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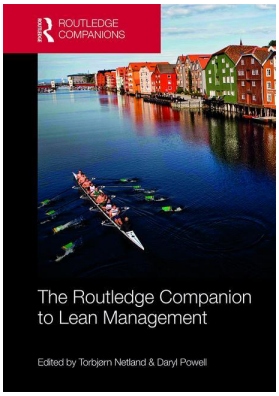

The Routledge Companion to Lean Management

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Lean Healthcare

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PART II

Lean across Industries

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23
LEAN HEALTHCARE

Daniel T. Jones

Introduction

In the advanced economies, healthcare providers face two problems. First, they need to recognize that the quality of healthcare has fallen behind other products and services. This has led to thousands of unnecessary deaths and injuries, as summarized in Allen (2013). Second, aging populations and less healthy urban lifestyles are resulting in a more rapid increase in demand for healthcare than can be paid for by both income and tax revenue growth in the squeezed middle classes. The situation is particularly challenging in the USA, which has some of the best hospitals in the world, but at the same time spends twice as much per head relative to other advanced countries to achieve similar outcomes.

The Institute for Healthcare Improvement (IHI, www.ihi.org) was established in the USA in 1991 to address the quality challenges facing healthcare. This became a global initiative with a large annual conference, many improvement activities, and research collaboration. It was led by Don Berwick, whose annual speeches are collected in Berwick (2014). It became apparent that the sustainability of improved medical practices needed to be embedded in improved processes for delivering care to patients. This has resulted in a growing interest in the potential of lean to simultaneously address both quality and costs issues.

What is Lean Healthcare?

Although lean was born in Toyota in the 1950s and 1960s (see Womack and Jones, 1996; Liker, 2004) it was not until after 2000 that the first hospitals in the USA, Europe, and Australia began to explore the use of lean. These pioneers came together to share their stories at the first Global Lean Halthcare Summit in the UK in 2007 and at a conference of healthcare leaders organized by the Lean Enterprise Institute (LEI, www.lean.org) in the USA in 2008. These conferences triggered many more experiments around the world, new training programs, and an army of consultants offering to help in return for learning how lean works in healthcare. ThedaCare established the *healthcare value network* for hospitals interested in lean (www.createvalue.org). Interest has grown rapidly over the past decade, with a growing literature collection, including Jimmerson (2007), Graban (2008), Baker and Taylor (2009), Toussaint (2010), and Barnas (2014), to mention a few.

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It is now clear that lean can deliver better quality (and safety) and a better patient experience (fewer queues and less rework) while simultaneously making better use of existing resources (to treat more patients) and improving the work experience of staff (less frustration and stress). Although it is true that "we don't make cars," the operational challenges hospitals face are actually not so very different from those in manufacturing or service delivery. The language is certainly different and the patient directly experiences the process of solving their problem. However, what is common is not the tools but the evidence-based methodology that is central to lean. Lean uses the same scientific method to diagnose and treat organizational problems as doctors use to diagnose and treat medical problems.

There are all kinds of examples where lean has made a significant difference in healthcare, varying from clinics and departments through to whole hospitals and even whole healthcare systems. However, not all of the initial experiments were successful or were sustained. Additionally, we are still a long way from lean being the way of working across healthcare. So what lessons can we learn from the first decade of lean in healthcare?

Challenges and Opportunities

What distinguishes lean from other process improvement methodologies is its focus on developing the capabilities of the front-line teams (doctors, nurses, and support staff) to manage and continuously improve their work. This begins as teams learn to create stability and standardize their work as a baseline for improvement. It deepens as teams practice using the scientific approach in addressing the issues that interrupt and distract them from caring for patients. Repeated practice in solving problems enhances their ability to see and to solve tomorrow's problems, which leads to a virtuous circle of continuous improvement (Jimmerson, 2007; Shook 2010). It also results in highly motivated employees who feel a strong sense of ownership of "their" improvements.

The use of a common problem-solving framework, such as Toyota's A3 process based on Deming's plan, do, check, act (PDCA) sequence, is the foundation for using the scientific, evidence-based approach to solving problems. Daily practice of solving local problems builds the capabilities of teams to address and solve larger problems, like in Figure 23.1 which designs an improved patient journey.

Individual and team-based learning is therefore the key focus of lean. We now know that these problem-solving skills are learnt through daily practice and not just from classroom training in lean tools or occasional kaizen workshops. These skills are best nurtured and sustained by team leaders and line managers supported by coaches and therefore not by delegating the implementation of lean to external or internal consultants. Improvement teams often end up extinguishing fires for top management, which reignite soon after they go off to fight the next fire.

To significantly improve the experience of patients and to deliver better hospital performance, these islands of improvement need to be joined together along the patient journey from admission to discharge and beyond. As we map patient flows through healthcare systems, we see all the handoffs and delays and interactions with support services that need to work together to enable the patient to move to the next step in their treatment journey. It also allows managers to see, for instance, that unless attention is paid to the timely discharge of patients, improving the admission process will only lead to longer queues waiting for beds. It also highlights the need for primary care and hospitals to work more closely with rehabilitation and social care in the community (see, for example, Baker and Taylor, 2009; Worth et al., 2012).

Value stream maps are initially used to help teams understand the flow of tests, records, patients, and so forth through their area or department. These are later used by cross-departmental and management teams to understand the handovers and bottlenecks between departments along

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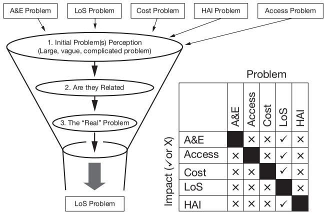
Title: Justification for Middletons's Emergency Medical Process Re-Design

Version: v2 **Date:** 21/11/07
Author: JB

What is the problem?

Patients' length of stay (LOS) is the big problem and is having an adverse effect on our other Big 4



Problem / Impact (✓ or X)

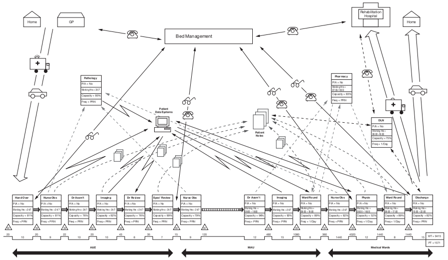
	A&E	Access	Cost	LoS	HAI
A&E	■	×	×	✓	×
Access	×	■	×	✓	×
Cost	×	×	■	✓	×
LoS	×	×	×	■	×
HAI	×	×	×	✓	■

Current condition:

1571 minutes (15%) Treatment Time

V's

9,415 minutes (85%) Waiting Time

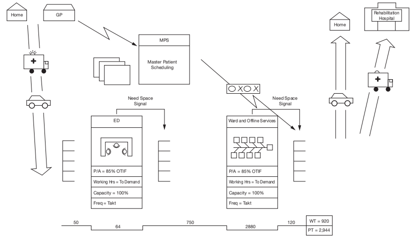


Target condition: Reduce Waiting Time by 64%, therefore reduce average LoS for Medical Patients By 4.94 days

Root Cause Analysis:
- No real plan for patients (hence no actual)
- Departmental working hours are not synchronized
- Capacity (staff) not calculated to meet Demand
- Frequency of interventions not designed to meet Demand

Responsible: JB Team members: BW/NE/JE/ML/HW

Proposed countermeasures:
- Create Stability thro' Ops Management
- Place "offline" services "online" & get them operating to takt
- Create Continuous Flow
- Introduce Buffers where we cannot Flow
- Create a Single Point of Schedule (Pacemaker)



Plan:

Date 01/11/2007 Patient Family: Emergency Medical

Loop	Burst	Line Item (objective)	Metric (Goal)	Lead	Related persons	Start/Complete	J	F	M	A	M	J	J	A	S	O	N	D	Reviews 30d	60d	90d
All	1. Develop & execute Comms Plan	Proposed re-design communicated	100% Staff aware	MB	LJ/LT/km	Jan Yr1 - Feb Yr1	○	△											×		
1. Stability	2. Ops Mgmt throughout CS	Plan for Every Patient	Ave' OTIF 85%	IT	LT/AN/LJ	Jan Yr1 - Feb Yr1		○							△				×	×	×
	3. Really understand demand	Demand In & Out known	By Hour/Day/Week/Season	IT	KR/MB	Jan Yr1 - Feb Yr1	○		△										×	×	
2. Post CS MAU	4. Establish Pacemaker	Scheduled by MPS	90% levelling	PL	RS/OG/TE	Jan Yr1 - Feb Yr1				○		△							×	×	
	5. Size & implement buffers	1. Pre Ward Buffer in place	Max LoS < 12.5 hours	PL	DM/MB/PB	Jan Yr1 - Feb Yr1							○		△				×	×	
		2. Discharge Buffer in place	Max LoS < 2 hours	PL	DM/MB/PB	Jan Yr1 - Feb Yr1										○		△	×	×	
	6. Pull offline services into flow	Top 80% into fishbone model	All 80% working to Takt	IT	JJ/GR/DE	Jan Yr1 - Feb Yr1							○						×	×	×
3. Post CS A&E	7. Implement Continuous Flow	Merged ED Cell	Max LoS < 80 mins	IT	BJ/GR/JR	Jan Yr1 - Feb Yr1											○		×	×	×
	8. Size & implement buffer	Per ED Buffer	Max LoS < 2 hours	RJ	DM/MB/PB	Jan Yr1 - Feb Yr1													×	×	

Key: ○ Planned Start; △ Planned Completion; ● (grey) Start on time; ● (dark) Start late

Follow Up:
- Conflicting Cost Improvement Initiatives in departments & divisions
- Who will do this work?
- How will we know if the actions have the impact needed?

Agreed by: MT **Date:** 08/11/07

Figure 23.1 Example of A3 in a hospital

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the patient journey from door to door, as in Figure 23.2. Later still they can be used by teams from primary, secondary, and tertiary care to map the entire patient journey from beginning to end.

The key to managing patient flows is to make the work and patient flows visible. This begins on admission as the team establishes a plan for all the expected steps right through to discharge for each patient. Displaying this on a whiteboard (rather than hiding it on a computer) helps the team to see whether the planned steps were completed on time and thus captures the reason for potential delays. Action can then be taken to get back on track. However, recurring interruptions signal the need for the team to diagnose and address the root causes of the problem rather than jumping to a solution and blaming others. Collecting the status of patients who are nearly ready to go home every two hours on a central *visual hospital* board helps to trigger the necessary actions to ensure they go home on time in order to free up enough beds for incoming patients (Baker and Taylor, 2009). Management at all levels can also see the current status of the hospital at a glance.

Visual planning boards, built upon a *plan for every patient*, are created on admission and revised on a regular basis, detailing all the work to be done through to a planned discharge date. *Patient planning boards* in each department are used to track planned versus actual work at intervals each day, to highlight delays and their causes. Visual hospital boards like the one in Figure 23.3 are updated frequently to review the status of all the hospital beds and unblock issues that might delay discharge.

It has become clear that supporting front-line improvement activity and the visual management of patient flows presents new challenges for senior management. Managers need to spend time on the front line understanding the issues, eliminating obstacles, challenging teams, and coaching problem solving. Perhaps the biggest challenge is learning how to manage by asking questions rather than telling subordinates what to do, which takes the responsibility for learning what could be done away from them. In this way managers learn to see the bigger, underlying issues by helping the front line learn to solve problems on their own.

The lean way to free up managers' time is to use a visual strategy planning process to establish the key objectives for the organization and to conduct a structured dialogue up and down the organization on proposed actions to achieve them (that is, "strategy deployment") (Dennis, 2009). As a result, resources and energies are focused and aligned through a visual process reaching right down to the front line. Using the same visual system for monitoring progress and managing deviations gives management the confidence that these vital few objectives will be achieved. This, in turn, dramatically cuts the number of projects and meetings that waste so much of managers' time. Building this visual management system and the very different behaviors that go with it is a long process.

Strategy or *policy deployment* is a framework for prioritizing actions to close the key performance gaps and for aligning all the improvement activities to achieve them. It is also used to track progress so the team can address the causes of delays in a timely manner. It can be used at the whole hospital or trust level, as in Figure 23.4, at department level, and in planning each improvement project.

Transforming a Healthcare Organization

There are several approaches to transforming a healthcare organization. A good example is Thedacare's six-step process described in Toussaint (2015):

1 *Laying the foundation*. Leaders should understand the potential of lean through visiting other lean organizations and training. This gives them a clear idea of their role in leading a lean transformation. They also need to be clear about the desired direction and objectives.
2 *Creating a model cell*. This can be done so that the team can create standard work and visualize plan versus action as a basis for making improvements. The team builds experience in making

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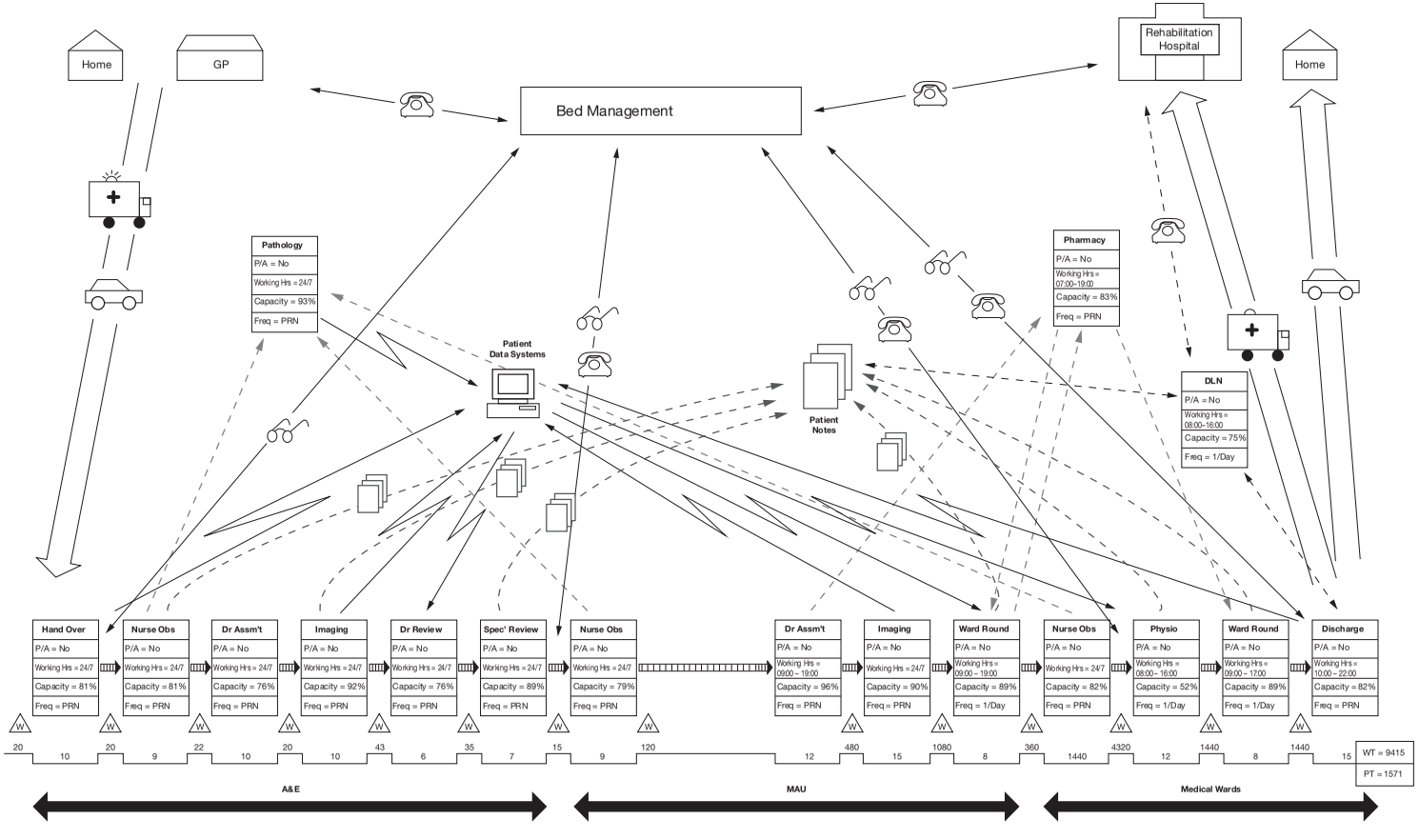

Figure 23.2 Example of value stream mapping in a hospital

Figure 23.3 Example of a visual planning board in a hospital

step-by-step improvements toward challenging performance goals. In addition, others can learn from their experiences.

3 *Establishing values and principles*. This includes, for example, "Patient first" and "Show respect for others," developing a consensus on expected behaviors and leadership, and making problems transparent in a no-blame culture.

4 *Creating a central lean or improvement team*. This can be implemented to facilitate lean activities while teaching lean concepts and developing future leaders.

5 *Building a daily management system*. This management system should include start of shift meetings, bed management meetings, and departmental progress meetings right through to board meetings. At each level management reviews the actual situation and discusses how obstacles to planned progress can be removed. At the same time they coach their teams in problem solving.

6 *Spreading lean across departments*. Teams should be engaged to begin using lean to solve problems in their areas. They should be provided with the necessary support and coaching. Challenges and results should be communicated across the organization.

A full description of a lean hospital management system can be found in Barnas (2014).

The Future of Lean Healthcare

We have certainly come a long way in learning how lean can help healthcare. Many of these lessons are common to other activities. However, we are still at the beginning of a long journey to

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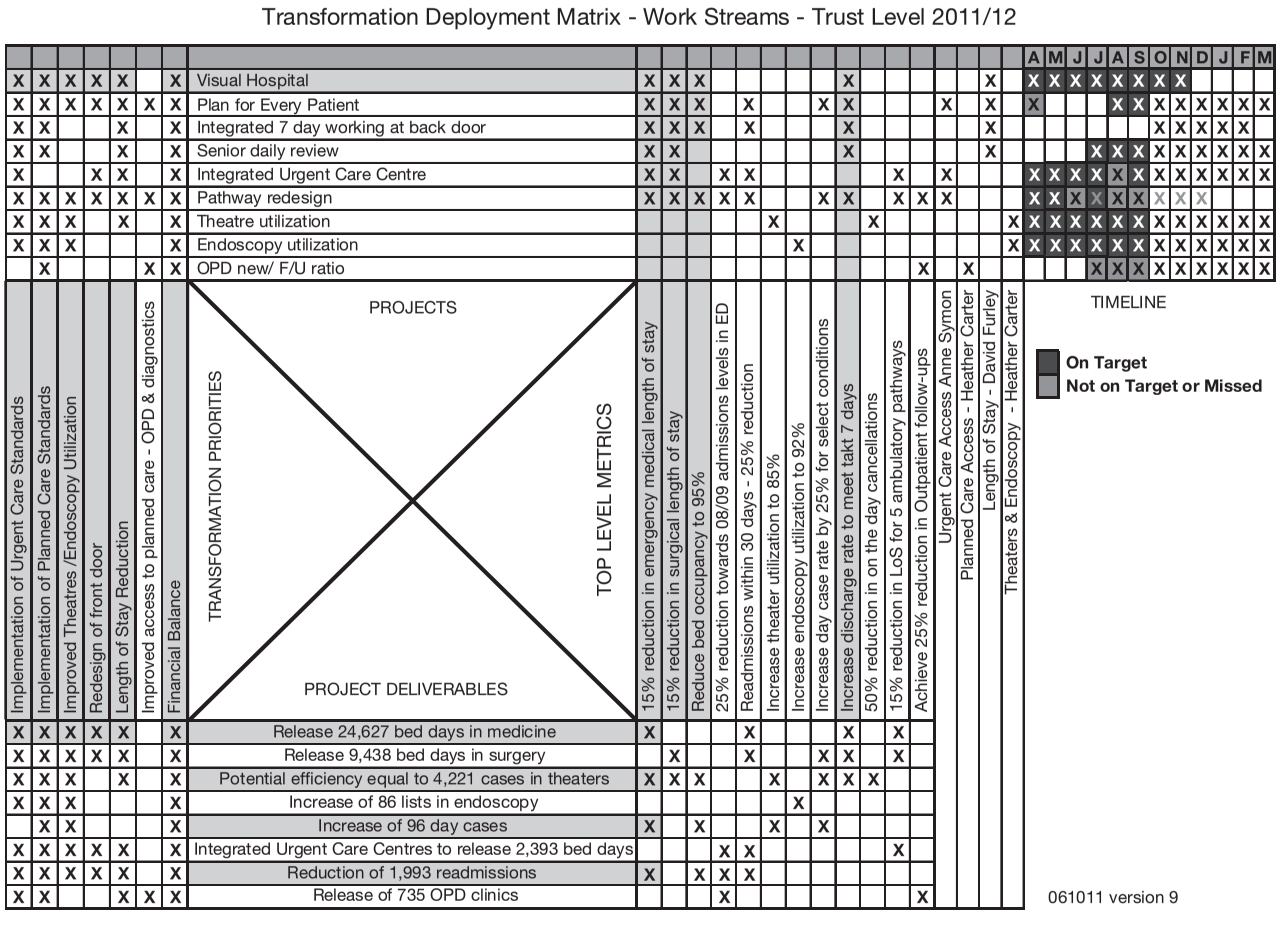

Figure 23.4 Example of policy deployment matrix at a hospital

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realize the full potential of lean as a management system and as a framework for designing healthcare delivery systems for the future.

So far we can distinguish between four different approaches to lean healthcare. First, numerous experiments in different departments, from admissions to operating rooms and imaging to pathology, where teams have learned to see the flow of their work differently using a lean perspective (see Jarvis, 2015). There have also been several experiments in joining these together along the patient journey (see Baker and Taylor, 2009).

Second, whole hospital examples, notably Thedacare and Virginia Mason (see Toussaint, 2010; Kenney, 2011), which have developed a comprehensive management system throughout the hospital and associated primary care units, described above.

Third, big experiments in state-wide healthcare transformation programs, modeled on the Virginia Mason experience, most notably in Saskatchewan in Canada (see Florizone, 2015).

The fourth model is a much simpler do-it-yourself approach where top management seeds and supports problem solving across the hospital, and actively links these improvements to deliver hospital-wide results. Instead of relying on outside or internal consulting support, lean is taken up by front-line staff and top management is advised and challenged by *senseis* or advisors with deep experience in asking challenging questions. This approach is being followed by several hospitals in Barcelona, Spain (see the case study below; Adalid, 2014; Pardos, 2014; Sanchez and Suarez, 2015).

Improving the performance of existing hospitals and healthcare systems is also the foundation for designing next-generation lean healthcare systems. Interesting experiments are underway in Saskatchewan, Canada using the lean *production preparation process* (3P) to design new hospitals (Florizone, 2015). This involves teams of front-line staff and patients mapping all the flows through the hospital (of patients, doctors, tests, drugs, etc.) in order to design an ideal room layout and to build full-scale mock-ups of key rooms. Once this process knowledge is captured, architects and contractors can then work out exactly how to build the new hospital. As a result, they will not only reduce the footprint and capital cost of the new hospital but also cut the running cost over the 40-year life of the building significantly.

What is striking about lean is its ability to touch people and give them hope that they can improve their work in caring for patients. When they describe with real pride the problems they have already solved and what problems they plan to tackle next, you know they will continue down this journey. The challenge for management is mobilizing and supporting this army of problem solvers.

Case Study: Lean Healthcare in Consorci Sanitari Del Garraf

Consorci Sanitari Del Garraf is a 440-bed public hospital with 961 employees located south of Barcelona in Spain. It was formed in a merger of three hospitals in 2009 and the new CEO, Josep Lluis Ibanez Pardos, was faced with a 17 percent cut in the budget for the hospital. While the first two years were spent integrating the operations and systems of the three hospitals, he was also determined to address the crisis by transforming the culture instead of just pursuing short-term cost savings. In previous assignments he witnessed the limitations of two external consultant-driven lean projects which did not last and was determined to lead this one himself.

In 2011, he took his management team to a lean practitioner training workshop run by the Instituto Lean Management in Barcelona, and later hired them as coaches and teachers for his team. Following the workshop, they learned to diagnose their situation and they developed a plan. The

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focus of this plan was to build the capabilities of employees in order to improve the core processes in the hospital. The basic thinking was to teach the use of data-driven analysis to establish stability, to teach scientific problem solving (PDCA) to make improvements, to focus on reducing time, and to communicate and share the results across the hospital.

Rosa Simon was appointed lean manager, supported by five staff. They developed their own training course for the hospital staff from pilot areas and helped them make their work visual, address the causes of variation, and use A3 for problem solving. While the staff from each area selected the problems to tackle, supported by the lean team, top management was always available to support and unblock issues they encountered. In many cases they tried experiments with alternative potential solutions to see which worked best. The experience of solving their own problems quickly built engagement, pride, and ownership, which was communicated across the hospital. They went on to identify the next problems they wanted to address.

Over the next three years, projects were conducted in many different areas. They streamlined the admission process at the front door to reduce waiting times and direct people to the right location, something that was visible to everyone visiting the hospital. In the operating room (OR) they reduced the time between operations from over an hour to 35 minutes, so they could carry out one additional procedure a day per OR. On the wards, they made the work visible so everything was done on time, response times were faster, and it took less time to prepare rooms and beds for the next patient. They also worked very hard to discharge a majority of patients before midday, freeing up beds for patients coming from the OR and the emergency department (ED). In the ED they reorganized the work sequence and the response times from imaging and blood tests so that waiting times and length of stay in the ED were cut in half.

Linking these improvements is making a big difference to patient experience and simplifying the work for staff as patients move through the hospital without delays and the hospital is able to treat more patients while meeting the reduced budget. These improvements were recognized as it became one of the top 20 hospitals for quality in Spain, and later won the award for best hospital in Spain in 2013. Visiting the hospital today gives the impression of a calm situation well in control. The staff are strongly committed to continuing their problem solving on into the future. As a result, they have inspired several other hospitals, large and small, in the Barcelona area to follow their example.

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