Lean

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Disclosures

- No Disclosures
Learning Objectives

• Understand the concept and principles of Lean
• Define Value and Waste
• Review the most common Lean Tools
Toyota Production System

Goal: Highest Quality, Lowest Cost, Shortest Lead Time

Just In Time
Operate with the minimum resource required to consistently deliver:
- Just what is needed
- In just the required amount
- Just where it is needed
- Just when it is needed

High Quality
Muri Mura
Method
Min Input
Max Output
Minimum Lead Time

Jidohka
- Detect abnormalities
- Stop and Respond
- Harmonise humans & machines

Heijunka
Standardised Work
Kaizen
Stability

http://www.1tech.eu/clients/casestudy_toyota3

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Principles of Lean

• Increases value by eliminating waste
  – Improve processes by removing non-value-added activities
• Value always defined by customer
• Lean is a journey towards perfection and not a destination
The Lean Concept


http://www.firstpointusa.com/blog/2012/08/olympic-rowing.html
Value in the Medical Industry

\[
\text{Value} = \frac{\text{Quality (Outcomes + Services + Safety)}}{\text{Cost}}
\]
7 Types of Waste or Non-Value Added Work

① Overproduction or underproduction,
② Wasted inventory,
③ Rework or rejects (i.e., assembly mistakes),
④ Wasted motion (i.e., poor work area ergonomics),
⑤ Waste associated with waiting (i.e., patients waiting to be seen for appointments),
⑥ Waste associated with processing (i.e., outdated policies and procedures),
⑦ Waste from transport or handling (i.e., transporting patients unnecessarily)

Lean Tools

- Waste Walk
- Pull Systems
- Balancing Workload
- Built in Quality
- 5S & Visual Management
- Value Stream Mapping
Waste Walk

Fong de los Santos, L. E., and Herman, M. G. (2012). Radiation oncology information systems and clinical practice compatibility: Workflow evaluation and comprehensive assessment. Practical Radiation Oncology 2 (4)

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Pull Systems

- Just in time, just what is needed, where it is needed, when needed.
- Nothing that isn’t required should be produced or delivered to a process

Balancing Workload

"a chain is no stronger than its weakest link"

What is the throughput of this system?
5S & Visual Management

① Sort -> Distinguish needed from unneeded items (eliminating the latter)
② Simplify -> Keep needed items in the correct place to allow for easy and immediate retrieval
③ Shine -> Keep work area swept and clean
④ Standardize -> Standardized cleanup (e.i. Consistent guidelines, visual indicators)
⑤ Sustain -> Education, communication, and continual improvement. Until it becomes a habit!

George, M et. al. The Lean Six Sigma Pocket Toolbook 2005
5S & Visual Management

- Helps creating and maintaining an organized, safe, and high-performance workplace
- 5S enables anyone to distinguish between normal and abnormal at a glance
Value Stream Mapping (VSM)

• Technique used to analyze and design the flow of materials and information required to bring a product or service to a consumer.

• Mapping all activities, both value creating & non-value creating, necessary to process the patient, product or service from start through completion.
Example - Current State VSM

**Information Flow**

- **Lab**
- **Pharmacy**

**Pull System**

- **Patient Arrival**
- **Process Box**
  - CA Prep
  - LPN Prep
  - Review pt info
  - Treatment
  - Obtain prescription

**PUSH System**

**Queuing / Inventory**

**Patient / Customer Flow**

**Summary Process Data**

- **DATA BOX – Total Process**
  - Total Wait Time (WT): 150 min
  - Total Process Time (PT): 231 min
  - Total Lead Time (LT): 281 min
  - Value Added Percent: 42%
  - First Time Quality: 20%

**Wait Times: Delay between processes**

- **Wait Time**
  - CA Prep: 7 min
  - LPN Prep: 1 min
  - Review pt info: 55 min
  - Treatment: 45 min
  - Obtain prescription: 45 min
  - Post visit follow-up: 10 min

**Process Times: Value & Non-Value Added**

- **Process Time**
  - CA Prep: 10 min
  - LPN Prep: 3 min
  - Review pt info: 20 min
  - Treatment: 30 min
  - Obtain prescription: 40 min
  - Post visit follow-up: 15 min

- **First Time Quality**
  - CA Prep: 95%
  - LPN Prep: 80%
  - Review pt info: 70%
  - Treatment: 70%
  - Obtain prescription: 85%
  - Post visit follow-up: 65%

Mayo Clinic Quality Academy. Silver Quality Essentials.

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Power of VSM

• Visualizes entire “end-to-end” material/patient and information flow
• Captures value and non-value add from end-to-end
• Provides qualitative and quantitative information
• Points to problems, from a system perspective – allows for prioritization
• Customer focused – through the eye of the customer
• Focuses direction - everyone is working from the same plan and the system benefits as a whole
WORD OF CAUTION

• Avoid making a process so Lean and efficient that it becomes unstable and prone to error

• Examples:
Conclusion

• Lean aims to eliminate waste across service lines to improve quality, workflow and value
• It is essential to first identify non-value-added activities
• Use one or multiple lean tools
• Do not go to lean...