



Inspiring Healthcare Leaders
Accelerating Change

Lean for Doctors

Physicians are finding new ways to analyze their work, reduce wasted time and effort, and improve productivity while improving the quality of care

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Introduction

Over the past 20 years, healthcare organizations around the world have been adopting and adapting customer-focused practices of Lean manufacturing and the Toyota Production System (TPS), from which Lean originated. These organizations, often learning from mentors in the business sector, began to engage physicians and staff members. “Customer-focused” translated to “patient-centric” in healthcare, and has improved the way physicians and staff do their work, focusing efforts on the bigger picture — improved quality of care at lower costs — instead of just improving a functional silo, department, or role.

Lean has led to measurable improvements in safety, quality, access, staff morale, and cost at several healthcare providers across the United States, such as:

- *University of Pennsylvania Medical Center, Philadelphia*, reduced hospital acquired infections, saved 57 lives, reduced ICU length of stay, and reduced costs by more than \$5 million over two years.¹
- *Four hospitals in California* avoided 87 readmissions for congestive heart failure in 12 months across four hospitals, saving \$830,000.²
- *Palo Alto Medical Foundation, California*, reduced waiting times for screening colonoscopies from 6 weeks to less than 24 hours, and reduced cost per patient by 9.5 percent.³
- *HealthEast, St. Paul, Minn.*, increased the percentage of atrial fibrillation patients treated within 40 days from 11 percent to 94 percent.⁴
- *Sumner Regional Medical Center, Gallatin, Tenn.*, improved emergency department patient satisfaction from 5th percentile to 98th percentile in just four months (achieved by reducing door-to-doc times from 67 minutes to 18 minutes).⁵

The Lean Enterprise Institute defines the “core idea” of Lean to be “[maximizing] customer value while minimizing waste” — i.e., “creating more value for customers with fewer resources.”⁶ The customer in healthcare is generally the patient and often their families and loved ones. Healthcare staff can be internal customers of a process, such as when a physician is the recipient of properly sterilized instruments or when a hospitalist waits for lab reports so they can provide a discharge summary.

Traditional approaches to healthcare management have been overly focused on reducing resources. What right-minded healthcare employee would earnestly attempt to improve a hospital process if they recognized that their work would result in the loss of his/her job? Lean thinking, on the other hand, is about providing the right resources to provide the right care, at the right time, in the right place, with the right safety and quality.

The automaker Toyota often helps non-profit organizations, including health systems, to apply Lean principles as a way of furthering its important goals. For example, Toyota helped Harbor-UCLA Medical Center reduce the amount of time a patient spends in their eye clinic from 4.5 hours to just over two hours. The backlog for eye surgery patients was reduced from “hundreds

of patients” to zero.⁷ Imagine the impact on patients, many who would have previously waited hours for surgeries. When caregivers help analyze their work and find ways to reduce wasted time and effort, productivity improves without harming quality.

Many executives in many professions have tried to pick up the improvement tools of Toyota and apply them discretely within their organizations — with little success. Toyota, within the company and in their work with UCLA Harbor and others, emphasizes that Lean/TPS is not just a set of technical methods for improvement; TPS is also a managerial approach and an organizational philosophy. Much of this philosophy, including the belief that people want to do good work and that the cause of most problems is the process (not the people), comes from an American who greatly influenced Toyota: Dr. W. Edwards Deming. Lean is an “organizational culture” and an “integrated system.” This isn’t achieved through a few improvement initiatives, but instead requires time to change behaviors and develop a Lean culture. Organizations should not expect to get great results by copying parts of this holistic approach.

Lean tools and methods might seem simple, but many of the principles are counterintuitive. For example, the need to reduce batching (grouping of activities or patients so they can be addressed en masse, which creates an unnecessary backlog of work). Other principles are counter to the ways we normally think about things, such as *not* blaming individuals for most problems (i.e., good people in a bad process will look bad). It might be easy to copy one Lean tool, but changing the culture and becoming a Lean thinking organization from top to bottom is much more challenging. But it’s worth the effort.

Lean as Familiar Thinking for Physicians

As healthcare organizations explore and embrace scientific problem solving by all clinicians and staff, it is critically important to engage physicians in this process. Lean offers physicians a means to remove non-value-added activities that unnecessarily exhaust their time and energy, and, thus, frees time for doctor-to-patient care. Unlike old management models that typically attempt to force change upon physicians and other healthcare professionals, Lean engages everybody in the practical science of improvement. As such, physicians and other clinicians should be familiar with Lean principles and they should be using them daily in the care of patients.

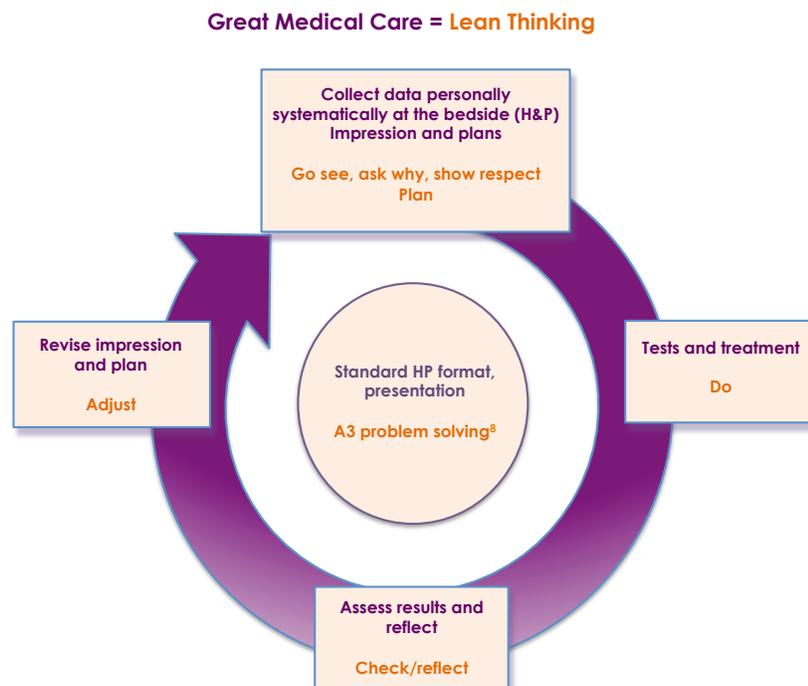
Organizations like the University of Michigan Health System in Ann Arbor and UMass Memorial Health Care in Worcester aspire to enlist every physician, nurse, and staff member as a problem solver, every day. Lean is built around every healthcare worker applying the scientific method to identify, share, and solve the problems they face at work. The model is often referred to as “Plan-Do-Check-Act/Adjust” (PDCA) or “Plan-Do-Study-Act” (PDSA) cycle.

Physicians should be quite familiar with the PDCA process-improvement cycle because it compares closely to the “SOAP” model:

- Understanding the *Subjective* complaint
- Looking at *Objective* facts and data
- Developing an *Assessment*
- Enacting and evaluating a *Plan* over time.

Great medical care and Lean thinking in healthcare have much in common, and the both drive toward common objectives (*Figure 1*). With Lean, clinicians can apply their aptitude and experience to solving *system* problems related to clinical quality and safety, while simultaneously improving the timeliness of care, cost, and throughput issues.

Figure 1



Source: Catalysis

PDCA problem solving happens in the actual workplace and is practiced by the people who do the work, not forced by consultants in far-off conference rooms. Physicians who lead and participate in this scientific problem-solving process recognize it as directly analogous to their approach to a complex patient.

Plan

Physicians start their problem solving with a deep understanding of the problem from first-hand observation and asking questions. It’s important to “go and see,” which means

examining the patient. No physician would diagnose and treat a patient based on hearsay or a report. With knowledge of the current situation and issue(s), they can then develop a *Plan*, similar to forming a hypothesis in diagnosing a patient. The current situation could be a patient's elevated blood pressure or it could be a process problem, such as the number of expired vaccine vials in a clinic refrigerator.

As part of the *Plan* phase, doctors set a goal for an ideal (or improved) situation, such as better blood pressure control or no (or few) expired vaccines. In investigating the causes of expired vaccines, one clinic team observed staff putting new vials into the front of the refrigerator, meaning older ones got stuck in the back. Asking why this occurs is the first step to putting a better process into place.

Sometimes problems have a relatively obvious solution that can be tested without any risk. In other cases, we need to look for the deeper root cause to a problem. This is just like creating a differential diagnosis on a complex patient, asking, "What are all the possible causes of the patient's problem?" Asking "why" many times in succession to previous answers leads to discovering the true root cause. Most problems in healthcare delivery are related to poor processes, but caregivers get blamed when things don't go well. They are often the answer to the first "Why?" question. Root-cause analysis digs deeper to process problems, thereby removing blame from the hard working healthcare staff.

Do

In the *Do* phase, the physician — i.e., process improver — tries something that he or she would expect to have a positive effect on the process. These controlled experiments are based on scientific knowledge, experience, or a reasonable-sounding hypothesis. For the medical problem of elevated blood pressure, the physician might incrementally increase antihypertensive medications. In the process problem of the expired vaccines, the physician conducts a small trial by changing the system used for storing and removing vaccines. A more disciplined "First-In-First-Out" (FIFO) system could be tested with vials. FIFO functions the way milk is stored and pulled in a grocery: the most recent milk is stocked in the back, while the oldest milk that was stocked (First In) is positioned in the front.

Check/Study

In the third phase of the PDCA cycle, the physician *Checks* the new performance that is the result of changes applied during the previous phase. This is done much as a physician would reflect on the results of a change in treatment of a patient. You would want to ask, and hopefully confirm, that the patient's blood pressure is dropping due to a change in medication. Or for the process problem, you want to record fewer expired vaccine vials.

An important part of *Check* is to assess if the planned solution was even enacted. Often in problem solving as in practicing medicine, we make plans, but they are not carried out (e.g., a patient didn't even start the medication you prescribed). We need to know if the intervention was even tried, and if not, ask "Why?" This evaluation should also seek to determine if the solution was correctly implemented. For example, maybe the FIFO plan for vials was communicated and staff were aware of new procedures, but no visual guidelines were posted to reinforce the new practice.

Act/Adjust

Finally, physicians will *Act* (or *Adjust*) based on the results they review. If our patient is not responding, we might try a different medication. If the vaccine expiration problem persists, we would observe again and try to find what was missed. If the problem seems to be solved, we might ask where else we can apply this thinking, such as a FIFO system for lidocaine vials or diabetic test strips. Our goal with improvement experiments is not to prove, at all costs, that our initial *Plan* was correct, but to honestly evaluate the results of what we tried. If we didn't get the results we predicted, a Lean thinker (or a doctor) would ask what we learned from the attempt.

Where will we find the time to practice this new way of thinking, improving something every day? It's not easy to shift from "we're too busy to improve" to a culture of continuous improvement. Why are we "too busy to improve"? Often it's because our work processes are so broken, we're spending a lot of time doing workarounds and getting frustrated. Improving the process to eliminate workarounds will free up more time, and begins a virtuous cycle of continuous improvement.

We start one team and one problem at a time, and gradually develop a culture of problem solvers. The PDCA becomes routine and habit rather than some new practice that you believe is pulling your time unnecessarily. It becomes inculcated in daily routines, and would be missed if it did not exist.

To get teams excited to embark on this journey, though, leaders must set the context for where the organization is headed. Establishing the principles that will guide the transformation is the foundation. Every clinician and staff member wants to understand the "why" behind the new way of thinking. Leaders play an important role in defining this.

From Lean Thinking Practitioners to Lean Health Systems

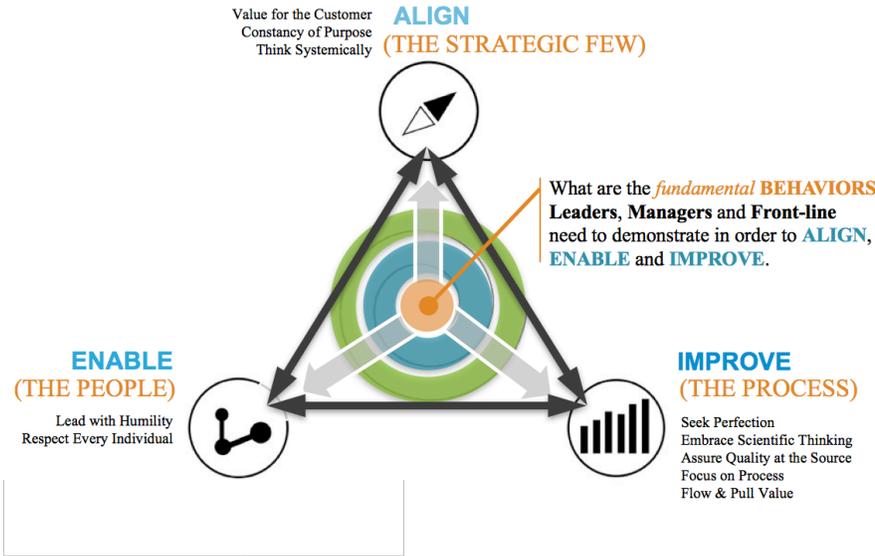
The science of healthcare management significantly lags progress in clinical medicine. There are no placebo-controlled, double-blind studies proving best management practices. Yet the management practices applied in healthcare have serious consequences to the staff, patients, and their families.

Examples of best management practices in healthcare are emerging throughout the world. In England, for example, Western Sussex NHS Foundation Trust was rated outstanding by the Care Quality Commission (CQC) in spring 2016,⁹ receiving the highest grade possible and a rating achieved by only two other hospitals. The secret sauce at Western Sussex? A rapidly adaptable management system that drives up standards and the quality of care experienced by their patients. The CQC particularly noted habits consistent with application of PDCA and problem finding and problem solving:

*Across the hospital there was an embedded culture of learning from incidents. Staff were encouraged to have an open and honest attitude towards reporting mistakes and incidents that were then thoroughly investigated. There was strong evidence of learning from incidents both locally and across the organisation.*¹⁰

The underpinnings of a successful management system in healthcare has roots in business, particularly manufacturing. W. Edwards Deming introduced “management by process” over 70 years ago and many types of organizations have been applying the principles ever since.¹¹ The principles of a rapidly adaptable management system were articulated in *Management on the Mend*¹² and are also represented in three categories presented by the Institute for Enterprise Excellence: align, enable, and improve (Figure 2).¹³

Figure 2



Source: Institute for Enterprise Excellence

Align

Align principles include constancy of purpose, thinking systemically, and creating value for patients. Value is defined by quality divided by cost. Processes should be designed to always improve the quality and lower the cost of the patient experience.

Leaders have specific roles to assure organizations are headed in the right direction to meet these dual goals. Typically, it's not clear to the staff in a hospital what is important to the organization, as the metrics have not been established or communicated to them, or staff cannot equate their specific role or performance with objectives for the organization. The handful of important, overall metrics are what a Lean organization would call "True North."

True North is not 37 executive metrics, as was observed in one hospital recently. Instead, True North represents the key metrics that instantly inform everyone in the organization if they are winning or losing. True North also helps to establish and align an organization's strategic initiatives; if True North is the destination, what are the most effective paths to get there? Co-author Toussaint once witnessed an executive team that had 222 strategic initiatives for the hospital. That's far too many to achieve, let alone monitor. It's the job of healthcare leaders to prioritize and, in many cases, deselect the mountain of existing and potential initiatives. This reduces the burden on frontline staff, especially as they are increasingly empowered to identify and solve problems at the bedside or wherever they work, each day.

Enable

Enable principles are the bedrock of the cultural change and include demonstrating respect for every individual, learning continuously, and leading with humility. Respect for every individual means we respect the people who do the work, and recognize they are the best ones to know how to improve the work. They aren't waiting for a manager's approval. If there is a problem, frontline staff can, most often, solve it themselves. By doing so, there is continuous learning. Toyota emphasizes the dual goals of process improvement — to solve problems and to develop people — and this is a power that healthcare organizations have begun to realize.

An enabling culture of continuous improvement is not created unless leaders are leading differently. Leading with humility requires leaders to admit that they do not have all the solutions. Instead, they build an environment in which the energy of all staff are unleashed to solve problems every day. That doesn't happen if the manager or leader is telling everyone what to do. Leaders must be engaged and observant in the place of work, regularly asking open-ended questions to better understand where the barriers are to improving the work. Only then can leaders provide support to remove those barriers, if staff can't do it on their own.

Improve

Improve principles are the core of many of the tools used for improvement and include focusing on process, utilizing the scientific method for problem solving, seeking

perfection, building quality at the source, focusing on flow and pull, and understanding and managing variation. The tools include PDCA thinking for problem solving, creating new processes for care delivery that build in quality, and reducing variation through standardized work, as discussed earlier.

Building quality into a process starts with standardizing the process. Physicians generally push back on the concept of standardized work. They justifiably bristle at new methods that leaders or their organizations force upon them, believing their ability to think creatively for the betterment of the patient is being restrained by outsiders. Toyota and other Lean advocates learned long ago that standardized work needs to be developed and improved by the people who do the work.

Standardized work is intended to foster creative solutions rather than stifle innovation, and this idea transfers well to healthcare. For example, evidenced-based medicine is based on a standard created through the scientific study of new therapies. Applying that same thinking to daily work and creating standards is no different. When there is no standard, processes differ each day, depending on the doctor or nurse on staff, and are too often in chaos. Without a baseline standard process — even one that clearly needs improved — there is no way to identify where and why problems arise and how to fix them. Standardizing the process of care delivery allows people to know where the defects are when they occur. Then it's possible to improve the process and establish new, better standard work. Emerging standards and protocols, such as surgical checklists¹⁴ and detailed guidelines for when it is safe to induce labor in pregnancy,¹⁵ are being developed by specialty societies.

Establishing management principles allows two things to occur: key behavioral indicators can be established, and systems can be built. These two essentials create Lean routines, helping physicians and staff perform in a consistent manner, focused on improving quality of care and lowering costs:

- At Zuckerberg San Francisco General Hospital, managers meet each day with team members for 15 minutes to discuss how they expect the day to play out. They use a “status sheet” — a series of open-ended questions that managers ask — to discuss important patient issues. For example, one question identifies patients who might be at risk for falling that day. Immediately after the discussion, process improvements to reduce a fall risk are implemented, such as having a family member sit with the patient or more regular nursing assistant checks.
- At Stanford Children’s Hospital, the lead anesthesiologist meets with all perioperative managers twice a day for 15 minutes to anticipate where surgical flow could be jeopardized, and immediate contingency plans are put in place. The meetings have reduced cancelled surgeries over a nine-month time frame from 14 per day to near zero.

At both institutions, managers report much less firefighting because they have a *system* in place. The status sheet is an example of one component of a management system.¹⁶ But the system is dependent on managers behaving a certain way. Instead of managers telling staff what to do, they ask open-ended questions and listen to the answers. The behavior of learning to ask effective questions is new and difficult, but it becomes one of the key behavioral indicators for the success of Lean. Gradually, those involved in the status meetings learn to hone their thinking and their answers, improving the efficiency and effectiveness of the gatherings.

Each new system, like the status sheet, has an associated key behavior that is required. The systems developed vary, depending on the organization, but are guided by the principles, which are the “why” behind the systems.

To make these fundamental shifts, leaders are required to change their behavior. First and foremost, they must be willing to change, starting at the top, as Deming always said. Leaders must be humble enough to admit they don’t have all the answers. They must be curious enough to go to the place where value is created for the patients so that they can see and learn how things actually work in their hospital or clinic. They must persevere when the going gets tough, with the self discipline to develop and adhere to the management system standards that are built over time. This is a different way to manage healthcare, but it’s a better way, regardless of its roots. Our physicians, staff, and leaders deserve it. More importantly, our patients deserve it.

Lean Leaders

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