

# THE CAPACITY TO IMPLEMENT LEAN MANAGEMENT IN THE HEALTHCARE SYSTEM IN POLAND – RESULTS OF A PUBLIC CONSULTATION

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## ABSTRACT

**Background:** Lean Healthcare Management is an innovative approach to process management in healthcare organizations. Despite that the Lean principles have been increasingly recognized worldwide as a tool to boost organizational performance, improve the quality of care and curb waste, the Lean methodology can be difficult to implement in some countries. This study seeks to identify the facilitators of and barriers to the implementation of Lean in the healthcare system in Poland. **Material and Methods:** A public consultation was held among 318 representatives of stakeholder groups in the healthcare system in Poland. Data was collected using validated self-administered questionnaires. Statistical analysis was performed using the IBM SPSS Statistics 25 software. **Results:** The study revealed that a large share of respondents believed that the awareness of the existing organizational deficiencies in work practices among stakeholders can greatly facilitate the implementation of Lean in the healthcare system in Poland (50.9%,  $p < 0.05$ ). The main barriers to the deployment of Lean include lack of awareness of the Lean methodology and its benefits (76.1%,  $p < 0.001$ ); insufficient institutional support (43.7%), and lack of funding for Lean solutions (32.4%). **Conclusions:** Gaps in the medical curricula and education programs for healthcare professionals concerning the latest process management solutions in healthcare should be addressed in order to raise awareness of the benefits of cooperation with and the active involvement of Lean experts in applying “lean” ideas to improve the organizational performance in healthcare. It is also necessary for policy makers to be aware of the benefits of contemporary process management in healthcare and to support its implementation. *Med Pr.* 2023;74(1)

**Key words:** needs assessment, delivery of health care, change management, workflow, implementation science, population health management

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## INTRODUCTION

Healthcare spending is rising around the world due to population aging and the consequences of unhealthy lifestyles on the one hand, and the advancements in medical technologies on the other. Further increases in healthcare expenditure in the EU and in the United States would constitute an increased risk to sustainable public finances. To deal with this common concern, Prof. Uwe Reinhardt [1] suggests that the only solution to make health systems financially sustainable is to implement innovations in

the management of healthcare organizations that reduce costs and increase the quality of healthcare.

In this context, the healthcare system in Poland has been subject to sustained public criticism. The CBOS survey of 2018 [2] revealed the widespread dissatisfaction (70% of respondents) with the way the healthcare system works, including limited access to specialist treatment and diagnostic tests, and shortages of medical staff in hospitals. Without appropriate process management, the healthcare system is unlikely to reach the expected levels of performance.

Also, the policy makers appear to be not fully aware of the need to implement effective and innovative management methods in the Polish healthcare. In this context, the role of the scientific research community appears even more vital as researchers are best prepared to advise the decision-makers in selecting tools that have proved successful in other developed countries and in exploring the best ways to implement them in the Polish setting.

Lean Management (LM) is a management concept which is increasingly recognized worldwide [3] and frequently discussed in the literature [4] as one of the methods likely to address and significantly reduce the drawbacks and inefficiencies of the healthcare system. Lean thinking, as proposed by Womack and Jones [5], draws on the concept of lean management originally used by production organizations, e.g., Toyota [5], and was imported from the industry and implanted to healthcare following the publication of a groundbreaking book *Lean Hospitals* by Graban [6]. This was the first comprehensive work on the application of Lean in healthcare that the industry found convincing as it presented the benefits obtained in all clinical areas. It actually marked the beginning of a global wave of Lean implementations in the health sector. The study "Lean Healthcare Systems Engineering Process for Clinical Environments" by Oppenheim of 2021 [7] has been critically important in terms of applying the latest Lean methodology in healthcare. The study combined Lean with systems engineering originating from the aviation industry, and determined the conditions for integration of distributed work elements of organizations, including healthcare facilities. The Lean Healthcare Systems Engineering (LHSE) is a logical and well-organized step-by-step process for improving healthcare organization rather than a strictly mathematical methodology. Importantly, Lean itself successfully addresses the elimination of waste, but does not integrate fragmented elements of care. The LHSE has been validated in >100 large projects implemented at major Californian healthcare centers.

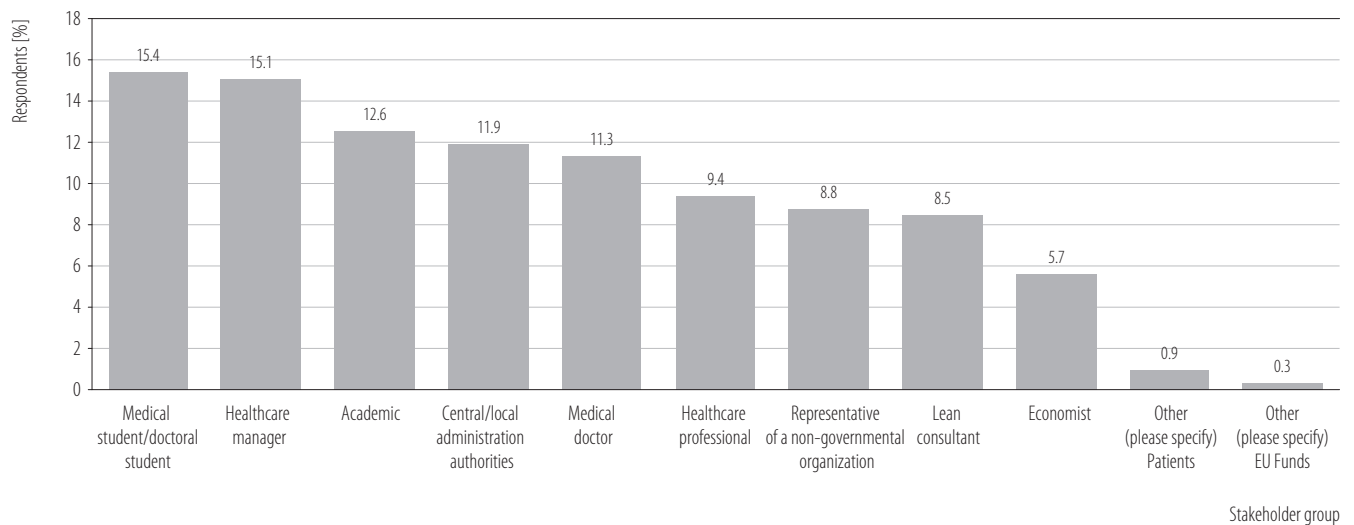
The basic Lean assumption is to reduce the wasted cost and time of healthcare professionals and patients to generate savings, while improving the quality of treatment and increasing patient satisfaction [8,9]. Value stream mapping is a lean management technique used to describe and pin down processes from the perspective of values that are important for patients in order to identify and create opportunities to improve the quality of services and contribute to patient empowerment in the Polish healthcare system. Moreover, the levels of stress and overwork attributed to the lack of continuity in the working procedures and

the care process are reduced (elimination of steps that contribute no added value) [10,11]. In Poland, the Polish Society of Health Economics has researched the development of national standards for Value Stream Mapping (VSM) in the management of stroke patients, under the research project of the National Center for Research and Development [12]. Regrettably, so far only a few LM projects have been implemented at healthcare institutions in Poland [13,14]. Globally, system-wide Lean implementations are rare (although in the US, more and more hospitals implement Lean in a systematic manner [8]), and a fragmented, selective use of Lean principles or individual Lean techniques and tools [3,15,16] prevails. Although the Lean implementation is complex and difficult [17], it is the key to success [18]. Understanding the facilitators and barriers to Lean implementation can make Lean even more effective in improving the quality of healthcare [18]. Therefore, it is necessary to pinpoint factors contributing to and impeding the implementation of the Lean principles in the healthcare in Poland.

## MATERIAL AND METHODS

The sample selection strategy was intentional in order to ensure the appropriate type and structure of the studied population in terms of a specific criterion (feature), i.e., a social group professionally engaged in the Polish health care system and interested in the lean management in health care. A public consultation was held with 318 representatives of key stakeholder groups, including executives of healthcare organizations, healthcare professionals, representatives of patients and family members, members of corporate governance bodies of healthcare organizations, public healthcare institutions: the Ministry of Health, the National Health Fund NFZ, Agencja Oceny Technologii Medycznych i Taryfikacji (Agency for Health Technology Assessment and Tariff System), Centrum Monitorowania Jakości w Ochronie Zdrowia (Quality Management System and Quality Monitoring Center), Krajowy Rejestr Nowotworów (the National Cancer Registry), consultants and experts in lean management and healthcare, and researchers. The survey was conducted among participants who agreed to participate in the study. Only 3% of the respondents (N = 10) who provided no or incomplete responses were not included in the final analysis of the results.

Data was collected using structured validated self-administered questionnaires. To account for the manner in which the survey was conducted, 2 types of questionnaires were used:



**Figure 1.** Stakeholder group the respondents engaged in the Polish health care system declared between 2015 and 2018 to be affiliated with

1) an anonymous audit questionnaire distributed during: a) visits to selected healthcare institutions (public offices, medical institutes and universities, public hospitals, private medical and diagnostic centers, and a network of Primary Healthcare (POZ), Outpatient Healthcare (AOS) and Therapeutic Rehabilitation entities throughout the country, i.e., from the area of Warsaw and Masovian Voivodeship, Podlasie, Łódź, Lower and Upper Silesia, West Pomeranian Voivodeship, and b) national conferences on health care management “Lean Management in Healthcare,” organized annually since 2015 by the Polish Society of Health Economics, and

2) an online survey provided to members of the Polish Association of Health Economics who were interested in economics, management and health promotion and in domestic health policy. Statistical analysis was performed using the IBM SPSS Statistics 25 software. The  $\chi^2$  test was used to confirm that the compared groups were equally represented in the study and to validate the relationship between nominal variables. A statically significant relationship between the nominal (multi-category) variables was tested with the Cramer’s V coefficient. The statistical analysis also included a frequency analysis (N, %). The p value < 0.05 was defined as statistically significant.

## RESULTS

### Stakeholder groups participating in the study

The diagram in Figure 1 presents the stakeholder groups the respondents declared to be affiliated with.

Most respondents were medical students/doctoral students and healthcare managers. Group of 66 (20.7%)

respondents declared to be medical doctors and other healthcare professionals.

The degree of expertise in Lean among stakeholders. Significantly more respondents (N = 180, p < 0.001) stated that they had read about the Lean concept, but did not have any hands-on experience with it (Table 1). Only 5.7% of respondents declared to have seen the effects of Lean implementations abroad. Only few respondents declared to have seen the effects of Lean implementations in Poland.

Significant differences in the degree of expertise in Lean depending on the position held (Table 2) are as follows:

- “I was not familiar with the Lean concept, it’s the first time I get the chance to learn more about it” ( $\lambda^2(8) = 21.77$ , p < 0.001). Most respondents who declared they were not familiar with the Lean concept were medical students/doctoral students ( $\lambda^2(7) = 17.65$ , p < 0.05).
- “I have read about it, but I don’t have any hands-on experience” ( $\lambda^2(8) = 61.74$ , p < 0.001). Most respondents who declared they have read about Lean, but lacked hands-on experience were medical students/doctoral students and academics ( $\lambda^2(7) = 17$ , p < 0.01). Unlike all other groups of stakeholders, this option was least popular among healthcare managers and Lean consultants.

### Drivers and main barriers

#### to the implementation of Lean principles in the healthcare system in Poland

The study revealed that a large share of respondents believed that the awareness of the existing organizational deficiencies in work practices among

**Table 1.** The degree of expertise in Lean among respondents engaged in the Polish health care system, selected between 2015 and 2018

Answer	Respondents (N = 317)	
	n	%
I have read about the Lean concept, but I do not have any hands-on experience	180	56.6
I am a Lean expert/consultant	48	15.1
I was not familiar with the Lean concept, it's the first time I got the chance to learn more about it	46	14.5
I have participated in a Lean implementation	19	6
I have seen the effects of Lean implementations abroad	18	5.7
I have seen the effects of Lean implementations in Poland	6	1.9

**Table 2.** Position of respondents engaged in the Polish healthcare system who declared between 2015 and 2018 that they were not familiar with the Lean concept, and it was the first time they got the chance to learn more about it and respondents who declared they have read about the Lean concept, but did not have any hands-on experience

Position	Respondents (N = 314)					
	no response		yes response		total	
	n	%	n	%	n	%
Not familiar with the Lean concept, first time gets the chance to learn more about it	268	100	46	100		
working at central/local administration authorities	35	13.1	3	6.5	38	12.1
healthcare manager	44	16.4	4	8.7	48	15.3
medical doctor	28	10.4	8	17.4	36	11.5
healthcare professional	23	8.6	7	15.2	30	9.6
academic	37	13.8	3	6.5	40	12.7
Lean consultant	27	10.1	0	0	27	8.6
economist	17	6.3	1	2.2	18	5.7
representative of a non-governmental organization	21	7.8	7	15.2	28	8.9
medical student/doctoral student	36	13.4	13	28.3	49	15.6
Read about the Lean concept, but doesn't have any hands-on experience	138	100	176	100	314	100
working at central/local administration authorities	14	11.1	24	13.6	38	12.1
healthcare manager	32	23.2	16	9.1	48	15.3
medical doctor	16	11.6	20	11.4	36	11.5
healthcare professional	10	7.2	20	11.4	30	9.6
academic	9	6.5	31	17.6	40	12.7
Lean consultant	27	19.6	0	0	27	8.6
economist	8	5.8	10	5.7	18	5.7
representative of a non-governmental organization	7	5.1	21	11.9	28	8.9
medical student/doctoral student	15	10.9	34	19.3	49	15.6

stakeholders can greatly facilitate the implementation of the Lean principles in the healthcare system in Poland (50.9%,  $p < 0.05$ ) (Table 3). Support of

healthcare managers and policy makers at the ministerial level were ranked second and third most important Lean facilitators.

**Table 3.** The main drivers and main barriers to the implementation of Lean management in the health care organizations, declared between 2015 and 2018 by respondents engaged in the Polish health care system

Main factor	Respondents (N = 318)	
	n	%
<b>Driving the implementation</b>		
awareness of existing inefficiencies among stakeholders	162	50.9
support from healthcare managers	120	37.7
institutional support (from policy makers at the ministerial level)	115	36.2
openness of the environment to changes and flexibility of organizations	89	28
support from non-governmental organizations	52	16.4
strong lobby of consultants	38	11.9
<b>Barriers to the implementation</b>		
insufficient knowledge	242	76.1
insufficient (or no) institutional support	139	43.7
lack of funds to support the lean deployments	103	32.4
reluctance of higher-level healthcare professionals	90	28.3
reluctance of mid- and low-level healthcare professionals	77	24.2
reluctance of healthcare managers	42	13.2

The strong lobby of consultants was considered the least important implementation driver by respondents. Rather, the respondents highlighted the future financial benefits. Interestingly, no single respondent mentioned any patient benefits.

The main barriers to Lean deployment in healthcare in Poland include: the awareness of stakeholders – significantly more respondents ( $p < 0.001$ ) declared that the awareness and knowledge of the Lean methodology and its benefits among healthcare professionals was “insufficient.” The reluctance of healthcare managers was ranked the lowest. It should also be noted that 28.3% of higher-level healthcare professionals were reluctant to and sceptical about Lean implementations.

It is important to note that respondents also pointed to the lack of:

- motivation of the public founding bodies supervising healthcare providers to optimize their performance,
- strategy, as evidenced in an uncoordinated operation of central institutions,
- pressure to optimize performance for the benefit of the patient,
- access to information,
- options to publish papers discussing this subject,
- organizational culture of healthcare entities.

Hierarchy of barriers to identify the main directions for improving management efficiency – the Pareto-Lorenz diagram

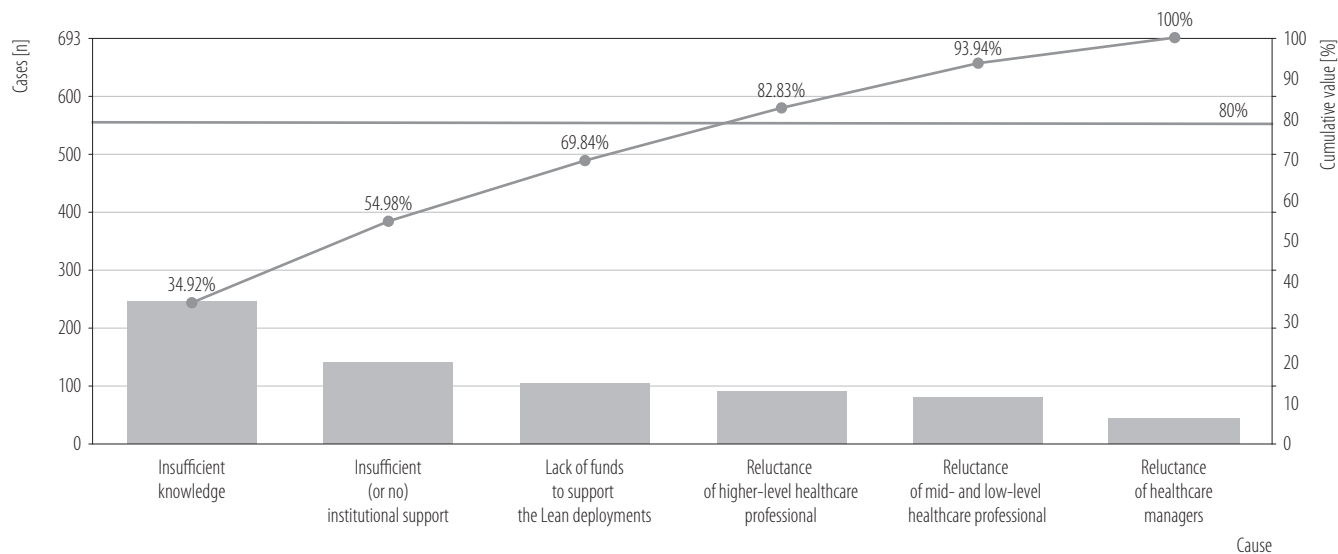
According to this study and the distribution of responses (Figure 2), there are main obstacles that account for as much as 69.84% of barriers to the deployment of Lean in the healthcare organizations in Poland:

- insufficient awareness and knowledge among stakeholders,
- insufficient (or no) institutional support,
- lack of funds to support the Lean deployments.

These are the areas that should be addressed as a priority in order to eliminate obstacles to the implementation of Lean principles in healthcare.

## DISCUSSION

The findings of this study are consistent with prior research and provide greater understanding of the specific factors that may either facilitate or hinder the deployment of Lean practices in the healthcare sector. Awareness of these factors and the ability to manage them are the preconditions for effective use of the Lean principles in healthcare. However, there is relatively limited scientific information in this respect, and most of the studies focus on the benefits of Lean itself [19–21].



**Figure 2.** The main barriers to the deployment of Lean principles in the Polish health care organizations, selected between 2015 and 2018 by respondents engaged in the Polish health care system

The critical factors driving the Lean introduction, as evidenced by the results of this study, as follows:

- a) self-awareness of the existing inefficiencies,
- b) support from the managers of healthcare organizations, and
- c) support from policy makers at the Ministry of Health.

The findings of a study conducted in Italy in 2021 [22] also confirmed how important it is to be aware of and familiar with the actual operational performance in in-patient settings. It was concluded that dissatisfaction with inefficient work practices within the medical area and the dissatisfaction of many patients who complained about long wait times and lengths of stay drive the deployment of Lean, along with benchmarking the treatment process performance with other providers, and the inability to effectively manage the increasing patient volumes.

In a study by Gonzales et al. [23], the effort to deliver employee training dedicated to Lean and the Lean principles was found to be the key to successful Lean introduction. A similar trend was demonstrated with the introduction of an innovative shared governance model across the London Health Sciences Centre (LHSC) – the training of medical staff and clinical executives in the Lean methodology provided sufficient knowledge and resources to support the Lean deployment [24]. The commitment to and the spread of the Lean philosophy by the executives of a healthcare organization and the training of medical staff to create and support the culture of continuous

improvement were considered key to the success of Lean deployment in a Singapore study [25].

The key barriers to Lean implementation identified in this study included:

- a) insufficient (or lack of) knowledge of the Lean methodology and its benefits,
- b) lack of institutional support, and
- c) lack of funds for deployment.

Reluctance of senior medical personnel to the deployment of Lean principles in healthcare is next in line. In a study by Gadolin [26], the insufficient knowledge of policy makers about the benefits of Lean in healthcare and relying on the education of managers as the primary factor to ensure implementation were recognized as limitations in the system-wide implementations of system-wide implementations of Lean in Sweden. In the study by Rosa et al. [22] in Italy, the resistance to change, scepticism, and the lack of motivation, time and resources, as well as the double line of clinical and management authority in hospitals were identified as the main obstacles to the implementation of Lean.

Noteworthy are the results of a systematic review of 2019 [27] concerning the implementation of Lean principles in hospital emergency departments. Some of the studies included in this review recognized not only facilitators and barriers to the implementation of lean, but also the effective factors that can greatly influence the success of Lean management. These include: support from senior management, commitment to increasing the knowledge of the characteristics and dimension of

lean among the providers of health service, as well as decreasing the resistance and consulting with external counsellors [28,29]. Taking into account the specificity of emergency departments, the high variability of processes, inconsistencies between processes and procedures, significant financial losses, and lack of operational data were indicated as barriers to deployment [30].

Also, according to an earlier literature review of 2015 by D'Andreamatteo [21], the support from managers and executives is necessary at every level of Lean implementation, including the assistance of policy makers at the national level, as well as the involvement of external agencies. In Poland, the Hospital Development Agency (ARS) is planned to be established (Draft Act of 29 December 2021 on the modernization and improving the performance of hospitals [31]), responsible for implementing and supervising the process management, including Lean management. Until now, there have been no legislative provisions in Poland governing the methods of process management. Such a legal act increases the chances of financial and institutional support – the main barriers for the deployment of Lean, as evidenced in this study – for the implementation and application of Lean principles in healthcare centres.

### Limitation

Non-random selection of the studied sample may be considered a limitation of this study; however, the arbitrary selection method was assumed to be justified as the studied population was highly fragmented (stratified) and in order to obtain optimal information to reflect the purpose of the study; a randomized study was concluded to be impossible or very difficult to do. Moreover, the results contained in Table 2 seem to corroborate the selected sample selection method, as 85.35% of the respondents reported to have come across the Lean Management at some time in the past.

### CONCLUSIONS

Gaps in the undergraduate curricula and education programs for healthcare professionals concerning the latest developments in process management in healthcare should be addressed in order to raise awareness of the benefits of cooperation with and the active involvement of lean management experts in applying “lean” ideas to improve the organizational performance of healthcare organizations. It is also necessary for policy makers to be aware of the benefits of contemporary process management in healthcare and to support its implementation.

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