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Doing More with Less: *Lean Healthcare* Implementation in Irish Hospitals

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Introduction

Worldwide, there is pressure on public services to become more efficient. For healthcare, this includes addressing challenges associated with ageing populations and chronic diseases at a time of resource constraint. Healthcare organisations need to deliver quality care and extend service levels whilst simultaneously controlling expenditure (Waring and Bishop 2010). Since the early 2000s *Lean*—a well-known service improvement approach—has been adopted to reconcile and achieve these goals (Brandao de Souza 2009; D'Andreamatteo et al. 2015). Reflecting this, *Lean* is emerging as a key component in the literature concerning service improvements in health systems.

Inspired by the work of Burgess and Radnor (2013), who examined the status of *Lean* implementation in hospitals in the English National

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Health Service (NHS), this chapter aims to determine how *Lean* is being applied in the Irish healthcare sector. *Lean* initiatives, especially focused around nursing practice, have been tested in a number of hospitals in Ireland (White et al. 2014). However, the overall situation regarding the implementation of *Lean* in Irish hospitals is an area that merits further investigation. Concretely, the following research questions are addressed:

- How are *Lean* methods and processes implemented in Irish public hospitals?
- What factors are influencing *Lean healthcare* implementation in Ireland?
- How does the Irish approach to implementing *Lean healthcare* compare when set against the approach to *Lean* reported for other countries?

This chapter starts by defining *Lean*, before outlining the current evidence regarding *Lean* in healthcare. The qualitative method is then detailed, before a presentation of the findings of this empirical pilot study. Finally, conclusions regarding the current state of *Lean* implementation in the Irish healthcare context, and its contribution towards creating, spreading and sustaining improvement in the Irish context, are outlined.

Background

Defining *Lean* is not straightforward (Pettersen 2009). An improvement philosophy, it originated at the Toyota Corporation in Japan in the 1950s and is sometimes referred to as the *Toyota Production System* or *TPS*. *Lean* thinking focuses on customer value, defined as the ability to deliver the exact product or service required by customers in a timely manner and at an appropriate price. It is premised on five key operational principles (Womack and Jones 1996):

- Value—Specifying the value desired by customers;
- Value stream—Identifying the value stream for each product, providing value and challenging all wasted steps;

- Flow—Making the product or system flow continuously;
- Pull—Introducing pull between all steps where continuous flow is impossible;
- Perfection—Managing towards perfection in order to reduce the amount of time and the amount of steps needed to serve the customer.

Recent literature suggests that *Lean* should be considered as a systemic quality improvement approach and not simply as a set of specific tools that enable improvements (Burgess 2012). We also note that discussion of *Lean* often incorporates *Six Sigma*, and it can be referred to as *Lean Six Sigma* (*LSS)* (Shah et al. 2008). Both are considered to be 'process improvement programmes', described as 'synergistic' (Bossert 2003: 31) as they are similar in approach to systemic quality management (Proudlove et al. 2008).

In healthcare, *Lean* is considered a strategic approach which enables hospitals to reduce delays and errors whilst improving the quality of care through involving their staff in a process of continuous improvement (Graban 2008). Toussaint and Gerard (2010) summarised *Lean* principles for the healthcare context in three points: focusing on and designing care around patients; identifying value for patients and eliminating waste; and minimising the waiting time for treatment as well as treatment time. Much of the benefit from *Lean* for healthcare organisations derives from its promotion of more efficient processes. This may enable savings to be made whilst also providing higher quality care, thereby promoting better value for patients. Additional positive outcomes derived from *Lean* include improved access, efficiency and quality of medical care as well as reduced mortality, whilst the empowerment of employees, the introduction of gradual continuous improvement and the resulting increase in accountability can be considered as further beneficial aspects (Mazzocato et al. 2010).

There is evidence of successful application of *Lean* to achieve these outcomes in health services around the world, including in the most prevalent adopters—the USA and the UK (Brandao de Souza 2009; D'Andreamatteo et al. 2015). Yet despite this potential, its application has been described as narrow, piecemeal and disjointed, characterised by

the application of specific *Lean* tools in distinct quality improvement projects or programmes (Poksinska 2010). It seems that *Lean* is not being implemented using the holistic and integrated approach advocated in the literature summarised by Burgess (2012, p. 65), who notes that '[t]he extant literature makes a very clear case that *Lean* as derived from the TPS should be understood as a holistic approach to continuous improvement and not a set of tools'. Sustainable results appear to be dependent on creating a change culture involving a longer term vision of continuous improvement (Radnor and Osborne 2013). It may be that because *Lean healthcare* is a relatively new field, its implementation is still at an early stage of development. Alternatively, barriers may negatively affect its prospects. These are considered below.

Brandao de Souza and Pidd (2011) identify major barriers to *Lean* implementation in healthcare settings. Some of these are unique to healthcare. Key barriers include professional and functional silos, hierarchy and resistance to change. In addition, failure to achieve readiness factors, such as leadership, training, organisational culture and communication (Al-Balushi et al. 2014) may be an impediment. Overall, *Lean* appears to bring about positive results when applied in a healthcare setting, but researchers have identified limitations which prevent general conclusions from being drawn regarding its overall impact (D'Andreamatteo et al. 2015).

Based on this succinct summary, one might expect a patchy implementation of *Lean* in Irish hospitals. The method by which this is explored is detailed in the next section.

Methodology

This part-replication study set out to investigate how *Lean* is being applied in Irish hospitals. Following Burgess and Radnor (2013), it combined content analysis of hospital annual reports with additional narrative analysis of interviews with recognised Irish *Lean healthcare* experts. The research objectives were to identify how *Lean* is being implemented in Irish hospitals and to apply the Lean implementation classification developed by Burgess (2012), to establish how the *Lean healthcare* process implementation is being carried out.

Phase 1—Secondary Source Data Collection and Analysis Within Irish Hospitals

The Irish health sector was undergoing significant restructuring at the time of data collection with the regrouping of fifty separate hospitals into seven distinct Hospital Groups (Health Service Executive 2015). Therefore, it was decided to focus on the seven main, large, multidisciplinary acute hospitals in Ireland for the purpose of this exploratory study. In this phase of the research, a content analysis of recently published annual reports (2013) was carried out, using a combined 'key word in context' and 'narrative analysis' approach as described by Grbich (2007). The three dimensions of Pettigrew and Whipp's (1991) Context-Content-Process model of strategic change adapted by Burgess and Radnor (2013) informed this content analysis. These three dimensions refer to the 'why', the 'what' and the 'how' of change.

Phase 2—Qualitative Interviews with Experts

The second phase of this research involved a narrative analysis of qualitative interview data. The purpose of these interviews was to contextualise the findings and facilitate a better analysis. Three semi-structured interviews were undertaken with prominent experts on *Lean healthcare* in Ireland: two certified *LSS* Black Belts both widely recognised as highly competent in the *LSS methodology* and leading quality improvement projects in a full-time capacity in Ireland, and an expert who has written about specific aspects of *Lean* implementation.

Findings

Annual report statements from the Chairperson and/or from the chief executive officer (CEO) of each hospital provided a narrative and offered valuable insight into the strategic context, processes and content of *Lean* and/or *LSS* implementation in the sample of Irish hospitals. Based on this content analysis, the following key words and the

rationale for selecting them were identified. These were judged to be linked with the implementation of *Lean healthcare* and/or *LSS*; some are identical to those used by Burgess and Radnor (2013):

- 'innovation'—referring to introducing new processes and projects which may involve *Lean* and/or *LSS*;
- 'reconfiguration'—linked to reorganisation and merging which may demonstrate that *Lean* and/or *LSS* methods are being implemented.
- 'pathways'—referring to patient pathways and the improvement of patient flow within them which is associated with *Lean* and/or *LSS*;
- 'value'—referring to identifying, specifying and increasing the value for patients;
- 'lean'—referring to knowledge or application of *Lean* and/or *LSS* approaches and methodologies;
- 'integrat'—base form of word integration which may describe processes of standardisation and improvement of systems, including clinical and information technology systems, commonly linked to *Lean* and/or *LSS*;
- 'waste'—referring to removing of waste in processes;
- 'quality', 'safety' and 'improvement' or 'QSI'—referring to process improvement initiatives and programmes which may be associated with *Lean* and/or *LSS*;
- 'improvement'—activities linked to quality improvement or service improvement which may indicate *Lean* and/or *LSS*;
- 'optimis'—base form of word optimising, synonymous with improving;
- 'initiatives'—synonymous with project and can identify initiatives associated with *Lean* and/or *LSS* methods;
- 'project'—identifying various projects which may involve *Lean* and/or *LSS* methods;
- 'productive'—referring to the implementation of the Productive Ward (PW) programme which is associated with *Lean* implementation;
- 'strateg'—base form of the word strategy, which may denote a strategic shift using process and quality improvements associated with *Lean* and/or *LSS*;

- 'process'—referring to process improvement which is intrinsically linked with *Lean* and/or *LSS*;
- 'performance'—referring to performance optimisation through continuous improvement which is associated with *Lean* and/or *LSS*;
- 'staff'—referring to staff cooperation and staff buy-in which are intrinsically linked to *Lean* and/or *LSS* implementation.

The *Lean* implementation classification developed and described by Burgess (2012) and Burgess and Radnor (2013) contained five categories. This was modified marginally through the introduction of a sixth category, 'No *Lean*', and used to guide the analysis of the content data. Therefore, the six categories of approaches to *Lean* implementation presented and described below were used to categorise the key words and determine the approach of Irish hospitals to the implementation of *Lean*:

- No *Lean*—no indication of *Lean* found[1];
- Tentative—the hospital is contemplating *Lean*; tendering for external management consultancy to help with implementation or piloting a small isolated project;
- Productive Ward (PW) only—the hospital is implementing Productive Ward and/or Productive Theatre but no other evidence of *Lean* implementation is identified;
- Few projects—the hospital is using *Lean* principles and methods to underpin projects relating to certain functions or pathways within the organisation;
- Programme—the hospital managers refer to *Lean* principles underpinning work programmes expected to last between one and five years;
- Systemic—the hospital reports refer to embedding *Lean* principles in the hospital as a whole so that it becomes the standard. A systemic implementation also emphasises *Lean* training for all staff.

[1]A minor modification involved adding a 'No *Lean*' category and replacing the word 'trust' by the word 'hospital' in order to ensure relevance to the Irish healthcare system.

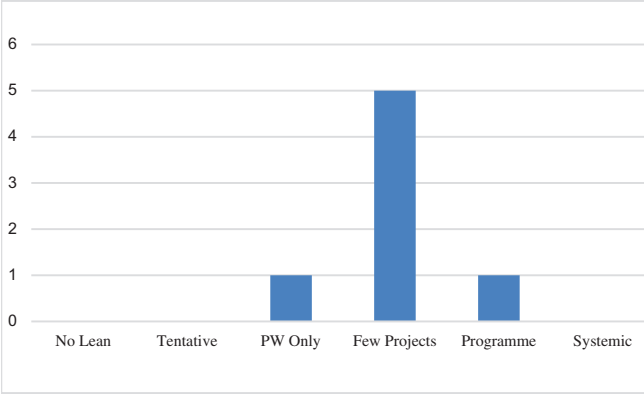

Fig. 6.1 Lean implementation in Irish acute hospitals

Lean application varied from 'PW only' to a 'programme' approach. It appears that having a 'few projects' was the approach to *Lean* implementation most common in Irish hospitals with five of the seven hospitals being classified as such. Figure 6.1 presents the overall findings from Phase 1 and presents a snapshot illustrating the distribution of the approaches to *Lean* implementation at the relevant point in time.

The results were as anticipated, with no hospital adopting a systemic approach and the dominant approach being one of implementing a 'few projects'.

Next, we detail the findings from the Phase 2 qualitative interviews. The interviews were conducted with influential stakeholders and practitioners in the area of *Lean* working in the Irish healthcare system. Their views provide a broader insight into *Lean healthcare* implementation in the context of service quality improvement in Ireland and serve to contextualise and support the analysis of the *Lean healthcare* implementation snapshot provided by Phase 1. Interviews were recorded in person, transcribed and analysed through narrative analysis. Interviewee A, an *LSS* Black Belt practitioner working in a large urban hospital, explained that *Lean* had become part of the philosophy and strategy of the hospital, stating that:

> Our goal is to be the first Lean hospital in Ireland and our second goal is to be the first Lean hospital group. The goal from the outset has been to

create a Lean culture as part of the transformational change within the hospital.

In Interviewee A's opinion, *Lean* in isolation does not work as it is part of the total service improvement process in the hospital, depending on and complementing other quality improvement initiatives. The hospital is moving towards a 'systemic' *Lean* implementation approach where *Lean* will become the standard across all hospital services. Interviewee A suggests that leadership and buy-in from all staff—medical and administrative—are equally important for successful *Lean* implementation. He warns that a 'toolbox' approach to implementing *Lean* could fail if staff are not provided with appropriate training. In this hospital, the *Lean* training model is inspired by best practice in the USA, the UK and Australia, but tailored to the needs of the hospital.

Interviewee A explained that *Lean* has a role to play in addressing 'silos in healthcare', enabling effective team integration in providing patient-centred services, but he stated that 'islands of best practice' can also create 'silos of *Lean*' within healthcare organisations. He provided evidence that in the hospital indirect financial benefits have been derived from *Lean*. Based on his previous experience of working with *Lean* implementation in hospitals in Ireland and abroad, he stated that a single approach to *Lean* may not work in all hospitals and that the implementation context needs to be taken into consideration.

Interviewee B works as a service quality improvement champion in the Irish Health Service Executive (HSE)—the national body responsible for the provision of health and personal care services in Ireland. Interviewee B stated that service improvement in healthcare is generally not dependant on a specific quality improvement process or tool, and that the Irish HSE's recommended approach to it can be considered an 'eclectic mix'. *Lean* is simply one approach that can be adopted in the Irish system. He described the take-up of *Lean* across the Irish hospital sector as 'sporadic' with 'specific islands of improvement'. Reflecting on why this was the case, he commented that the turnover of senior management in Irish hospitals may be contributing to the relatively conservative approach and slow take-up of initiatives such as *Lean.* Where *Lean* has been implemented, hospital managerial leadership has been a

critical influencing factor, supported by an emphasis on staff engagement in the process and training to enable successful implementation.

Interviewee C provides technical support and advice to hospitals interested in implementing *Lean* processes. He commented that continuous improvement is very challenging as well as complex in health service organisations, and that understanding the impact and benefits of the change process from the patients as well as the service provider's perspective is important. Interviewee C stressed that putting the patient at the centre of the improvement process could bring about safe quality care as well as streamlining processes. He asserted that in implementing a Lean improvement process, it is important to adopt an organisation-wide perspective and to work on specific improvement projects which complement each other. For successful implementation of a quality change project such as *Lean*, Interviewee C concurred with previous interviewees that managerial leadership, staff buy-in and training were important, but he also suggested that implementing such a change required a supportive culture and good governance structures.

Based on these interviews, it is clear that the experts view *Lean* as part of a systemic approach to quality and service improvement, suggesting that it is more than implementing a 'tool-kit'. All experts focus on the managerial leadership role in owning *Lean*, coupled with achieving staff buy-in and training to achieve it in the widest sense of delivering internal organisational processes to eliminate waste and patient care as well as delivering externally focused objectives such as delivering patient satisfaction. All interviewees refer to the fact that initially external consultants were retained to implement *Lean* projects in Irish hospitals, but that Irish experts are now trained in *Lean healthcare* implementation.

Discussion

As expected and evidenced by our findings, *Lean* implementation in the Irish healthcare service can be considered to be piecemeal and sporadic. Some *Lean* processes and methodologies are being implemented, but there is no evidence of a systemic approach to *Lean* implementation across the sample of Irish hospitals.

Pettersen (2009), building on the work of Hines et al. (2004) and Shah and Ward (2007), developed a framework identifying approaches to *Lean* which provides a way of mapping *Lean* implementation in organisations. He distinguishes between: a) approaches towards *Lean* implementation, classified as performative (practical) or ostensive (philosophical); and b) level of *Lean* implementation, which he describes as discrete (operational) or continuous (strategic). This provides four distinctive categories of approaches to *Lean* implementation: 'toolbox *Lean*'; '*Leanness*'; 'becoming *Lean*'; and '*Lean* thinking'. Burgess (2012) utilised this framework to categorise her findings on *Lean* implementation in healthcare in the UK. We have adapted this framework slightly, reverting to the language originally suggested by Hines et al. (2004) regarding the level of operational implementation as operational and strategic, and that suggested by Shah and Ward (2007) regarding the approach to *Lean* as being philosophical or practical.

As can be seen in Table 6.1, the quadrants illustrate different potential approaches to *Lean* implementation. For example, a hospital adopting an operational, practical approach will, according to Burgess (2012), be involved in a set of specific projects including the Productive Ward, and will be using a tool-kit approach.

Applying this framework, our sample of Irish hospitals is predominantly categorised as adopting an operational, practical approach, described as a 'Toolbox *Lean*' approach. One Irish hospital adopts a philosophical approach to *Lean* implementation and can be assigned to the '*Leanness*' category, as it currently has a programme approach with a strategic objective to achieving a systemic approach. This approach is based on the vision of managerial leadership committing to integrating

Table 6.1 Adapted version of Pettersen's (2009) lean implementation framework

	Operational	Strategic
Philosophical	Leanness programme approach	Lean thinking systemic approach
Pratical	Tool-box lean projects PW	Becoming lean

Lean healthcare into the culture, structures and processes of the hospital, the appointment of a *Lean* specialist, and the establishment of a *Lean Academy* to communicate the vision and provide training in *Lean* processes.

This snapshot of the current *Lean* implementation situation in Irish hospitals appears to be consistent with the disjointed and fragmented approach to *Lean* found in healthcare organisations around the world and well documented in the literature (Poksinska 2010). There are of course exceptions, with the Virginia Mason Medical Center in the USA and Flinders Medical Centre in Australia being cited as examples of systemic *Lean* implementation in a healthcare context (see for instance: Bohmer and Ferlins 2006; Ben-Tovim et al. 2007). The main explanation for this approach, proffered in Ireland by the experts as well as in the literature, is that *Lean* as an approach to service and quality improvement is a relatively new phenomenon in the healthcare sector. Hines et al. (2004) suggest that we could consider health organisations as on a *journey*, evolving through stages of *Lean* development as set out in Table 6.1, from practical and operational to philosophical and strategic. Pettersen (2009) makes the insightful point that an internally focussed tool-kit approach favoured by practitioners, facilitating the development of 'pockets of best practice' (Radnor and Walley 2008) and described as 'islands of improvement' by our interviewees, should not be dismissed nor considered incorrect as these piecemeal interventions do achieve specific goals and have an impact. Further, in demonstrating small impacts (e.g. indirect savings within hospitals as outlined by our interviewees, and overcoming functional silos, viewed negatively by certain authors, e.g. Towill and Christopher 2005; Waldman and Schargel 2006), as evidenced in one hospital in our sample, these piecemeal approaches may in fact be developmental steps from a practical, operational tool-kit approach towards a philosophical, strategic systemic approach to service quality improvement. Other explanations put forward to explain the slow take-up and spread of *Lean* in Irish hospitals include the fact that the financial benefits of *Lean* for Irish hospitals appear to be mainly indirect, and the short tenure of senior management in Irish hospitals (White et al. 2014) results in a focus on short-term hits as opposed to long-term strategic change interventions.

Nevertheless, *Lean* theory and our interviewees advocate a more coordinated and systemic approach to *Lean* implementation (Burgess 2012). All interviewees recognise the relevance of context to achieve this. At the hospital level, the impact of financial constraints and their impact on the strategic choices managers can make, within the constraints of broader government policy, were mentioned. It was suggested by the experts that the Irish healthcare service, in seeking inspiration from best practice abroad, may lead *Lean* consultants and experts to overlook important contextual aspects crucial to the successful implementation of quality improvement in an Irish context. The interviewees in this study warn against a narrow, best-practice approach to service improvement and recommend the development of a structured implementation methodology tailored to the specific hospital, a view echoed by Stanton et al. (2014). Managerial leadership of the *Lean* process is widely acknowledged as imperative to successful implementation. Both literature (Al-Balushi et al. 2014) and interviewees underscore the importance of an appropriate organisational structure and culture, with the interviewees stressing the importance of empowering staff and securing staff buy-in into the process of change.

Conclusions and Limitations

Lean, as a recent strategic philosophical approach to service and quality improvement in healthcare organisations, offers the promise to streamline service provision from a patient-centred perspective and reduce waste across the health delivery system. The promise of these improvements, coupled with the strong prescriptive recommendation from both theory and practice to adopt a systemic approach, are recognised.

This snapshot of sporadic, piecemeal *Lean* implementation in a small sample of Irish acute hospitals has demonstrated that the pattern of *Lean* implementation in Ireland is similar to that reported in other countries. The Irish approach is described as practical and operational, evidencing some specific *Lean* projects and Productive Ward initiatives in Irish hospitals. Based on both the hospital annual report and the interviews with experts, there was evidence of strategic intent towards

integrating a *Lean* philosophy into the service improvement processes in one hospital. We argue that these findings demonstrate that Irish hospitals are at the beginning of a *Lean* journey, and that with the leadership, training, supportive organisational structures and culture prescribed by *Lean* theorists and recommended by practitioners, this philosophical approach will develop. Then, the positive benefits to be accrued from this process innovation will be evident in better patient-centred service delivery and tangible cost savings.

Our study investigating the implementation of *Lean* in Irish acute hospitals has a number of limitations. The fact that annual reports from a relatively small sample of hospitals were analysed may be viewed as a limitation. However, when the recently created Hospital Groups are better established and integrated, a more representative sample of Irish hospitals could be surveyed. Second, recognising that the implementation of *Lean* is a journey, conducting longitudinal research or carrying out the analysis at two points in time, similar to the study by Burgess and Radnor (2013), would enable the progression of *Lean* implementation within the broader context of service improvement in the Irish health service to be estimated. Third, it is possible that the annual reports analysed in Phase 1 could be incomplete, distorted and/or biased. Hospitals might be using *Lean* tools and/or methodologies, but these might not be mentioned in their annual reports. Interviewing Hospital Group managers could address the issue of hospitals not compiling annual reports as encountered during the research process. Finally, it is recognised that the interview target group of three experts is a limitation, but at the time of the study, there was widespread recognition that the three experts were the main champions of *Lean* in the Irish healthcare system.

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