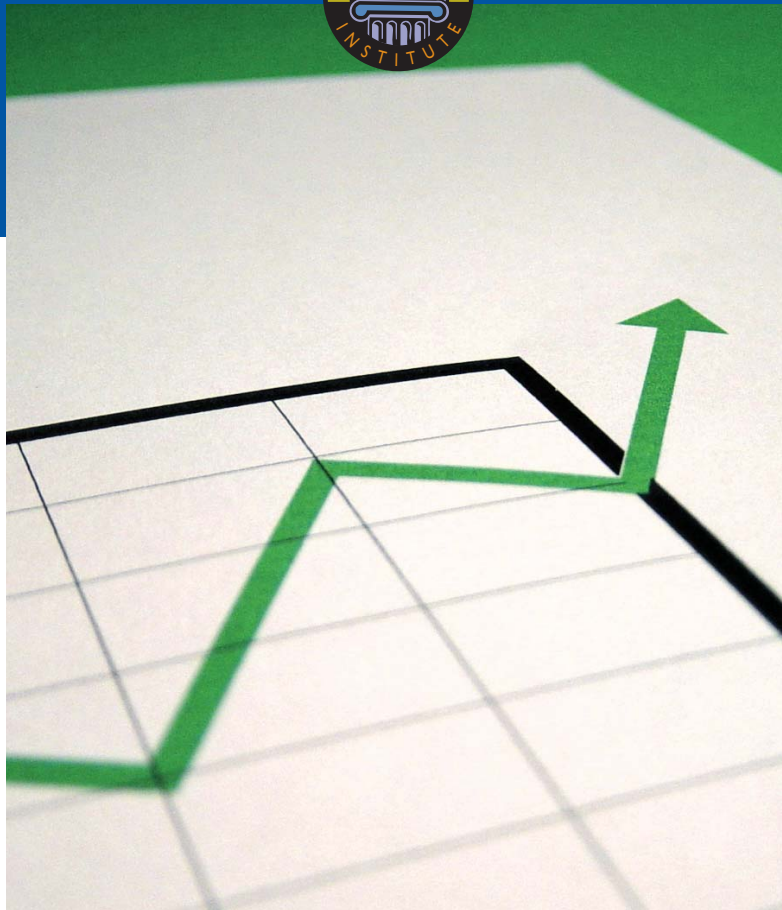


CHCA Executive Institute Special Report



September 2007

Lean Healthcare: A Journey, Not a Destination Part I

Lean Healthcare



The concept of lean processing, which at its core focuses on eliminating waste, was originally developed for the automobile manufacturing industry, but its application has reached across industries to improve the flow of services.

This special report outlines how Toyota System principles can be applied systematically in healthcare organizations, as demonstrated by Children's Hospital and Regional Medical Center's implementation of the Continuous Performance Improvement (CPI) initiative. The report includes the "rules of engagement" executive leaders should consider prior to pursuing a lean strategy within their hospitals.

This is the first report in a two-part series illustrating the impact of lean strategy on the operational efficiencies of children's hospitals. The second report explores in detail the efforts of three Owner Hospitals - Le Bonheur Children's Medical Center (Memphis, TN), Rady Children's Hospital and Health Center (San Diego, CA) and Children's Hospital and Regional Medical Center (Seattle, WA) - as they work to shift the culture and create an atmosphere of continuous process improvement in the Laboratory and Radiology Divisions.

Contributing Author

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Lean Healthcare

Lean Healthcare: A Journey, Not a Destination Part I

Linking Toyota Motor Company and Children's Healthcare

Healthcare leaders have much to learn from other industries, as demonstrated to hospital and physician leaders from Children's Hospital and Regional Medical Center in Seattle during a recent visit to Toyota Motor Company and its suppliers in Japan.

Seeing first-hand the power of the Toyota System, Children's leaders realized the potential of a full implementation of lean processing.

"We saw that "the pursuit of standard work does not eliminate the opportunity for artful creation of a product. In fact, it's the other way around."

- Dr. Bryan King

"We learned that we need to question assumptions all the time and look for simple solutions.Look for good ideas everywhere. Persistence is key. We consider this (lean) a process we can use for the next 100 years."

- Peggy Walton, Board Chair

"This trip changed our idea of what is possible and pointed to our failure of imagination."

- Dr. Edgar Marcuse

It's understandable why Children's leadership team was impressed when they visited Toyota. Toyota remains the undisputed leader in quality, reliability, cost and throughput. Toyota principles described by James Womack and Daniel Jones in Lean Thinking (Simon and Schuster, 1996) have been studied and implemented by manufacturers worldwide. There is a growing consensus among healthcare innovators that much can be learned from studying and implementing the lean principles of the Toyota System (also referred to as the Toyota Way.)



Looking to Toyota as a model for achieving dramatic breakthroughs is not new. More than a decade ago, early adapters of lean thinking in acute care settings included Overlake Hospital in Bellevue, Washington, inspired by Boeing in 1995 and the Pittsburgh Regional Healthcare Initiative, inspired by Alcoa ("The Lean Enterprise Meets Healthcare", McAuliffe, Moench and Wellman, Hospital and Health Networks, Feb 10, 2004.) Today many national healthcare conferences include presentations on the successful implementation of lean principles.

New is the emergence of healthcare leaders who view the Toyota System as more than a set of now familiar tools such as just in time, mistake proofing and cellular processing. They understand the Toyota System for what it is: a powerful philosophy, a cultural transformation and a management system with tools to achieve work flow with zero defects. These leaders also view this as a long term "generational" journey requiring full integration from front-line employees to the CEO.

Lean leaders hold no illusions that they can become experts in a short time; expertise is developed over years of study and constant application. For this group of healthcare leaders, the comments of Katsuaki Watanabe, Toyota's President, ring true as he reflects on his post-training program debrief with 30 young Toyota executives.

"The managers felt happy and said that they had learned quite a bit. When I asked, many of them said they were now able to understand the Toyota Way fully. That's totally wrong. Two or three months aren't a long enough period for anyone to understand the Toyota Way. The managers may have understood what's on the surface, but what lies beneath is far greater. I asked them to explore that. There

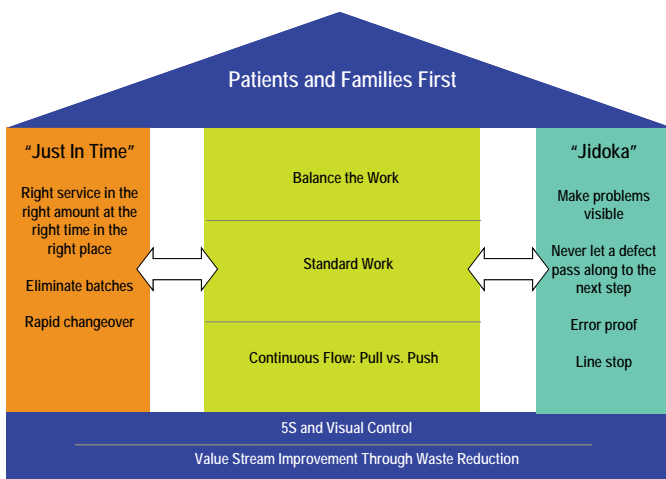
is no end to the process of learning about the Toyota Way.” (“Lessons from Toyota’s Long Drive”, Harvard Business Review, July-August 2007.)

Toyota Translated for Healthcare

The Toyota System is often shown as a house. The two columns holding up the house are “Just in Time” and “Jidoka.” “Just in Time” refers to having the minimum amount of material available to consistently deliver products and services to the right place, at the right time, in the right amount. “Jidoka”, a much less understood pillar, refers to intelligent machines that stop when there is a problem. “Jidoka” is embedded in a cultural philosophy that stops to correct problems and ensures the same problem does not occur again (don’t keep going with the intention of fixing it later.)

The house stands on a foundation of waste (non-value activity) elimination. The structural integrity of the house requires that both pillars be strong and rest on a solid foundation. The Lean Healthcare System, adopted from Toyota, is shown in Figure 1. As in the Toyota System house, the Lean Healthcare System requires structural integrity. All parts must work in sync to meet the requirements of patients and families.

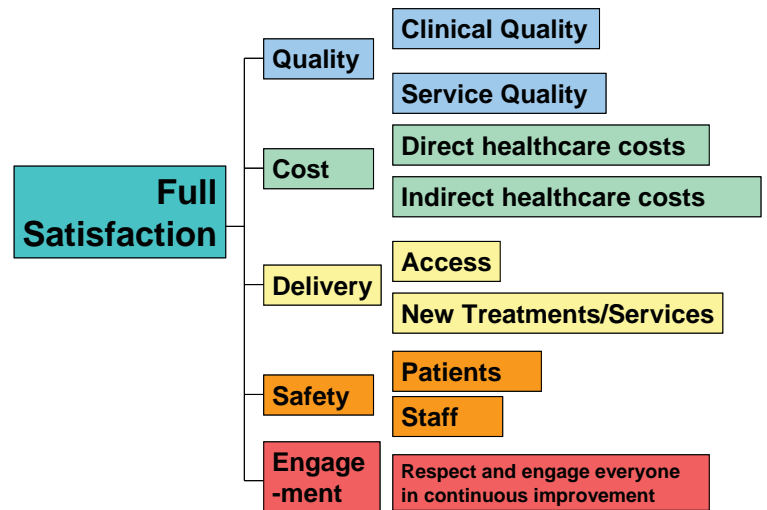
Lean Healthcare System
Figure 1



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Patient and Family Satisfaction

Figure 2



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The Lean Healthcare System measures results on behalf of patients and families in five categories of improvement (Figure 2). The graphic is key to understanding that lean is not simply another “management cost reduction strategy,” but a balanced approach of simultaneous improvement in quality, cost, delivery, safety and engagement, referred to as QCDSE.

The ability to simultaneously improve QCDSE comes from a deep understanding of how all elements of the Lean Healthcare System work together as a system, not a collection of parts. For example, in a hospital’s outpatient pharmacy, the simultaneous improvement in order quality (error free) works together with continuous flow (characterized by standard work using a pull system with limited work in progress inventory) and work balance practices. Using all parts of the lean system, several pharmacies have achieved dramatic lead time reductions with higher levels of patient and family satisfaction. Lead time reduction saves money by supporting earlier availability of discharge medications and less medication waste. As staff engages in using lean tools and methods, scores on employee survey questions such as “I feel that my opinion counts at work” rise.

Lean Philosophy and Culture: A Good Fit for Health Care

Steven Spears points out “that few manufacturers have managed to imitate Toyota successfully, even though the company has been extraordinarily open about its

practices,” (“Decoding the DNA of the Toyota Production System”, Harvard Business Review, September-October, 1999.) He points out that this is not due to Toyota’s roots in Japan. Indeed, many Japanese companies have tried and failed to model themselves after Toyota, while Toyota transplants in North American have been successful. The reason, Spears points out, is that observers confuse lean tools and practices with the system and its philosophy.

One key element of the Toyota’s philosophy is to “create a community of scientists.” This includes continually using data and direct observation to test hypotheses. The emphasis on “going to gemba” (the workplace), trying new ideas rather than brainstorming and checking results with direct observation and data are cornerstones of a lean philosophy. While this approach challenges cultural norms in many healthcare organizations who aim first to perfect a plan before testing, it is appealing to many healthcare professionals trained as scientists.

Lean Healthcare Tools

The Lean Healthcare System employs a variety of lean methods to help teams assess existing processes and identify potential solutions. In addition to the methods below, there are many other tools typically employed. Examples of additional methods include Root Cause Analysis, Failure Mode Effects Analysis (FMEA) and Rapid Changeover.

Rapid Process Improvement (RPI) Workshops

RPI’s are five-day workshops focused in a targeted area. During the week, representatives from the area assess current process, envision the process without waste and conduct trials.

The goal of an RPI is to achieve a 50 percent improvement during the week of the event. Participants are trained in all aspects of the Lean Healthcare System and immediately begin applying what they learned to their own work area.

Rapid Process Design (RPD) Workshops

Used to design new processes or redesign existing processes, this five-day workshop relies on extensive data collection prior to the event and multidisciplinary participation during the event. A variation of the RPD is RPD for Facilities, also known as a 3P workshop. RPD for Facilities ensures that lean principles are incorporated into new facility design.

5S Workshops

During a 5S event, participants implement all five - sort, simplify, sweep, standardize and sustain - to achieve workplace organization and standardization. The outcomes include reduced search time, improved safety, enhanced ergonomics, reduced inventory and saved space.

Value Stream Mapping and Alignment

A value stream map is a visual representation of the activities required to produce health care from the patient’s perspective. The map, at a minimum, includes the flow of patients, material and information. Value Stream Alignment sessions produce a consensus of the “future state” of the value stream and the plan for achieving the desired state. Value stream work is most effectively used when tied directly to an organization’s strategic plan.

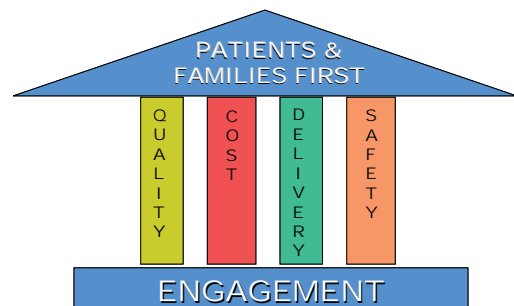
The Story of Children’s Hospital and Regional Medical Center (Seattle, WA)

The Continuous Performance Improvement (CPI) initiative implemented by Children’s has matured in five years from local or “point” improvements using RPIs and 5S events to an organization-wide commitment directly tied to the strategic plan.

The hospital began their lean journey with improvements in support areas. Success in these areas quickly led to working in clinical and direct patient care areas including lab, emergency department, pharmacy, operating room and inpatient medicine. Within two years of launching the initiative, Children’s was conducting more than 40 lean events per year and continues today. Results are measured according to Children’s CPI targets (Figure 3.)

CPI Management System for Achieving our Vision

Figure 3



2007 Children’s Hospital and Regional Medical Center

The chart below contains examples of Children’s results in each area identified in Figure 3.

In 2006-2007, Children’s shifted the work from “point improvement” to “line improvement,” or “value stream improvement.” Today, the CPI focus is on value streams identified in Children’s strategic plan. Value streams generally include the entire continuum of care for patients in selected services such as Orthopedics and General Surgery.

The value stream approach requires that “paired accountability teams” made up of physicians and operations managers train together, plan together and monitor results

against targets set in the strategic planning process. Education of paired accountability teams begins with a one week internally taught Lean Leader course and includes joining a team on a factory shop floor for a week as well as a two week trip to study Toyota and its suppliers in Japan. Paired accountability teams receive support from internal CPI staff, Strategic Planning and Decision Support.

CPI at Children’s has not been without its skeptics who, in the early days, wondered why the organization was taking a liking to a “business” or “manufacturing” model. Pat Hagan, Children’s Chief Operating Officer, often refers to the tenacity it took to start this work. Part of this tenacity was insisting that senior managers become serious students of Toyota

Category	Examples of Results 2004-06
<p>Quality</p> <ul style="list-style-type: none"> • Service Quality • Clinical Quality 	<p>37% improvement in family response to “Did the staff (in the OR) who cared for your child work together as a team?”</p> <p>57% reduction in “left without being seen” in the ED and 23% reduction in families who said they waited one hour or more to see a doctor</p> <p>61% improvement in families rating inpatient medicine care as excellent</p>
<p>Cost</p> <ul style="list-style-type: none"> • Reduction in direct or indirect costs • Cost avoidance • Revenue enhancements • Increased capacity with same resources 	<p>93% reduction in check steps and elimination of handoffs in insurance processing</p> <p>Elimination of \$43,000 of copying costs in Institutional Review Board process</p> <p>50% reduction in unused formula with an annual savings of \$42,000</p> <p>At least \$760,000 cost avoidance annually through implementing medication reconciliation to avoid 304 adverse drug events per year</p> <p>20% increase in work volume in lab with no FTE increase</p>
<p>Delivery</p> <ul style="list-style-type: none"> • Decreased lead time for services of all types 	<p>68% reduction in room turn times (time from family departure to bed ready for next patient)</p> <p>67% reduction of steps in inpatient medicine care process</p> <p>50% increase in number of patients discharged by noon</p> <p>45% reduction in clinic registration time</p> <p>Elimination of “stat” lab tests (routines are now as rapid as stats were in the past)</p> <p>31% improvement in #1 family issue of “waited too long on day of surgery”</p> <p>23% reduction in new ambulatory appointment wait time and reduction of patient referral to patient on schedule from one to two weeks to 24 hours</p>

<p>Safety</p> <ul style="list-style-type: none"> • Patient safety • Staff safety 	<p>Reduction in handoffs in inpatient medicine care process from 17 to 10</p> <p>Improved pharmacy cart fill accuracy from 93.7% to 99%</p> <p>Reduction in variation on phlebotomy trays from 20 to 6 standard trays</p> <p>89% reduction in repeated OR documentation</p> <p>Reduced potential delays in inpatient medicine care process from 32 to 5</p> <p>Reduced “borrowed meds” by 82% and after hours calls to pharmacy purchasing staff to zero</p>
<p>Staff Engagement</p> <ul style="list-style-type: none"> • Clinical staff • Operations staff 	<p>Increased percent of staff who are actively engaged (psychologically committed to hospital with higher retention rate as measured by Gallup Engagement Index) from 25% to 45%</p> <p>Decreased percent of staff who are actively disengaged from 19% to 12%</p> <p>Trained 59 RPI workshop leaders, including 20 physicians with 344 RPI participants in 18 months</p>

and actively participate and co-lead one week RPI events. Today, the learning and application of Toyota principles continues in what Hagan calls “a generational effort”.

“From the perspective of patients and families about 95 percent of what hospitals do is ‘waste’, whether from waiting time, redundancy or due to outright errors. That comes as a shock,” said Hagan, “but it’s a clarifying shock. Understanding the experience of patients and families guides us in our efforts to improve inefficient systems that have evolved over the years. Our CPI methodology puts “patients and families first” and enables Children’s to consciously design more efficient and effective procedures and processes.”

- Pat Hagan, Chief Operating Officer

Rules of Engagement for Executive Leadership

Executives often ask, “what should I know before I start?”

Below are six rules of engagement to consider prior to initiating a Lean Healthcare System.

1. Make a long-term commitment to pursue this as an organization-wide strategy, led by the CEO and COO.

While the application of lean tools as “a performance improvement method” can have powerful early results, organizations will experience limited success without a pervasive effort. Local energetic “islands of improvement” will eventually backslide when they try to change their interaction with upstream and downstream processes. When this happens, the conclusion that “lean doesn’t work here” will stop the initiative dead in its tracks.

2. Make a substantial time investment (measured in weeks and months) in your own learning and active participation.

Every change effort has its share of people “sitting on the fence” waiting to see if “lean will stick”. The early and lasting active involvement of executive leadership is key to engaging the “fence sitters”. This involvement signals the initiative is “not going away” and sets expectations for involvement.

3. Make a substantial infrastructure investment.

Be prepared to invest heavily in education, measurement talent and logistics support. Build a lean brain trust using succession planning candidates as internal consultants. This ensures the effort will outlive your current leaders' tenure.

Choose external consultants who are experts at developing people and have deep experience in implementing full scale lean conversions over a period of years.

6. Take on powerful cultural norms and change direction.

A successful implementation of the lean process requires a significant shift in thinking. Executives should proactively address the most common responses to change included in the chart below:

Old Perspective	New Perspective
<ul style="list-style-type: none">• Standardization is not possible or desirable in medicine• Benchmark other healthcare organizations• New ideas need to be perfected before implementation• Produce improvement by working together in a conference room• Senior leaders delegate improvement work	<ul style="list-style-type: none">• Standardization is foundational to the scientific method and to continuous improvement.• We need to learn from whoever has the best outcomes in quality, cost, delivery and safety and engagement.• It's better to get 50 percent improvement today than to wait to achieve "perfection."• Improvement only happens in the actual work area so "go to gemba (the workplace)" and try our ideas.• We won't be successful if this is viewed as a "side occupation" for senior leaders.

4. Communicate your reasons for adopting lean and emphasize the importance of a balanced approach.

As with the Toyota System, a Lean Healthcare System delivers the simultaneous improvement of Quality, Cost, Delivery Safety and Engagement (QCDSE). For healthcare professionals who are suspicious that lean is another "management cost reduction strategy," this is a critical message.

5. Find a manufacturing partner to help you learn shop floor improvement.

Certain elements of the lean strategy are best learned in a factory where the work is highly visible. Children's reports "there are some things we didn't learn until we saw them in factories."

As lean thinking gains momentum in health care, it is crucial that leadership recognize lean as a philosophy and management system, not just a set of tools to deploy intermittently. Adopted as a strategic priority, the Lean Healthcare System can dramatically improve business processes across hospital departments, and ultimately, transform the patient experience.