



HEALTHCARE QUALITY IMPROVEMENT TOOLS AND PROCESSES: A REVIEW OF LITERATURE

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ABSTRACT

The healthcare delivery system falls short of care that is safe, effective, efficient, patient centered, timely, and equitable. Over the last decade, health care institutions have borrowed performance improvement tools from manufacturing sector, including 'Lean', emphasized by Toyota, as well as 'Six Sigma', with its early roots at Motorola. By applying the set of principles, practices and methods represented by Lean and Six Sigma, better coordination, timeliness, efficiency and value of healthcare services can be achieved.

quality improvement tradition promoted by Deming's TQM principles and the works of Juran[6]. The goal of Six Sigma is to reduce variation within processes to produce a product that is closer to the customer's specification; the term refers to a process performed with an error rate of 3.4 errors per 1 million opportunities. Many hospitals have embraced these concepts to reduce cost, increase access to care, and increase capacity without any, or minimal, capital expenditures[7]. A Six Sigma project requires a major expenditure of money and employee time, and a willingness to make some hard decisions about jobs, employee retention and relationships among stakeholders. An institution's culture should be considered as part of the decision about using Six Sigma. If the institution has a history of making data-driven decisions, or at least has displayed openness to operating in that manner, Six Sigma has a good chance of success[8]. A variety of systematic methodologies for identifying, assessing and improving processes have been developed as part of the Six Sigma approach. The Six Sigma improvement model, *Define, Measure, Analyze, Improve, and Control* (DMAIC) specifies the following sequence of steps for understanding and improving a process: 1) defining the project goals and customer (internal and external) requirements; 2) measuring the process to determine current performance; 3) analyzing and determining the root cause(s) of relevant defects; 4) improving the process by eliminating defect root causes, and 5) controlling future process performance. Another Six Sigma methodology, *Design for Six Sigma* (DFSS), is used to systematically design new products and services that meet customer expectations and can be produced at Six Sigma quality levels[9]. Six Sigma also involves the training and certification of designated process

INTRODUCTION

The performance improvement strategies aim to implement process improvements through a coordinated set of principles and practices that promote greater efficiency and effectiveness, with fewer wasteful practices or errors. Evolving from their original application in manufacturing industries, these strategies have been extended to other settings including construction, software development, financial services, health care delivery, and laboratory sciences[1]. The current transformational strategies being employed in healthcare sector include Six Sigma[2], Lean/Toyota Production System [3]and StuderGroup's Hardwiring Excellence[4].

Six Sigma

Six Sigma is an organized and systematic method for strategic process improvements and new product and service development that relies on statistical methods and the scientific method to make dramatic reductions in customer defined defect rates[5]. The methodology and concepts are clearly rooted in the

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specialists (called *black belts*, *green belts*, or other similar titles) within organizations to help guide Six Sigma improvement efforts. Other distinctive Six Sigma features include the expectation that process quality improvements be translated into financial metrics to assess value and the active involvement of top management in all Six Sigma initiatives[10].

Lean/Toyota Production System

Lean calls for cultural change and commitment and what have been called the 4-Ps – philosophy of adding value to customers, society, and associates; processes paying off over time; people and partners who are respected and developed; and problem-solving to drive organizational learning. Much of the attention is focused specifically on work processes, quality, and efficiency[11]. Lean (also known as Lean Production, Lean Enterprise, and Lean Thinking) involves a set of principles, practices and methods for designing, improving and managing processes. The development of Lean is attributed to Ohno's articulation of the Toyota Production System. A Lean process reflects the goal of continually reducing waste and improving work flow to efficiently produce a product or service that is perceived to be of high value to those who use it. Implementation of Lean involves systematic process assessment and analysis. The preliminary stages of Lean assessment include "value stream mapping" in which key people, resources, activities and information flows required to deliver a product or service are made explicit and depicted graphically. The value stream map is a key tool for identifying opportunities to reduce waste and more tightly integrate process steps, thus improving process efficiency[1]. Koning D et al. (2006) described several applications of an integrated Lean Six Sigma approach instituted at a Dutch hospital that led to reduction in the complexity of hiring part-time clinical staff, optimizing operating room scheduling by designing a new pre-surgical admissions process, and developing a new work planning system to expedite completion of equipment maintenance requests[12]. The U.K.'s National Health System adopted a variety of Lean strategies, including redesigning the number of steps, and hence the time, needed for collection and processing of blood samples at Bolton Hospital[13]. Successful applications of Lean and Six Sigma have been reported at numerous other health care settings[14]. As pointed out by Deming and other management theorists, implementing a truly transformative change takes time and shifts in organizational behavior that establish a foundation

for process improvements to be accepted and fully integrated into the organization's routine operations and expectations[15]. Recognizing the importance of the "softer side" of organizational behavior in process change is a critical component for making a Lean or Six Sigma project succeed[1].

StuderGroup's Hardwiring Excellence Approach

This intervention comes out of the socio-behavioral change arena by taking a customer-focused and employee-centered approach combined with organization-wide training and leadership behavior modeling to bring about significant cultural change and quality and financial gains. In contrast to the number of transformational strategies originating in manufacturing, StuderGroup's Hardwiring Excellence approach was created by a healthcare administrator[1].

CONCLUSION

Six Sigma, Lean and StuderGroup's Hardwiring Excellence as healthcare quality improvement tools will become increasingly useful as health care delivery and education continue to transform. The healthcare organizations need to be flexible and open enough to derive significant productive outcome.

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