Lean in Health Care: A new solution of an old problem? or ”Old Wine in New Bottles?”

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Quality Costs?

”Anneth (??) sitter på en guld gruva – 1 mia för förbättringar av sjukvården”
Ni sitter alla på en guldgruva!

J. M. Juran (1951):
“The gold in the mine”
“The costs which would disappear if no defects where produced”

J. M. Juran (1989):
“Cost of Poor Quality (COPQ) is the sum of all costs that would disappear if there were no quality problems”
## A comparison between 2 Assembly Plants - Japan versus USA (1986)

Source: The Machine that Changed the World (1990)
Princippet der ændrede verden (1991)

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<thead>
<tr>
<th></th>
<th>GM Framingham</th>
<th>Toyota Takaoka</th>
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<tbody>
<tr>
<td>Adjusted Assembly Hours per Car</td>
<td>31</td>
<td>18</td>
</tr>
<tr>
<td>Assembly Defects per 100 cars</td>
<td>130</td>
<td>45</td>
</tr>
<tr>
<td>Assembly Space per Car</td>
<td>8.1</td>
<td>4.8</td>
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<tr>
<td>(square feet per car per year)</td>
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<tr>
<td>Inventories of Parts (average)</td>
<td>2 weeks</td>
<td>2 hours</td>
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**Lean Production?**

- “A production philosophy which breaks with mass production and its waste related overproduction, inventories, buffers, failures, queues, delays.
- “LP uses less of everything compared with mass production -
- half the human efforts in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time, less than half the needed inventory on site,
- results in many fewer defects, and produces a greater and ever growing variety of products.”
A comparison between 3 Assembly Plants - Japan versus USA (1987)

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<td>2 weeks</td>
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<td>2 days</td>
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The aim of LP:
Reduction of Waste (Muda)

**Waste** (spill, slöseri) is:
- Everything that increases cost without adding value.

**For whom?**
- The customers/ the patients!!
Waste measurement problems

The problem with waste is that you will not have an overview of its size because it is never registered or measured as a whole in the hospital’s accounting system.

Some bits and pieces are measured and registered but most of it is invisible.

2 kinds of waste must be eliminated

1. Visible waste
2. Invisible waste
Jens J. Dahlgaard, Quality Technology & Management, Linköping University,

The 7 Types of Waste

Taiichi Ohno (1912-1990), the Toyota Executive who was the most ferocious foe of waste human history has produced, identified seven types of muda.

Some of these waste groups absorb huge amount of time/ money, and it is a necessity for any employee to have a continuous look at opportunities for waste reduction.

Jens J. Dahlgaard, Quality Technology & Management, Linköping University,

Toyota: “7 kinds of waste must be eliminated!”

1. Defects

2. Overproduction & early production

3. Inventory

4. Unnecessary transportation

5. Waiting

6. Unnecessary motions/ actions

7. Over processing
### The 7 Types of Healthcare Waste

1. Mistakes, which require rectification *(failure in diagnosis, medication, treatment, care, communication, patient files etc.)*,
2. Production of service no one really wants,
3. Patients waiting for further “processing”,
4. Design of care services, which don’t meet the needs of the patient,
5. Processing steps, which aren’t actually needed,
6. Movement/transport of patients or employees from one place to another without any purpose,
7. Groups of people in a downstream activity standing around waiting because an upstream activity has not delivered on time.

### The 5 Principles of Lean Production


1. Specify value by specific product or service
2. Identify the value stream for each product
3. Make the value flow without interruptions
4. Let the customer pull value from the producer
5. Pursue perfection

**Comments:**

- Same as the guiding principles of craft production
- These guiding principles were lost during the industrial revolution and mass production
- Toyota was the first car manufacturer to realize that
**Contributions to man hour Productivity Growth**

<table>
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<tr>
<th>Investment in Humanware</th>
<th>Number of improvement suggestions per man/ per year</th>
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<tbody>
<tr>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>3</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>25%</td>
</tr>
<tr>
<td>5</td>
<td></td>
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<td>6</td>
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**The 5 Principles of Lean Production in HC**

1. Specify value by specific patient:
   Specify what has to be done to help the patient by using up-to-date professional knowledge
2. Identify the value stream for each patient:
   Map the process (flow charting) – meaning, who has to do what (create value), and in what sequence
3. Make the value flow without interruptions:
   Plan and execute without process delays
4. Let the patient pull value from the producer:
   Listen to and involve the patient in the process, and deliver the value when the patient requests for care
5. Pursue perfection:
   Use PDSA, Standardization, Value Flow Mapping, Measurements, CI Tools, Team Work.
Erfaringer med Lean på OUH

- 2006: 3 Test avdelninger - Ortopädkirurgi, Hjertemedicin, och Röntgendiagnostik
- 2008: alla avdelningar är nu på gång med Lean!

Se:  http://www.ouh.dk/wm218170

Lean Results at OUH, Denmark (2007)
Ortopädkirurgisk Avd.

- Reduceret gennemløbstid undersøgelse/beh. 3.146 timer
- Flere patienter afviklet 4.592 pat.
- Reduceret ventetid på undersøgelse 54.606 dygn
- Frigivet tid for personale 6.208 timer
- Indtjæning på drift (til OUH) 11.103.000 kr
- Sparede kroner (til avdeling) 2.492.425 kr
- Sparede sengedage 2.280.000 kr
- Timer frigivet til udvikling og uddannelse 975 timer
- Timer brugt til lean-uddannelse (leangruppen) 866 dage
Erfaringer med Lean på OUH


Jens-Otto S. Jeppesen (hospitalsdirektør), Peter Frandsen (chefläge), Alice Stövring (chefsygeplejerske)

OUH: ”Lean – et kulturskift”

Det er medarbejdernes viden om arbejdssprocesserne, der skal frem i lyset. Lean medfører derfor ofte et kulturskift på arbejdspladsen. Man forholder sig til sit arbejde på en anden måde.

Lean viser respekt for den enkelte medarbejders viden og erfaring, men kræver, at begge dele bruges kreativt og aktivt – for eksempel til at på tværs af faggruppernes arbejdsgange….

Filosofien bag lean er, at man alltid kan blive lidt bedre i dag end i går, og at mange små ændringer kan give store resultater.”

Jens J. Dahlgaard, Quality Technology & Management, Linköping University,
Theory and Reflections

**The Theory**

By focusing on the Lean Principles (= improvement of the patient flow) problems will immediately come to the surface, and the causes for the problems and poor healthcare will be easily understood by everybody, and hence easily prevented.

**Reflections**

Do you think that implementing the Lean Methodology:
- Will address all healthcare problems?
- Alternative road maps?

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En enkel process för Ständiga Förbättringar

1. Identifiera kvalitetsproblem/ fel
2. Identifiera orsakerna (använd kvalitetsverktyg och Toyota’s ”5 varför”!)
3. ”Döda” dessa orsaker (”samurajfilosofi”)
4. Fortsätt (1, 2, 3, 1, 2, 3, …….)
Toyota’s ”5 varför” eller flera?

1. Varför vill bilen inte starta?
   A: Batteriet är svagt

2. Varför är batteriet svagt?
   A: Glömde släcka ljuset

3. Varför glömde du släcka ljuset?
   A: Jag hade bråttom att lämna bilen

4. Varför hade du bråttom?
   A: Jag var försenad på min väg till jobbet

5. Varför var du försenad?
   A: Jag sov dåligt

6. Varför sov du dåligt?
   A: Problem med min fru

7. Varför hade du problem med frun?
   A: Continue

The PDSA Cycle for Continuous Improvements

Act

- 7. Standardise (if satisfactory Results)

Plan

- 1. Problem id.
- 2. Cause analysis
- 3. Plan preventive countermeasure

Study

- 6. Analyse/Study/Learn!

Do

- 4. Implementation/Practice
- 5. Measure
Continuous Improvements of a Process - an example

- Hip Fracture - standard treatment 5 days
- **1. Problem id.**: The process manager finds out that the patient is still in his hospital bed after 9 days
- **2. The cause(s) has to be identified/ understood**
- **3. Preventive measures** have to be developed and
- **4. Practised/ implemented ("kill the causes")!**
- **5. Effect measurements**
- **6. Analysis/ Reflection/ Learning**
- **7.** If result is satisfactory: **Standardise** the method!
- **8.** If non-satisfactory: Go to 2.

Two biggest Health Care Problems?

- **Most AE (Adverse Effects) occurring in hospitals are medication errors (ME) and hospital acquired infections (HAI), both are preventable**
- **The World Health Organization estimates that an average of 8.7% of hospital patients had HAI during or after hospital admission**
Hygiene - A Hospital Problem?

Birth physician Ignaz Philipp, Vienna (1850):
- 20% of the women died at the hospitals within a few days after delivery
- Of the women which delivered at home some had complex deliveries and were brought to hospital:
- 25% of these women died
- Mandatory hand wash was commanded
- Result: Death rate decreased to 1-2%

Jette Zimakoff, Ph.D., Institute of Health Care, DK:
- Observation of employees at intensive departments during a longer period
- Result: “The employees washed their hands less than half of the times where they ought to do it”
- Other similar studies in DK and abroad have confirmed her results
- The employees know the hygiene standards, but they do not practice the standards! Why?
Why don't employees practice what they know is a good standard?

**Jette Zimakoff:**
- “If you learned to wash your hands as a child you will continue with this habit. Difficult to change habits, which you have not learned as a child”

Laura Bækhøj, Hygiene Nurse, Aarhus County:
- “Employees do not have enough respect for bacteria. Many people forget how easy bacteria are transmitted, because you cannot see or smell them.
- There is a tendency, when people are busy, that they think nothing will happen if they don’t wash their hands.”

How to motivate people to practice good standards?

**Jette Zimakoff:**
- “All departments should map (flowchart), measure and supervise how people are working with respect to hygiene,
- and **maybe most important:** Employees should continuously be confronted with the results of their own hygiene. In this way the problems will become more visible and the number of infections can be reduced”.

Jens J. Dahlgaard, Quality Technology & Management, Linköping University,
The Effects of Infections (1999)?

1. Every hour year round will 10 patients be infected at Danish Hospitals! Equal to 87,600 Patients! Patients’ sufferings?
2. Increased death rate?
3. Prolonged stay at the hospital

Estimate for Danish Surgery departments only:
- Prolonged stay at hospitals 300,000 “bed days”!
- Equal to increased cost of DKK 700 Mill.
  (one “bed day costs DKK 2,388)
- Equal to a hospital with 822 beds!

This is really “MUDA” (= Waste)!

Effects of Quality Control Methods on Reduction of Infections?

Norway: Quality Assurance Systems at hospitals has been a legal requirement for several years.
Result: 6% of patients get infections (1999)

Denmark: No legal requirement for Quality Assurance Systems
Result: 10% of patients get infections (1999)
Estimated Effect: 40% reduction of infections!
Cause? The Quality Assurance System? Or ???
Effects of an Excellent Health Care (CIP) Culture?
Excellent Health Care?

**Excellent Health Care is:**
- A *corporate culture* characterized by increased patient satisfaction through continuous improvements, in which all employees actively participate.
- **Employees?**
  - Managers, physicians, nurses, laboratory people, office people, technicians etc.

Hospital Excellence?

1. **The European Quality Award definition**
2. **Balanced Excellence in both Enablers and Results**
2. The 4 P definition:
- Excellent People
- Excellent Partnerships
  - (external/internal suppliers, internal customers, patients, society)
- Excellent Processes
- Excellent Products (= Satisfied Patients!)
Total Involvement in Quality (TIQ)
A strategy for building a culture characterized by continuous improvements, creativity, learning through the "4P"

Excellent People?

1. Values:
   - Honest, Open, Respect, Helpful, Trust….

2. Competencies:
   - Diagnosing, treatments, care, co-operation, problem solving capabilities…..

3. Commitment:
   - A Will for Personal Leadership i.e.
   - Strong Personal Vision for Continuous Learning and Improvements
Florence Nightingale (1820-1910)

- Known as the mother of continuous health care quality improvements
- In 1854 she demonstrated (Skutari Military Hospital, Crimea) that a statistical approach by graphical methods could be persuasive in reducing the cost of poor quality care by more than 90 per cent within a short period of time
- Death rate decreased from 42% to 2%!
- Focus: Improvements in hygiene, food, accommodation, patient care.....

Excellent Partnership?

- Partnership with:
  - **External customers** (patients on waiting lists, families, organisations, society, ...)
  - **Internal customers** (patients, subordinates, colleagues, other departments,...)
  - **External Suppliers** (other hospitals, private doctors...)
  - **Internal Suppliers** (leaders, managers, subordinates, colleagues, other departments...)
- **Aim:** To improve health care by increased customer focus in all customer-supplier relations
Excellent Processes

 Responsibilities:
 To plan and assure for each patient a treatment flow across boundaries inside and outside the hospital which assures:
 - Improved patient satisfaction
 - Improved professional quality
 - Better utilization of resources
 - Better documentation, evaluation, learning
 - Continuous Improvements! CI Teams!

 Process Managers: Have to be educated!!

 Who? Nurses, physicians,…

 Excellent Processes?

 People working in different processes understand:
 - Why they work? (Aim: To achieve excellency in health care!)
 - What they must do in order to satisfy internal- and external customers

 They understand that:
 1. Continuous improvements of the way they work are a necessity for the satisfaction of the patients
 2. All processes can be improved!
 3. The biggest potential for improvements are between sub-processes, functions and departments
Excellent Products?

- The output from any process is a product/service!
- Each “product” has one or more users:
  - Patients (external- or internal patients)
  - Other employees or departments
- If products do not satisfy user needs the result will be **dissatisfaction** and/or **waste** i.e. too many resources are needed
- Hence all processes should be assessed once a year in order to identify OFI (Opportunities For Improvements!)

The “4P” Model of Toyota Production System (TPS)

Jens J. Dahlgaard, Quality Technology & Management, Linköping University,
Reflection

*An obvious Road to Excellence is to:*

1. Reduce Resources for process failures, problems and non-value output.
2. Use resources for improving the value of the care giving processes.
3. Everybody’s participation and involvement is needed, as well as:
4. Toyota’s DNA
5. Caring, Dreaming, Expecting and Risking are “must-be qualities” for Attaining Excellence.

Jens J. Dahlgaard, Quality Technology & Management, Linköping University,

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**Toyota’s DNA**

*(Toyota’s Vision and Mission 2001)*

- Respect For People
- Continuous Improvements

Jens J. Dahlgaard, Quality Technology & Management, Linköping University,
Excellence
can be attained if you...

Care more
than others think is wise.

Risk more
than others think is safe.

Dream more
than others think is practical.

Expect more
than others think is possible.