

Chapter 13: The Future for Lean Healthcare

About the Author

Dr. Timothy D. Hill is a recognized leader in Lean best practices and human capital. His work as an international consulting industrial and organizational psychologist has literally spanned the globe. His push to connect best practices from Lean and human capital was motivated by the need to connect people and processes. Beginning in the 1980s, Tim spent large portions of his time in the Far East. He has worked with Toyota for over 20 years in Canada, China, Japan, and the US.

While working in North America and the Far East, he partnered with Toyota, Matsushita, Motorola, and others to study quality and production practices. He also studied at the Asian Productivity Organization, the W. Edwards Deming Institute, the Kaizen Institute, the Japanese Association of Suggestion Systems, the Quality Control Research Institute, Japan, and the Japanese Union of Scientists and Engineers (JUSE) in order to bring Kaizen, Lean manufacturing, quality control, Six Sigma, TBP, TPM, TPS, TQM, TQC, and more to production, professional, and service settings. Tim worked with Dr. Deming, Ishikawa, Imai, and other world quality leaders. His influential research paper¹ built on work in the early 1980s and showed a 'Lean' connection that dated back to the late 1800s.

His client base reflects the wide range of organizations that have requested his assistance in solving difficult problems. Tim decided to concentrate his Lean/TPS skills in the two areas most needed in Canada – healthcare and manufacturing.

Tim is a partner at CycleTime Management, president of Kyosei Canada, and is cited as Canada's leader in Lean/TPS for healthcare and manufacturing. He has been a Consulting Industrial & Organizational Psychologist for over 25 years. At King's University College at the University of Western Ontario he is the Invited Professor, Corporate Social Responsibility and an Invited Professor, International Economics. He is listed as the expert in Lean and Human Capital at the University of Western Ontario. He has received lifetime Lean recognitions from a number of leading bodies. He has authored books on Lean and Kaizen in collaboration with Toyota in Canada and Japan, in addition to developing and delivering training for Toyota.

Executive Summary

This last chapter emphasizes the importance of Lean in the future of Healthcare. There is no other realistic option that will let Healthcare survive ever accelerating changes. Dropping contributions from a shrinking tax base, escalating demands from a population with growing population-wide behavioural pathogens and more all add up to never before seen challenges to healthcare.

These global challenges have placed healthcare at risk. It has been deemed unsustainable past 2015. The likely truth is that the tipping point for healthcare's survival will happen before that. For healthcare to survive, Lean must become a foundation element – as mandated by a new set of leading voices in the private sector, government and healthcare. A Canadian provincial Minister of Health, for example, has explicitly called for Lean (as based on TPS -- the Toyota Production System) as the sole prescription for healthcare.

This chapter asserts that the threats to healthcare's future can be met by bringing Lean/TPS to all aspects of healthcare. Lean/TPS has made inroads in healthcare, but largely within conspicuous areas with high user contact such as emergency rooms, operating rooms, radiation therapy and others with chronic wait time problems. Lean/TPS must also be applied to medical errors, administration functions and other elements of the healthcare value stream.

This chapter closes with a suggested Lean/TPS roadmap for deployment that is sustainable, avoids the biases seen in earlier improvement efforts and best practices suggestions for ensuring that Lean/TPS efforts are sustained.

Lean's Roots

Lean management is not a new concept. My own research in the early 1980s showed a 'Lean' connection between Toyoda and others that goes back to their roots in textiles. Lean is new to healthcare. Toyoda is the family name behind Toyota, the car company, and elements of the world-renowned Toyota Production System (TPS) go back to the late 1800s and the family's textiles business.

Drawn from TPS and called 'Lean' by the authors of *The Machine That Changed the World*, Lean/TPS refers to sustainable Lean, as developed and practiced by Toyota since 1949.

Lean's roots are certainly deep, and they have spread out to a wide range of areas, most notably in the manufacturing and automotive sectors. In many ways, healthcare is where manufacturing was about 30 years ago. Manufacturing suffered from poor process practices, poor cycle time, long waiting periods, very high error rates, and more. Right now, healthcare shares all these symptoms.

I have heard healthcare people say their sector is so complex that car company best practices have no place in their world. I have heard them say medical professionals will refuse standard work and even threaten to strike if standard work was enforced. While they are right when they say that patients are not cars, they are very wrong when they say their processes are inordinately complex, more complex than simple car company 'best practices' could cope with.

Healthcare leaders who have been early Lean adopters have seen the light – any process can be improved, and healthcare has processes. Since Lean's roots are concerned with increasing the flow through any process while making the entirety of that process more visible, they saw the attraction of Lean.

These same leaders saw the value of reducing wait times, lowering medical errors, increasing transparency and more were advocating the TPS flow and visible foundations. Early Lean/ healthcare leaders include the following:

- Virginia Mason in the US
- ThedaCare in the US
- Kingston General Hospital in Canada
- Flinders Medical Centre in Australia
- The National Health Service in the UK

Leaders of these organizations also emphasized the importance of creating a sustainable Lean work culture that is ready and willing to accept new thinking and best practices. Given the 80:20 balance of culture versus tools, the failure to build the culture means that Lean/TPS will fail.

As much as new books about Toyota and Lean try to present the 'secrets' of this 'new' quality system, much of Lean is based on the work of W. Edwards Deming. He emphasized that that managers should get out of their offices and focus on improving processes in order to increase flow of work and build quality into the product. "Getting it right the first"; reducing waste and overhead; containing costs – all these were the Deming legacy that was shared with, and blossomed in, Toyota.

For almost all of the 20th century, Lean/TPS thinking was not associated with healthcare, even though healthcare and manufacturing shared the same problems -- wastes of time, effort, money and supplies as well as unacceptable error rates.

Lean is not a cost-reduction program. It is a management practice applicable to all organizations because it improves processes. All organizations – including healthcare organizations – are composed of a series of processes intended to create value for those who use or depend on them (customers or patients). Process improvement is driven by business practices supported by site leadership. The Toyota business practices are arguably the world's best and have been successful for over a century.

Toyota's Business Practices

Toyota's business practices have followed an eight-step plan:

1. Clarify the problem so that everyone knows about the problem. This includes going to the site of the problem to see first-hand.
2. Break down the problem so that the elements are clear.
3. Target specific problems within the larger problem set and rank them from largest to smallest.
4. Perform a root cause analysis to ask the right question about which problem to address and how.
5. Develop a solution (countermeasure) and set a specific goal for success. Typically, the goal is to reduce the problem to zero. Creating overhead to manage a problem is not acceptable.
6. With the countermeasure and objectives ready, implement the solution.
7. Don't assume that the 'fix has gone to plan'. Monitor results and processes.
8. When the change is stabilized, standardize the change by refining the processes to reflect the countermeasures and improvements.

Books such as *Extreme Toyota* get attention because Toyota emphasizes continuous change and improvement while requiring standard work. This often confuses people. To get 'reliable and stable change', Toyota requires an improvement to standard work. This Kaizen approach (see Fig 13.1) improves the standard and then the standard becomes the stable process. Non-Lean/TPS

improvement efforts often fail – with performance results that were lower than their starting values.

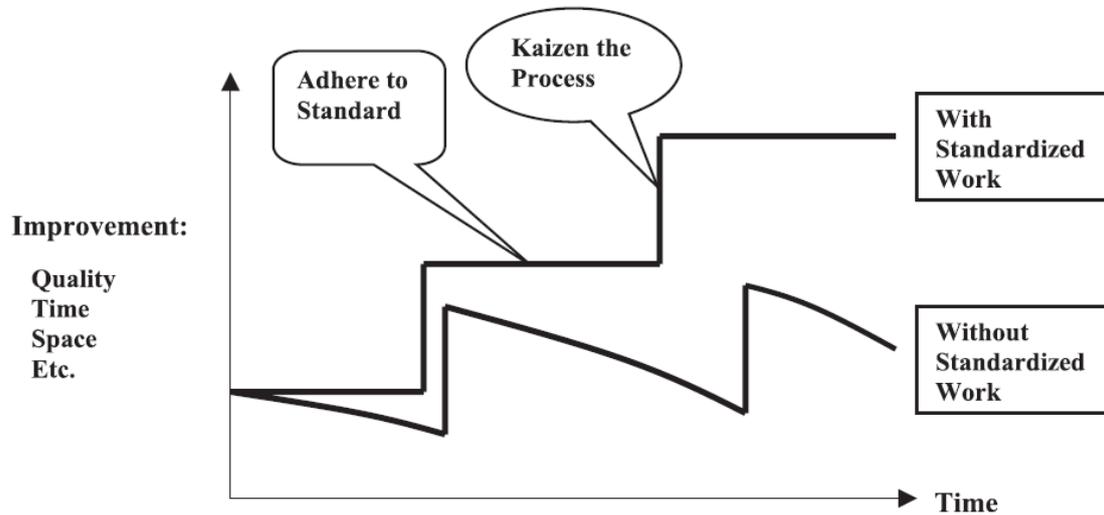


Fig 13.1: Using Kaizen with standard work.

By building many small steps for improvement, Toyota avoids two mistakes. It will not fall backwards after change. And it will not lose competitive advantage by waiting for big changes – running the risk of missing market and customer influences.

Lean Thinking drives everyone’s involvement in increasing the flow of work to build a just-in-time practice (see Fig 13.2). The other element is Jidoka, the practice of making things visible so that problems are no longer hidden and can be eliminated.

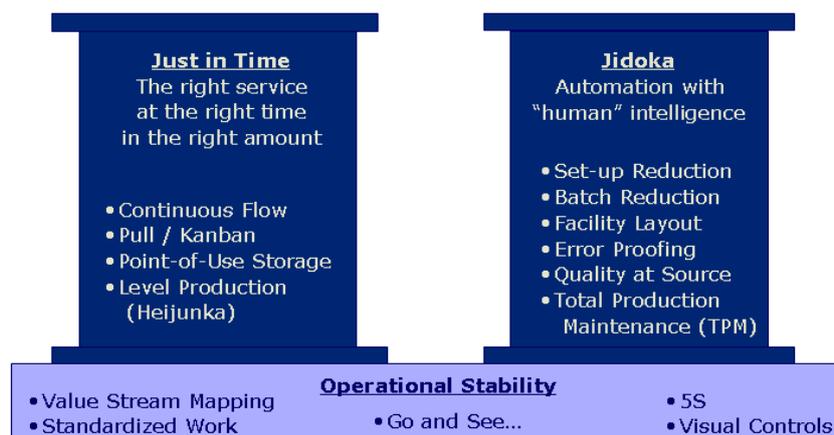


Fig 13.2: JIT and Jidoka.

The Global Crisis in Healthcare

It's fair to say that all the healthcare leaders who were early Lean adopters were driven by some manner of crisis. For example, the Flinders Medical Center (FMC) was constantly in the papers in 2003 because of overcrowding in the ER, delays in treatments, ambulance diversions, clinical outcomes being compromised, and other problems. Internal and external ED safety reviews were uniformly critical. The center was at the breaking point.

FMC's problems are worldwide and more healthcare money is not the answer. The United States leads the world in per-person healthcare costs but delivers some of the world's worst healthcare. In the US, increased spending on Medicare and Medicaid reflects the fact that it has an aging population with greater problems, and increased insurance and delivery costs.

The US Congressional Budget Office (CBO) brief, "Accounting for Sources of Projected Growth in Federal Spending on Medicare and Medicaid", found that growth in healthcare costs per beneficiary relative to GDP growth will be the largest driver of healthcare spending than the aging of the population. In other words – it will simply become more expensive. Worse, the CBO's report assumes real GDP growth in the US and a minor escalation of health issues. Neither assumption is well founded. Large GDP growth is simply not likely for the US. The US population is certainly not getting healthier or younger.

My country, Canada, is not that far behind. More money is not the answer to the healthcare crisis, even though it is typically the first thing that non-Lean Healthcare leaders call for. The US and Canadian examples apply world-wide. The Boomer generation's increases in behavioural pathogens act as a multiplier for all that is wrong in healthcare.

Healthcare Crisis: Behavioural Pathogens

The US Centre for Disease Control's (CDC) Behavioral Risk Factor Surveillance System reports behavioural pathogen data. BRFSS data from three years (1990, 1998 and 2007) are presented below. The growth rate for the highest level of obesity is increasing dramatically. In addition to the adult population increases, there is data that the obesity rates for the youth population is growing even faster.

Consequences of Obesity

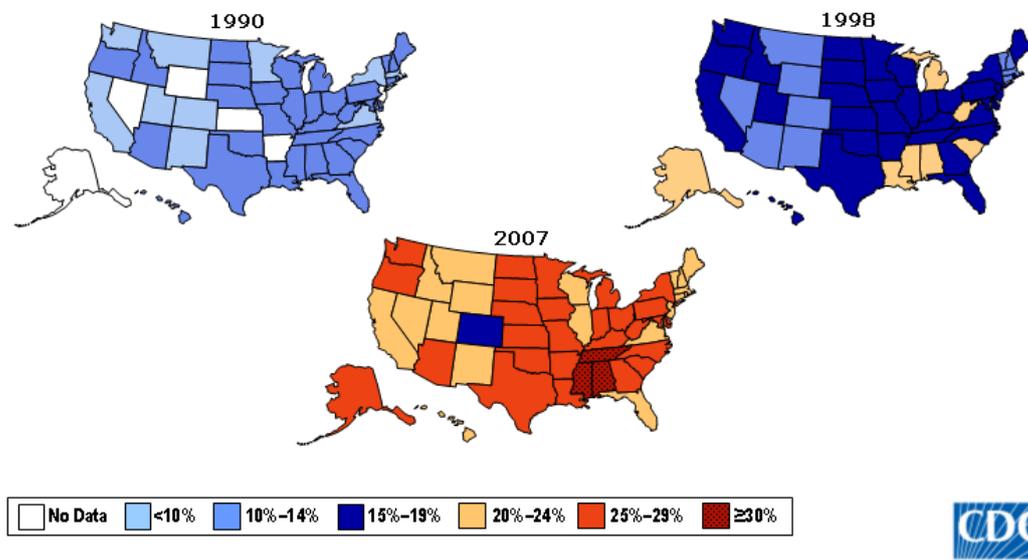
Research has shown that as weight increases to reach the levels referred to as 'overweight' and 'obese' (see Fig 13.3), the risks for the following conditions also increase.ⁱⁱ

- Coronary heart disease
- Type 2 diabetes
- Cancers (endometrial, breast, and colon)
- Hypertension (high blood pressure)

- Dyslipidemia (for example, high total cholesterol or high levels of triglycerides)
- Stroke
- Liver and gallbladder disease
- Sleep apnea and respiratory problems
- Osteoarthritis (a degeneration of cartilage and its underlying bone within a joint)
- Gynecological problems (such as abnormal menses or infertility)

Obesity Trends* Among U.S. Adults BRFSS, 1990, 1998, 2007

(*BMI ≥30, or about 30 lbs. overweight for 5'4" person)



Source: CDC Behavioral Risk Factor Surveillance System.



Fig 13.3: Obesity trends among American adults.

Healthcare Errors

Errors are becoming more costly for hospitals. Patients and their loved ones have long felt the effects of the patient safety and quality problems in the industry.

The Institute of Medicine estimates that nearly 100,000 patients die in hospitals each year because of medical errors, with more than half of these errors being preventable. This is three times the number of people who die on highways. It does not include deaths that occur in ambulatory settings or deaths after discharge that resulted from medical errors when the patient was hospitalized.ⁱⁱⁱ

The *New England Journal of Medicine* reported in 2003 that the quality of adult healthcare in the US was startlingly poor. In that study, 439 indicators of clinical quality of care were reviewed from the medical records of 6,712 patients, for 30 acute and chronic conditions, plus prevention. Participants received about half of

the prescribed care. The conclusion: the 'defect rate' in the technical quality of American healthcare was about 45%.

Lean has been used to tackle hand washing and hospital-borne infections. The CBC reported that every year, 250,000 Canadians pick up infections while they are in hospitals being treated for something else. That's a staggering one out of every nine Canadians who are admitted to hospital becoming infected while the prevention was blazingly simple. Every year, those infections kill more than 8,000 people. Also from the CBC.^{iv}

- Another study estimated the cost of MRSA alone to the healthcare system at \$100 million annually. Although it's difficult to pinpoint the exact cost of all hospital-acquired infections, some Canadian infection control experts have estimated it's as high as \$1 billion annually.
- With better infection spread control, for example, better hand washing, an estimated 30 to 50 per cent of infections would be preventable in Canadian hospitals. Yet healthcare workers usually only wash their hands between 5-30% of the time.
- Excuses for avoiding standard work abound – these are the same types of excuses that healthcare workers use to avoid Lean and standard work across many healthcare settings. A study in Montreal found that occupational and physical therapists had the highest rate of compliance to MRSA hand washing guidelines, while nurses complied more often than doctors, cleaning staff and people visiting the hospital.
- About as many Canadians die from antibiotic-resistant hospital infections than car accidents, AIDS and breast cancer put together.
- A 2002 study found the most common hospital-acquired infections were: urinary tract infections, pneumonia, surgical infections, bacteremia and Clostridium difficile-associated diarrhea (respectively). The study by the Canadian Nosocomial Infection Surveillance Program and the Canadian Hospital Epidemiology Committee of Health Canada examined 29 acute care hospitals. The same study found that patients in intensive care units were more likely to have additional hospital infections. Infection rates were lower for children than adults, and higher for infants than older children.

When Dennis Quaid was interviewed by 60 Minutes^v about the medical errors that happened to his twins *twice* (4 errors) at Cedars-Sinai hospital in Los Angeles, he told the story of how his infant twins were given massive overdoses of a blood thinner that nearly killed them. Quaid said:

We all have this inherent thing that we trust doctors and nurses, that they know what they're doing. But this mistake occurred right under our noses, that the nurse didn't bother to look at the dosage on the bottle. ... It was ten units that our kids are supposed to get. They got 10,000. And what it did is, it basically turned their blood to the consistency of water, where they had a complete inability to clot. And they were basically bleeding out at that point. ... There was blood oozing out of little blood draws on their feet, and things like that, you know, through band-aids.

Lean in Healthcare

One of my mentors, Dr. W. Edwards Deming, wrote almost 20 years ago that one of the world's worst exports was a management style that focused on short-term gains and not long-term improvement. During the 1980s and 1990s, healthcare started to adopt cost cutting, shared costs to reduce overhead, and more, but it

was still largely a US-style management philosophy -- Create HMOs to drive economy of scale; See more patients per day; Have direct billing to patients and insurers; Reduce wait times for payments and more. All had their part in creating the healthcare crisis while demand skyrocketed.

Canada is catching up to Lean, with leaders calling for Lean as the medicine for healthcare. The Quebec health minister has turned to Toyota for inspiration, saying the Toyota way is a 'common sense approach to improving quality'.^{vi}

"If we could understand the Toyota system in health we would save thousands of lives and billions of dollars."^{vii}

"Managers -- without more money or federal action -- can use Toyota management principles to create an environment where it is difficult to make a mistake and people can take joy in work and deliver better and better patient care."^{viii}

At a time when we are overwhelmed by the staggering evidence that health care systems that we depend on often fail us, Lean captures the power of real transformation.^{ix}

For 2008-2009: Based on no service cuts, 75 Ontario hospitals (49 per cent) project deficits for 2008-09. For 46 hospitals (30 per cent), the deficits will be greater than two per cent in 2008-09.

For 2009-10: 104 hospitals (68 per cent) project deficits. For 66 hospitals (43 per cent), the deficits will be greater than two per cent in 2009-10.^x

The Health Council of Canada (HCC) was created to monitor how money for healthcare is being spent. HCC reported that the 'state of healthcare reform in Canada today is largely a patchwork of pilot projects, not a model of system-wide change'. In a report this year, it listed nine areas of disappointment, including home care, primary care (family doctors), and accountability.^{xi}

Tom Closson, Preside of the Ontario Hospital Association, noted at the HealthAchieve2008 conference^{xii} that cost cutting, while it might have been useful in the 1990s has been displaced by greater concerns. Access to healthcare was cited as the leading concern in the early 2000s. This is a view I have also echoed – the time of cost cutting is past. Cost cutting reduces services, causes other backlogs, interferes with quality and accelerates the race to the bottom. In the face of increasing Healthcare demands, cost cutting is the opposite of what's needed. Healthcare needs to deliver more service, not less, as demand from the aging population increases.

Canada, like all countries with a boomer generation (post-WW2 baby boom) has a large portion of its population in the 65 and over range are the most expensive patients in the history of healthcare. A more accurate, if more dire, picture comes

from IBM, whose report about Healthcare claims it will simply be unsustainable by 2015.^{xiii}

Threats to Lean Healthcare Success

Frankly, healthcare has viewed quality and capacity in a very naïve manner. The successes noted earlier in this book are all cases of overcoming these threats, whether or not they were explicitly recognized.

Quality has typically been addressed by reducing the number of *presenting* problems (treating the symptoms and not the root causes). And capacity has typically been addressed by asking for more money for more capacity – more beds, more physicians, more nurses, etc.

In either case, these views have precluded the search for true root causes that can be permanently fixed with appropriate countermeasures. In effect, healthcare has become used to managing problems and not eliminating them. It is hard to over-emphasize the importance between managing problems and eliminating them. Healthcare has become very good at managing, not eliminating, problems to its detriment.

For example, consider the revolving bed crises, the hospital infections crises, or the reappearance of problems that were once considered resolved. How many healthcare problems are old problems that only had the symptoms treated? Band-Aids might belong in a home first aid kit, but they are not permanent countermeasures that reduce problems to zero. Does a 2010 model year Toyota still have the problems of a 1970 Toyota? No. Neither should healthcare.

There are two roots causes for the delay of Lean healthcare.

Poor Thinking about Staffing and Quality

The logic has been that people shortages lead to quality issues and wait times. If hospitals had more people, it has been argued, quality would go up and wait times would go down. Hospitals have been facing severe shortages of key skilled employees, including nurses, pharmacists, and medical technologists. Some of this is the result of shifting demographic patterns. Consider retirement rates. It is estimated that that by 2012–2013, half the people working as nurses will have left for retirement. Adding people to address quality will not work. Cutting positions to balance budgets will not work, either.

Poor Thinking about Capacity and Quality

When trying to address wait times, hospitals usually ask for more capacity.

Emergency room waiting, access to radiation therapy, surgical procedures, and other wait times were thought to be best answered by adding capacity – more machines, more beds, and more funding. The typical answers have been to add more diagnostic equipment – x-ray, radiation therapy, MRI, CAT scan equipment

or more beds, new buildings, renovations or additions, and more. Adding this type of 'capacity' will not work.

Medical Decision-Making Biases

The above root causes are linked to a number of medical decision-making biases.

Using Dysfunctional Decision Making

Kevin Patterson^{xiv} warned about the risks of allowing biases in medical decision making. He noted that:

The point isn't that some medical treatments don't work as well as it is thought, or even that in treating patients, doctors sometimes hurt them – this has always been true. The point is that the conclusions doctors reach from clinical experience and day-to-day observation of patients are often not reliable. The vast majority of medical therapies, it is now clear, have never been evaluated by systematic study and are used simply because doctors have always believed that they work.

The impact (and truthfulness) of this can be seen in recent reversals about the efficacy of hormone replacement therapy and arthroscopic knee surgery, to name only two items with large impact.

Rushing to Diagnose

The rush to diagnose, to proceed with the familiar (and fall victim to decision-making biases), means that the healthcare community can be said to work harder and costlier to make poorer decisions.

Promoting Healthcare Professionals to Managerial Roles

Making matters worse is when healthcare professionals are promoted to managerial positions. They bring these same biases to organizational decision making.

Using Healthcare People to Drive Lean

Healthcare leaders and practitioners insist that Lean teams should incorporate seasoned healthcare professionals. This is wrong for three reasons:

- 1) Healthcare professionals are not good at process improvement or organizational change because they don't come from Lean or behavioral sciences backgrounds
- 2) Healthcare professionals often fail to listen to those at the gemba (closest to production) level – the staff and patients who have the real expertise
- 3) Healthcare professionals treat organizational *symptoms* and not the *true root causes* that can lead to sustainable countermeasures and improvements

To be clear, the healthcare profession is truly full of people who care deeply about the health and recovery of their patients. However, measurements of productivity are like accident statistics. They tell you there is a problem, but they don't do anything about the accidents.

Successful healthcare leaders who build Lean into their organizations can realize huge and sustainable benefits. Lean is likely the only method by which their organizations can overcome the global healthcare challenges introduced above.

What Can Lean/TPS Deliver to Healthcare?

Lean/TPS efficiency is not driven by reducing headcount, although some Lean “experts” have based their business model on this. Lean efficiency is about the ability to do more work with fewer people – to build sustainable successes with wits, not wallets.

We know that at least 30-40% of a typical nurse’s time is spent on waste, such as rework and searching for medication or supplies. Some reviews place that value at 90% and higher. Analysis of healthcare processes, similar to processes in other industries, shows that roughly 80-99% of time spent is on waste or non-value added activities. Lean/TPS improvements focus on removing non-value-added steps versus doing value added steps faster.

The typical Lean/TPS “types of waste” are seen throughout hospitals:

Table x: Lean/TPS Savings from Waste and Error Reductions

Type	Laboratory Example	Patient Care Example (Oncology)
Defects	Mislabeled patient specimens	Wrong medication delivered to patient
Overproduction	“Just in case” blood tubes drawn from patients, but not used	Patients seen by MD faster than can be treated with chemotherapy, causing delays
Transportation	Moving specimens long distances from receiving to testing	Long walks from MD clinic to chemotherapy
Waiting	Specimens waiting in batches for testing	Patients waiting due to physician lateness or schedule exceeding capacity
Inventory	Expired test reagents	Expired chemotherapy drugs
Motion	Technologist walking due to poor layout	Nurses searching for missing or poorly located supplies
Over-processing	Time/date stamps on labels that are not used	Time spent creating a schedule that is not followed
Human Potential	Employee ideas not listened to	

Success of Lean in Healthcare

In order for Lean success to be carried across the globe, healthcare leaders need to drive home the importance of sustainable culture change. Lean is not a fad or a program. It is the culture of continuous improvement – a journey, not a destination.

Hospitals that have been successful at dealing with challenges have implemented Lean and have seen patients and staff benefits. They have lowered costs, kept savings, and responded to growing demand for services in the face of

shrinking tax contributions. These hospitals are building on experience and similarities to the manufacturing sector.

A Lean in Healthcare Success Story: Virginia Mason Medical Center (VMMC)

Consider VMMC in Seattle, Washington. It has been using Lean management principles for several years (see Table 13.1). Using Lean to eliminate waste and make problems visible, VMMC eliminated the need for planned expansions by creating capacity.

Category	2004 results – after two years of Lean	Metric	Change from 2002
Inventory	1,350,000	Dollars	Down 53%
Productivity	158	FTEs	36% redeployed to other open positions
Floor space	22,324	Sq. Ft.	Down 41%
Lead-time	23,082	Hours	Down 65%
People distance	Traveled 267,793	Feet	Down 44%
Product distance	Traveled 272,262	Feet	Down 72%
Setup time	7,744	Hours	Down 82%

Table 13.1: Results of 175 rapid process improvement weeks at VMMC.^{xv}

In addition to the above, VMMS also saved:

- \$1 million by eliminating the need for an additional hyperbaric chamber
- \$1 to \$3 million for proposed endoscopy suites relocations
- \$6 million for new surgery suites whose capacity was found in existing ‘bricks and mortar’

A Recent Canadian Lean Healthcare Project

- Within days of completing proper Lean/TPS training, one team believed they had reduced errors to zero for patient test data ...
- Another team showed how a simple solution could save 2-6 years of patient wait time per every month of their work ... Across the entire group, the savings worked out to 70 years of patient wait time per year
- An additional salary was saved from preventing loss of lab consumables ...
- 2.4 years of wasted time in process recovered ...
- Additional salaries were saved ...

One team from that project commented:

We were surprised at the size of the expected results. There were years of patient wait time that we could eliminate with a few improvements. We found we could save hundreds of days of waiting from some processes and unexpected dollar savings in other areas.

The Lean Healthcare Future

Healthcare centers, hospitals, and medical groups must break free from a 'business as usual' mentality. Here is a prescription for healthcare leaders:

1. Healthcare leaders need to build Lean cultures that promote the search for waste in healthcare. They can help their teams and employees to apply the economic concepts of efficiency and effectiveness to redirect resources. It's as simple as finding Lean savings and eliminating the budget silos that prevent savings from one area being used to address the needs of other areas.
2. They must look hard at their human performance management systems in order to drive home the accountability for process improvement and shed the 'That's not my job' mentality. Given the huge levels of waste in working time for nurses, for example, there must be a transition from 'sit and wait' to actively addressing continuous improvement. Idle time is waste, plain and simple.
3. They have to encourage their employees to look at other sectors and drive out the biases that have plagued medical decision making and Lean implementation efforts to date. This will lead to fact-based decision making, with people going to the source of the problem (gemba), and using realistic approaches to problem solving so that root causes are revealed and countermeasures can be permanent. This includes a strong effort on moving away from treating symptoms, not root causes. In one case, I was called in as a consultant to fix a critical backlog problem. The previous consultants had ordered overtime in order to reduce the backlog and claimed that as a Lean success. However, they'd tackled only the symptom, not the root cause. My team fixed the root cause.
4. They should look at internal transformation as a precondition for meaningful Lean health system reform. Do not rely on in-house experts, who are likely to repeat earlier failures. Drive the internal change with select partners who know Lean, can help with organizational change as a result of behavioral science backgrounds, and have demonstrated an ability to help throughout the Lean journey.
5. They must use Lean to both rise above the current challenges and meet the new imperatives of the medical marketplace, such as medical tourism, multi-level healthcare, mobility in the patient populations, and new competition for healthcare and related services (such as lab work or medical assessments).

The global healthcare sector must look to internal resources to reduce costs and increase net revenues because there simply aren't any other options.

Quality of care must increase in the face of diverse challenges. We know that Lean can meet these challenges because we know it *has met those challenges* in healthcare and other sectors. We know the prescription for healthcare, and it's Lean.

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Endnotes

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