

# Leadership for healthcare improvement and innovation

## Background reading Week 4: Introduction to Lean in healthcare

In this section we consider one of the more popular quality improvement (QI) approaches in recent times: Lean systems. There is growing evidence that Lean is becoming progressively widespread. A recent literature review of 'Business Process Improvement Methodologies' carried out on behalf of the National Audit Office (Radnor, 2010), found that 51% of the publications sourced focus on 'Lean' and 35% of those were in the Health Services.

The first published use of the term Lean was in 1988 by John Krafcik to describe observations by a team of researchers as part of the International Motor Vehicle Program (IMVP). The IMVP was established in America to investigate the reasons why Japan was outperforming the West in terms of quality. The observations and effects of Toyota's methods in terms of superior performance gained were recounted by IMVP researchers John Krafcik (Krafcik, 1988) and Michael Cusumano (Cusumano, 1988) and acquired worldwide attention in 1990 through the book 'The Machine that Changed the World' by James P. Womack, Daniel Jones and Daniel Roos (1990). This research finally blew the myth that the superior performance of Japanese production was intrinsically related to Japanese culture.

The term Lean production was arrived at through the initial observations by John Krafcik to describe the operation at Toyota Motor Company:

*'It uses less of everything... half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a product in half the time. Also it requires keeping far less of half the needed inventory on site, results in many fewer defects and produces a greater and ever growing variety of products.'* (Womack et al., 1990:13)

Lean can be viewed as an alternative method to mass production and batch processing. Where mass production is geared towards large scale production ahead of customer demand in order to keep unit costs low and productivity high, the starting point of Lean is to minimise batch size as far as possible. Instead, Lean is geared towards continuous one-piece-flow production to keep production in pace with demand, thereby achieving the twin objectives of low unit costs and high quality levels.

Thus the principles of Lean run counter to the principles of traditional manufacturing. The latter focused on 'push' control - moving inputs to the next stage of the transformation process regardless of whether a demand for that input exists. Thus whether a process is designed to manufacture cars in an assembly plant, process a benefits claim form in local government or treat patients in a hospital, the emphasis on push process will nearly always create high levels of Work in Progress (WIP). This means that inventory (e.g. in the form of component parts, forms or people) is also amassed in storage areas waiting to be processed. By contrast, Lean is about strategically redesigning production processes to limit waste by improving flow of production and using 'pull' mechanisms (that are more responsive to demand) than push. This was the essence of the Toyota Production System (TPS)

which focused on eliminating non-value adding activities known collectively as 'waste' or 'muda'. According to Shingo (1989:191) there are various kinds of waste:

1. Over-production – producing more than is required by the customer
2. Delay – any kind of 'waiting' impedes the flow of the product to the end customer
3. Transport – movement from one place to another that does not add any value to the customer
4. Over - Processing – more work is done to a product/process than is required by the customer
5. Inventory – presents a capital expenditure which has not yet produced any income
6. Wasted motions – refers to the motions of the workers and equipment, excess motion wastes time and can cause injury/damage
7. Defects – when defects occur, extra costs and delays ensue

Following the success of 'The Machine...' Womack and colleagues defined five principles of Lean, describing these as 'a sort of North Star... a dependable guide to action to help managers transcend the day-to-day chaos of mass production' (Womack and Jones, 2003:10). These five principles are considered probably the most widely cited in the academic literature:

1. Specify value from the perspective of the customer
2. Identify the value stream for each product and challenge all of the wasted steps
3. Make value flow continuously, without interruptions
4. Let the customer pull value from the producer
5. Pursue perfection

There are a multitude of 'tools' that are associated with Lean. Broadly speaking it is possible to differentiate between tools that identify 'value', tools that prepare for 'flow', tools for mapping and analysis, tools for ensuring quality (reducing defects) and tools for continuous improvement. Some authors also report different approaches to Lean, depending on how it is implemented in different settings. Hence, Emiliani (2008) typifies approaches as 'fake Lean' or 'real Lean' where fake Lean relates to an approach based around the tools of Lean and real Lean refers to a management system where 'respect for people' is central. Similarly, Pettersen (2009) distinguishes between 'two main traditions of Lean', described as 'tool box Lean' and 'Lean Thinking' and links these to different goals: externally and internally focused. Whereas 'an internally focused cost reduction initiative will differ substantially from an externally focused initiative to improve customer satisfaction' (p.5). It is also noted that Lean may exist at two levels, both operational and strategic and that Lean can be seen as having a practical as well as a philosophical orientation.

## Lean in healthcare

Outside of manufacturing, the ideas and practices of Lean are still considered to be highly fashionable. Indeed some of the most successful examples of lean implementation have been in organisations such as the UK supermarket retailer Tesco and the UK based Logistics organisation Unipart (Radnor, 2010). In more recent times, Lean has also become popular in public organisations (such as local authorities) and, as we noted above, increasingly in healthcare.

Increasingly it is suggested that healthcare organisations might benefit greatly from adopting lean principles. Focusing on the cases of two hospitals, Spear (2005) highlights the potential for lean to help break free from

what he terms a 'work-around' culture where new processes continuously weave around and build upon existing ones regardless of complexity and waste. He describes the work around culture as a response to ambiguity in the system, where people face the same problems every-day for years but they lack the capability to deal with them. Speer also notes how these difficulties are accentuated by the functional structure and mind set of hospitals and other health organisations (which we explored in week two):

"Typically, care in a hospital is organized around functions. Issuing medication is the responsibility of a pharmacist, administering anaesthesia of an anaesthetist, and so on. The trouble is that the system often lacks reliable mechanisms for integrating the individual elements into the coherent whole required for safe, effective care. The end result is ambiguity over exactly who is responsible for exactly what, when, and how. Eventually a breakdown occurs-the wrong drug is delivered or a patient is left unattended. Then, doctors and nurses improvise. They rush orders through for the right drugs, urge colleagues to find available room for patients, or hunt down critical test results. Unfortunately, once the immediate symptom is addressed, everyone moves on without analysing and fixing what went wrong in the first place. Inevitably, the problem recurs, too often with fatal consequences" (Speer, 2004:4).

Grove *et al.* (2010) describe the consequences of functional organising in healthcare as disjointed care pathways, ambiguous communication, high levels of variation and unresolved errors. The ultimate penalty in healthcare as the Chief Executive of VMMC discovered is the preventable death of a patient, now one of the largest causes of death in the US.

In the UK, Fillingham (2007) published a paper describing the implementation of Lean in Royal Bolton Hospital Foundation Trust in the UK with the title "Can Lean save lives?" The paper concludes "the potential is enormous". Similarly, Gary Kaplan, CEO of Virginia Mason in Seattle – considered the first hospital to implement Lean across the organisation - declares "Lean works! ... We can create a better, safer, more efficient, and higher-quality health care system if we are willing to embrace these new methods and are truly willing to lead" (Black and Miller, 2008:xii).

In recent years there have been a number of examples of how lean principles have been implemented successfully in healthcare. A highly publicised case is the development of a Patient Safety Alert System at Virginia Mason Medical Centre (VMMC) in Seattle, USA. This patient safety alert system requires a member of staff to alert management as soon as a medical error or potential error presents itself. Senior management are notified immediately and commit to address the root cause of the problem with the aim of mistake proofing the process to prevent such an occurrence from happening again. According to the VMMC website, 14,604 PSAs have been reported from the program's inception in 2002 through to 2009, most processed within 24 hours. Another example is the Flinders Medical Centre in Australia which, after two and a half years of implementing Lean, was doing 15-20% more work, with fewer safety incidents, on the same budget, using the same infrastructure, staff, and technology (Gubb, 2009). The Royal Bolton NHS Foundation Trust is also credited with having reduced its average turnaround time in pathology from over 24 hours to 2-3 hours using less space and fewer resources.

There is therefore a growing interest and momentum to implement lean principles in healthcare, with obvious potential to improve efficiency and quality. As we shall see in the next section (4.5) this is especially in situations where a more strategic approach towards lean is adopted (where lean thinking is mainstream).

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