

# A Mini Review on Importance in the Implementation of Lean Management in Healthcare

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**Abstract.** Lean management contributes to pursue the quality, accessibility and efficiency of healthcare institutions. Its importance of the implementation of lean management in the healthcare sector using different strategies to improve services like: the supply chain in hospitals. In this review was used the model proposed by seuring and gold based on the analyze a sample of articles indexed in Scopus, web of science and also the simulation tool was used to in order to illustrate the approach. After implementation of lean thinking in different hospital in some countries improves the structure, process and outcome of care and management actions and management in healthcare promotes advantages in terms of quality, safety and efficiency of healthcare in hospitals.

**Keywords:** articles, healthcare, efficiency, lean, thinking

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## Introduction

The term lean thinking was introduced from the Toyota production system, the lean concept is applicable to organizations that plan and execute a series of actions in a certain sequence and time, to provide value to a customer (Buzzi and Plytiuk, 2011; Selau *et al.*, 2009). The use of lean management in the healthcare system starts around 2002 specially in countries such as: USA and Spain (Muñoz, 2010; de Souza, 2009).

The increase in the demand for health services in conjunction with the current moment of crisis economic, making necessary the lean management to seek the maximum efficiency (Lodge and Bamford, 2017; Aguilar-Escobar and Garrido-Veja, 2013). The lean management has been focused to the hospital on different aspects, such as: the hospital supply chain, the use of technologies information, the redesign of processes or the need for comprehensive management of the provisioning (Kumar *et al.*, 2008; Rogoski, 2006; Aptel and Pourjalali, 2001). The principles of lean management in healthcare is widespread in various contexts of health, such as emergency, oncology, pharmacy, intensive care unit, radiology, orthopedics, mental health clinics and cardiology services (D'Andreamatteo *et al.*, 2015).

The first objective of the lean management in hospitals must be to guarantee the supply of products exactly where and when they are need and with the quality and quantity required for the provision of the service, avoiding any breakdown of stocks and performing this process in the most effective and efficient way (Dickson *et al.*, 2009a; Lenta *et al.*, 2009; Domínguez-Machuca *et al.*, 1995). Some researches have pointed out specially the importance of the supply chain health, due to transformation activities and the flow of resources and patients that support the provision of health services, avoid different difficulties such as: strategy of zero stocks and zero deadlines (Dickson *et al.*, 2009b; Feare, 2004).

The three domains or conceptual assessment variables of this model are: structure, process and outcome. Structure is related to the physical and organizational settings, in which care occurs. Attributes included are: material resources (facilities, equipment and financial), human resources (quantity and qualifications of health professionals) and organizational structure which are (physical structure and organization of health care staff). Process corresponds to the set of activities that occur between professionals and patients during care delivery and includes both the technical components of care (procedures, diagnosis and therapeutic interventions) and as well as interpersonal relationships. Outcome

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refers to the effects of care on the patient's health status and also includes the customer and staff satisfaction with receiving and providing care, respectively (Magalhães *et al.*, 2016).

The aim of this article is to explain the importance of the implementation of lean management in the healthcare sector using different strategies to improve services like: the supply chain in hospitals.

## Materials and Methods

The implementation of a healthcare system represents rigorous methodological framework analyzing a sample of research documents in a systematic way. In this review was showed different techniques for the implementation of a healthcare management used from different researches.

**Model proposed by seuring and gold.** The model proposed by (Seuring and Gold, 2012) represents an effective tool for analyzing a sample of research documents in a systematic way using different steps: material collection, descriptive analysis, category selection and material evaluation (Tahar doost, 2021; Rotter *et al.*, 2018; Gomes *et al.*, 2017).

**Material collection.** The first step is the screening of the publications found was performed through the verification of titles and abstracts, in order to discard those that did not fall within the scope of this research. The inclusion criteria of the articles Indexed in Scopus and Web of Science.

**Descriptive analysis.** The second step consisted in the fluent reading of the texts and abstracts of articles completes in order to identify which lean tools were used by the authors.

**Category selection.** The classification criteria are divided into three main blocks, which are divided into subcategories.

**The categories are details below.** General information of the article which based on the informations collected, analyzes were made regarding the year of publication, most relevant journals and the main authors.

**Research method.** The papers were classified as conceptual or practical/applied. In conceptual ones, fit those article that seek to critically evaluate recent production about lean healthcare theme. They are the literature reviews. The papers can be considered for studies and reports of experiences.

**Material evaluation.** The data of the article were evaluated according to the journal (Indexed in Scopus or Web of Science).

## Results and Discussion

**Implementation of the lean management in healthcare at virgen macarena hospital.** The results after the implementation at Virgen Macarena Hospital improved the effectiveness and efficiency of the logistics process, the flow of information and materials (Aguilar-Escobar and Garrido-Veja, 2013).

**Zero stocks.** A reduction in the level of stocks was obtained in the general warehouse and in the final warehouses of plants. The stock rotation increased, showing the high level of activity of the logistics platform. In addition, the reduction in the quantities stored in the hospital warehouses has translated into savings due to the return of unused merchandise by them.

**Zero deadlines.** The reduction of inventories in the warehouse was due to the increase in requests and the decrease in the delivery time and delays of the suppliers, as well as the reduction of the periods of coverage of the requests of the internal customers of the hospital.

**Zero defects.** The new logistics system has produced a reduction in stock outs and an increase in customer satisfaction. Low inventory levels have forced the entire organization to be more attentive to ordering policy. Thus, to avoid breakdowns, daily controls were established for items with low stocks and especially zero stocks.

**Zero bureaucracy.** The computerized system used in the logistics platform has reduced the need for paperwork to fulfill orders.

**Implementation of the lean management in health-care at national health service.** The implementation showed improvements in different activities of the organization which can be redirected towards providing better direct care to patients (Grove *et al.*, 2010).

The current state value-stream map for birth notification in the health visiting service at a large UK Primary Care Trust (PCT) identified a total of 67 processes, of which 58 were identified as waste. The redesigned process map had 23 processes demonstrating a potential saving of 65% in the number of processes required for birth notification and arrangement of the initial visit.

The time and motion study defined a benchmark level of performance for future improvement activity. Results

indicated that clinical staff in a health visiting service in a large UK PCT spent 56% (range 12e70%) of their time on work which directly benefits their patients. The remainder is spent on non-value added but business essential work (29% range 15e65%) and 15% (range 24e63%) on waste. Administrative support staff performed 0% VA work, since value is defined as being of direct benefit to the patient. They performed 53% (range 37e76%) of NVA business essential work and the remainder is spent on waste activities. It is important to note the administrative support staff role is essential to free up clinical staff for VA work.

**Implementation of the lean management in health-care at cystic fibrosis clinic.** Before initiating this project, the CF clinic was capable of scheduling 30 patients per week. By the conclusion, the clinic was capable of scheduling 40 patients per week which is based on a 50 week per year, the available capacity was increased by 500 patient visits per year. Given the average revenue generated per patient visit was US\$331.00, the potential additional revenue from lean implementation efforts was estimated to be US\$165,000 annually, a very conservative estimate. The estimate itself included only physician professional and facility charges and did not capture revenue from microbiology, pulmonary function studies or ancillary services (respiratory, physical therapy, nutrition, psychology, etc.).

Results of this research advance the current literature dedicated to quality improvement initiatives in the healthcare setting through the documentation of lean methods in the context of the CF clinic's operating efficiency. It is important to note that these findings could be applicable not only to other CF clinics but to any multidisciplinary clinical setting. The patient care model devised, in its entirety or in part, could be adapted for implementation in similar clinics nationwide, leading to higher quality care and increased revenue potential. The value of these efforts is underscored by the lack of external resources required and the relatively simplistic approach used to achieve practical results. Thus, the true value lies in the framework, which is designed to provide flexibility in applying quantifiable methods to quality improvements (Smith *et al.*, 2011).

**Implementation of the lean management in health-care at veterans health administration.** This study demonstrated a significant reduction in patient wait times for surgical procedures and an improvement in access in the clinical and operative settings when implementing lean processes. The improvement gained

was noted over multiple areas and seen during the implementation of new technologies. The changes in the measured outcome categories occurred early, and the differences were sustained across the entire observation period. This study demonstrated that there were improvements in the volume of general surgery patients seen both in the clinic and the OR. Part of this improvement involves the adoption of e-consultations, which can be used as a formal form of communication between physicians, residents and nurse practitioners within the electronic medical record. Primary care physicians often use e-consultations for focused questions or so specialists can answer a question that does not require direct patient interaction. In addition to the time flexibility for the parties involved, there is also a well-defined turn around time of 72 h. This, along with a decreased need for travel for straight forward questions, significantly decreases the backlog of wait times and improves patient satisfaction.

This study also demonstrated that there was significant improvement in the use of CVT26 The VA system pioneered the implementation of this technology and it is used for pre and postoperative assessments and patient education. Ostensibly, this supports reducing wait times, given that it eliminates a large number of unnecessary clinic visits and travel times. A recent audit of the system demonstrated that there were missed opportunities to capitalize on the available infrastructure and only a limited annual growth (13%) of non institutional care patients using CVT27 The improvement in the e-consultation and CVT visits shown in this study were much more dramatic, and between FY 2013 and FY 2014, there was a 100% increase in the number of patients seen on CVT. Clinical video tele-conference visits were added to existing clinic days, obviating the need for a separate clinic. A combination of eliminating unnecessary face-to-face encounters and increasing CVT visits also had the welcome benefit of reducing the clinic no-show rates. This further frees clinic appointments to accommodate additional patients and reduces the economic burden on the system and patient wait times. As these are still newer processes, additional studies to specifically identify best practices to improve their use will be critical to improve efficiency in the system (Valsangkar *et al.*, 2017).

## Conclusion

This study showed that the implementation of lean management in healthcare improves the structure, process and activities in hospitals with maximum efficiency.

The excellent results in some private organizations after the implementation of health management is a positive predictor to be used in the public sector.

**Conflict of Interest.** The authors declare that they have no conflict of interest.

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