Guest Editorial

Lean in Healthcare: history and recent developments

Terry Sloan

School of Business, University of Western Sydney, Sydney, NSW, Australia

Anneke Fitzgerald

Griffith Business School, Griffith University, Southport, QLD, Australia

Kathryn J. Hayes

Griffith Business School, Griffith University, Southport, QLD, Australia

Zoe Radnor

Loughborough University in London, London, United Kingdom

Suzanne Robinson

School of Public Health, Curtin University, Perth, WA, Australia

Amrik Sohal

Department of Management, Monash University, Melbourne, VIC, Australia

Abstract

Purpose – This editorial briefly outlines present applications of lean systems applications in healthcare and then summarises the contributions to this special edition.

Design/methodology/approach – A brief background to lean is introduced to provide the context for the subsequent papers in this special issue

Findings – The requirements for successful introduction of Lean Systems Thinking (LST) to healthcare organizations share much in common with the requirements for the initial introduction of lean to manufacturing organizations. However, introducing LST in healthcare is further complicated by the necessity of navigating complex social and organisational structures associated with the professional identities of healthcare practitioners.

Originality/value – Though there has been a recent increase in the reported research on LST in healthcare, these reports have focused on the gains achieved through the application of lean tools and techniques. This work explores the under-reported socio-technical aspects that greatly affect the success of lean interventions.

Keywords – lean systems thinking, healthcare operations, supply chain, innovation implementation, healthcare quality and safety

Paper type – General review

Continual pressures on healthcare budgets coupled with increasing demands (Institute of Medicine, 2012; OECD 2002; Porter and Lee, 2103) and evidence of poor performance have led national and local healthcare organizations to look for methods to improve quality, safety and value in health service delivery. Increasingly this search for solutions has extended beyond the boundaries of healthcare practice to investigate methods that have been successfully employed in other industries. Lean Systems Thinking and continuous improvement activities have come to the attention of healthcare administrators looking for ways to improve organizational performance. Originating in the work of Deming (Deming 1953), and refined in Japan, lean techniques and lean management principles have been developing in manufacturing settings since the 1950s. After becoming prominent in the early 1980's, lean practices have more recently been introduced into service industries.

Comment [I1]: Also maybe Mid Staffordshire NHS trust, Garling (Australia) reports,

TS – Agree with additions but could not open endnote file

In both manufacturing and service contexts lean implementation has concentrated on identifying value-adding processes and removing waste from the system. While healthcare provision and manufacturing operations may differ in many ways, the prerequisites for successful change in each have been found to be remarkably similar – demonstrated commitment to the projects from senior management, engagement of the practitioners involved, and recognition of shop floor expertise in the identification of possible improvements. Their differences in terms of the geographical protection of healthcare delivery, the variability of customer presentations and the high specialist influence in healthcare only add to the contingencies that need to be considered in the adoption of lean techniques into healthcare organizations. Though healthcare organizations are inherently conservative, the utilization of lean systems thinking and activities in healthcare is now gaining increased attention.

Comment [I2]: Professional control over?

Professional control also a problem in manufacturing, esp in pharmaceutical companies - TS

Comment [I3]: Local funding models?

Local funding models also exist in multinational manufactures - TS

Prior applications of lean in healthcare have focused on improving the safety, quality and efficiency of healthcare delivery in areas such as improving information and communication flow, the delivery of innovations to drive continuous service delivery improvement, redesigning the patient journey to improve access and reduce waiting times, medical supply chain management, implementation of IT solutions, and policy implications ranging from the local organizational level to decisions on national healthcare policy. Lean is being implemented in both large health institutions and across national health systems. Lean initiatives have been found to have positive impacts on timely delivery of services, cost, quality and healthcare productivity. The introduction of lean into the highly complex health service sector with its varied professional identifications has highlighted the influence of the socio-technical aspects of lean implementation – the major focus of the papers in this special issue. The papers in this issue seek to uncover factors that facilitate the acceptance of Lean Systems Thinking in healthcare.

Several papers in this special issue, in particular Drotz et al and Timmons et al, allude to an important question involving the mechanism leading clinicians to accept and implement Lean Systems Thinking in healthcare organisations. Healthcare organizations are acknowledged to be difficult contexts in which to enact change (Nembhard et al., 2009), populated by powerful and semi-autonomous professional groups (Timmons et al.), and presenting dramatically different contexts to the car manufacturers where LST originated. However a well-researched

Comment [SR4]: Full references for the special issue all need adding to the paper We need to add and make a note to Emerald to include page numbers

Agree – don't have access to other authors of papers - TS

mechanism to explain the acceptance of Lean Systems Thinking in health exists grounded in the experimental learning literature of psychology.

One important question involves the mechanism leading clinicians to accept and implement lean philosophy and tools in healthcare organisations. Delays, duplicated information, rework, staff-burnout, unnecessary movement of patients and staff, missing equipment and supplies are endemic and enduring features of healthcare organisations. People working in healthcare organisations become skilled in developing “workarounds” (Tucker et al., 2013) but the eight wastes categorized by LST (over-production, transportation, waiting, over-processing, motion, inventory, defective products and latent talent) cause organizations *and* individuals pain, dissatisfaction and frustration. LST provides opportunities for people in healthcare organisations to reduce some of their own, workplace inflicted pain, in autonomous ways consistent with their professional and occupational norms. In reducing any of the eight wastes healthcare organisations are changing their working environments in ways that deliver welcome, negative reinforcement to their staff.

Operant conditioning (Skinner, 1976) identifies four ways to modify behaviour through pairing a stimulus with a response. Possibly the most misunderstood is negative reinforcement, in which a behaviour is paired with *the removal of an aversive stimulus*, resulting in an increased frequency of the behaviour; e.g. rapid acceptance of effective migraine medication (Treisman and Clark 2011). Successfully using LST to remove one waste in a healthcare organisation may well lead to increased efforts to address other causes of organizational pain.

To date much lean health literature has focused on results achieved; however, as reported in the papers included in this special issue, individual and social factors are now receiving consideration ~~(need to add refs from special issue)~~. The spread of safety, quality and value improvements in healthcare organisations may proceed more quickly in the next decade if all healthcare organisation members are given the opportunity to reduce the pain they experience, and in doing so reduce the pain experienced by their patients.

Comment [TS5]: Don't think reference needed as this refers to all papers in this edition

The first paper in this special issue by (**Sohal et al**) forms an introduction to lean in healthcare by presenting a comprehensive review of the literature on lean and lean healthcare. Along with the established readiness factors of leadership, organizational culture, communication, training, measurement and reward systems that have previously been established in the general management literature as necessary for successful change management they further identify the ability to authorize a decentralized management style, and to undertake an end-to-end process view as critical for the successful application of lean operating principals in healthcare organizations.

After this introduction to the historical development of lean in healthcare (**Morrow et al**) develop this theme through an examination of the nature and impact of leadership in lean implementation. In their examination of 13 NHS case studies they found that leadership at multiple levels was necessary for effective lean implementation. For this leadership to be successful development of lean skills and knowledge, along with the empowerment of team

members, was a prerequisite to implementation at all levels. It was further recognised that there was no one 'best practice' leadership style, but that different approaches must be developed to match the traits of individual leaders.

The work of (**Morrow et al**) is re-enforced by (**Drotz et al**) who examined lean implementation from the employee's perspective. They interviewed the professionals in three healthcare organizations with varying approaches to implementing lean, examining how lean production influences the roles, responsibilities, and job characteristics of the healthcare professional. While not all aspects of lean were transferred successfully into the healthcare sector, for example increased multiskilling and job rotation were seen as unsuitable for application in the healthcare context. However significant improvements were seen through the adoption of standardization, flow orientation, improvement team rotation and the implementation of visual controls, though the existing power structures within healthcare moderated the full realization of the benefits that could be obtained from lean implementation. **Drotz et al** highlighted the importance of team functioning, and the implementation and group functioning of healthcare teams has been examined by (**Ulhassan et al**). Their study examining the socio-technical aspects of a lean intervention explored the changes that arose in teamwork over time related to a lean intervention in a Swedish hospital. Their longitudinal study into team functioning in three departments revealed varying impacts of lean on teamwork, which they primarily attributed to the group functioning at the time when lean is initiated, indicating that successful lean implementation is more likely if it is built on well established, functional work teams.

A further study by (**Timmons et al**) of the implementation of lean methods in an emergency department investigated role of the professions and professional status in the success of lean implementation. They found the status of the professional project for doctors in the Emergency Department lead to more engagement and enthusiasm by the professionals than is usually reported in the literature on lean implementation in healthcare, indicating the acceptability of initiatives like lean methods in healthcare may be heavily influenced by the professional status of the participants. The work of (**Hayes et al**) reinforces the findings of (**Ulhassan et al**) and (**Timmons et al**) in also emphasising the importance of mutual recognition of participants' expertise in an effective lean rapid improvement event. While detailing the mechanisms of a rapid improvement event, their report also quantifies the significant benefits that may arise through trusting the occupational expertise of the participants to solve their own problems. It also demonstrates the applicability of lean techniques *between* as well as within emergency and pathology hospital departments. Along with the quantifiable improvements in process times, LST supported a calmer working environment, and personnel reported increased satisfaction through their exercising control over their work environment.

While the previous studies report on the implementation of lean methodologies in individual departments or projects, the final two papers in this special edition report on system level implementation of lean techniques. In their comparison of Australasian healthcare supply chains with those of the European automotive industry, (**Tillmann et al**) found these supply chains were generally underperforming. An exception was found in an organization that had

elevated supply chain management to a core competence for their organization. There a systems approach including mapping value stream performance had increased functional integration of the supply chain, with consequent increases in performance.

The paper that concludes this special edition is the work of (**Mazzocato et al**) who undertook multiple case studies to examine the impact of a hospital-wide lean inspired intervention on independent organizations in their supply chain, and reciprocal effects on hospital performance. As with the interventions examined in single departments, (**Mazzocato et al**)'s study emphasised the critical role of leadership in lean implementation and further identified that care process complexity may be a significant source of variation in the success of implementing lean process improvements. In complex care processes the ability to coordinate across inter and intra organizational boundaries was found to be integral to achieving improvements in process capability.

The papers in this issue, as well as many other published articles reflect once again the impact lean, LST and associated approaches can have on a healthcare system. The papers indicate the importance of not only the tools and techniques but the organisational factors that are important to implement and sustain the lean approach. However, as Radnor et al (2012) reported lean is context specific and some of the assumptions that hold with the implementation of lean in manufacturing organisations do not hold in healthcare systems. Challenges of defining the customer and the subsequent creation of customer value; disjointed approaches to implementing lean; tool-based approaches being taken and, implementations projects tended to 'hit a glass ceiling' were reported (Radnor et al, 2012). The good news is, as the findings of the papers in this issue report, aspects of these are being addressed. This is important given the need for healthcare organisations and networks to remember, manage themselves and delivery with service at its core. Designing and improving processes and systems to delivery service based healthcare is critical to meeting the needs and expectations of the citizen. Engaging in LST supports this but LST itself must be continually challenged for both practice and theory to be developed.

- Deming, W. E. (1953), Statistical techniques in industry, *Advanced Management*, Vol. 18, Issue 11, pp. 8-12.
- Institute of Medicine (2012), *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*, The National Academies Press.
- Nembhard, I. M., Alexander, J. A., Hoff, T. J. and Ramanujam, R. (2009), Why Does the Quality of Health Care Continue to Lag? Insights from Management Research, *Academy of Management Perspectives*, Vol. 23 No. 1, pp. 24-42.
- OECD (2002), *Measuring Up: Improving Health System Performance in OECD Countries*, Paris, France, Organisation for Economic Cooperation and Development Publications Service.
- Porter, M. and Lee, T. H. (2103), The strategy that will fix health care: Providers must lead the way in making value the overarching goal, *Harvard Business Review*, Vol. 91 No. 10, pp. 50 - 68.
- Radnor, ZJ., Holweg, H., and Waring, J. (2012), Lean in Healthcare: The Unfilled promise? *Social Science and Medicine* Vol. 74, Issue 3, February 2012, pp 364-371.
- Skinner, B. F. (1976), *About Behaviorism*, New York, Vintage Books
- Treisman, G.J and Clark, M.R. 2011. A Behaviorist Perspective, in Clark M.R. and Treisman G.J. (eds): *Chronic Pain and Addiction. Adv Psychosom Med.* Basel, Karger, 2011, vol 30, pp 8–21
- Tucker, A., Heisler, W. S. and Janisse, L. (2013), Organizational Factors that Contribute to Operational Failures in Hospitals. *Harvard Business School Division of Research Working Paper* [Online], available at: www.hbs.edu/faculty/Pages/download.aspx?name=14-023.pdf.