Lean and Safety Management in Primary Care Centres: An Italian Case Study

Caterina Pozzan, Anna Tiso, Fabrizio Ronchi and Chiara Verbano
Department of Management and Engineering, University of Padova, Vicenza, Italy

caterina.pozzan.1@phd.unipd.it
anna.tiso.2@phd.unipd.it
fabrizio.ronchi@unipd.it
chiara.verbano@unipd.it

Abstract: The primary care sector is globally recognised as the pillar of an efficient and patient-centred care model. Despite its importance, many countries fail to ensure equitable access and individualised care. This problem significantly impacts the most vulnerable part of the population, such as chronic and elderly patients. In this context, considering the large number of people affected by multiple diseases, multidisciplinary and multi-organisation teamwork has become fundamental to guarantee high levels of quality, increasing patient satisfaction, and continuity of care. Furthermore, working in a multidisciplinary primary care team can improve information exchange between care providers and patients, positively impacting on clinical performance. Despite these opportunities, the primary care workforce is often overloaded in its daily activities and not adequately organised and coordinated to avoid burnout experiences and inefficient skills deployment. In this context, implementing Lean and Safety Management (L&SM) as a process improvement methodology can increase care pathways performance and integration, patient safety and satisfaction through the reduction of wastes and risks. The current study aims to implement L&SM in a primary care centre in Italy, with the final goal of increasing productivity and effectiveness in daily activities performed by primary care physicians. This project is carried out following the DMAIC cycle; a managerial approach that combines qualitative and quantitative techniques to support process improvement. The implementation roadmap will combine HLM and CRM, planning to achieve the main steps listed as follows: mapping the care demand and the available resources to define the focus of the study; identifying the most representative and critical patients; mapping the target care pathway; identifying wastes and risk and their root causes; identifying critical aspects and improvement events; implementing countermeasures; evaluating and monitoring results. The expected results of the forthcoming months consist of measurable improvements within the healthcare pathway, supporting the optimisation of the primary care centre. Moreover, this initiative may represent a pilot case for other similar projects, contributing to spread L&SM culture throughout primary care centres with benefits for both patients and clinical staff.

Keywords: Lean management, Lean healthcare, Risk management, Quality management, Primary care centres

1. Introduction and Theoretical Background

Primary care is globally recognised as a “key process in the health system that supports first-contact, accessible, continued, comprehensive and coordinated patient-focused care” and represents a key factor to achieve high levels of accessibility and diffusion of health and well-being (World Health Organization & United Nations Children’s Fund, 2020). Despite the importance of primary care, many countries fail to ensure equitable access and a high level of quality, resulting in unnecessary hospitalisations, inappropriate prescriptions, and lack of continuity throughout the care pathway (OECD, 2020). This problem significantly impacts the most vulnerable part of the population, such as chronic and elderly patients (Doetsch et al., 2023). Moreover, the daily activities of primary care workforce are often not adequately balanced in terms of both workload and task distribution, resulting in burnout experiences and inefficient skills deployment (OECD, 2020). When multiple disease conditions are considered, clinical staff teamwork becomes fundamental to guarantee high levels of quality, increasing patient satisfaction and continuity of care. In fact, working in a multidisciplinary primary care team fosters information exchange between care providers and patients with a positive impact on clinical performance (Li et al., 2023). Implementing Healthcare Lean Management (HLM) can increase care pathways performance and integration of care services (Tiso et al., 2022; Tlapa et al., 2020). It has been well established that HLM is the most applied improvement approach in healthcare worldwide (Henrique & Godinho Filho, 2020), and its aim is to support continuous process improvement through a wide range of tools and practices, reducing waste, and spreading the 'lean' culture within the organisation (Radnor et al., 2012). In the last decade, the request for high levels of care quality has increased dramatically aiming at improving not only efficiency, effectiveness, and timeliness, but also people-centredness, equity, integration of care and safety (World Health Organization, 2020). Safety is particularly crucial because adverse events in care processes are one of the leading causes of disability and death worldwide (Ghebreyesus, 2018; World Health Organization, 2019, 2020). For this reason, combining Clinical Risk Management (CRM) with HLM can positively impact quality of care (Crema & Verbano, 2015). In fact, CRM aims to improve the quality and safety of healthcare services by identifying adverse events and acting to prevent and minimise risks and harm to patients (World Health Organization, 2011). The

current project integrates both methodologies to implement Lean and Safety Management (L&SM) within a primary care centre in Italy, with the final aim of increasing productivity and effectiveness in daily care processes performed by primary care physicians, patient safety and satisfaction.

2. Methodology

The purpose of the current study is to implement L&SM within a primary care centre, with the final goal of increasing productivity and effectiveness in daily activities carried out by primary care physicians, patient safety and satisfaction. In recent years, regional governments have encouraged collaboration between general practitioners in integrated centres to ensure continuity of care and coordination with other health providers at different levels of assistance. The future objective is to strengthen this model by establishing multi-disciplinary primary care centres across each region, including not only general practitioners, but also specialised outpatient and home care services. This research is carried out in a primary care centre located in northern Italy that represents an emerging recent association model in which eight general practitioners, five nurses, and six administrative clerks are employed. This centre serves approximately 9000 patients, providing primary care for both acute needs and chronic disease management. Additionally, milder emergency situations are handled to prevent patients from going to the hospital emergency department.

The project implementation plan follows the DMAIC cycle; a managerial approach that combines qualitative and quantitative techniques to support process improvement (Pyzdek, 2003). The implementation roadmap will combine HLM and CRM (Crema & Verbano, 2015), following the Define, Measure, Analyse, Improve, and Control phases, as described:

- Define: mapping the care demand and the available resources to define the focus of the study; identifying the most representative and critical care patients.
- Measure: mapping the target care pathway; defining and collecting data on key process indicators; identifying and analysing critical aspects, risks, and wastes; defining specific and measurable improvement objectives.
- Analyse: analysing the root causes of risks and wastes.
- Improve: identifying and prioritising improvement events; implementing countermeasures.
- Control: evaluating and monitoring results; standardising improvement achievements.

3. Preliminary Results

In recent months, the ‘Define’ phase has been completed, resulting in the identification of type 2 diabetes mellitus (DM2) as the target care pathway. At first, the availability of resources and the activities carried out were identified and evaluated through staff interviews, field observations and the extraction and analysis of patients' database. This resulted in a first aggregated healthcare process mapping that highlights resources consumption depending on different diseases. Among them, DM2 was the most resource-intensive disease in terms of healthcare services provided, high volume of patients and long time needed to manage this chronic care pathway, which is characterised by a wide range of activities and requires proactive contact with patients.

Concerning the 'Measure' phase, the target pathway was initially mapped through the Makigami process map, resulting in two independent maps. The first refers to all activities performed while the patient is inside the centre and includes medical and nursing visits, prescriptions for drugs and exams and referrals to specialists. Instead, the second includes administrative activities performed to manage periodic drug prescriptions that are processed in response to a patient request, but do not require patients to physically visit the centre. Each of these maps is linked with a set of indicators to measure waiting time, patients’ volumes and activities performance, such as the number of calls and the number of prescriptions. These preliminary maps provide the first qualitative wastes identification. Among the most significant are the lack of standardisation of similar activities carried out by different physicians and the frequent failure to update patient information in the database.

In the coming months, all measures will be completed by collecting field data and retrieving specific information from the patients’ database. A detailed Value Stream Map (VSM) will be created to identify risks and wastes, allowing the definition of specific and measurable improvement objectives. Then, the risks and wastes analysis will be performed using the ‘Failure Mode and Effects Analysis’ (FMEA) and the ‘Five Why’s technique’ (5Ws). Improvement solutions will be defined and implemented, and the results will be measured and monitored over time with the final objective of improving DM2 care pathway performance, patient safety and satisfaction.

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References

Crema, M., & Verbano, C. (2015). How to combine lean and safety management in health care processes: A case from Spain. *Safety Science*, *79*. https://doi.org/10.1016/j.ssci.2015.05.007

Doetsch, J. N., Schlösser, C., Barros, H., Shaw, D., Krafft, T., & Pilot, E. (2023). A scoping review on the impact of austerity on healthcare access in the European Union: rethinking austerity for the most vulnerable. *International Journal for Equity in Health*, *22*(1), 3. https://doi.org/10.1186/s12939-022-01806-1

Ghebreyesus, T. A. (2018). How could health care be anything other than high quality? In *The Lancet Global Health* (Vol. 6, Issue 11). https://doi.org/10.1016/S2214-109X(18)30394-2

Henrique, D. B., & Godinho Filho, M. (2020). A systematic literature review of empirical research in Lean and Six Sigma in healthcare. In *Total Quality Management and Business Excellence* (Vol. 31, Issues 3–4). https://doi.org/10.1080/14783363.2018.1429259

Li, M., Tang, H., & Liu, X. (2023). Primary care team and its association with quality of care for people with multimorbidity: a systematic review. *BMC Primary Care*, *24*(1), 20. https://doi.org/10.1186/s12875-023-01968-z

OECD. (2020). *Realising the Potential of Primary Health Care*. OECD. https://doi.org/10.1787/a92adee4-en

Pyzdek, T. (2003). The Six Sigma Handbook - A Complete Guide for Green Belts, Black Belts, and Managers at All Levels. *Search*.

Radnor, Z. J., Holweg, M., & Waring, J. (2012). Lean in healthcare: The unfilled promise? *Social Science and Medicine*, *74*(3). https://doi.org/10.1016/j.socscimed.2011.02.011

Tiso, A., Pozzan, C., & Verbano, C. (2022). Health lean management implementation in local health networks: A systematic literature review. In *Operations Research Perspectives* (Vol. 9). Elsevier Ltd. https://doi.org/10.1016/j.orp.2022.100256

Tlapa, D., Zepeda-Lugo, C. A., Tortorella, G. L., Baez-Lopez, Y. A., Limon-Romero, J., Alvarado-Iniesta, A., & Rodriguez-Borbon, M. I. (2020). Effects of Lean Healthcare on Patient Flow: A Systematic Review. In *Value in Health* (Vol. 23, Issue 2). https://doi.org/10.1016/j.jval.2019.11.002

World Health Organization. (2011). Patient safety curriculum guide. Multi-Professional Edition. In *Paitent Safety*.

World Health Organization. (2019). *Patient safety. Key facts.* https://www.who.int/news-room/fact-sheets/detail/patient-safety

World Health Organization. (2020). *Quality health services: a planning guide*.

World Health Organization, & United Nations Children's Fund. (2020). *Operational framework for primary health care: transforming vision into action*