Lean Management In Public Sector

Prof. Dato’ Dr. Mafauzy Mohamed
Assistant Vice-Chancellor / Director of Campus/Director of Hospital Health Campus, Universiti Sains Malaysia
1. Overview of LEAN Management
2. History of LEAN Management in Malaysian Public Sector
3. LEAN Healthcare
4. LEAN Management In Hospital USM
1. Overview of LEAN Management
Government agencies have numerous “processes” that produce “products”—including regulations, guidance memos, reports, grants, workshops, inspections, travel authorizations, employee benefits processes, mail delivery, and so on. All of these processes have work flows waiting for improvement. Therein lays the promise of Lean.
QUALITY EQUATION in Lean Management

• Quality Is NOT an Option
• The only movement is FORWARD and UP
• Stakeholders expectations have gone forward and up
• Patients/Customers/clients know and expect to receive Quality Service
WHAT IS LEAN?

**Lean** refers to a collection of principles and methods that focus on the *identification and elimination* of non-value added activity (waste) in any process.
EIGHT FORMS OF WASTE

Lean Six Sigma: 8 Wastes

Defects
Efforts caused by rework, scrap, and incorrect information.

Overproduction
Production that is more than needed or before it is needed.

Waiting
Wasted time waiting for the next step in a process.

Non-Utilized Talent
Underutilizing people's talents, skills, & knowledge.

Transportation
Unnecessary movements of products & materials.

Inventory
Excess products and materials not being processed.

Motion
Unnecessary movements by people (e.g., walking).

Extra-Processing
More work or higher quality than is required by the customer.
# 8 Waste (MUDA) in Government

<table>
<thead>
<tr>
<th>WASTE</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>Backlog Of Work (Permits, Plan Approvals), Excess Materials/Info, Obsolete Databases/Files/Folders</td>
</tr>
<tr>
<td>Defects</td>
<td>Data Errors, Missing Info, Errors In Documents, Confusing Instructions Or Requirements, Typos</td>
</tr>
<tr>
<td>Overproduction</td>
<td>Unneeded Reports And Copies, Excess E-mail Messages, Doing Work Not Requested</td>
</tr>
<tr>
<td>Complexity</td>
<td>Unnecessary Process Steps, Too Many Signature Levels, Unclear Job Descriptions</td>
</tr>
<tr>
<td>Waiting</td>
<td>Time For Approval Cycles, Waiting For Information Or Decisions, Waiting For People In Meetings</td>
</tr>
<tr>
<td>Excess Motion</td>
<td>Trips To Printer And Copier, Unnecessary Movement To Find Files Or Supplies, Travel To Meetings</td>
</tr>
<tr>
<td>Moving Items</td>
<td>Report Routing, Transport Of Documents, Document Storage</td>
</tr>
<tr>
<td>Environmental Resources</td>
<td>Excess Use Of Paper, Energy, Or Water</td>
</tr>
</tbody>
</table>


Two Fundamental Concepts

✓ Elimination of Waste
✓ Respect for People

Basic Lean Principles

• Add nothing but value
  – Eliminate “muda” – waste

• Do it right the first time

• People doing the work add value
  – Team oriented

• Deliver on demand
  – “Pull” instead of push
Lean Mindset

A Success Mindset Is About

• Taking the **right action** to achieve them.

• Whether your **attitude** is positive or negative, is all up to you
Lean Thinking

- 5 lean principles:
  - Specify value from the customer’s point of view.
  - Identify the value stream, the complete set of activities required to create the output valued by the customer.
  - Make value flow through the value stream by eliminating non-value added activities and streamlining the remaining value added steps.
  - Have the customer pull value through the value stream.
  - Pursue perfection.

#ICSP2016
Lean Mechanics

**Methodology**

- **F** find a process to improve
- **O** organize an improvement effort.
- **C** clarify the current process.
- **U** Understand process variation
- **S** select improvement strategies

**P** Plan the change
**D** Do or implement the change
**C** check the results
**A** act upon the data to reinforce or modify the change
Lean Architecture

- **MUDA** = Waste
- **MURA** = Variation, fluctuation
- **MURI** = Overburden

1. *Design the system with sufficient capacity to fulfill customer requirements without overburdening people, equipment, or methods.*
2. *Strive to reduce variation/fluctuation to a bare minimum.*
3. *Then strive to eliminate sources of waste!* 

- **Quality first, then cost** – *first stop shipping scrap*
LEAN TOOLS

Standardised work
Andon
5S
Performance management
Right first time
Problem Solving
SMED
Poka Yoke

Customer Focus
Eliminate Waste
Simplify Everything
Create Flow

Just In Time
7 wastes
Audits
Takt time
Kanban

Continuous Improvement
Visual management
TPM
Autonomaion
Kaizen

Value stream mapping
Bottleneck analysis
Jidoka
What is Productivity in relation to Lean?

➢ There are two ways to increase productivity

1. the first is to increase service output.

2. The second is to reduce the amount of input required for a given measure of output.

➢ Lean Management is a philosophy to reduce unnecessary input (waste).

PRODUCTIVITY = \frac{SERVICE\ OUTPUT}{SERVICE\ INPUT}

• Productivity can be expressed as the result of how much input is required to achieve a given output (finished services/goods).

PRODUCTIVITY↑ = \frac{SERVICE\ OUTPUT}{SERVICE\ N\ INPUT}

• One way to boost productivity is to increase output. But isn’t this determined by the customer?

PRODUCTIVITY↑ = \frac{SERVICE\ OUTPUT}{SERVICE\ INPUT}

• As we reduce the input required (waste) to build Service, we increase productivity.

#ICSP2016
Lean Transformation

Where Do You Start – Either? Both at once?
Lean – NOT Another “Efficiency” System

A discipline and culture

Focus on the Patients/customer

Eliminating waste by doing only value-added

Challenge EVERYTHING you do, including “legal”
Becoming a Lean Culture

• Lean organizations are learning organizations, a culture, not a technique

• Lean culture needs to be implemented as a “whole system” and “sub systems” of the work flow also include:
  ▫ Motivation and incentive systems
  ▫ Training systems
  ▫ Organization and management levels
  ▫ Improvement processes

• Lean is a culture and all cultures are complex
**Lean Government - Impact Measurement and Benefits**

- **Time**: evaluate the time to produce and deliver a product or service to Customers, the portion of time that is spent processing the product or idle time, whether customers receive products or responses on time, and other time-related considerations.

- **Cost**: measure cost savings and the costs of products or processes, such as the amount of full-time equivalent employees needed for a process.

- **Quality**: examine the quality of products or services, such as customer satisfaction and whether documents are complete and accurate.

- **Output**: track the production or activity of agency processes, such as the number of permits issued.

- **Process complexity**: describe the complexity and nature of a process, such as the number of handoffs and steps in the process.
2. History of LEAN Management in Malaysian Public Sector
Lean Awareness

- Awareness Programme
- Promotional Activities
- EIIP Pilot Projects

Lean Launch & Lean Pilot Project

- CoE Lean (MPC WPT) 22 Sept 2011
- Round Table Discussion (RTD)
- MoU (Local Council & SEDC)
- Lean Curriculum Development
- Train of Trainers (ToT) / Capacity Building
- EIIP Pilot Projects
- Observation Best Practices Study Mission
- 1st Lean Summit (MPC and Lean Applied)

Lean System Government Wide Lean Launch

- Project Engagement
- Lean Champions
- Lean Hands-On Workshop (Lean HoW)
- Best Practices Collaboration
- Launching of Lean Transformation in Government

Lean Enterprise Strategic Planning

- Intergation of Productivity Improvement Methodology
  - TRIZ Center of Excellence
  - RTD TRIZ
  - International Study Mission
- Lean Portal
- Lean Database
- Just Lean Bulletin

Lean Culture Way of Life

- Recognition - Lean Champion & Organisation
- Lean Creanova Awards
- Asean Lean Summit
- Awards
- IETEX / ASQ Convention

Align with National Agenda

- Productivity
- Economic
- Social
- Technology
- Environment
- Legal

Impact Towards (ME)
Maximize Customer Value
Eliminate Waste

Activities 2013 - 2014

- Lean EIIP: 126
- MoU: 13
- MPC Partner Lean: 50
- Study Mission: 13
- Lean Expert: 36
- Curriculum Development: 12
- Capacity Building: 264
- RTD: 10
- MPC partner: 10
- Lean HoW: 16
- Lean Recognition: 33
- Organisation
- Sharing Session: 174
History Of Lean Management In Malaysia

• First Public Institution to adopt Lean Management – Perbadanan Kemajuan Negeri Pahang (Pahang State Development Corporation) in March 2011

• In Public Institutions;
  Sectors involved - Healthcare, Education, Services
    Healthcare – 4 Institutions
    Education – 5 Institutions
    Services – 9 Institutions
3. LEAN Healthcare
WHAT IS LEAN IN HEALTHCARE?

“The endless transformation of waste into value from the patients’ perspective”.
What **Advantages** Does Lean in Health Care?

- We **expect** change: new treatments, drugs, devices
- We have **scientific** literature to guide us
- We accept **standardization in research protocols**
- We (mostly) accept **standardizing treatment** of common conditions:
  - “evidence-based medicine” and practice guidelines
- We accept **standardization** to improve **patient safety**
- We use **root cause analysis** in safety and quality
- We are working on **transparency** to improve safety
- We have **external pressures** for efficiency, safety and quality
  - Pay for performance
  - Public reporting
Lean Healthcare: What The Patients want?

Value!

- No waits treatment & results
- Appropriate information throughout the process
- Bed available when needed
- Private changing facilities
- Clean environment
- Know what’s wrong
- Treated kindly by friendly staff
- Reduced duplication
- Not to be moved from one waiting area to another
- Relatives/carers kept informed appropriately
Eliminating Waste

- Waiting
  for bed assignments
  or
  discharge,
  or
  testing results
Eliminating Waste

- Processing
  - Retesting
  - More paperwork
  - Duplicate procedures
Eliminating Waste

- **Inventory**
  - Linen (laundry)
  - Pharmacy stock
  - Supplies
  - Specimens waiting for analysis
Eliminating Waste

- Defects
  - Medication error
  - Wrong procedure
  - Wrong patient
  - Missing information
3. LEAN Management In Hospital USM
LEAN MANAGEMENT IN HOSPITAL UNIVERSITI SAINS MALAYSIA

• Teaching hospital of Universiti Sains Malaysia
• Established in 1983
• Tertiary referral centre
• 770 beds – multidisciplinary (eg. Internal Medicine, General Surgery, Obstetrics & Gynaecology)
  – sub-specialties (eg. cardiothoracic, neurosurgery)
• Centre of training for medical students, specialists & sub-specialists

www.usm.my
QUALITY SYSTEMS PRACTICED

ISO 9001:2008

QE/5S

Persijilan ICC Organisasi 2011-2016

ISO 17025 - MAKMAL PENYELIDIKAN

GMP – GOOD MANUFACTURING PRACTISE (BANK TISU)

Blue Ocean Strategy (BOS)

MS 1900:2005 (QUALITY MANAGEMENT SYSTEM – REQUIREMENT FROM ISLAMIC PERPECTIVE OLEH SIRIM QAS INTERNATIONAL SDN.BHD.)

MS ISO 13485:2006 (MEDICAL DEVICE QUALITY MANAGEMENT SYSTEM REQUIREMENTS FOR REGULATORY PURPOSES)

MS ISO 15189:2007 (MAKMAL DIAGNOSTIK)
Health Campus has established a Management Committee tasked with implementing Lean management Lean Healthcare here under the guidance and monitoring by the Malaysian Productivity Corporation (MPC) as well as experienced consultants.
PROGRAM WITH MPC

BRIEFING ON THE IMPLEMENTATION OF LEAN
- Briefing on awareness / interest LEAN

WORKSHOP ON VALUE STREAM MAPPING (VSM) PROCESS
- Process / flow / 'leveling' / coordination LEAN

COURSE ON ORGANIZATIONAL TRANSFORMATION THROUGH LEAN
- Understand Method / concept / application / problem / report

LEAN CONSULTING SERVICES
- Advice for registered projects

REVIEW OF LEAN PROJECTS ACHIEVEMENT
- Help report on project achievements
LEAN HEALTHCARE PROJECTS IN 2014

1. Reducing patient waiting time for treatment in Family Medicine Clinic
2. Reducing the time to supply drugs through trolley for ward patients
3. Improvements in the process of supplying Orthoses in Rehabilitation Unit
4. Shortening the time for X-Ray requested by Private Clinics
5. Reducing patient management processes for ESWL procedure in Operating Theatre
Reducing patient waiting time for treatment in Family Medicine Clinic

PRESENT SITUATION

- Patients with appointment should be seen within one hour - still there are 32.5% of patients seen after more than 1 hour
- The average total time to get treatment and medication (lead time) is 1 hour 50 minutes – from the time patient arriving at the porter to leave the pharmacy

PERCENTAGE WAITING TIME FOR ALL PATIENTS IN FAMILY MEDICINE CLINIC IN 2014

- 67.50%
- 23.20%
- 8%
- 1.30%

Present Situation

- 0-1 jam
- 1-2 jam
- 2-3 jam
- > 3 jam
Reducing patient waiting time for treatment in Family Medicine Clinic

**IMPACT OF PROJEK**

<table>
<thead>
<tr>
<th>NO</th>
<th>SUBJECT</th>
<th>CURRENT STATE</th>
<th>FUTURE STATE</th>
<th>% IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PROCESS (STEPS)</td>
<td>21</td>
<td>17</td>
<td>-19</td>
</tr>
<tr>
<td>2</td>
<td>TOTAL LEAD TIME (MINIT)</td>
<td>110</td>
<td>74.2</td>
<td>-33</td>
</tr>
<tr>
<td>3</td>
<td>DISTANCE (m)</td>
<td>282</td>
<td>262</td>
<td>-7</td>
</tr>
<tr>
<td>4</td>
<td>TOTAL MAN POWER</td>
<td>9</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>PROCESS EFFICIENCY(PE)</td>
<td>19%</td>
<td>24.3%</td>
<td>+28</td>
</tr>
<tr>
<td>7</td>
<td>TOTAL NON VALUE ADDED TIME (MINIT)</td>
<td>91</td>
<td>56.6</td>
<td>-37</td>
</tr>
<tr>
<td>8</td>
<td>PENJIMATAN KOS – STAF (RM/PER PESAKIT)</td>
<td>19</td>
<td>17.4</td>
<td>-8.4</td>
</tr>
<tr>
<td>9</td>
<td>PENJIMATAN WANG PESAKIT (PER PESAKIT)</td>
<td>28.49</td>
<td>18.48</td>
<td>+35</td>
</tr>
</tbody>
</table>
Reducing patient waiting time for treatment in Family Medicine Clinic

• KAIZEN 1 - Create separate room for patients with appointments and ‘walk-in’ patients
• KAIZEN 2 - Written guide in the form of powerpoint notice for new medical officer on duty at the clinic to refer
• KAIZEN 3 - Encourage doctors to comply to tact time by creating reminder card in the consultation room
• KAIZEN 4 - Create a printer networking for consultation rooms with no printer
• KAIZEN 5 - Reinforce 5s by creating forms, equipment checklist and reminder flashcard
• KAIZEN 6 – Arrange equipment and create express files within the reach of doctors
• KAIZEN 7 - Arrange the room numbers in sequence and update phone number of the rooms in POLS
• KAIZEN 8 - Separate Counters for ‘Walk-in’ and appointments
• KAIZEN 9 - Reinforce promotion for Appointment System by making posters
• KAIZEN 10 – Establish penalty box for non-compliant appointment patient
• KAIZEN 11 - Propose to the management to identify patient folders from ward / A & E in the Record Unit
• KAIZEN 12 - Propose to the Development Office to improve the floor plan and directions in hospital
Reducing patient management processes for ESWL procedure in Operating Theatre

PRESENT SITUATION

1. Many work process (8 processes)
2. Long time (5 hours)

PROBLEM STATEMENT
1. Admission to the ward of ESWL cases causes increased use of beds in the ward
2. Staff workload increase because of many processes
3. Other cases affected by the use of bed by ESWL cases.

PROJECT TARGET

Reduce work process for ESWL cases

5 Hours

3 hours
30 mins
Reducing patient management processes for ESWL procedure in Operating Theatre

## Implementation

5 KAIZEN: ALL KAIZEN IMPLEMENTED

- **Removing Registration Process at Local Registration Counter**
- **Management of Patient Folders Completed Before End of Procedure**
- **KUB X-Ray Done Without Following Turn by Numbers**
- **X-Ray Rooms nearer to ESWL Room**
- **No Need for Ward Admission**

## Rangkuman Impact ProjeK

<table>
<thead>
<tr>
<th>Perkara</th>
<th>Sebelum</th>
<th>Selepas</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead Time</strong></td>
<td>300min 18s</td>
<td>137min</td>
<td>54.3%</td>
</tr>
<tr>
<td><strong>Waiting Time</strong></td>
<td>166min 56s</td>
<td>47min 43s</td>
<td>72%</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>2518 meter</td>
<td>763 meter</td>
<td>69.7%</td>
</tr>
<tr>
<td><strong>Human Resource</strong></td>
<td>20 orang</td>
<td>12 orang</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>47</td>
<td>27</td>
<td>42.5%</td>
</tr>
<tr>
<td><strong>Patient's Savings</strong></td>
<td>RM 651</td>
<td>RM 594</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Organizational Savings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Wages</td>
<td>RM 29,100</td>
<td>RM 12,804</td>
<td>57%</td>
</tr>
<tr>
<td>(B) Papers</td>
<td>RM 342.72</td>
<td>RM 40.32</td>
<td>88%</td>
</tr>
<tr>
<td>(C) Linen Laundry Cost</td>
<td>RM 3,780</td>
<td>RM 1,260</td>
<td>66.7%</td>
</tr>
<tr>
<td><strong>Non Value Added</strong></td>
<td>24</td>
<td>14</td>
<td>41.6%</td>
</tr>
</tbody>
</table>
# Reducing time to supply drugs through trolley for ward patients

## CURRENT SITUATION

1. Time to supply drugs slow and often do not achieve the KPI set
2. Supply of drugs in unit dosage requires intense time, packaging and labeling of medications can cause errors
3. Staff work overtime and work overload

## PROJECT TARGET

1. Ensure KPI of Unit achieved 80% and above
   a) Medication trolley arrived before 10:30 am completed in 1 hour 45 min
   b) Medication trolley arrived after 10:30 am completed in 3 hours
## Time Reduction

<table>
<thead>
<tr>
<th>MECTRIC</th>
<th>BEFORE KAIZEN</th>
<th>AFTER KAIZEN</th>
<th>% (IMPROVEMENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process time (PT)</td>
<td>6164s (1h 42m 44s)</td>
<td>3835s (1h 3m 55s)</td>
<td>38.35</td>
</tr>
<tr>
<td>Waiting Time (WT)</td>
<td>11181s (3h 6m 21s)</td>
<td>6088s (1h 41m 28s)</td>
<td>35.25</td>
</tr>
<tr>
<td>Lead Time (LT)</td>
<td>17345s (4h 49m 5 s)</td>
<td>9923s (2h 45m 23s)</td>
<td>36.39</td>
</tr>
<tr>
<td>First Time Quality (FTQ)</td>
<td>17.5</td>
<td>25.2</td>
<td>59</td>
</tr>
<tr>
<td>Activity Ratio (PT/LT)*100</td>
<td>35.53%</td>
<td>38.65 %</td>
<td></td>
</tr>
</tbody>
</table>
# Improvements in the process of supplying Orthosis in Rehabilitation Unit

## CURRENT SITUATION

Manufacturing and supplying of orthosis takes a long time to be supplied to the patient.

## PROJECT TARGET

1. Reduce the time of supplying orthosis to customers by 50%.
2. Reduce the waste of raw materials by 50%.
## Impact Measurement

### OLD

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of steps</th>
<th>Time (Min)</th>
<th>Distance (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>6</td>
<td>22m 58s</td>
<td>52.5ft</td>
</tr>
<tr>
<td>Transport</td>
<td>6</td>
<td>7m 30s</td>
<td></td>
</tr>
<tr>
<td>Inspect</td>
<td>3</td>
<td>3m</td>
<td></td>
</tr>
<tr>
<td>Delay</td>
<td>4</td>
<td>23m7s</td>
<td></td>
</tr>
</tbody>
</table>

### NEW

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of steps</th>
<th>Time (Min)</th>
<th>Distance (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>6</td>
<td>9m47s</td>
<td>20ft</td>
</tr>
<tr>
<td>Transport</td>
<td>4</td>
<td>3m25s</td>
<td></td>
</tr>
<tr>
<td>Inspect</td>
<td>1</td>
<td>13s</td>
<td></td>
</tr>
<tr>
<td>Delay</td>
<td>3</td>
<td>5m13s</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>BEFORE</th>
<th>AFTER</th>
<th>DIFF</th>
<th>% SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROCESS TIME</td>
<td>40m</td>
<td>26m</td>
<td>14</td>
<td>35%</td>
</tr>
<tr>
<td>LEAD TIME</td>
<td>202m</td>
<td>99m</td>
<td>103</td>
<td>50.99%</td>
</tr>
<tr>
<td>VA</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>BNVA</td>
<td>17</td>
<td>9</td>
<td>8</td>
<td>47%</td>
</tr>
<tr>
<td>STEPS</td>
<td>20</td>
<td>13</td>
<td>7</td>
<td>35%</td>
</tr>
<tr>
<td>DISTANCE</td>
<td>52.5ft</td>
<td>20ft</td>
<td>32.5</td>
<td>61.9%</td>
</tr>
</tbody>
</table>
# Shortening time for X-Ray requested by Private Clinics

## CURRENT SITUATION

1. Waiting time to obtain a copy of the x-ray is long
2. No systematic work process

## PROJECT TARGET

1. Reducing waiting time to obtain a copy of x-ray.
2. Time reduction of 50%
# Achievements/Impact

<table>
<thead>
<tr>
<th>NO</th>
<th>Detail</th>
<th>Achievement</th>
<th>Percent Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Process</td>
<td>32 min</td>
<td>20 min</td>
</tr>
<tr>
<td>2</td>
<td>Lead time</td>
<td>162 min</td>
<td>55 min</td>
</tr>
<tr>
<td>3</td>
<td>Distance</td>
<td>4065.87 ft</td>
<td>2178.63 ft</td>
</tr>
<tr>
<td>4</td>
<td>Staff</td>
<td>12 people</td>
<td>9 people</td>
</tr>
<tr>
<td>5</td>
<td>PE ratio</td>
<td>16.67 %</td>
<td>43.64 %</td>
</tr>
</tbody>
</table>
PROJECTS IN 2015-2016

• Reducing the Average Waiting Time For Patients To Get Medicines From Outpatient Pharmacy Unit
• Reduce Patient Waiting Time In Yellow Zone In Emergency Department To Admission Into Hospital Wards
• Improving The Process Of Preparing Patient Discharge Summary
• Accelerating The Process Of Inpatient Discharges
• Speeding Up The Process Of Receiving Physiotherapy Treatment in Orthopaedic Wards
• Improving Research Item Procurement Process In School of Dental Sciences
ACKNOWLEDGEMENT

- Malaysian Productivity Council (MPC)
- LEAN Management Committee Of Hospital USM
- All The Staff Of Hospital USM Involved In LEAN Projects
THANK YOU