production efficiency principles, the TPS is a comprehensive, systemic approach to manufacturing that reduces or eliminates waste and production inconsistencies to maintain or increase value to customers.

The TPS also embraces a number of underlying principles, including the value of organizational learning as a tool for fostering continuous improvement. The principles and practices collectively known as Lean production (or Lean, for short) are largely derived from the philosophy and approach embodied in the TPS.

The promise of more efficient production with reduced overhead costs has spurred interest in lean principles for more than 20 years, and lean thinking has been successfully adopted and adapted by a wide range of international corporations at facilities worldwide. Increasingly, Lean principles and practices are being applied in non-production environments as diverse as software development and education. More recently, efforts to introduce Lean principles in health care have gained considerable traction, as health care institutions and providers seek initiatives that move beyond the limits of traditional production efficiency or quality improvement programs. Indeed, Lean initiatives in health care

offer the potential to achieve quality of care objectives, improve patient and worker safety, speed delivery of medical services, and lower costs.

Lean in Practice

At its core, the Lean approach focuses on customer value by improving processes to reduce waste and eliminate inefficiencies. Regardless of the specific setting in which Lean thinking is espoused, the application of Lean is based on the following five defining principles:

1. **Specify value** — Define value from a customer’s perspective. Learn what a customer values and how their experience could be improved to support the best outcome.
2. **Identify value stream** — Evaluate how all the steps of a process or procedure should be organized to deliver a seamless customer experience; eliminate any steps that do not directly contribute to achieving that goal.
3. **Flow without interruptions** — Whenever possible, eliminate waste between steps of a process so that a product or service is delivered as efficiently as possible.
4. **Customer “pulls” services** — Allow the customer to receive or request products or services if and when needed; do not push a product or service that a customer is not ready to receive.
5. **Pursue perfection** — Continuously adapt to an ever-changing environment and customer needs in order to deliver a product or service of the highest possible quality.

The application of Lean principles depends on an organization’s commitment to continuously improving the value provided to a customer. In practice, a Lean improvement system uses science-based problem-solving methods to identify root cause issues, and applies improvement tools to create new standard procedures that reduce waste and improve quality. The effectiveness of new procedures is monitored to assess results, and changes are incorporated to further improve the process.

The most successful Lean initiatives are: implemented by front-line employees, supported by organization leaders, coached by staff Lean experts, and consistent with an organization’s mission and strategy. They are systematic, not project driven, and are not a reaction to a specific condition or event. Taking this approach, the application of Lean principles contributes to the creation of an organizational culture in which continuous improvement is the rule and not the exception.

An essential element of an effective Lean-driven culture is Lean leadership. Lean leadership is the commitment of an organization's leaders to empower its employees to continuously identify and implement changes that will improve customer value. In the most successful examples, Lean leadership starts at the highest levels of an organization and requires a willingness to ask questions rather than provide answers so that others can develop and implement effective and lasting changes based on their direct experience.

Lean leadership also requires an ongoing commitment to training and development so that all employees have the knowledge and the skills necessary to identify root cause issues and to implement changes that improve value. Finally, Lean leaders must make sure that the mission and values of their organizations are aligned with the goal of increasing customer value through continuous improvement.

Lean principles and practices are being successfully applied in daily processes used by health care leadership and staff at a number of health care institutions. In one rural hospital, for example, Lean principles were applied as part of an effort to eliminate medication errors. The hospital estimated that nearly one-third of pharmacy staff time was spent resolving problems related to incomplete, unclear or illegible medication orders, placing patients at risk and costing approximately \$155,000 per year just to clarify problem medication orders.

In this instance, the application of Lean principles resulted in process changes to post-operative and medicine unit orders. These changes have reduced the average amount of time required to process a medication order to less than five minutes. More importantly, the changes have dramatically reduced the number of medication orders placed on hold for further clarification, from 2% of all orders to just 0.02%.

Problems with post-operative medication orders have dropped from 34% to 10%, thereby decreasing the amount of time patients wait to receive medication following surgery. And the percentage of unclear post-operative medication orders has been reduced by 42%. These improvements have also resulted in a reduction in the time hospital pharmacists spend resolving problems with medication orders, allowing them to focus more time on value-added activities.

A Business Case for Lean in Health Care

The application of Lean principles and practices in health care settings can dramatically improve the delivery of patient services and the quality of patient care. But Lean initiatives in health care can also provide important business advantages for health care institutions, including the following benefits:

- Improved patient outcomes — Lean initiatives can increase value for patients by providing better health care services that more effectively treat medical conditions and reduce rates of recurrence. Such results can prevent unnecessary readmissions and the associated added costs or reduced reimbursement rates.

- Increased patient satisfaction — Patients are becoming more knowledgeable consumers of health care services. Satisfied patients are more likely to remain with health care providers who provide quality services in a timely manner and are less likely to change health care providers.
- Reduced operating costs — Lean initiatives typically result in greater operating efficiencies that lead to reduced staffing and facilities requirements. Employees can be deployed to perform more value-added functions, and facilities can be redesigned to offer new or expanded services.
- Stronger financial performance — By increasing productivity and reducing costs, health care institutions can achieve stronger financial results, thereby building a more solid financial base and providing financial resources for further investment.
- Greater employee engagement — Lean initiatives depend on empowering employees to increase patient value. Empowered employees are more engaged and are likely to exhibit higher levels of job satisfaction. These results can lead to increased employee retention and reduced turnover rates.

Unlike other quality improvement initiatives, efforts based on Lean principles are not capital intensive. Instead, they are built on alignment of an entire workforce focused on continuously improving patient value. Successful Lean initiatives stimulate service improvements that benefit patients as well as the health care institution and its employees, often with little or no direct financial investment.

The business of health care is undergoing a significant transformation as health care institutions and leaders seek innovative ways to improve quality of service and reduce costs. Traditionally applied in production settings, Lean principles and practices are now being implemented in non-production-related settings, including health care environments.

Lean offers significant advantages over legacy quality improvement models by increasing efficiency and reducing waste while simultaneously improving quality of patient care. With its focus on increasing value, Lean has the potential to help balance the costs associated with health care, increase the job satisfaction of health care professionals, and fundamentally improve the health of our communities.

Eight Wastes in Health Care

Waste is any element of a process that does not add value to a service or outcome, but increases cost. In the health care context, value is defined as the provision of customer/patient service and satisfaction. Any activity which doesn't contribute to this is classified as waste.

Identifying the eight wastes can help to achieve improvement in health care by enabling staff to examine their own workplaces and eliminate wasteful activity. This improves the patient experience as well as gives front line staff more time to reinvest in services. As waste is a symptom rather than the root cause of problem, it indicates problems within the system or organization.

Typically in a health care process, 95 percent of a total activity is non-value-added. The concept of Lean is to eliminate the waste and the non-value-added activities. Removing waste in a process requires intuition, creativity, courage, and strength. By developing and executing Lean strategies, a cultural shift in your organization will begin to take place. You will notice that it is much easier to institute change, provoke thought and leadership from all team members, and develop efficiencies you never believed to be possible.

The term "waste" encompasses an array of definitions for hospitals and health systems, including wasted time, finances, steps and human potential, to name a few.

1. **Defects.** This includes all time spent doing something incorrectly and inspecting or fixing errors. One example of defect waste is the time spent looking for an item missing from a surgical case cart.
2. **Over-production.** This includes doing more than what is needed by the patient or doing it sooner than needed. A broad example of this is the performance of unnecessary diagnostic procedures.
3. **Transportation.** Unnecessarily moving patients, specimens or materials throughout a system is wasteful. This type of waste is evident when the hospital has a poor layout, such as a catheter lab located a long distance from the emergency department.
4. **Waiting.** Waiting for the next event or work activity to occur can eat up time and resources. Patients waiting for an appointment is a sign of waste, as is employees waiting because their workloads are not level.
5. **Inventory.** Hospitals create waste when they incur excess inventory costs, storage and movement costs, spoilage and waste. One example is letting supplies expire and then disposing of them, including out-of-date medications.
6. **Motion.** Do employees move from room to room, floor to floor and building to building more than necessary? That accounts for one type of waste. Lab employees may walk miles per day due to a poor hospital layout, for example.

7. **Over-processing.** This describes work performed that is not valued by the patient or is caused by definitions of quality that aren't aligned with patient needs. One example is extra data stamps put onto forms, but that data never being used.
8. **Human potential.** This waste is caused when employees are not engaged, heard or supported. Employees may feel burnt out and cease sharing ideas for improvement.

Eliminating waste along entire value streams, instead of at isolated points, creates processes that need less human effort, less space, less capital, and less time to make products and services at far less costs and with far fewer defects as compared with traditional business systems. Organizations are able to respond to changing customer desires with high variety, high quality, low cost, and with very fast throughput times. Also, information management becomes much simpler and more accurate.

The Concept of Flow

Do patients, providers and staff want to wait in your hospital? No, of course not. Ideally, they want to go from one process to the next process - never having to wait. They want, and need, service to flow. Because waits, delays, and cancellations are so common in health care, patients, providers and staff assume that waiting is simply part of the care process.

When patients, providers and staff have to wait, then the flow of the value stream has stopped. Basic to Lean is to create processes where there are no stoppages or interruptions. By removing wasteful or non-value-added activities properly, and increasing the value for the client, we are able to reach this ultimate goal of flow.

The term "flow" describes the progressive movement of people, equipment and information through a sequence of processes. In health care, the term generally denotes the flow of patients among staff, departments and organizations along a pathway of care.

Flow is not about the what of clinical care decisions, but about the how, where, when and who of care provision. How services are accessed, when and where assessment and treatment is available, and who it is provided by, can have as significant an impact on the quality of care as the actual clinical care received.

The concept of using flow to improve care has received increasing traction within health care, especially in relation to reductions in patient waiting times for emergency and elective care. Awareness has been growing of the ideas, first tested in other industries, and results that organizations have generated by applying flow thinking to their organizations.

The goal of flow is to eliminate the use of batching and queuing within a process. Processes that use batches and queues produce multiple wait times and interruptions. The U.S. health care system is built on batch and queue systems. A

patient who feels sick calls his physician and makes an appointment. At the appointed date and time, he arrives at the provider's office and waits to be seen. Upon examination, the doctor may recommend the patient see a specialist, have laboratory tests performed, and even begin taking a prescribed medication. Each step entails waiting for a service or product to be delivered.

Batches and queues are also evident in processes involving reimbursement, coding, and chart review. Even electronic health record systems, promised to streamline health care, rely on some form of batching and queuing. For example, a patient's phone message and request for appointment may be stored in a queue on the toolbar of the physician's computer. If the physician reviews his queue before going home and calls back only those patients he thinks are the most severe, the system actually impedes providing needed treatment in the timeliest manner.

The ultimate goal of flow is to ensure that a process is continuously worked on until it is complete. For the patient, this means receiving the care he or she needs without waiting, interruptions or suffering unnecessary pain.

By enabling stakeholders to more easily understand the issues, they can more readily identify and link root causes of issues to specific activities and steps within a process. This also assists with prioritizing process improvements. Whereas traditional people and process improvement tends to focus on a single process, value stream mapping provides a complete end-to-end perspective.

Understanding patient flow requires looking at the whole system of care, not just in isolated units. Reducing variation in flow has been shown to improve overall patient flow. Providing patients with timely access to appropriate care is an essential element of high-quality care, because when care is provided is often as important as what care is provided.

As the national policy agenda focuses more strongly on integration among primary care, acute services and social care, the need to understand and improve how patients flow through systems is more important than ever. High-profile cases of failures in the timeliness and quality of care serve as warnings of the painful consequences of poor-quality systems and processes.

The Voice of the Customer

Every organization serves a unique need for the customer. A key feature that differentiates a successful organization from a not-so-successful organization is that a successful one listens to what the customer needs and creates products and services that exceed expectations. Health care attracts the most dedicated, well-intentioned professionals who truly care about the well-being of their customers, the patients.

However, unlike other service organizations (think hospitality industry), health care professionals will tell you what they think their customers want and need, but will often fail to directly ask what their patients *actually* want by determining the Voice of the Customer.

The impact of customer satisfaction on profitability is widely researched and reported. For every patient complaining, there are 20 more who do not directly complain, but will not return. Understanding the patient's wants has an immense implication on the satisfaction, retention, staff morale and profitability of an organization.

In health care, the "customer" perspective has historically been gathered mainly as a risk management or public affairs activity to reduce the possibility of costly litigation or negative media exposure. This focus on mitigating negative patient feedback began to evolve as the quality improvement (QI) movement took hold in the early 2000s. Quality improvement science has evolved the concept of customer satisfaction to a more holistic view, often called the Voice of the Customer (VOC).

The VOC is the idea that the wants and needs of the customer are central to any business or service. In Lean methodology, anything done by an organization that does not provide value to the customer is waste and should be minimized or eliminated. Regardless of the type of QI science utilized, a truly QI-focused organization has a strong, fundamental link to the VOC.

Too many people consider only the voices of external customers (in health care, the external customer is the patient). To design something that is truly patient-friendly, designers must take into consideration all of the customers, both internal and external. In health care, this means creating processes that take the needs of the patients and their loved ones, housekeepers, nurses, physicians, and lab technicians into consideration.

Considering the needs of internal customers can also mean involving people in the QI initiative or "redesign" who are not normally involved in direct health care delivery. These internal customers should be included, as they are passionate about the care and services they provide and are up to date on new ideas in their fields. These individuals may play a significant role in creating new and innovative solutions to QI concerns. Incorporating the voice of these innovative internal customers moves QI beyond just meeting current customer expectations and preventing problems to truly customer-focused service delivery.

Some common Lean tools used to elicit the Voice of the Customer in health care are surveys, customer complaints databases, focus groups, Kano Model analysis, leadership rounds (management by walking around), process observations (watching the actual process), encounters based on "moment of truth" (Carlzon defines a moment as truth as the point where the customer interacts with the organization and forms an impression on the quality of the service provided), mystery shoppers, Critical to Quality Trees, Quality Function Deployment (QFD) and some proprietary off-the-shelf packages.

To truly create high-quality, focused health care that is meaningful to patients, we must ask patients (external customers) what it feels like to seek and receive health care and related services. We have to ask health care providers (internal customers) what it feels like to provide health care services. We must engage all health care customers in the quality improvement process to improve health care delivery. Establishing a formal connection to the VOC by actively engaging customers in ongoing quality committees or patient advisory groups ensures there is a constant flow of information both to and from the customer. Only by listening to customers can we hope to meet their needs.

Lean Culture Transformation

Lean is often perceived as a “toolbox” of concepts and methodologies that are implemented and tailored to an organization. While this statement is true, it is only a small step on the Lean journey to operational excellence. Organizations stand little chance of implementing Lean unless they have paid at least equal (or more) attention to creating the right culture, and the conditions and circumstances, which can become the foundation for implementing change. Just imagine what you could achieve if your organizational culture actively welcomed change.

Consider how easy it would be to install the training, the techniques, the methodologies and the common language that accompanies any Lean strategy, if staff at all levels chose to perceive change as an aid to their work, rather than as a hindrance and distraction from their daily, weekly and monthly targets. The organizational culture determines the success of Lean or any other change initiative. Sometimes the biggest problems facing implementation of Lean thinking have nothing to do with the tools, but rather the behaviors inherent in the organization’s culture. Nothing changes until behavior changes.

Organizations are social systems composed of conflicting interests focused on working to ensure that strategic goals are achieved. Culture change is about driving performance across the organization to exceed customer expectations. Change is not just a technical-rational process. It is a behavioral, emotional and political process.

Most organizational cultures exist by accident or default. The original owners or architects who created the organization ensured that their values of transacting operations were central to “how things get done.” This became their culture, but over time, and with key players and new actors entering the scene, the organizational culture changes.

Leadership for change is perhaps the most important aspect of implementing a Lean management system. This calls for leaders to lead the change, not manage it. It is driven by behaviors like coaching, modeling, mentoring and empowering. It is leadership taking the responsibility for the transformation and actively crafting the organizational culture. It is leadership establishing the behavioral expectations and driving accountability to those expectations.

Everyone in the organization must first understand the need for change and then embrace their role in that change model. The model must be driven by the empowerment to solve staff's own problems and be recognized for those efforts.

Lean can be a major strategic initiative focused on major cost efficiencies managed from the top of the business, or it can evolve in smaller discrete initiatives lower down in the organization. The preferred route of a top-down approach will have a major positive impact. If managed effectively, Lean can be the major philosophy uniting the organization in a relentless drive for improvement.

In other words, Lean works from the top down and the bottom up: strong leadership support from the top to create the right conditions and expectations, and strong grassroots involvement from the front-line staff to make it all happen. The goal of developing a Lean culture is to create an army of problem solvers, which includes everyone in the organization pulling the rope in the same direction.

Lean Data and Metrics

Successful implementation of Lean principles requires a systematic method of information and data collection. Clearly stated metrics and appropriate data collection will drive successful Lean project implementation.

The general principles of Lean management are increasing value and eliminating waste. There are five Lean performance measures organizations should be aware of in order to best leverage this strategy:

- 1. Human development.** Human development is the engagement of all stakeholders in the improvement process. Lean engages people in daily problem solving and furthers their involvement in running the business, as opposed to a top-down approach.
- 2. Quality.** The second performance area is quality, as Lean projects aim to improve quality by eliminating unnecessary processes. As hospitals focus more on quality and patient safety, they may turn to Lean to guide quality improvement initiatives.
- 3. Service.** The service dimension of Lean relates to on-time delivery, such as the ease of scheduling an appointment at the hospital, a short wait time for services and smooth patient flow between departments. This area of performance is a way that hospital organizations and clinics can differentiate themselves in a competitive environment, and how they can attract more patients to their facility.
- 4. Cost.** Cost, which is tied to productivity, is an element of Lean that is becoming more important today in an environment of reduced reimbursement. Lean process improvement can decrease costs by eliminating unnecessary steps and increasing productivity. Lean practices

may also help hospitals cut costs without needing to lay off employees.

5. Growth. Hospitals need to implement a growth strategy concurrently with a Lean approach to optimize the benefits of Lean processes. As Lean streamlines processes, staff who may not be needed for certain processes can be redeployed to other areas, such as expanded services. By pursuing a growth strategy, hospitals can reinvest the savings achieved through Lean to continuously improve — one of the tenets of Lean.

In addition, Lean thinking places a strong emphasis on measuring, evaluating, and communicating performance results. In this context, metrics enable organizations using Lean to:

- Identify and target the right problems during Lean events and projects
- Evaluate potential process improvements and select appropriate actions for implementation
- Establish baselines for process performance and track progress over time
- Understand and communicate the results (outcomes) of Lean
- Inform and monitor efforts to deploy Lean throughout an organization

There is always a scale by which we measure the success of our endeavors, and someone is always keeping score. For managers, this means there is a scale by which the consequences of our decisions and actions are measured. Our hope is that the results of our efforts are favorable for those who entrust us with decision-making authority. In a profit-seeking organization, the shareholders, employees and customers measure the outcomes of the decisions we make and the actions we take. In government, this task is given to the voting public. For non-profits, managers are brought to account by fundraisers, contributors and the beneficiaries of the organization's services.

In our world of health care, the ultimate trust is that which exists between our patients and us. When they require care, they rely on us to provide the right diagnosis, early and timely treatment, and the best conditions for a complete recovery. And yes, they too are keeping score. Now, more than ever, the health care industry needs to embrace the economic value proposition of improving productivity.

For the past 20 years, health care has experienced negative productivity growth. The economic consequences of this type of performance are stunning. The bottom line is that until true health care cost reform becomes a reality, these pressures will continue to cause problems for providers, for people's health care and for the nation's economy. Health care organizations should use these pressures as motivation to embark upon a relentless pursuit of ever-increasing productivity.