Lean Six Sigma and Patient Safety

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Lean Six Sigma

<table>
<thead>
<tr>
<th>Lean tools</th>
<th>Six Sigma tools</th>
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<tbody>
<tr>
<td>Developed by</td>
<td>Industrial Engineering</td>
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<tr>
<td>Goal</td>
<td>To improve efficiency and productivity (reduce process cycle times, improving on-time delivery performance) and to reduce cost</td>
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<tr>
<td>Deployed mainly for</td>
<td>Daily continual improvements and performance sustaining activities under the lean kaizen events led by Line Engineers and Supervisors</td>
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<tr>
<td>Methodology</td>
<td>Focus on eliminating non-value added waste in a process</td>
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<tr>
<td>Pioneer</td>
<td>Toyota (1930s)</td>
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<td>Today</td>
<td>An integrated and balanced combination of the speed and variation reduction power of both Lean and Six Sigma to achieve business management process full optimization</td>
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Lean Six Sigma

- Lean eliminates non-value added steps or waste from the process
- Six Sigma improves quality of value add steps by reducing the variability in the process

Lean Six Sigma DMAIC Integration Model

Overall Yield Vs Sigma (±1.5σ shift)

Use in health service

- Six sigma – 2002
- Lean – 2006
- Lean six sigma – recently
  - Strategic and non-clinical - usually
  - Patient safety issue
Opinion of Lean Six Sigma experts

- Estimation: 20% hospitals using it
- Number will grow exponentially
- Same principles to improve throughput can be used to improve safety
- Need to be used organizationwide, not just for patient safety
- Aim at zero defects – need to change the way one deliver healthcare

Examples

- Providence Health and Service, California
- Cedars-Sinai, Los Angeles
- Exempla Lutheran Medical centre – Wheat Ridge, Colo
- Ashe Memorial Hospital, Jefferson, NC

<table>
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<tr>
<th>Safety Area</th>
<th>Providence Health and Service</th>
<th>Cedars-Sinai</th>
<th>Exempla Lutheran Medical Centre</th>
<th>Ashe Memorial Hospital</th>
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<tbody>
<tr>
<td>Process change</td>
<td>Re-scheduling of traffic flow</td>
<td>3 phases: Strategic placement, raise awareness, sustaining success</td>
<td>Focus on when they are expected to wash their hands – clear guideline</td>
<td>Rapid process improvement using lean tools</td>
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<tr>
<td>Results</td>
<td>Medication error rate decreased by 47% within 2 months, continued to reduce</td>
<td>Short term success recorded</td>
<td>Increase compliance to 92%</td>
<td>Hospital acquired infection rate dropped</td>
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<tr>
<td>Philosophy/Success Factors</td>
<td>Management commitment to support recommendation Employee empowerment</td>
<td>Measurement system to show where staff are gain success incrementally</td>
<td>Gemba: Creating value for customers through daily work</td>
<td>Frontline workers make the change and management accepting and supporting it</td>
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Providence Health and Service, California

- Used it for 5 years
- 2007 – used it for patient safety
  - Patient falls
  - Medication errors
  - Pressure ulcers
  - Medication management
  - Patient handoff communication
  - Labeling supplies in operating rooms

Medication error rate in pharmacy department

- Staff – a week with a Black belt – map out current processes
- Another week – collect data and observe the process – identify issues within process
- Frontline staff to identify the problem and suggest solutions – design new process – take ownership of process
- Main contributing factor – staff distracted while filling prescriptions – cluttered work area
- Office and pharmacy supplies
- Inpatient and out-patient functions
- Foot traffic

- Lead process improvement initiatives
- Drive process change
- Get acceptance
- Sustaining gains
- Spread solution hospitalwide and other hospitals
New process

- Schedule
- Specific hours who can walk into pharmacy
- Prescription pick-ups
- Results:
  - Average monthly medication error rate decreased by 47% within 2 months – continued to reduce
  - Executive sponsors to work with process owner – make sure changes are sustained
  - Dashboards – monitor gains
  - Condition change – revisited by Black Belt – redesign process change
- Key success factors
- Management commitment to support recommendation
- Employee empowerment

Cedars-Sinai, Los Angeles

- Gain success incrementally – units – whole hospital
- Project to reduce hospital-acquired infections
- Hospital used lean six sigma for hand hygiene program
- Unsatisfactory compliance level after a few years of project
- Participated in the JC’s Centre for Transforming Healthcare – tackle hand washing failures
- Should look at workflows of staff members coming into contact with patients
- Use of hand sanitizers
- Map workflow process
- If hand sanitizers not readily accessible – were not used
- Even need a few seconds to look for it – would interrupt process – decrease chance to use it

3 phases to raise hand hygiene compliance

- Strategic placement of hand sanitizers to coincide with staff workflow - put them to increase chance of being used by staff members
- Need to understand how staff members move through the unit and work - Different category of staff member move differently – physicians, nurse, supporting
- Take the advice of fire marshal – sanitizers are inflammable
- Also make sure they are filled

Exempla Lutheran Medical centre – Wheat Ridge, Colo

- Sustaining hand washing compliance
- Some difficult
- Trained secret shoppers
  - Short term function
  - Additional resources
- Technology (experimenting)
  - Video camera to watch – privacy problems
  - Sensors and wrist badges – record hand washing activity
- Monitoring and reporting to staff – useful – staff to realize the discrepancy between where they actually are and what they think they are

- Raising awareness
  - Place kiosks of hand sanitizers, facial tissues and face masks at entry points to ward areas
  - Display hand hygiene messages on posters o elevator doors and computer screen savers
  - Orientation of new employees

- Successful with non-clinical area
- Now focus to patient safety
- Hand-washing program - Educating employees about how to do it
- Compliance – 80%
- Old program removed and began it anew
- Standard definition and measurement system – know the baseline
• Understand why there is 10 to 20% non-compliance by Gemba – the actual place – a lean method for creating value for customers through daily work
• Watch the workflow of different employees
• Should focus on when they are expected to wash their hands not how to wash
• Guidelines for different types of employees when to wash hands eg radiographers, food service employees, nurse etc
• Results: increase compliance rate to 92%
• Hospital acquired infection rate dropped
• MRSA rate dropped by 50%
• Next step look at environment – computer keyboards, tables, curtains

Ashe Memorial Hospital, Jefferson, NC
• A small hospital – 25 acute beds, 60 nursing home beds
• A year ago – financial losses – use Lean Transformation
• Focused on 5 areas:
  – Human development
  – Delivery of care
  – Cost and productivity
  – Growth
  – Patient safety and quality

Patient hand-offs
• Problems:
  – Inaccurate information
  – Took long time to conduct
• Inpatients needed imaging exam – inefficiencies and inaccuracies between nursing department and imaging unit
• Rapid process improvement using lean tools – 100% accurate and increase efficiency
• Not top down but bottom up
• Frontline workers make the change and management accepting and supporting it
• Higher level performance

Application to the Case
• Problem usually not as simple as it looks
• Need to understand the actual situations and workflow with the help of frontline staff
• Learn from other industries
• Not accepting the current practice
• Bottom up approach, empowerment
• Support by management

THANK YOU!