

Six Sigma in Healthcare Industry : Some Common Barriers, Challenges and Critical Success Factors

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Six Sigma as a powerful business strategy has been around for almost twenty years and has grown exponentially in healthcare industry during the past five years. As a process performance improvement methodology, Six Sigma is viewed today as a disciplined, systematic, measurement-based and data-driven approach to reduce process variation. This powerful management strategy combines improved metrics and cook-book methodology to reduce defects or mistakes or errors in processes and thereby strengthening a company's market position and enhancing the financial impact to the bottom-line. In manufacturing, it is quite possible to reduce or even eliminate (in some cases) most of human variability through automation. In healthcare industry, the delivery of patient care is largely a human process, and hence the causes of variability are often difficult to identify and quantify.

Six Sigma was first developed by Motorola in the late 1980s. It has been extensively used within companies such as General Electric (GE), Allied Signal (former Honeywell), ABB, Texas Instruments, Caterpillar, Sony, Toshiba, City Bank, Bank of America, JP Morgan Chase to name a few here. Sigma is a Greek letter used to describe process variability or in mathematical terms, standard deviation of a random variable. A number of times Sigma indicates the amount of defects that are likely to occur in a given process (manufacturing, service or transactional). For example, a 3 sigma process has a defect rate of 6.7% whereas a Six Sigma process has less than 4 defects per million opportunities. Defects in processes cause increase in costs due to scrap, rework, repair, re-test and so on. The following are some of the typical characteristics of Six Sigma. Six Sigma:

- *Emphasises a data-driven methodology*
- *Places a strong emphasis on customer needs and expectations (in Six sigma context these are called Critical-to-Quality characteristics (CTQs))*
- *Focuses on elimination of defects or errors in processes due to unacceptable process variation*
- *Offers a structured approach to get into the root causes of problems using the DMAIC (Define-Measure-Analyse-Improve-Control) methodology*
- *Integration of powerful statistical and non-statistical tools in a sequential manner within the DMAIC methodology*
- *Places a greater emphasis on hard-dollar savings from projects which are aligned with strategic objectives of organisation's business*

Six Sigma versus Total Quality Management (TQM)

Six Sigma is often criticised as 'an old wine in a new bottle'. There are five aspects of the Six Sigma business improvement strategy that are not emphasised in Total Quality Management (TQM) and possibly many other quality improvement initiatives of the past.

- 1. Six Sigma places a very clear focus on the bottom-line impact in financial or monetary terms. A Six Sigma project will not be approved by the Project Champion (who is responsible for assigning projects) unless the bottom-line impact has been identified.*
- 2. As Six Sigma is a data-driven methodology to problem solving, a Six Sigma team uses measurements to analyse problems and thereby improve the patient care process. This measurement is the sigma quality level with which the core healthcare processes are currently operating. This sigma quality level of a process provides a baseline performance for process improvement activities.*
- 3. Six Sigma has been very successful in integrating both the human and process aspects of improvement. Here the process aspects include process stability, process capability, etc. whereas the human aspects include teamwork, customer focus, cultural change, leadership etc.*
- 4. The Six Sigma methodology (DMAIC) creates a sense of urgency by emphasising rapid completion of projects in a very stringent time framework of between 4 and 6 months. No improvement process uses DMAIC as effectively as Six Sigma does.*
- 5. Six Sigma utilises a very healthy infrastructure of champions, Master Black belts, Black belts, Green belts and Yellow belts that lead, deploy and*

implement the methodology. The champions provide resources and keep the project focused on the business need, remove barriers or obstacles(if any) encountered by the Black belts during the project execution and get involved in the selection of Black belts for project execution. The Master Black belts is the technical expert providing training, coaching and counselling for the Black belts and Green belts. The Black belts work full time on projects which on average should bring at least \$175,000 US to the bottom-line of the organisation. The Green belts carry out small projects in their own work place and generally work part time on projects. The Yellow belts in many cases are process owners and assist Black belts and Green belts in data gathering and collection methods.

Potential areas in Healthcare Industry where Six Sigma could be applied

The Six Sigma methodology works quite well in health care processes. Six Sigma projects in health care industry are focused on direct care delivery, administrative support and financial administration. Six Sigma projects can be executed in the following health care processes.

- i. Increasing capacity in X-ray room
- ii. Reducing turn around time in preparing medical reports
- iii. Improving patient satisfaction at ER
- iv. Reducing bottle necks in emergency department
- v. Reducing cycle time in various inpatient and outpatient diagnostic areas.
- vi. Reducing the number of medical errors and hence enhancing patient safety
- vii. Increasing the accuracy of laboratory results

- viii. Increasing the accuracy of billing processes and thereby reducing the number of billing errors
- ix. Improving bed availability across various departments in hospitals
- x. Reducing the number of post-operative wound infections and related wound problems
- xi. Increasing surgical capacity
- xii. Reducing length of stay in ER
- xiii. Reducing inventory levels
- xiv. Improving patient registration accuracy, and so on.

Critical Success Factors (CSFs) of Six Sigma in Healthcare Industry

Like manufacturing processes, CSFs play a crucial role in the implementation of Six Sigma projects within the health care industry. The leaders of health care industry should consider the application of Six Sigma from the perspective of improving the quality and capability of current processes as well as the ability of processes to deliver patient care and safety. The following list of CSFs are absolutely imperative for the successful development and deployment of Six Sigma in a hospital environment.

1. Uncompromising Top Management Support and Commitment

Applying Six Sigma in a health care sector is not easy, and if senior management team is not on board, it is almost certainly a formula for failure. The deployment of Six Sigma should begin with a two day broad overview of Six Sigma business strategy for the senior management team, ensuring buy-in and commitment for the implementation. Six Sigma project champions responsible for identifying and overseeing projects must be carefully chosen before the

training program. In order to buy-in senior management support and commitment, it is also essential to select projects which are tied to strategic business focus.

2. Formation of Six Sigma infrastructure and the appropriate Training

The selection of right people is crucial for the execution of Six Sigma projects. Once the Six Sigma infrastructure is defined with the help of a Six Sigma consultant with adequate experience from service industry, training may begin. The project champions should receive a good overview of Six Sigma fundamentals and the skills required for project selection, project prioritisation, and project scoping and project execution. The Black belts must receive four weeks of intensive training, one week each month for four months. The focus of the training must be on the execution of Six Sigma projects and the required tools and techniques for problem solving. The Black belts should work on two Six Sigma projects as part of their certification process. Each Black belt is expected to spend at least 80% of their time on Six Sigma projects. The Green belts must receive two weeks of training. Green belts may work part-time and are expected to select a project from their own processes at the work place. They may also get involved with those projects which are executed by Black belts.

3. Project selection and the associated financial returns to the bottom-line

Potential Six Sigma projects within a healthcare setting may relate to operational processes such as billing, registration or work flow or they may involve clinical procedures such as medication administration. When identifying and prioritising projects in a healthcare industry, the first consideration should be the customer and knowing the Critical-to-Quality characteristics (CTQs) that drives the project. The customer in this context may be the patient, physician, nursing staff,

department manager or other stakeholder, depending on the process being reviewed. The following tips may be useful while selecting potential Six Sigma projects in health care industry.

- a. Projects must be aligned with critical hospital issues, patient care issues and strategic objectives of the business
- b. Projects must be feasible to execute from a resource and data standpoint
- c. Project objectives must be clear to everyone involved in the project
- d. Ensure that projects can be completed on time
- e. Ensure that a tollgate review must be performed at every stage of the Six Sigma methodology
- f. Select those projects which have the ability to show measurable improvements in quality, cost and timeliness parameters

Some Common Barriers and Challenges in the implementation of Six Sigma within Health Care Industry

There are several barriers and challenges lurking below the surface for health care industry for consideration before the implementation and deployment of Six Sigma business strategy. The first and foremost challenge is the initial investment in Six Sigma Belt System training. The absence or difficulty to obtain the baseline data on process performance is another major challenge while applying Six Sigma in health care sector. There will be lots of data available in the health care sector, however, most of the time these data are not readily available for its analysis. For health care industry, it is often a struggle to identify processes which can be measured in terms of defects or errors per million opportunities. Another barrier to Six Sigma

deployment in health care industry is the psychology of the workforce. Last but not the least, it is important to present recommendations using the business language rather than the statistical language.

Conclusion

Although Six Sigma has been used by world class companies for several years with immense success, its application in healthcare sector is still in its infancy. Appropriately implemented, Six Sigma clearly produces benefits in terms of laboratory and medication error reduction, improved patient care, etc. Some of the early successful applications of Six Sigma in health care have resulted in a reduction of surgical inventory costs, reduction in length of stay at ER and an improvement in patient satisfaction. The success stories of Six Sigma are rapidly growing, all touting the impact of this powerful and rigorous methodology to problem solving. The authors believe that Six Sigma as a business strategy allows health care sector to deliver a truly high class service to patients. Think of the true impact that Six Sigma could have if we focus on the core issues of health care and improving the quality of lives of patients. In authors' opinion, the application of Six Sigma in health care industry will continue to grow, especially here in Europe over the next five years or so. As with all improvement strategies all it takes is a couple of brave leaders willing to take the right course and confront resistance to core issues once and for all.