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# Lean in healthcare: The unfilled promise?

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ABSTRACT

In an effort to improve operational efficiency, healthcare services around the world have adopted process improvement methodologies from the manufacturing sector, such as Lean Production. In this paper we report on four multi-level case studies of the implementation of Lean in the English NHS. Our results show that this generally involves the application of specific Lean 'tools', such as 'kaizen blitz' and 'rapid improvement events', which tend to produce small-scale and localised productivity gains. Although this suggests that Lean might not currently deliver the efficiency improvements desired in policy, the evolution of Lean in the manufacturing sector also reveals this initial focus on the 'tool level'. In moving to a more system-wide approach, however, we identify significant contextual differences between healthcare and manufacturing that result in two critical breaches of the assumptions behind Lean. First, the customer and commissioner in the private sector are the one and the same, which is essential in determining 'customer value' that drives process improvement activities. Second, healthcare is predominantly designed to be capacity-led, and hence there is limited ability to influence demand or make full use of freed-up resources. What is different about this research is that these breaches can be regarded as not being primarily 'professional' in origin but actually more 'organisational' and 'managerial' and, if not addressed could severely constrain Lean's impact on healthcare productivity at the systems level.



## Introduction

There is a growing pressure on public services around the world to increase their efficiency by adopting concepts and methodologies more commonly associated with private enterprise and manufacturing. A recent review on the use of such methodologies in the public sector revealed that 51% of publications focused on Lean, a further 13% on Business Process Reengineering, with 35% stating their use in health services (Radnor, 2010). In short, Lean seeks to reconfigure organisational processes to reduce waste and enhance productivity based upon the application of specialist analytical tools and techniques coupled with creating a culture of continuous improvement (Womack & Jones, 1996). Lean projects in healthcare have become widespread: Brandao de Souza (2009) show that most have occurred in the USA (57%), with the UK growing at a fast pace (29%), followed by Australia at 4%. Cases such as the Virginia Mason Medical Center in Seattle (USA), Flinders in Australia and the Royal Bolton NHS Foundation Trust in the UK have become celebrated examples of Lean implementation in healthcare settings. In these and other cases there is growing evidence of the potential impact on quality, cost and time, and satisfaction of both staff and customers. Many of the results reported have been in terms of tangible outputs such as reduction in waiting times, increases in quality through a reduction of errors, reduction in costs, as well as intangibles ones such as increased employee motivation and increased customer satisfaction (Radnor & Boaden, 2008).

It is worth considering, however, that this 'efficiency agenda' is not new and that since 1970s and 80s various attempts have been made across the world to contain healthcare spending and improve service performance, including major structural reforms in commissioning (Ham, 1997). One of the most prominent and widely debated developments has been the expansion of management practices in the organisation of clinical services (Alford, 1975). Reflecting the ethos of New Public Management (Hood, 1991), the managerialisation of healthcare is widely based upon the introduction of *'private sector personnel, models and techniques'* (Pettigrew, Ferlie, & McKee, 1992). This translation of private sector management practices into healthcare has been

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described by many commentators as representing challenging, even countervailing powers to established healthcare professionals (Alford, 1975). In the UK National Health Service (NHS) for instance, a multitude of specialist management domains have been introduced to transform established organisational and professional working practices regarded as wasteful, unproductive or unsafe. This includes performance management (Scrivens, 1988), Business Process Engineering (BPR) (McNulty & Ferlie, 2002), quality assurance (Pollitt, 1993), risk management (Waring, 2005) and knowledge management (Currie, Waring, & Finn, 2008). It is within this context that the recent introduction of Lean Healthcare can be seen as a further attempt to reorganise and rationalise healthcare services through the translation of management practices found within the commercial sector (Waring & Bishop, 2010). It is worth noting, that in many of these instances the impact on organisational performance, and indeed professional practice, has often been less than anticipated. Research attests to the persistence of deeply institutionalised forces that complicate and constrain reform (Currie & Suhomlinova, 2006; Pettigrew et al., 1992). This includes competing or contradictory political, regulatory or commissioning priorities; the persistence of powerful professional groups as manifest in specialist expertise, established ways of working, and defined jurisdictional boundaries; and high degrees of organisational complexity between both clinical specialities and service sectors that make the management of change difficult and contingent.

This marks the starting point of our paper, asking to what degree Lean has been successfully transferred into healthcare. We report on four multi-level longitudinal case studies within one region of the English NHS (three Hospital Trusts and one Mental Health Trust), where we essentially assessed what works, what did not, and why. We compare our findings to the general evolution of Lean in private organisations in order to draw out the differences related to the respective contexts over time, and to assess the validity of Lean as context-free improvement methodology.

## Lean thinking

Originating from the Toyota Motor Corporation, Lean (also referred to as the Toyota Production System, TPS) is considered to be a radical alternative to the traditional method of mass production and batching principles for maximising operational efficiency, quality, speed and cost (Holweg, 2007). The development of Lean Production has been widely discussed, and shall not be recounted here (Fujimoto, 1999; Hines, Holweg, & Rich, 2004; Holweg, 2007; Ohno, 1988; Womack, Jones, & Roos, 1990). Instead we briefly define Lean and its underlying assumptions, before discussing its applications in healthcare.

### *Definition and key assumptions of Lean*

Although conceptually simple, it is not easy to define 'Lean'. The core philosophy is to continually improve a process by removing non-value added steps or 'waste' (Japanese: 'muda'). The initial wastes were defined by Taiichi Ohno for a manufacturing environment and have been adapted for the healthcare context, for example by the NHS Institute for Improvement and Innovation (NHSIII, 2007), as shown in Table 1. Another way of defining Lean is through the five 'Lean principles' (Womack & Jones, 1996), as outlined in Table 2. These are based on an underlying assumption that organisations are made up of processes, and through engaging with these five principles in a step-wise and sequential way organisations can work to add value, reduce waste and continuously improve ("kaizen") in an ever-repeating process.

**Table 1**
The original seven wastes and healthcare examples.

| Original Wastes | Examples of Healthcare Wastes (NHSIII, 2007) |
|---|---|
| 1. Transportation | *Transportation:*<br>• staff walking to the other end of a ward to pick up notes<br>• central equipment stores for commonly used items instead of locating items where they are used |
| 2. Inventory | *Inventory:*<br>• excess stock in storerooms that is not being used<br>• patients waiting to be discharged<br>• waiting lists |
| 3. Motion | *Motion:*<br>• unnecessary staff movement looking for paperwork,<br>• not having basic equipment in every examination room |
| 4. Waiting (Delay) | *Waiting* for:<br>• Patients, theatre, staff results, prescriptions and medicines<br>• doctors to discharge patients |
| 5. Overproduction | *Overproduction:*<br>• requesting unnecessary tests from pathology<br>• keeping investigation slots 'just in case' |
| 6. Over- Processing | *Over processing:*<br>• duplication of information<br>• asking for patients' details several times |
| 7. Defects | *Correction:*<br>• readmission because of failed discharge<br>• repeating tests because correct information was not provided |

The focus on waste alone restricts the scope of Lean given that 'muda' (waste) is only one of three interrelated concepts: 'mura' relates to 'unevenness', and argues for stable demand that results in less variation and more efficient and standardised processes; 'muri' relates to 'excessive strain', and argues for good working conditions that prevent injuries and strain on the worker which is a clear factor in reducing absenteeism. Thus, putting the elements together, we define:

> *'Lean as a management practice based on the philosophy of continuously improving processes by either increasing customer value or reducing non-value adding activities (muda), process variation (mura), and poor work conditions (muri).'*

We distinguish three aspects of the Lean activities: assessment, improvement, and performance monitoring. Assessment activities which include reviewing the performance of existing organisational processes in terms of their waste, flow or capacity to add value, such as "waste walks" or more formal process/value stream mapping exercises. Improvement activities to support and improve processes, e.g. Rapid Improvement Events (RIEs, also referred to as "kaizen blitz" or "kaikaku" events) which are held over 3–5 days and involve staff evaluating, developing and redesigning processes

**Table 2**
The five Lean principles (Womack & Jones, 1996).

1. Specify the value desired by the customer.
2. Identify the value stream for each product/service providing that value and, challenge all of the wasted steps.
3. Make the product flow continuously. Standardise processes around best practice allowing them to run more smoothly, freeing up time for creativity and innovation.
4. Introduce 'pull' between all steps where continuous flow is impossible. Focus upon the demand from the customer and trigger events backwards through the value chain.
5. Manage towards perfection so that non-value adding activity will be removed from the value chain so that the number of steps, amount of time and information needed to serve the customer continually falls.