Implementing Lean healthcare

Things to consider when making the change

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Abstract

The pressure on the healthcare sector is increasing all over the world. The amount of treatable diseases increases and the time spent with each patient decreases. As a reaction towards the way the healthcare works today, patient-centred healthcare has become increasingly popular. Bringing the patient into the centre also needs changes in the staffs’ way of working. One way of making these changes is by implementing Lean healthcare.

This thesis uses a systematic review approach to find out what organisational changes have been made at hospitals where they have implemented Lean healthcare and how the implementations were done.

The results showed that the most important thing was to engage the staff at an early point. Those hospitals that had representatives from all the different categories of the staff were the ones who managed to make the modifications with less effort and they also had an easier way of maintaining them.

The most obvious similarities in the organisational changes the hospitals had made were that they clearly defined who were supposed to do what and that they changed the work into multi-disciplinary teams. By that the hospitals saved a lot of time both for the staff and for the patients.

Lean thinking has similarities theories of cognitive science, like distributed cognition and safety barriers and it could get inspiration from these areas to enhance the implementations.

There are few articles concerning the organisational changes that have been made at hospitals when implementing Lean healthcare. However the results of this thesis was that the most important thing when implementing Lean healthcare is to involve everyone at an early stage and the only way to get Lean healthcare to really work is by changing the attitude and making people realise that improvement is a never ending process. The changes that were most common among the hospitals were to clearly define and document who was supposed to do what and to change the structure to multi-disciplinary teams working together.
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1. Introduction

In Sweden the need to change the healthcare sector is becoming more and more pressing. As a part of a larger project at Linköping University together with the University Hospital of Linköping aiming to find a new way of working with patients that is in line with the Swedish healthcare system, the purpose of this thesis is to find what changes that have been tried in other countries with focus on the concept Lean healthcare.

1.1 Background

The pressure on the healthcare sector is growing all over the world. The medical advancements make it possible to save patients and/or keep them alive longer. This means that more patients need treatment and in most cases they need it for a longer period of time. As we live longer this also puts pressure on the healthcare and the costs for healthcare are rising. The amount of treatable diseases increase and the time spent with each patient decrease. As a reaction against a more task-centred, profession-centred or disease-centred care that is common today, patient-centred care was developed (Hobbs, 2009).

According to International Alliance of Patients’ Organizations (IAPO) there is not one unique way of defining the term patient centred healthcare (IAPO, 2007), each organisation and country have their own definition. This makes it a bit difficult to compare because today the term refers to everything from letting the patient chose their own meal at the hospital to nurses spending most of their time by the patients beds to physicians having to include the patient early in the diagnosis and explain everything that is going on. According to IAPO the advantage with this is that the point of patient-centred healthcare is precisely that, the patient should be in the centre no matter what the subjects are and as long as that is the essence, then any definition is acceptable. Though bringing the patient into the centre does not necessarily mean giving the patient everything he or she asks for, it is more than just meeting the demand of a customer (Robinson, Callister, Berry, & Dearing, 2008).

However, not having a precise definition of patient-centred healthcare does make it difficult to compare different hospitals and/or countries and thereby to find out what impact the implemented changes have on the quality and efficiency of the hospital care. It also means that learning from others is more difficult and it seems from many of the scientific articles published today that we are “inventing the wheel” over and over again.

Lean healthcare however has a definition that is universal, to put the customer in the centre and remove all actions that does not add to the customers goal. Lean healthcare is not connected to patient-centred care but the essence is the same (if you put the patient as customer and getting better as their goal) and the fairly precise definition makes it easier to compare hospitals and countries.

1.2 Purpose

Lean healthcare is a rather new concept that comes from Lean production which the Japanese car industry has used for a long time. Lean healthcare is a concept in time and the number of studies relating to the subject has increased drastically during the past ten years. Most reviews on the subject concern the results of the implementation rather than what changes were made. Since Lean healthcare is more a way of thinking than a handbook on
certain ways to do the daily work, it is interesting to see how different hospitals have formed different solutions to problems that are common in most hospitals.

The aim of this thesis is therefore to discern what organisational changes have been made in hospitals where they have implemented Lean healthcare. Whether there are similarities regarding how they have changed the organisation of the departments or hospital or in the way they have rearranged the daily work. Answers to these questions will enable hospitals to learn from others mistakes and also to get a push in the right direction at an early stage of the implementation of Lean healthcare.

This thesis is based on a systematic review approach and not on observations or interviews made by the author.
2. Lean healthcare

This chapter will explain what Lean healthcare is and its origin. It starts with Lean production that later became the wider Lean thinking and then narrowing it down again to Lean healthcare.

2.1 A brief history

Lean thinking originated in the 1950s when a Japanese engineer from Toyota Motor Company visited the Ford factories in Detroit to find out what they did differently. Toyota had trouble getting cars finished and was in a crisis. After the visit they found that Fords way of doing things would not work in Japan but they invented their own technique/philosophy, Lean thinking (or Lean production as it was called while it was only used in manufacturing). (Pascal, 2007)

Lean production was kept within the car manufacturing industry, starting with car engine manufacturing in the 1950s, developed into the vehicle assembly in the 1960s and in the 1970s it was spread over the entire supply chain. It took another 10 years before it reached the English speaking parts of the world and became the wider term Lean thinking. Everything before the 1980s was written in Japanese and it took another ten years before other manufacturing industries saw the point of using Lean thinking and not until the beginning of 2000 the service sectors (among others, the healthcare) became interested in Lean thinking (Hines, Holweg, & Rich, 2004).

2.2 What is Lean thinking?

“Lean thinking is not a manufacturing tactic, nor a cost-reduction program, but rather a management strategy that is based on improving processes in a system.” (Nelson-Peterson & Leppa, 2007)

Although Lean thinking started as a manufacturing tactic it soon became clear that it could be used for more than that, and in understanding this it also became easier to apply Lean thinking to other areas. It took a while for the ideas to reach the western countries, because initially all documentation was in Japanese. The main reason however, that Lean thinking spread and especially into new areas of interest was that Womack and Jones in 1996 scaled Lean thinking into five main principles that described the intentions and the way to work with Lean thinking on a more abstract level that was no longer specified to the manufacturing industry. These five principles are: specifying value, identifying the value stream, flow, pull and pursue perfection.

- **Specify value** means that you need to know who your ultimate customer is and what value means to them. For example in an ice cream shop, value for the customer means getting an ice cream and not waiting in line. It is also worth noting that when you try to define value it should be in terms of the whole product and not just specific parts of it. If you take healthcare as an example, depending on how you look at it you have different “customers” and they value different things. But if you look at the whole hospital, the only real customer is the patient and the only real value is “to get better”. This is one of the reasons for disputes in the literature because it is
It is not always that easy to define the customer if you look at existing systems for example the finance manager, administration and so on have different things they value though this does not actually impact the patient getting better. (Radnor, Holweg, & Waring, 2012).

- **Identifying the value stream**, a value stream is all the actions that are needed for the customer to get a product, this could include things being done twice (then they also should be documented twice), waiting time, detours etcetera not just the actions that immediately help create the product. The easiest way to identify the value stream is by making a map of all the steps and writing them down in the order that they happen. Each action should then be parted into one of three categories, those that add value, those who does not add value but are necessary for the process (at the moment) and those that do not add any value and can thereby be eliminated. The first step in implementing Lean thinking is to remove steps that do not add any value and are not necessary. Later on, the goal is to eliminate those actions that do not add value but are necessary today. (Womack & Jones, 1996) When applying this to the healthcare sector, with the patient as customer and “to get better” as value, you should create a map containing all the steps that happen from the moment the patient enters the hospital until he or she leaves. Including waiting time, the nurses’ assignments, laboratory tests, referrals, physicians and so on.

- **Flow** is taking the value-creating steps that were identified above and making them flow. This is one of the more difficult steps to accomplish; you should take one product and make it flow through the system in the shortest possible time. This means that all steps have to be available at all times and also that everyone in the system is aware of the status of the production. (Womack & Jones, 1996) For the healthcare this means that waiting areas should be unnecessary and that none of the staff have to do anything that is not strictly connected to treating the patient. This is in a perfect world and it isn’t done overnight.

- **Pull**, that the product should be pulled from you by the customer. This means that you should not produce anything until there is a demand for it from the customer (and then it should be made quickly).

- **Pursue perfection**, Lean thinking is not something you do once and never have to worry about again, it is a never ending process, a change in attitude. Everything can always take less time, space, cost less or you can make fewer mistakes. However implementing Lean thinking should not be something you have to spend money on, it should be something that is integrated into the work, and everyone can contribute to new ways of making it better or suggest new areas that should be scrutinized. (Womack & Jones, 1996)

The main thing in Lean thinking is to eliminate **waste**: Waste is all those actions or steps found that do not immediately add value to the process. There are seven types of wastes that Taiichi Ohno (a Toyota executive) identified; transportation, inventory, motion, waiting (delay), overproduction, over-processing and defects.
2.3 Distributed cognition

Another way of looking at how to make changes in a larger system, or in this case healthcare departments, is to use distributed cognition. Distributed cognition was developed by Edwin Hutchins and combines cognitive science with sociology to change the way we look at cognition. Distributed cognition takes into account that humans are social creatures and what was originally described as cognition (what happened inside the mind of an individual) is hard to distinguish from what happens between individuals and artifacts (tools that in some way help or enhance human work). The line between what happens within the individual and between individuals is difficult to draw, according to distributed cognition and this might not always be something to aim for either (Hollan, Hutchins, & Kirsh, 2000), at least not if it is the whole system you are supposed to look at. Distributed cognition is mostly used when it comes to studying, understanding or explaining a whole system, containing humans and or artifacts that have to operate together.

Hutchins (1995) claims that distributed cognition is especially useful when trying to understand a system in order to make changes. Because when you make changes in the environment it might lead to unexpected problems if you do not understand the entire system and how it all works together. As an example Hutchins uses a cockpit, where you, among other things have an analogue instrument that shows the airspeed with a needle. When the cockpit became digitalized this instrument were changed into an instrument that just showed figures. This caused a lot of problems for the pilots and they had trouble knowing the right speed and had to check both the instrument and a manual more often. What the designers had missed was that the pilots made small marks on the original instrument, for highest speed, lowest manoeuvrable speed and so forth, and they did not originally look at the actual speed but instead whether or not the needle was within the limits. In order to make the right changes you have to understand the whole system because otherwise you might miss something that is important even though it does not seem like it at first.

Another way of looking at whole systems and what changes that should be made is the intelligent use of space (Kirsh, 1995). According to Kirsh when we get better at doing things it often means that we get better at arranging our environment. At the beginning when learning something new we need to think and analyse every step to make sure we are doing the right thing, but after a while it seems to come naturally. In addition, to actually get better at what we are doing we also learn how to rearrange our environment so that it gives us the clues we need to remember the next step. This means that we do not have to analyse every step or even have them all in mind but instead we use the space around us to remind us what should come next.

Closely related to both of these theories are Hollnagels (1999) safety barriers. Barriers are something that acts to prevent or obstruct an accident from happening. There are four different types of barriers; material (physically preventing an action to be made, walls, fences, gates, etcetera), functional (sets up pre-conditions that has to be met before an action can be made, a lock or a password for instance), symbolic (indicates a limitation, but it does not have to be followed, warning signs or other types of signs or signals) and immaterial (regards the knowledge of the user but is not actually present, like rules, restrictions or laws).
3. Material and methods

This chapter will explain what methods were used in this thesis.

3.1 Systematic review

An easy way to comprehend a new subject is to read review articles that have been written on the subject. However, if the review is not carried out in a systematic way and the author uses only articles known to him, it might not give a correct view of the subject (SBU, 2011). To avoid this a systematic review approach taken from the Swedish Council on Health Technology Assessment (better known as SBU) was used. SBU task is to assess different methods that are used within the healthcare system in Sweden. Systematic reviews of existing articles make it easier to compare and assess methods and to find out where the level of evidence in the article is and thus gives the best results. They are focusing their work on the healthcare research and this method has been developed in cooperation of specialists in the field. The reason a systematic review is seen as a way to give a correct view is because it meets certain criteria that makes it reproducible. It should (among other things):

- have a clearly defined problem formulation;
- be possible to reproduce, by reporting the selection criteria and also reporting the strategies for the search;
- include a systematic search through all relevant literature for the problem formulation in question

The first thing you should do is to clearly define your problem formulation. Then state the inclusion and exclusion criteria that apply to the study and finally clearly report the search strategies.

Every abstract of each found article should be read and then decided whether they fit the inclusion criteria or they should be omitted from the study. After that you can hand search the reference lists in the articles already found and use the so called snowball effect, to see if there might be anything that is relevant and then do the same process with them. After this screening you will have the significant articles to read and analyse.

3.2 Problem formulation

- How have hospitals implemented Lean healthcare?
- What organisational changes have been made both regarding the staff’s way of working and the layout of the department or hospital?
- Who took the initiative to implement Lean healthcare and how has that affected the outcome?
3.3 Inclusion criteria

- Studies where they have implemented Lean healthcare on an entire department or hospital.
- Studies that focus on the changes in the organisation, how they have rearranged both the staffs’ work and the departments layout.

3.4 Exclusion criteria

- Studies where hospitals or departments only used a small part of Lean thinking (for instance only rearranged the storage areas)
- Studies that focus on results regarding costs or medical treatment on patients
- Studies that have been made at a department that does not have an obvious care of patients (for instance pharmaceutical or administrative departments)

3.5 The search strategy

The search for articles was made through Linkoping University’s database (LiUBSearch) and also through PubMed and Scopus. The words that was used for the search was “Lean healthcare”, “Lean health care” and “Lean thinking + healthcare”.
4. Result

The search in Linköping University’s database resulted in 20 articles that could be relevant. By using the so-called snowball effect and thereby reviewing all the 20 articles’ references the amount of relevant articles rose to 55. According to the systematic review approach the abstracts should first be read to find out if the articles really were relevant but this did not work, because the abstracts didn’t mention if the organisational changes that had been made were described detailed enough. Most of the articles that were later excluded focused on the result of the change instead of describing the actual change. But after reading all the articles, seven of them were found to have enough information and details to be included. These seven articles were based on implementations from all over the world; one from Sweden (Mazzocato et al., 2012), two from United Kingdom (Papadopoulos & Merali, 2009; Waring & Bishop, 2010), two from USA (Dickson, Singh, Cheung, Wyatt, & Nugent, 2009; Snyder & McDermott, 2009) and two from Australia (Ben-Tovim et al., 2008; King, Ben-Tovim, & Bassham, 2006). The hospital in Australia, Flinders Medical Centre, is the only one that has implemented Lean healthcare in the entire hospital, which has changed the entire flow of the patients from the moment they enter until they leave. In the other articles the implementations have been kept to one department, most often a department that is in desperate need of reorganisation because of either patient overflow or unhappy staff.

4.1 Changes regarding the staff’s work

The most common change regarding the way the healthcare staff did their work was to clearly define and detail who was supposed to do what. This was never before documented and often resulted in things being done twice or not at all, because no one knew if it had been done or should be done. The hospitals starting the implementation of Lean healthcare within the emergency department (Ben-Tovim et al., 2008; Dickson et al., 2009; King et al., 2006; Mazzocato et al., 2012) all found it necessary to arrange the staff into some kind of multi-professional teams. In the emergency care multi-professional teams meant that the patient was seen by the whole team (physicians and nurses) at once and thereby the patient didn’t have to tell their history several times. This shortened the waiting time and also everyone concerned with the patient knew what was supposed to be done and who should do it. Flanders Medical Centre (Ben-Tovim et al., 2008; King et al., 2006) was the most extreme case where they later changed the entire hospital into multi-professional care teams to make the patients flow more effortlessly through the hospital. Another change they made was to divide all patients into two categories at the moment they arrived to the hospital, one for those who were likely to be treated and sent back home within 72 hours and one for those who were likely to be admitted to the hospital. This change made it possible for one group to specialize on the short care patients and the rest of the hospital to concentrate on those who needed more complex care. Yet another change they made was that each specialist team was responsible for finding new cases among the more complex patients already in the emergency care, saving the time it took the emergency care staff to find available beds for patients that should be admitted somewhere at the hospital.

At Astrid Lindgren Children’s Hospital (Mazzocato et al., 2012) they made another change that was to involve the emergency care specialists earlier, this was made possible by creating two new positions called flow managers. Flow managers were an experienced nurse and a specialist. Their job were to have a general view over the emergency
department, to assign new patients to the teams depending on the teams experience and availability and also to function as support for the junior teams. Since the flow managers were always available in the emergency department they had time to review patients with the teams before the patient was seen by the team and hence, could advise them on what to do at an early stage. Before implementing Lean healthcare the junior teams had to track down a specialist on their own which was something that Mazzocato et al. found to be time-consuming.

4.2 Department changes

The most obvious way to implement Lean thinking is by organizing and restructuring the workplace. This can be taken straight from Lean production without tweaking it for the healthcare sector. Five of the studies (Ben-Tovim et al., 2008; King et al., 2006; Papadopoulos & Merali, 2009; Snyder & McDermott, 2009; Waring & Bishop, 2010) reorganized the storage spaces with help from Lean thinking. This meant that things often used together were placed close to one another and also things that when needed had to be found quickly got new placements close to where they would be used (treatment areas for example). The biggest change that implementing Lean thinking in storage spaces created was that things had fixed places, earlier much of the nurses time were spent looking for things, this way everything had their specific place and were easy to find.

Snyder and McDermott (2009) made a change that affected the entire hospital. One of the problems they had at this rural hospital was that the staff in the emergency department had to spend a lot of their time on finding free beds for the patients that should be admitted. This was very time-consuming both for the emergency staff but also for the nurses at each department because they had to run around their own department to see if there were any free beds. Their solution was that at every department there was a board by the nurses’ station where all the departments’ beds were detailed. Here the nurses could mark each bed as soon as it became available for a new patient. This also made it easier for the cleaning staff to know where they had work to do. It hasten the entire process when the staff from the emergency department only had to make one call and the person answering could easily see if they could take on a new patient. When Snyder and McDermott finished their research the hospital was in process to make those boards into a computerized program that would speed up the process even more, because the emergency staff could see where there were free beds from their own computer without having to spend time calling someone.

4.3 Staff involvement

In all studies the idea to implement Lean healthcare has come from the management, from the Head of each hospital, but there is a difference in when the rest of the staff became involved. In Waring & Bishop (2010) the Head of the hospital, the Head of the operating department and other senior physicians decided how they would implement Lean healthcare in their daily work and after that they informed the rest of the staff at morning meetings. The staff (nurses and junior physicians) were never educated on why these changes were necessary and this made them question it. Especially when the implementations only appeared to make their work more complicated and seemed completely unnecessary. When Waring & Bishop returned four months later most of the staff had gone back to the way they used to work. This is a very clear example that if the ideas for implementation and changes
do not come from those who are supposed to work with them, there is a great chance that the changes will not last.

Mazzocato et al. (2012) included the staff from the beginning and all the ideas came from a group consisting of physicians, nurses and nurse’s aide (all working at the department in question) and they also first implemented the changes in a trial period of 3-4 days to find out if this really was a good way to go. On the other hand at Snyder & McDermott’s (2009) hospital, they only included physicians in the initial phase and then had a workshop about Lean healthcare with the rest of the staff just before implementation. This made the rest of the staff suspicious of the changes that were to be made. It took longer and a few more workshops before they had convinced everyone that Lean healthcare was the way to go. The nurses here were especially afraid that the Head of the hospital tried to cut down on the amount of nurses in the permanent staff and because of this the changes were not really implemented until everyone was convinced.

None of the studies showed that the hospitals were making the changes towards Lean healthcare because they wanted to cut down on staff, instead they made them because they wanted to use their staff to their maximum capability and didn’t have resources enough to hire more people or in other ways expand the department/hospital. All the studies except for Waring & Bishop (2010) show that the hospitals had a plan for continuous changes even after the first implementation, this is a very important part of Lean production and thereby an important part of Lean healthcare that it is not just a onetime thing to implement Lean healthcare, because you are not just implementing a new way of working, you are implementing a new way of thinking and this means that it never ends, you’re never finished.
<table>
<thead>
<tr>
<th>Article</th>
<th>Where have Lean healthcare been implemented?</th>
<th>Organisational changes regarding the staff’s way to work</th>
<th>Organisational changes regarding the structure of the department</th>
<th>Who has taken the initiative to implement Lean healthcare?</th>
<th>To what extent has the healthcare staff been involved?</th>
<th>How do they maintain the changes?</th>
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</table>
| Ben-Tovim et al (2008) and King et al (2006) | Flinders Medical Centre (Australia), started as a way to save the Emergency department and continued with a rearrangement of the entire hospital | • Divided the patients into two categories, those who probably would be treated and sent home within 72 hours and those likely to be admitted to the hospital.  
• One group specializes in the short care patients.  
• The rest of the hospital then gets to focus on the long stay patients with more complex problems.  
• Each patient has one specialist team taking care of them at a time and each patient has a home team that’s distributed at every morning meeting.  
• Instead of having the emergency department looking for free beds in the hospital, each specialist team has to find patients in the ED to take care of.  
• Standardizing and dividing the workload between senior and junior staff. | • Structured waiting lists.  
• Standardised and restructured storage spaces, both for medication and other material. | The Head of the hospital | Head of each department is a part of the group leading the Lean healthcare implementation. | They’re focusing on making the changes that’s already been made to standard procedure. |
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| Mazzocato et al (2012) | Emergency department at Astrid Lindgren Children’s Hospital (Sweden) | - Divided into four multi-professional care teams per shift, consisting of a physician (most often a resident) and a nurse or a nurse’s aide.  
- Flow managers, a specialist and an experienced nurse, assigns patients to the different doctor-nurse teams depending on their experience and availability. The flow managers also function as support for the junior teams and discuss each case with them before they see the patient.  
- Created a detailed description of job assignments and the division of labour. | - New workplaces where each team has their workstations connected.  
- Flow managers workstation is positioned in the middle of the treatment area.  
- A computer monitor showing each team’s work pace (how many patients they treat) helping the flow managers when they should assign new patients to the teams.  
- Made changes to the work schedule so that the shifts overlap enabling the incoming teams to see new patients while outgoing teams finish with their remaining patients. | The Head of the hospital | The team in charge of the redesign and all the changes that should be made was composed by personnel from the department (nurses, nurse’s aide and physicians) | Monthly meetings with the entire staff at the emergency department to continuously improve the work. |
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| Dickson et al (2007)               | Emergency department (USA)                   | - Work in teams (each team consists of a nurse, resident and specialist) and they get the patient history together.  
- (Re)Define roles and the division of labour  
- Try to involve other teams or groups (from other departments) as early as possible. | | The Head of the hospital | All the different work groups from the department were represented at the initial workshops. | The ideas for changes were generated by front-line staff (those who were supposed to work with it later) and they continued to develop it. Though larger changes were later concentrated around workshops with different themes. |
| Waring and Bishop (2010)           | Operating department at a UK NHS hospital    | - Detailed description of job assignments and the division of labour.  
- Standardize the work with help from checklists. | - Reorganized storage space | The Head of the hospital | The staff was informed about the changes in their work routines at their morning meetings. | Most of the staff retrieved their old way of working and routines after four months. |
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<tr>
<td>Papadopoulos and Merali (2009)</td>
<td>Operating department at a UK NHS hospital</td>
<td>• Detailed description of job assignments and the division of labour.</td>
<td>• Changed the layout of the department and special areas to get a better flow and get rid of unnecessary movement. • Moved the disinfecting of instruments to a company outside the hospital, that they were already cooperating with.</td>
<td>The Head of the hospital together with the Head of the department</td>
<td>Educated the entire staff in Lean healthcare before implementing it.</td>
<td>Introduced boards where the staff continuously could write down new ideas for changes or areas in need of improvement.</td>
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<tr>
<td>Snyder and McDermott (2009)</td>
<td>Rural hospital</td>
<td>• Detailed description of job assignments and the division of labour. • Changed the order of how information is presented and how it’s prioritized.</td>
<td>• Reorganized the storage spaces. • Introduced a board at the nurses’ station in each department where all free beds were marked, the plan was to later make this into a digitalized system.</td>
<td>The Head of the hospital</td>
<td>Initial workshops were kept for representatives from every working group at the hospital. They were later left to create and be in charge of their own groups (consisting of the rest of the staff) with Lean projects.</td>
<td>A brief education was held for the entire staff and they then worked continuously with new Lean projects. To make it easier to suggest new project or areas in need of improvement they made a form to fill in whenever you discovered a need for change.</td>
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5. Discussion

This chapter contains first a discussion regarding the results and following that is a short discussion regarding the method that has been used.

5.1 Results

The most common argument against implementing Lean thinking to public sectors is that there are too many customers involved (Radnor et al., 2012) and this makes it hard to define Value. The result of this thesis shows that it is possible to implement Lean thinking to the healthcare with good results and Womack and Jones explains value in their book “Lean Thinking: Banish Waste and Create Wealth in Your Corporation” as follows:

“Value can be defined only by the ultimate customer. Value is distorted by pre-existing organizations, especially engineers and experts. They add complexity of no interest to the customer.” (Womack & Jones, 1996)

This might be the problem with the public sectors as well, that there are a lot of things today that are needed and this makes it more and more complicated. It also makes it hard to see who the real customer is and make everyone agree on the ultimate customer.

"Attitude changes take the longest to conform. One way to start changing how people think is to change how they do their job." (Snyder & McDermott, 2009)

The change that was most common in the articles in this thesis was to modify the work-structure into multi-disciplinary teams and to clearly define who was supposed to do what. These changes were made to make use of all the knowledge already within the healthcare that was not used before. Making the administrative work easier also creates time left for other things and, when things are not done twice this frees time and, a cooperative work between everyone involved with the patients saves both time and energy (and indirectly money). Maybe this is something not only for the emergency care or other departments that are in crisis, but for the whole healthcare sector? All the articles that were found in this study on implementing Lean healthcare involved departments that had to make changes because they had problems keeping up with the work as it was. Should it really be necessary to have a crisis before the changes are made?

Judging by the result of this thesis there are a few things that are important to think about if you want to succeed with the implementation of Lean healthcare. The first one is to involve all the staff at an early stage. Those who had representatives from all the different categories of the staff involved from the beginning also had the best result and they managed to maintain the positive changes and continued to work on it. Those who did not include the staff at the start had problems with the implementation, either created by the staff working against them or that the staff simply did not understand what was expected from them. Since Lean healthcare is not something you only do once it is very important that you include everyone to give them a chance to comprehend Lean thinking at its full potential.

Another thing that the results showed is that Lean healthcare could easily be interpreted as a way for the Head of the hospital to cut down on the amount of staff and this is something that should be taken into account when presenting the idea of implementing Lean
healthcare. Because Lean healthcare is not originally a way to manage with less staff but rather a way to make use of the full potential of the workforce and this is something that should be made clear from start.

Furthermore it is important to clarify what Lean thinking mean by standardizing the work. This is something that most healthcare staff are against and do not think fits into the healthcare environment. A way of dealing with this could be to define what you mean by standardizing. Regarding healthcare standardizing does not necessarily mean that you should treat every patient the same way and work from a checklist when meeting them but rather make the administrative work easier and less time-consuming, such as having fixed places for everything in the storage area or making some referral-document (that frequently occurs and where the intention is the same) pre-written and following a certain form that makes it easy to fill in and to understand for the recipient.

Implementing Lean healthcare on already existing parts of a hospital has been done as a way of dealing with the immediate problem and it works and gives good results though one cannot help wondering whether it is the right way to go. If you look at the Flinders medical centre (Ben-Tovim et al., 2008; King et al., 2006) where they changed the entire hospital’s way of working, which is a more thorough implementation of Lean thinking, they addressed the whole problem instead of just fixing parts of the problem as they arose. Could this be one of the problems concerning how the healthcare sector works today? When problems arise they have to be solved by either a quick solution or some kind of workaround that lives on and that this has changed the healthcare from its original thought and now it might be hard to go back? Despite how we try to improve it, it still only solves the problem momentarily and maybe the only way to actually get a good result is by making a drastic change?

5.2 Similarities between Lean healthcare and distributed cognition

The similarities between Lean healthcare and distributed cognition are striking, although they have developed from completely different environments: Lean from the car industry and distributed cognition from the fields of behavioral science. They both have however, the same perspective on development and the importance of looking at the whole picture when making a change. The changes that were made at the hospitals in this thesis could just as well have been made with the help of theories of distributed cognition and the intelligent use of space.

Creating a map over the value stream and thereby documenting every step that is made at the moment and then creating the changes is something that Hutchins (1995) could have suggested, it looks a lot like the way he works with distributed cognition in the wild. The changes that were made in altering the work areas (and storage areas) could have come from working with the theories in the intelligent use of space (Kirsh, 1995).

Combining these three different areas could help enhance them. The research that has already been made in distributed cognition could very well contribute to making Lean healthcare (and Lean thinking overall) easier to work with by help generating new ideas and theories behind the changes that should be made.
5.3 Further research

It would be interesting to connect Lean healthcare with the theories of distributed cognition, the intelligent use of space and safety barriers, to see if this might enhance the work even more. To make use of already existing research and thereby making even better changes. It would also be interesting to rearrange a whole hospital after these theories and see if it really works.

Although this thesis does not have any focus on patient safety there are a lot of articles about Lean healthcare that have looked at this subject too and combining that with Hollnagels (1999) safety barriers might make it even better? Because both theories are already working in the same directions and combining them might enhance the results even more?

5.4 Method

If you’re following SBU (The Swedish Council on Health Technology Assessment) there are a few more steps to this method that should be done. That includes quality assessment and an assessment of the scientific evidence. I decided not to do this because it did not seem relevant to this research, since this thesis concerns the changes that have been made and not what the changes have led to. The changes are only described in an observational way and nothing that can be measured or assessed on quality or scientific evidence.
6. Conclusion

There are not many articles concerning the organisational changes that have been made at hospitals when implementing Lean healthcare. Though the results of this thesis point towards that the most important thing when trying to implement Lean healthcare is to involve everyone at an early stage, the only way to get Lean healthcare to really work is by changing the attitude and making people realise that improvement is a never ending process. The changes that were most common among the hospitals were to clearly define and document who was supposed to do what and to change the working structure to multi-disciplinary teams working together.
7. References


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