



# “Lean Management” a Method of Improving Change Management in Healthcare Organizations

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## Abstract

The aim of this article is to present selected ways of developing the management in medical institutions in Poland with the help of Lean Management. The author concentrates on processes of changes in clinical hospitals which include dealing with special tasks in healthcare system, diversity of tasks, medical technology, diversity of relationships with the surrounding, financing from few different sources, limits of resources (especially public ones). The article leads to a conclusion that Lean Management should be a way of thinking.

**Keywords:** Lean; Management; Health services; Health care units restructuring

## Admission

The production management system developed and implemented at the Toyota concern in the period after World War II was recognized as a kind of miracle in the area of management systems, enabling the improvement of productivity, quality and efficiency of enterprises. For years, it was introduced to production systems, as well as in health care and many entities operating in various sectors of the economy under the name Lean Management, Lean Production or simply Lean. Lean in management means eliminating losses and any factors not adding value to a product or service. The key ingredient of Lean is continuous improvement [1]. According to Graban, Lean is a set of tools, management system and philosophy, whose introduction can change the way of organization and management of medicinal entities. “A lean system is a method that allows hospitals to improve the quality of patient care by reducing the number of errors and reducing waiting times” [2]. Permanent pursuit of perfection in the management of manufacturing processes is not without a negative impact on the satisfaction of healthcare system employees. It is often not connected with raising salaries, improving work safety or improving working conditions.

The purpose of this article is to indicate selected directions for improving change management in healthcare entities in Poland using the Lean Management concept. Changes in management were presented in the aspect of restructuring activities undertaken in healthcare entities. Particular attention will be focused on change processes in multi-specialized hospitals, which have the following features:

- a) Performing specialized tasks in the field of health protection,
- b) Multi-tasking,
- c) Using highly advanced medical technologies,
- d) The multiplicity and diversity of relationships with the environment,
- e) Financing from several sources.

Specialist hospitals, due to their organizational complexity, are subject to change processes, which results not only from legally imposed obligations [Act of 15 April 2011 on medical activities: Dz.

Of Laws 2011 No. 112, item 654], but also from the decisions of managers managing entities. These institutions are implementing changes in the financial and organizational area. The effectiveness of actions resulting from centrally made systemic decisions aimed at restoring the financial balance of public health care facilities in Poland has been undertaken since the 1990s and is now being continued. As part of the so-called Plan B in the years 2009–2016 [Resolution No. 58/2009 of the Council of Ministers of 27 April 2009 on establishing a multiannual program called ‘Support for local government units in actions stabilizing the health care system’]. The restructuring changes program at that time covered 80 independent public health care facilities [Rydzewska 2017, p. 179-187].

Source: Dynamics of total SPZOZ liabilities, broken down by voivodships. MZ information based on survey data obtained from voivodship offices, the Ministry of the Interior, the Ministry of National Defense, medical universities and SPZOZ supervised by the Ministry of Health, <http://www.mz.gov.pl/>

Despite a number of initiatives at the level of the Ministry of Health and at the level of management by public local governments of public health care facilities, their debt not only has not stabilized, but - as the latest data shows - it increases in the scale of the health system Table 1. In view of such facts, it is justified to seek and implement solutions that are good practices enabling rational and effective / lean resources of medical organizations while reconciling the interests of recipients of medical services.

**Table 1:** The debt of public healthcare institutions in Poland (first quarter 2016).

| Province            | Balance (in PLN million) | Dynamics (first quarter: 2016) |
|---------------------|--------------------------|--------------------------------|
| Dolnośląskie        | 697,8                    | 98,0%                          |
| Kujawsko-pomorskie  | 800,1                    | 106,4%                         |
| Lubelskie           | 865,3                    | 102,0%                         |
| Lubuskie            | 356,5                    | 99,2%                          |
| Łódzkie             | 624,3                    | 97,3%                          |
| Małopolskie         | 731,5                    | 96,0%                          |
| Mazowieckie         | 1 787,0                  | 102,8%                         |
| Opolskie            | 125,8                    | 94,1%                          |
| Podkarpackie        | 518,4                    | 103,8%                         |
| Podlaskie           | 374,6                    | 103,8%                         |
| Pomorskie           | 632,6                    | 98,8%                          |
| Śląskie             | 1 285,8                  | 99,7%                          |
| Świętokrzyskie      | 384,8                    | 104,0%                         |
| Warmińsko-Mazurskie | 176,8                    | 87,8%                          |
| Wielkopolskie       | 620,6                    | 99,6%                          |
| Zachodniopomorskie  | 294,8                    | 98,5%                          |
| MON                 | 180,9                    | 102,0%                         |
| MSW                 | 283,8                    | 115,1%                         |
| Total               | 10 741,3                 | 100,8%                         |

### Lean Management Concept Main Assumptions

A number of Lean Management terms have been presented in the literature. This concept is presented as business management, which assumes adapting it to market management conditions based on continuous organization rationalization processes and its relations with the environment. These processes should concern the introduction of changes in the organization in terms of operations, property structure, management, shaping the attitudes of employees focused on “slimming” the organization [3]. In another term, the emphasis is on ways of reducing the cost of generating

added value for the customer by rationalizing employment, infrastructure, expenditure on current and investment activities, and working time [4]. The main principle of Lean Management is primarily the elimination of waste to reduce the costs of the entity’s operations while ensuring adequate added value for the client [5]. In a different approach, Lean Management is combined with the organization management method, especially in the process of implemented changes [6]. It emphasizes rationalization by restructuring the organization’s resources and the way they are used, taking into account the conditions arising from its environment. In the term Lean Management, the role of “slimming”

the organization in order to improve the productivity and quality of products is emphasized [6]. As it results from the quoted terms, the Lean concept refers to both the internal elements of the subject and his relationship with the environment in which he operates. It covers activities improving the quality of products, restructuring the scope of manufactured products, related to the flattening of organizational structures, with changes in human resource management and ensuring the competitiveness of manufactured products. The key concept of Lean Management is the added value of the product or service for the recipient, while generating profit for their producer. Obtaining it requires meeting at least the following conditions:

- a) The customer (in the case of health protection, individual patient or institutional payer - public or private) is willing to pay for the product,
- b) The product (health service) has the value desired by the customer (it is not defective, has utility value, corresponds to the health need),
- c) The manufacturer (medical entity) rationalizes the use of production factors (labor input, expenditure on manufacturing

instrumentation, expenditure on infrastructure, proper inventory rotation).

Understanding the Lean Management principle is a condition to avoid misunderstanding its essence. Correct interpretation is associated with its identification with activities aimed at eliminating waste (from Japanese Muda), and not with austerity measures consisting in limiting expenditures while providing value not fully desired for the patient (e.g. limiting the employment of persons in the positions of medical secretaries assisting the work of doctors or people working in the registration of medical entities, resulting in longer queues and patient waiting times, as well as employee dissatisfaction due to excessive workload). [7]. The term Muda is combined, among others with: production of defective products, production of products with low utility and low efficiency for the recipient, production of often unnecessary products, inefficient organization of employees' work resulting in so-called apparent actions (not having a real purpose), lack of synchronization in time and space of activities of individual employees or groups of employees (downtime related to time not worked effectively, resulting from non-delivery of products by the previous product manufacturing links) Figure-1.

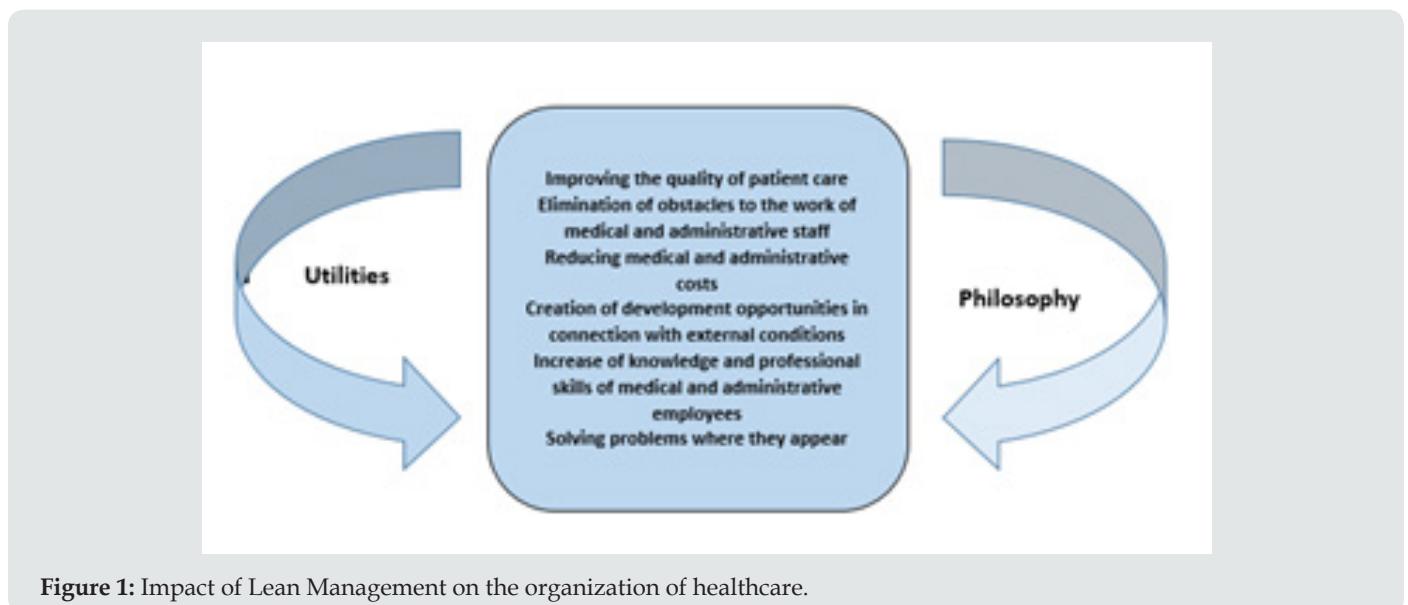


Figure 1: Impact of Lean Management on the organization of healthcare.

Source: Own study based on [2].

To sum up, it should be emphasized that the concept of lean management, especially in the management of healthcare organizations, should be clearly understood. Elimination of waste (time, equipment and apparatus, money) should be distinguished from economical and limiting resources of medical organizations that cause disruptions in the course of medical processes, extending patient waiting time, offering defective health services and dissatisfaction of employees with work overload. Lean Management as a concept supporting the implementation of changes is not a way to generate profit at all costs, but is a way to reconcile the demand side with the supply side through the transformation of assets, the

way of management, organization, relations with the environment understood not only as a market of health services, but much more widely (legislation, competition, outsourcing, general economic factors).

### Principles and Tools of Lean Management in the Aspect of Application in Healthcare Organizations

Creating patient value should be based on several principles of Lean Management. The rules are as follows:

- a) The products are free of defects (benefits having value for the recipient; benefits not disputed by payers - in accordance with technological standards, requirements set by payers as to

the qualifications of personnel, medical equipment and apparatus, infrastructure conditions; benefits corresponding to satisfying a given health need; no loss of time and material; safe in terms of health, technology and hygiene for all stakeholders),

**b)** Solving problems at the place of origin (employees' readiness to redefine activities and redesign work),

**c)** Compliance of the performed health service with the standard way of its performance (if it was developed), objectives, conditions of implementation,

**d)** Transparency of relations between producers and recipients of health services thanks to a properly designed and constantly improved process of manufacturing and supplying products; designing roles enabling the production of services without defects [8].

**e)** Techniques leading to the elimination of losses and adapting business results to external expectations should also be adapted to the specifics of healthcare organization entities. Selected techniques include, but are not limited to, techniques that may prove particularly valuable from the perspective of the effectiveness of implementing changes in healthcare organizations. These are among others:

**f)** Just in Time or production on time - the use of this tool allows you to eliminate the unjustified expectations of patients, employees from the same or another organizational unit, recipients, suppliers, and as a consequence prevents the loss of contracts and income.

**g)** Kanban - is a system of signals used in undertaking individual actions at various stages of product creation (at what point in time the next health service for the patient is needed, in which organizational part of the entity, which personal and material resources are to be used). The condition of introducing the signal system is to create an undisturbed system of relations between individual groups of employees or organizational units of the therapeutic entity leading to the development of principles of close cooperation and a system of communication between them. A particularly desirable approach to patient management is treating the patient care path as an inseparable whole (successive phases of value creation), which is a condition for determining the cumulative value (final health effect) of individual services (medical procedures) performed for the patient. The condition is cooperation between individual organizational parts of the entity and a departure from treating services performed by individual organizational units as final or detached from the final effect for the patient.

**h)** Elimination of waste - areas of waste can be: production of health services that do not correspond to the reported demand, breaks / downtime between the individual stages of the process of creating value (the final health effect) for the recipient, unjustified movement between the stages of creating value (transport of the patient between parts of the hospital or between hospitals), the

appearance of defects in the manufacturing process or product (making an incorrect diagnosis based on a faulty performance of a diagnostic test), unjustified generation of inventory, unnecessary movement of employees, equipment and apparatus, documentation and an unfriendly way of delivering products to recipients (failure to comply with the dates and hours of health service). For example - obtaining incorrect results of a patient's diagnostic examination requires correction or repetition, i.e. the consumption of additional material resources and workload, as well as additional control. This, in turn, can cause "downtime" in other parts of the medical organization.

**i)** 5 S (selection, systematics, cleaning, standardization, self-discipline) - the use of this tool becomes possible to reduce in-hospital infections, which may also result from irregularities in waste storage, non-compliance with occupational hygiene, movement between hospital departments without adequate protection against exposure to infection biological agents.

**j)** Creating a value stream map (VSM) - the essence of VSM is to analyze how to produce and deliver the product to the customer and identify those activities that add value. The activity that creates the value of a patient's medical service is to conduct an interview with the patient by a nurse, as opposed to providing no interview with a patient waiting for direct contact with a doctor who only after entering the office orders or conducts the interview himself.

**k)** Jidoka - is a way for employees to respond in the event of problems during the product manufacturing process. Prevents the penetration of the defective product or its parts into the next stages of manufacture and subsequent positions, e.g. in the event of incorrect preparation of the patient for a diagnostic test or surgery, the employee should break the chain of subsequent medical activities that may have a defective "effect" of the medical procedure.

**l)** To sum up, it should be emphasized that the selection of tools under the Lean Management concept and the way they are used must take into account the specifics of a given activity, as well as adapting them to a given type of therapeutic entity [9].

### Using the principles of "lean" management in restructured healthcare organizations - Lean Healthcare

The principles of Lean management in health care were adopted to be called Lean Healthcare. They have been introduced in many healthcare organizations in numerous countries [10]. However, experience shows that only part of the Lean Management tools and methods have been used to improve selected areas of activity of health care entities, especially hospitals. Given the specifics of the healthcare sector and operations, Lean Healthcare has a specific interpretation: a medical entity is an entity that produces specific products - most often they are health services; health service is a manufacturing process; the patient, together with the services provided to him which bring specific health effects, is a product.

The applications of Lean Healthcare in healthcare organizations presented in the literature show that it is most often focused on improving the quality of health care (increasing the value of the product for the patient), improving access to health services, improving organizational processes and rationalizing costs. Improving access to healthcare understood as shortening the waiting time for health services, streamlining internal processes related to providing patients with services are the factors that allow rationalization of the costs of medical procedures. By increasing work efficiency, both in terms of health services and support activities (patient registration, referring patients to appropriate organizational units in the hospital) - there is the possibility of shortening expectations for services and improving the economic efficiency of entities. With the high effectiveness of implementing changes, patient waiting times can be reduced by up to 42% [11]. Reducing patients' waiting time for medical procedures is not the only attribute of high-quality healthcare. It also depends on the method of providing health services, especially in those entities (mainly hospitals) that provide comprehensive care for a package of medical services. Often, due to the nature of the disease, the group of patients requires various activities not only within one ward / hospital department. An example would be elderly patients with chronic diseases. The experience of hospitals indicates that ensuring higher quality of care may depend on the implementation of so-called complex co-managed care depending on the patient's condition and medical procedures that he needs. This creates a situation in which patients are not exposed to frequent movement between different parts of the hospital (avoiding unnecessary transport) and frequent changes of the staff who care for them. This undoubtedly increases the sense of patient safety [12]. The problem of many healthcare organizations in most health systems is the strong bureaucracy of organizational structures. This is associated with the loss of working time of medical workers, and from the point of view of patients with prolonged paths and time from the moment of issuing the diagnostic test order to its execution and obtaining the test result. Often, the extension of the "path" is associated either with errors in completing order cards or with errors in the performance of the study itself. According to Canadian experience, by optimizing the time spent on organizational processes or activities related to medical diagnostics, hospitals can intensify both human and apparatus work, and thus at the same time provide more health services, which can translate into increased accessibility them. An additional advantage is the implementation of the same activity with the same measures [13]. The changes inspired by the Lean Healthcare concept, which resulted in a reduction of patients' waiting time by 19-24%, were associated with the creation of clear, understandable mechanisms of cooperation between individual employees by defining their roles in the chain of creating value for the patient, creating new principles of employee communication, defining patterns procedures and work schedules, scope of duties and ways of solving current problems. Adaptation of Lean Healthcare in Swedish hospitals has resulted in improved management due to the introduction of work standardization,

organizational connections of positions / people working in mutual logical relationships, elimination of unnecessary and disruptive medical procedures, introduction of employee motivation to independently identify problems and overcome them [14].

The effectiveness of Lean Healthcare adaptation in strengthening employee roles in the value creation chain may be conditioned by transferring greater responsibility for the way the work is performed and its effects to individual employees who perceive it as an increased motivation to work [15]. Given the specifics of the tasks performed, the manner of management in healthcare organizations, and strong restrictions on their functioning, caused by limited access to public funds, an approach that can bring good results from the implementation of Lean principles is the evolutionary approach [Nielsen, Improving Healthcare through Lean Management: Experiences from the Danish healthcare system].

In view of the international experience and conclusions resulting from the implementation of Lean Healthcare in healthcare entities and the conditions for the functioning of healthcare organizations in Poland, an attempt can be made to indicate directions for improving management in healthcare entities. Particular attention will be focused on specialist hospitals. The starting point for determining the areas of the entity's operations that should become subject to improvement / restructuring is the diagnosis of the entity's activities, including:

- a) Analysis of the economic situation (basic economic values and indicators as well as financial statements); in the conditions of growing financial debt of hospitals in Poland, the scope of analysis should include: financial efficiency ratios - receivables turnover, liabilities turnover, inventory turnover; debt ratios - total debt ratio, equity to liabilities ratio; productivity indicators),
- b) Analysis of the causes of the entity's existing financial situation (impact of system changes on the entity's position),
- c) Analysis of internal causes of organization and management irregularities (scope and structure of resources, degree of their adaptation to conducted activity, allocation of resources in the entity, organization of work processes, mutual relations between medical activities).

The conclusions made as a result of the diagnosis should become the starting point for indicating the directions of improving the management of the entity. However, creating a uniform list of directions, or "path of change" for all hospitals is not justified because existing profile, technological, organizational and financial differences that generate other problems. Potentially they may include:

- a) Setting priority and other tasks in individual areas of conducted activity (medical, scientific, didactic) and medical specialties as well as individual activities constituting their implementation;

**b)** Organizational changes, e.g. laboratory diagnostics combined with a change in the location of diagnostic cells to reduce costs; allocation of archived documents in one “place” in the hospital building, which will allow faster access to information and adaptation of vacant rooms for other purposes;

**c)** Functional changes - restructuring of hospital beds in order to adjust the financing bed base (monitoring indicators of average period of stay of patients, waiting time for admission to a ward or clinic, the degree of bed use);

**d)** Resource changes: a combination of clinical units enabling consistent policy to intensify the use of medical equipment and apparatus; providing access to the departments’ facilities providing health services as part of caring for the local population (eliminating duplication of purchases of the same equipment and apparatus as well as dispersion of equipment increasing operating costs); centralization of the distribution of diagnostic base elements;

**e)** Changes in personal resources in the aspect of assigning employees to diagnostic, hospitalization and outpatient tasks; formal assignment of employees to consulting tasks not only within one branch, but also for other organizational units;

**f)** Eliminating (by pooling) duplication of the same medical procedures by several hospital organizational units to improve resource management and eliminate unnecessary manufacturing factors;

**g)** Determining the centers of responsibility for the management of medical equipment and apparatus (taking over supervision over the management of diagnostic equipment by a separate department, plant, clinic or clinic);

**h)** Implementation of new medical technologies enabling more efficient diagnosis of disease entities, which is associated with shortening the waiting time for results and the time from diagnosis to intervention;

**i)** Implementation of an integrated IT system facilitating and accelerating the flow of information in the hospital (integrated management of drugs, medical equipment, centralization of material management);

**j)** Implementation of integrated management of medical materials, medical consumables and medicines;

**k)** Establishment of cost responsibility centers to strengthen supervision and eliminate waste;

**l)** Developing the principles of communication between the management and employees in order to explain and motivate, which allows reducing stress and social unrest associated with the economic uncertainty of the entity;

**m)** Compliance with the precise implementation of contracts with payers in order to eliminate any financial sanctions, including the termination of contracts; particular attention should be focused on the so-called over-limit benefits;

**n)** Property restructuring (e.g. when the hospital operates in several different buildings / rooms distant from each other or the infrastructure is not used due to poor technical condition) to eliminate unnecessary usable space and unnecessary transport, to rationalize maintenance costs and depreciation costs;

**o)** Outsourcing of non-medical services.

## Summary

The effective functioning of medical entities depends not only on the course of internal management processes, but also on the flexible adjustment of their activities to the changing environment. The emergence of new health technologies, changing health exposures not yet occurring or occurring to a limited extent, demographic and epidemiological changes in combination with systemic factors force changes in which the use of “lean management” may be particularly useful. The main directions of improving the functioning of healthcare organizations should be: reducing the time of access to health services by designing an efficient from the point of view of direct recipients of the implementation of activities preceding the performance of health services; this is associated with a smooth transfer of information, e.g. about available places in hospital wards; maximum focus on patients’ expectations, while in the case of financing services from public funds - focus on the implementation of obligations towards public payers (National Health Fund, ministries, local governments), which are related to the implementation of the principles of contracts concluded (comprehensiveness and continuity of care, accuracy of diagnoses, reliability of the use of diagnostic, therapeutic and prophylactic methods, ensuring declared personnel, equipment and infrastructure conditions, maintaining the assumed level of costs and financial result). Ensuring good communication between patients and the medical entity in the scope of providing information at every stage of medical treatment with the patient. Conducting constant analysis of work positions, activities of individual organizational parts of the medical entity in order to formulate current recommendations for employees assuming equal treatment of medical employees and those indirectly involved in the provision of medical services.

In addition, care for proper technological preparation, which allows to avoid discouragement of employees and patients as well as the increase of costs and losses, which result, e.g. from poor-quality diagnostic tests results requiring repetition, downtime, cancellations of medical services. It is also important to increase the quality of tasks implemented, which contributes to strengthening the relationship between hospitals and recipients of their products (patients, payers, other medical entities) [16]. Even precise determination of directions of changes in health care organizations may not prevent management staff from implementing them incorrectly. The main risks associated with the distortion of the Lean being are most often: identifying the Lean concept with the economic or financial rationalization of the medical entity’s economy, reducing financial liquidity, reducing the

quality of services and bypassing legal provisions imposing specific obligations on entities contracting benefits with payers, increasing the level of employee stress and decrease in motivation to work, rationalizing employment by simply limiting it, neglecting the problems of employees with lower qualifications [17]. According to prof. Zimmiewicza [18], the need arises to consolidate the Lean concept as a way of thinking.

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