

Lean: Quality Improvement Methodology

Lean Thinking

- ✓ Developed in the 1950s by Toyota (Toyota Production System or TPS) based on the work of W. Edwards Deming and commonly referred to as “lean thinking” or just simply “lean”.
- ✓ Aims to:
 - Streamline organizational processes to improve quality and patient safety through **waste reduction** and **increased efficiency**.
 - To provide internal/external customers/clients with “**value**” through minimizing wasted time, effort and cost
 - Identify and modify/eliminate “**non-value add**” activities and actions to reduce “waste” and provide improved organizational capacity and performance

(Institute for Healthcare Improvement, 2005; Lord & Smith, 2014; Powell, Rushmer & Davies, 2009; Spath, 2013).

Lean Thinking

- **Lean production** is an integrated set of activities designed to achieve production using minimal inventories of raw materials, work-in-process, and finished goods.
- “just in time” and are completed and move through the process quickly.
- Lean is also based on the logic that nothing will be produced until it is needed.

Lean thinking

- Lean is driven by the identification of customer needs and aims to improve processes by removing activities that are non-value-added (a.k.a. waste).

Lean Thinking

Redefining “lean”

Definition:

“Becoming ‘lean’ is a process of eliminating waste with the goal of creating value.”

Note: This stands in contrast to definitions of lean that only focus on eliminating waste, which is too often interpreted as cost cutting – independent of its impact on value delivery

Two mindsets

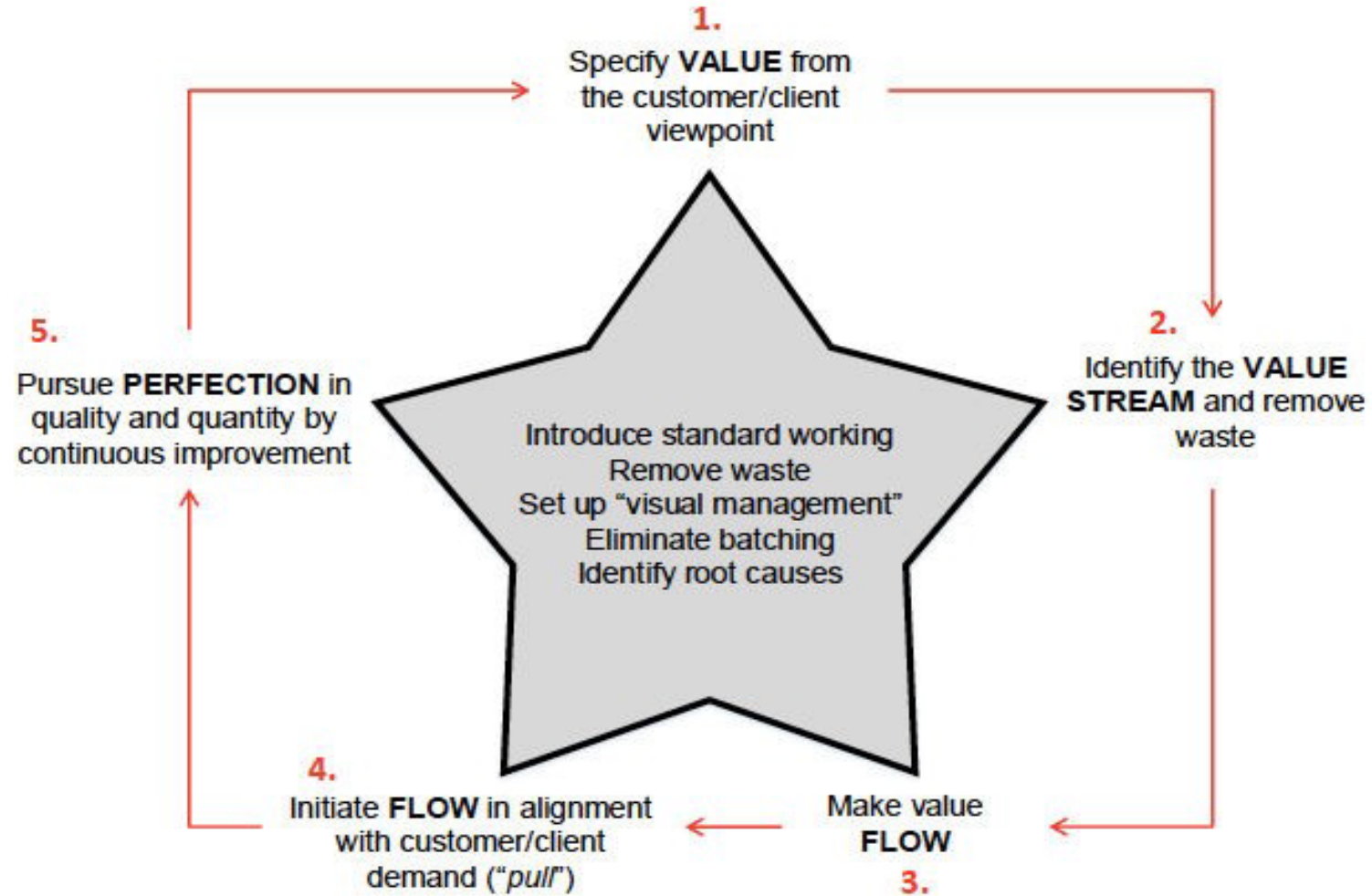
“Mass Production” Mindset

- **Producer “push”**
- **Movement of materials**
- **High volume**
- **Inspection**
- **Expert-driven**
- **Decomposition**
- **Periodic adjustment**

“Lean Enterprise” Mindset

- **Customer “pull”**
- **Flow of value**
- **Flexible response**
- **Prevention**
- **Knowledge-driven**
- **Integration**
- **Continuous improvement**

Principles of Lean



(Adapted from Institute for Healthcare Improvement, 2005; Lord & Smith, 2014)

Before starting a lean project or activity it is vital to establish organizational understanding of what the aim of the project or activity is and what the measures to prove success or failure are.

Examples can include:

- # patients on waiting lists
- Length of stay
- Admissions/readmissions
- Patient experience
- Waiting days
- Staff morale
- Turnaround times
- # incidents/defects
- # complaints
- Cost
- Quality

Answers key measurement questions :

- *How will you achieve an understanding of a current state?*
- *How will you know where to focus your change/improvement efforts?*
- *How will you know if your lean project/activity has made a difference?*

Don't forget to baseline!!

Identify value

- Voice of the customer
- Gemba Walks

Definition Gemba Walks

Go to the source to find the facts to make better decisions, build consensus and achieve goals

- Gemba means “the real place”
- Go “see” first hand, with own eyes what is really happening vs. what you assume is happening
- The “Check and Adjust” part of PDCA



Prepare for the Walk

- Define 'purpose' for walk – why doing it?
- Define a scope for the walk – where headed?
- Coach appropriate behaviors to participants:
 - One conversation at a time
 - Show respect, listen more than you talk
 - Make no on the spot judgments, seek to understand



Go See



- Test your assumptions and learn
- Do people in the organization:
 - Understand purpose of their work?
 - Follow standard work practices?
 - Understand performance expectations and why?
 - Use a scientific thought process for problem resolution?
- Are people inhibited from doing their jobs by organizational support systems?



Go See #2



- Observe the 5Ms (Man, Machine, Methods, Materials, Measurement)
- Observe the 3Ms (Muda, Mura and Muri) - they all deal with capacity utilization
 - Muda (8 Wastes) Inefficient/ineffective use of capacity
 - Mura (uneven) Inefficient flows and capacity utilization...sometimes too little, sometimes too much
 - Muri (overburden) Work exceeds the capacity - *in an office administrative this looks like multi-tasking as people try to do several things at the same time*
- Develop a deeper understanding of value added, vs. waste, vs. non-value added but necessary to do - in the current environment



Ask What, then Why



- Anyone can look around, good observations require skill
- What is the work people are trying to accomplish?
- What are the targets? Why is that important?
- Why is performance less than desired?
- Why is there backtracking, rework....?



Ask the right questions



Coach employees on more critical thinking skills

- What type of a problem were you trying to solve?
- How did you become aware of the problem?
- What did you (the team) change?
- How did this improvement affect business results?
- What is your next improvement?

Reinforce lean concepts

- How do visual management tools help you?
- How do you know when there is a problem?



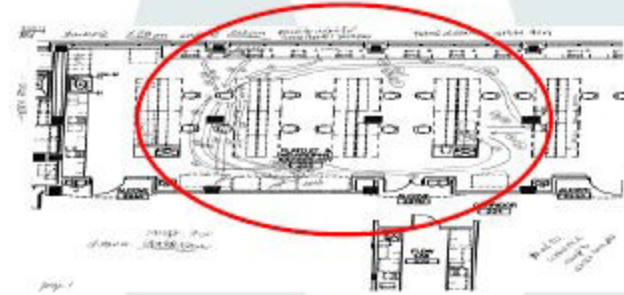
Identify Value Streams

- All of the actions, both value-creating and non value-creating, required to bring a product from concept to launch and from order to delivery.
- These include actions to process information from the customer and actions to transform the product on its way to the customer

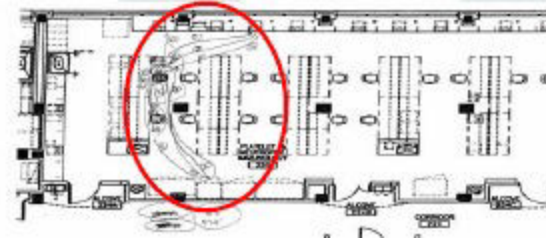


Spaghetti map

- A graphic showing the movements of the patients and caregivers.



Before
Total travel = 1415 ft



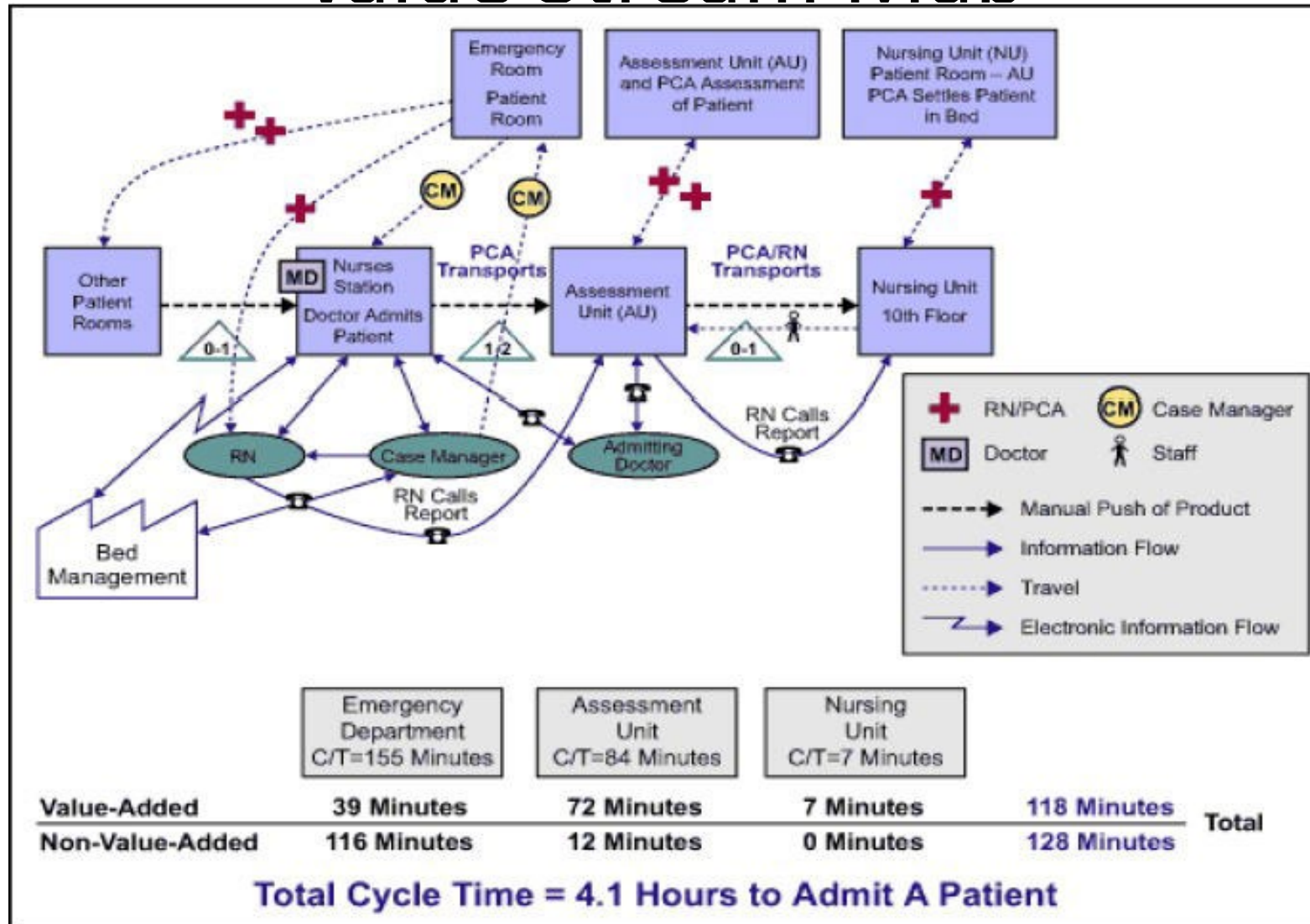
Sources of Waste

- Transportation
- Inventory (Unnecessary)
- Motion (Unnecessary)
- Waiting
- Overproduction
- Over processing
- Defects

Examples of waste in healthcare

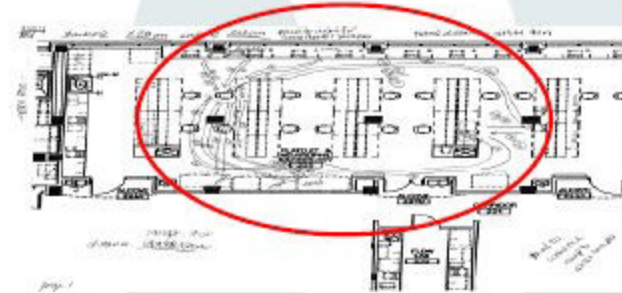
Type	Laboratory Example	Patient Care Example (Oncology)
Defects	Mislabeled patient specimens	Wrong medication delivered to patient
Overproduction	"Just in case" blood tubes drawn from patients, but not used	Patients seen by MD faster than can be treated with chemotherapy, causing delays
Transportation	Moving specimens long distances from receiving to testing	Long walks from MD clinic to chemotherapy
Waiting	Specimens waiting in batches for testing	Patients waiting due to physician lateness or schedule exceeding capacity
Inventory	Expired test reagents	Expired chemotherapy drugs
Motion	Technologist walking due to poor layout	Nurses searching for missing or poorly located supplies
Over Processing	Time/date stamps on labels that are not used	Time spent creating a schedule that is not followed
Human Potential	Employee ideas not listened to	

Value Stream Map

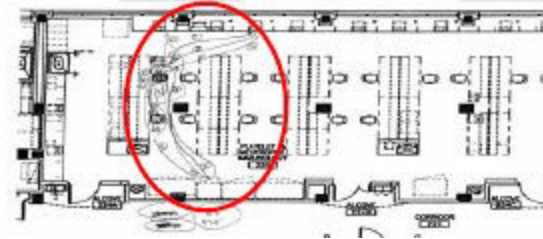


Spaghetti map

- A graphic showing the movements of the patients and caregivers.



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5S + 1

Sort - All unneeded tools, parts and supplies are removed from the area

Set in Order - A place for everything and everything is in its place

Shine - The area is cleaned as the work is performed

Standardize - Cleaning and identification methods are consistently applied

Sustain - 5S is a habit and is continually improved



+ 1 Safety

Work areas are safe and free of hazardous or dangerous conditions

Kaizen

- Kaizen methodology includes making changes and monitoring results, then adjusting.
- Large-scale pre-planning and extensive project scheduling are replaced by smaller experiments, which can be rapidly adapted as new improvements are suggested
- Preparing for a kaizen event
 - Select process (define the business issue)
 - Scope the process to be improved
 - Establish goals
 - Assemble the team

“Kaizen”, a Japanese word for continuous improvement (*literal translation “to become good through change”*) is a method for **accelerating the pace of process improvement** - of restructuring and reorganizing all aspects of an organizational system to ensure that it operates at its optimum efficiency

Characteristics:

- ✓ Teams work for 3-5 days exclusively.
- ✓ Dedicated resources including 100% dedicated/protected staff time.
- ✓ Scope and purpose critically defined and cannot be altered.
- ✓ Basic baseline data collected prior to start.
- ✓ Implementation is immediate and completed within the event timescale.
- ✓ Actions not completed with the timescale, completed within 20 days.
- ✓ Senior management ensures support in place.

A3 problem solving

Define problem or opportunity:

(What is the problem/opportunity for improvement to be solved?)

Project management details:

(Project team member; approvals, dates, etc.)

Current state:

(What is happening now? Use value stream maps, measurements, data graphs, etc.)

Desired future state:

(What does the desired future state look like? A value stream map is recommended.)

Problem/opportunity for improvement objective(s):

(Stated in SMART format - specific, measurable, achievable, relevant/results oriented, time-based/bound.)

Action plan:

(The what, why, whom, when and how, based on the PDCA cycle - plus progress update entries.)

Waste identified:

(Correction (defects), waiting, transportation, over-processing, inventory, motion, overproduction.)

Outputs (results) and measures:

(What was the PDCA cycle? Timeline? Before-after data collection comparison and analysis using diagrams, charts, graphs, etc. - plus return on investment analysis.)

Root Cause Analysis (RCA):

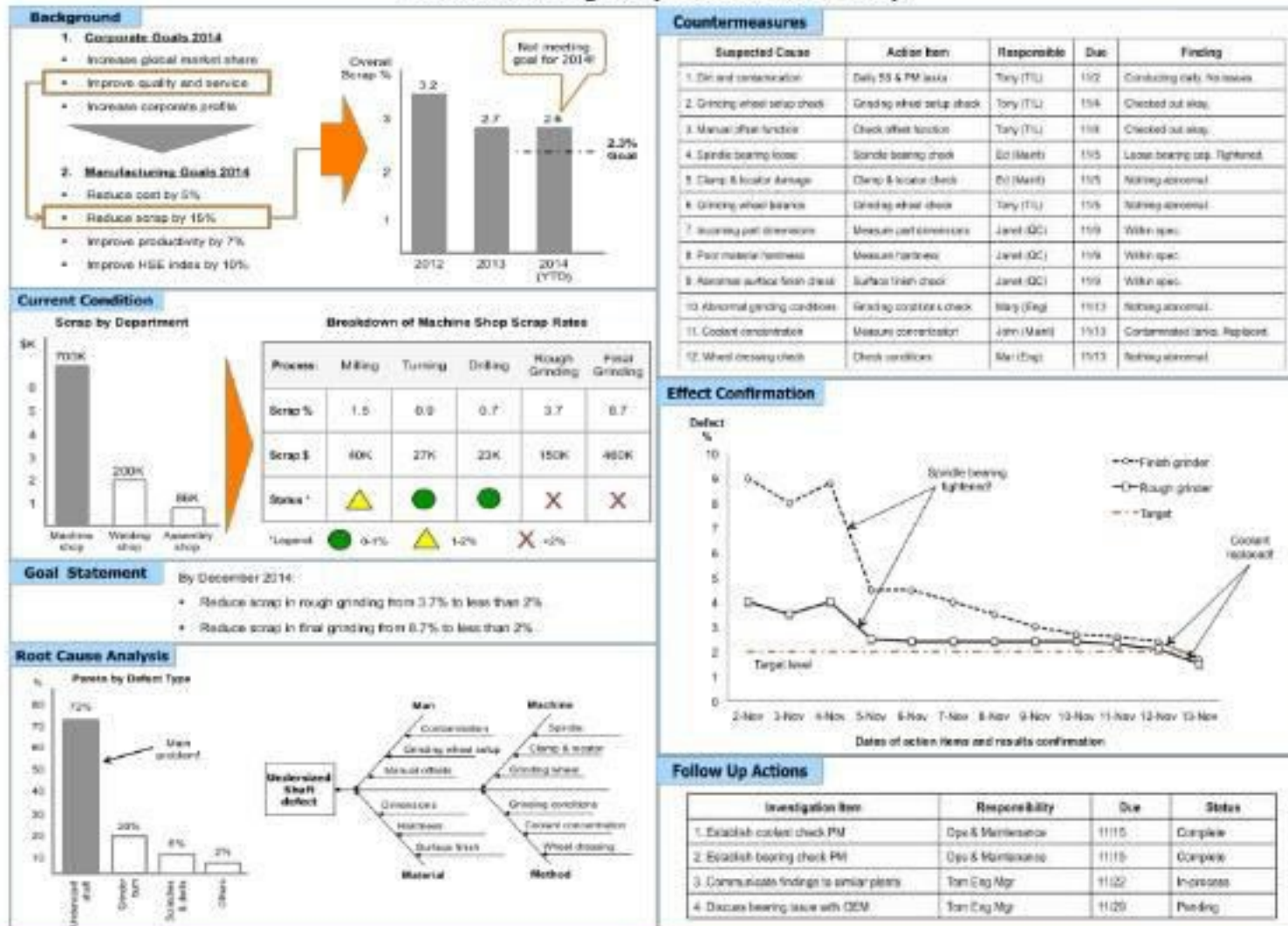
(What is the root cause of the problem/opportunity for improvement? Use "5-whys", fishbone/cause-effect diagram, etc.)

Post-project next steps:

(What are the next steps? Are there any issues still remaining? Is follow-up required?)

Example 1: Problem Solving A3 Report

Theme: Reducing Scrap in the Machine Shop



Lean Sigma

- The term combines two quality improvement approaches: Lean and Six Sigma.
- Lean methodologies focus on eliminating waste and streamlining processes.
- Six Sigma projects involve increasing quality and yield while reducing defects and variation

Quality Improvement Tools

	Qualitative Tools	Quantitative Tools	IA Qu Gu Im
Step 1: Define the improvement goal	Affinity diagram Brainstorming Decision matrix Force field analysis Multi-voting Nominal group technique Survey	Bar graph Check sheet Control chart Histogram Line graph Pareto chart Scatter diagram Survey	
Step 2: Analyze current practices	Brainstorming Cause and effect diagram Five Whys Flowchart Survey Workflow diagram	Bar graph Check sheet Control chart Histogram Line graph Pareto chart Scatter diagram Survey	
Step 3: Design and implement improvements	Affinity diagram Brainstorming Decision matrix Flowchart Force field analysis Nominal group technique Planning matrix Stakeholder analysis Workflow diagram	Bar graph Check sheet Control chart Histogram Line graph Pareto chart Scatter diagram Survey	
Step 4: Measure success	Storyboard Survey	Bar graph Check sheet Control chart Histogram Line graph Pareto chart Scatter diagram Survey	

Resources



Introduction to
understanding
“lean thinking” in
healthcare

Dr. Luke Feeney

Lean Thinking Module 1.1

Joel Cutcher-Gershenfeld

*Senior Research Scientist, MIT Sloan School of Management and
Executive Director, MIT Engineering Systems Learning Center*

Presentation for:

ESD.60 – Lean/Six Sigma Systems
MIT Leaders for Manufacturing Program (LFM)
Summer 2004