

## Lean Six Sigma: The Basics

Hospitals are feeling the pinch of lower reimbursements and higher costs. Concerns about the quality of healthcare in the United States are making headlines. Payors are refusing to pay for poor quality. Competition is fierce. Successful strategies from the past are no longer enough. Today, hospitals cannot focus on patient satisfaction alone to set them apart. Top objectives now include a focus on outcomes, error reduction, and provision of the best patient care while driving efficiencies. Instituting effective and efficient processes within the hospital is no longer an option, it's a necessity.

So, how does one become a performance improvement leader? The task sounds daunting, but it is not. Deploying Lean Six Sigma strategically throughout your organization will enable you to achieve your key objectives, deliver business results, and set you apart.

Many hospitals have deployed Six Sigma and other tools such as Lean throughout their system; Cleveland Clinic, Mayo Clinic, Florida Hospital, and Mount Sinai in New York are just a few. They have realized that in order to improve outcomes, they need to distinguish between the critical and non-critical drivers of the process.

### Six Sigma Core Principle

Six Sigma is best known for delivering results in manufacturing. However, over 53% of Fortune 500 companies and 82% of Fortune 100 companies are currently utilizing this methodology. Why? Because it works. Six Sigma has been around for over 20 years and is a methodology that has shown a high level of flexibility in adapting to and integrating alternative management philosophies. The core principle behind Six Sigma is to reduce the number of defective outputs of a process to a level of 3.4 defects per 1 million opportunities (DPMO).

	Six Sigma Level	% Accuracy	DPMO
Excellent	6	100.00%	3.4
	5	99.98%	233
	4	99.40%	6,210
Average	3.5	97.70%	22,700
	3	93.30%	66,807
Needs Improvement	2	69.10%	308,537

An institution that performs at six sigma quality has 3.4 defects per million opportunities. Most U.S. businesses operate at a level of two to three sigma. This means that there are between 308,537 and 66,807 defects per million opportunities or between 69.0 and 97.7% accuracy. In healthcare, these kinds

of error rates can be deadly. We mistakenly think that 99.9% performance is good, but this only equates to five sigma. The following examples of five sigma performance illustrate this point:

- One hour of unsafe drinking water every month.
- Two unsafe plane landings per day at O'Hare airport in Chicago.
- 16,000 pieces of mail lost by the U.S. Postal Service every hour.
- 500 incorrect surgical operations each week.
- 50 newborn babies dropped at birth by doctors each day.
- 22,000 checks deducted from the wrong bank accounts each hour.
- 32,000 missed heartbeats per person, per year.

While sigma levels are higher in many core processes such as lab testing, transfusions, medication administration and surgery, even these core processes are error prone. Additionally, hospitals cannot afford to operate in the two-three sigma range for auxiliary processes such as throughput, turnaround time and other service-related processes that drive patient and physician satisfaction. As a result, hospitals will have to strive for nearly perfect performance in the future. It is a matter of survival.

### Why Use Lean Along With Six Sigma?

Lean tools focus on reducing cycle time and making errors visible, while Six Sigma tools are aimed at reducing defects. "Lean improves the through-put of the process; Six Sigma removes the barriers that hinder the process. The trick is knowing which methodology to use for which type of problem. A Master Six Sigma expert can provide guidance as to where Lean tools, Six Sigma tools and Design tools should be applied. "If all you have is a hammer, then everything looks like a nail," states Hans Froehling, DBA, CMBB.

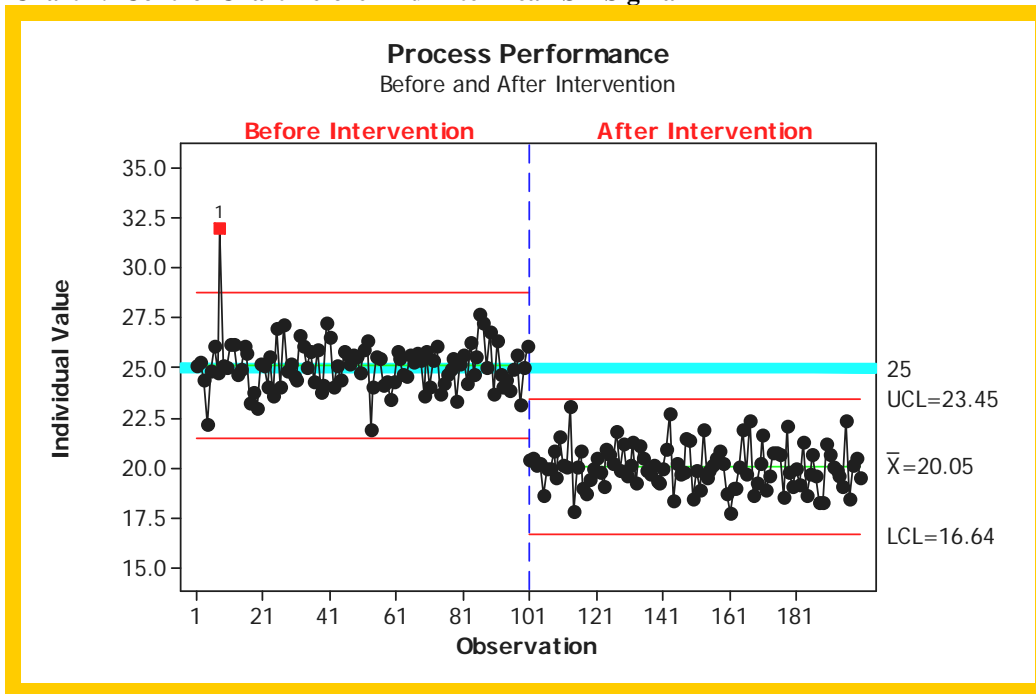
Lean provides tools to reduce process lead-time and eliminate waste. Sources of waste are associated with extended wait times, transportation, over processing, high inventory levels, high defect rates, over producing and the lack of creatively using the most effective asset of a hospital system: its employees. By contrast, Six Sigma focuses on consistency and reduction of errors. Bringing the two methodologies together delivers not only faster results, but will dramatically reduce the error rates of hospitals.

*"Many people in healthcare know a little bit about Lean Six Sigma but few understand the intricacies of project prioritization, risk analysis and the complex statistical tools used in Lean Six Sigma," says Kathy Murphy, PhD, President of Chi Solutions. A little knowledge can be very dangerous. Tinkering with a process can actually make it worse, so don't be afraid to ask for guidance.*

### An Example of Lean Six Sigma

The following is an example of the power of Lean Six Sigma. The Emergency Department (ED) requires that lab results be reported within 25 minutes. If the test is reported late, this is considered a defect in Six Sigma terms. A side by side comparison of turnaround time (TAT) before and after intervention is shown in Chart 1. The average TAT was reduced from 28 to 20 minutes and variation is reduced so that the risk of producing a result in greater than 25 minutes is virtually eliminated. Lab processes are in control and the customer's expectations are consistently met.

**Chart 1: Control Chart Before And After Lean Six Sigma**



The Lean Six Sigma improvement cycle is very similar to the Total Quality Management (TQM) cycle of Plan, Do, Check, Act. What is different is the organizational structure, process selection, methodology, the rigor and tools with which projects are executed, and the calculation of the financial impact in hard and soft dollars.

**What Is the Process and How Much Time Needs To Be Invested?**

The Six Sigma methodology is a five-step process known by the acronym DMAIC:

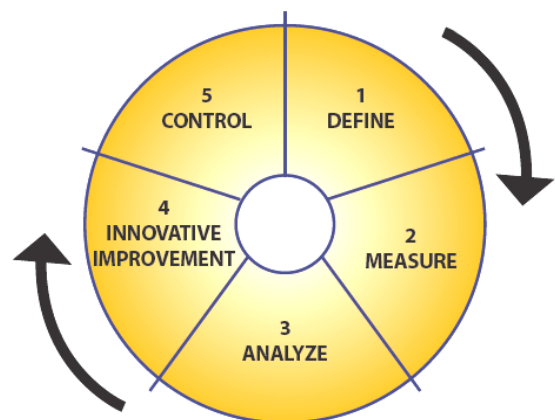
**Define** the Customer, their Critical to Quality (CTQ), the problems associated with the CTQ, and the Core Business Process involved.

**Measure** the performance of the Core Business Process involved.

**Analyze** the data collected and review the process map to determine root causes of defects and opportunities for improvement.

**Improve** the target process by designing solutions to fix and prevent problems.

**Control** and monitor the new process improvements to ensure that any variances stand out and are corrected before they can have a negative influence on a process thereby causing defects.



Depending on the complexity of the project and the experience level of the project leader, the average length of time to improve a process ranges from three to six months. Successful projects require a Six Sigma expert working with a cross-functional team. Everyone needs to be on board and coordinated.

### **A Little Information Can Be Very Dangerous**

In healthcare, there are low levels of frequency of errors and high levels of severity- there is more at stake than just a defective product—lives are at stake. So, if you are ready to implement Lean Six Sigma, make sure you partner with someone who is familiar with healthcare and the constraints specific to our industry. “Many people in healthcare know a little bit about Lean Six Sigma but few understand the intricacies of project prioritization, risk analysis, and the complex statistical tools used in Lean Six Sigma,” says Kathy Murphy, PhD, President of Chi Solutions. A little knowledge can be very dangerous. Tinkering with a process can actually make it worse, so don’t be afraid to ask for guidance.

### **In Summary**

“I think hospital executives would like to know that these problem-solving methodologies can dramatically improve the quality of care and have a strong ROI,” urged Froehling. When properly deployed, Lean Six Sigma not only reduces errors but it creates value in your organization by achieving up to a 15% expense or margin improvement. You can have it all: satisfied patients and physicians, lower costs and higher quality.

For more information, please visit [www.chisolutionsinc.com](http://www.chisolutionsinc.com).