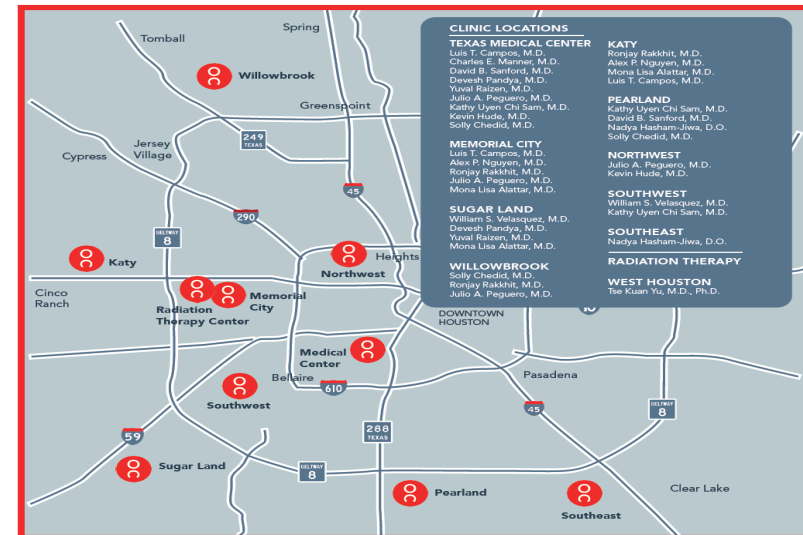


Lean Management Utilizing Six Sigma: Overview & Real-World Applications in Community Oncology

By Alti Rahman, MHA, MBA, CSSBB

Practice Overview

- **Location:** Houston, Texas
- **Services:** Medical Oncology, Radiation Oncology, Radiology, Retail Pharmacy, Lab, Clinical Research
- **Providers:** 14 MOs, 2 ROs, 4 NPs
- **Sites**
 - 9 Med Onc, 2 Rad Onc, 2.5 Imaging Centers, 3 Retail Pharmacy locations
- 280 FTE



Presentation Overview

1. Why do we need this
2. The Origin Story
3. It all Starts with Culture
4. The Trifecta
5. Practical Applications
6. *Readiness Assessment*

Why do we need this ?
(This is the way we have always done it)

Do the statements sounds familiar...what next?

- Statements

1. There is too much work to do...I don't have enough time
2. My patient complained about this issue..we need to get a team together...
3. We have grown a lot ...we need more (people tools, technology)...we are making mistakes now
4. This happens ALLLL the time...Does not happen at all
5. This is the way we have always done it....it works, don't need to change

- Actions taken

1. Hire additional FTE? Re-Assign tasks ?
Give Overtime (how much) ?
2. Who should be on the team? Prioritize this over another issue?
3. Hire someone new? Buy new technology?
4. What does that mean ? All the time means what? Daily, monthly, weekly.....yearly ?
5. Are you sure ? What is the poof ?

2 Important Factors: Value and Impact

1. If you don't value it, you won't change it

- Organizational structure or a team focused on the issue
- Alignment between management and executive board
- Resources invested (Technology, People)

2. If you cannot measure it, you cannot change it

- What are you measuring
- Understand magnitude of problem
- Keep the problem in context to organizational goals

The Origin Story

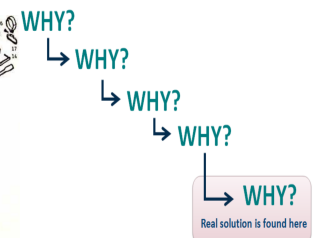
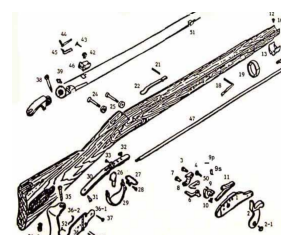
(A long time ago...in a Galaxy far far away)

Names to know

- Frederick Taylor: “Father of Scientific Management”, standardization of work, time and motion studies
- Eli Whitney: Interchangeable parts
- Henry Ford: Continuous flow of production
- Sakichi Toyoda: Toyota Production Systems, aim of eliminating waste
- Taiichi Ohno: “Just-in-Time” system
- Amongst so many others...



Scientific Management



What is Lean Six Sigma?

Lean

(Basis on Qualitative Factors)

- Guiding principles based operating system
- Relentless elimination of all waste
- Creation of process flow and demand pull
- Resource optimization
- Simple and visual

Six Sigma

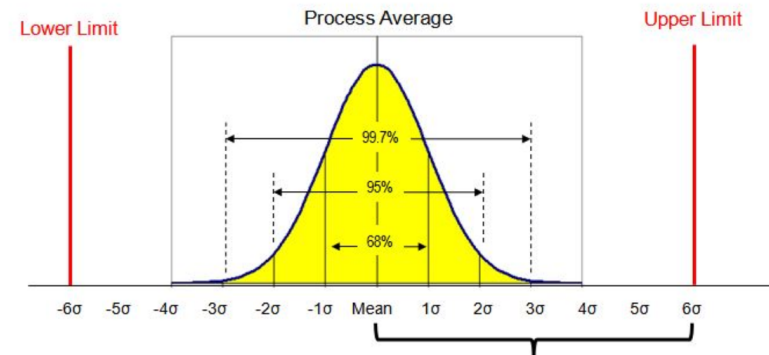
(Basis on Quantitative factors)

- Focus on voice of the customer
- Data and fact based decision making
- Variation reduction to near perfection levels
- Analytical and statistical rigor
- 3.4 defects per million opportunities

Lean Six Sigma combines the strengths of each system into one

Common Terms

- Lean Six Sigma: Continuous Improvement="Kaizen"
 - origins can be found in Japanese manufacturing
- Six Sigma (6σ): data driven, statistical approach to eliminating defects in a process; 3.4 defects per million opportunities
- Bell Telephone systems in the United States one of the first to document methodology and results (Walter Shewart)
 - Performance, Quality, and Cost were measured as part of the management retention policies



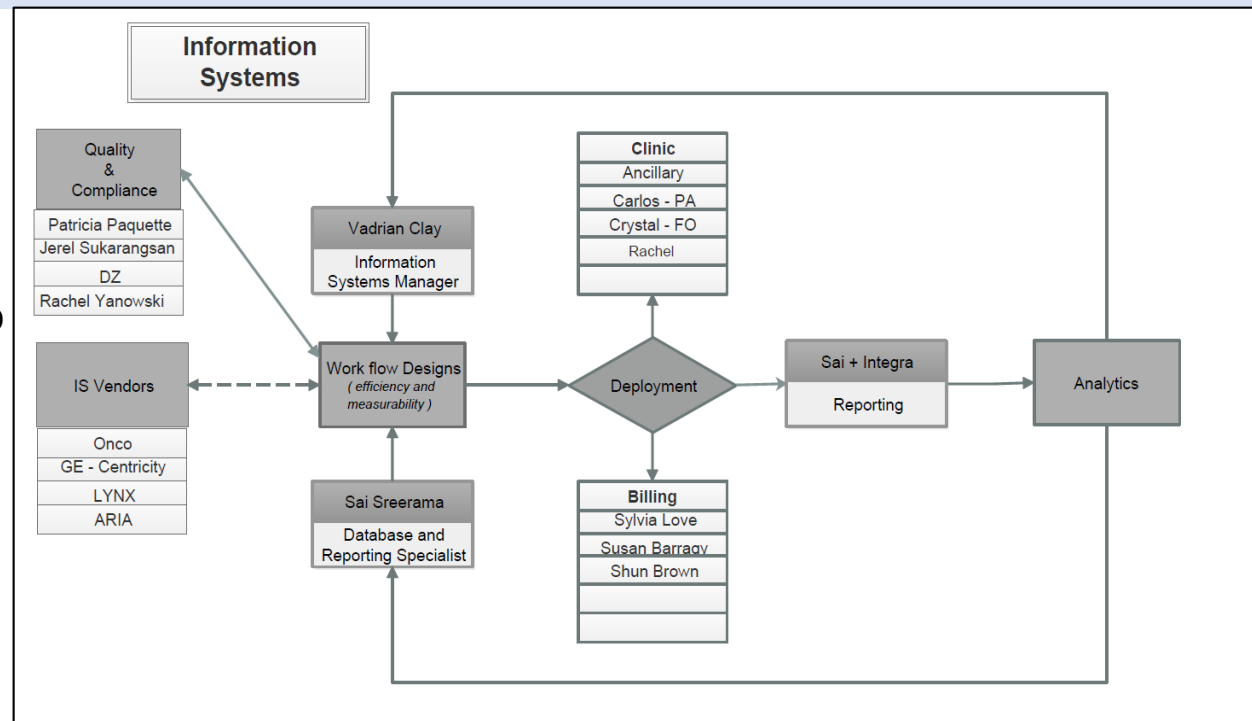
It all Starts with Culture
(DO Not Pass Go, DO Not Collect \$200)

Culture Transformation

Culture Factors	Traditional	Lean Six Sigma
Organizational Structure and Workflows	<i>Department specific, Task specific, Silos</i>	<i>Focus on total process flow and patient</i>
Who defines improvement priorities	<i>Executive Management, Senior Management, etc....</i>	<i>Traditional plus front line team leaders and team members</i>
Leadership	<i>Project Managers, Department Heads</i>	<i>Project Champions, Improvement Specialists</i>
Who develops and Implements solutions	<i>Managers and specialists</i>	<i>Traditional plus team leaders and members</i>

Design Organizational Structure around Lean Management

- Supported by Physician Champions
- Cross functional team consisting of both clinical and business leadership
- Continuous feedback loop to understand performance



The Methodology, The Problem, The Team (The Trifecta!!)

Methodology Overview (DMAIC)

- **Define**.... Define the problem, project goals and customer/patient (internal and external) deliverables.
- **Measure**...the process to determine current performance; quantify the problem
- **Analyze**...and determine the root cause(s) of the defects.
- **Improve**...the process by identifying and eliminating defects.
- **Control**...ongoing process performance.

Type of Problems/Wastes

THE 8 WASTES

The 8 Wastes are eight types of process obstacles that get in the way of providing value to customers.



Defects

Efforts caused by reworks, scraps, 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.

Voice of the Patient

- Process used to obtain feedback/requirements from the customer to provide them with the best service quality possible.

- Proactive

- Captured through:

- *Interviews*
- *Surveys*
- *Focus groups*
- *Observations*
- *Complain Logs*



Team Roles and Performance

Champion

- Set the direction, vision, tone of the project, make key decisions

Facilitator

- Serves as mediators for team members to find common ground

Team Leader

- Responsible for keeping the forward momentum

Process Owners

- Directly Responsible for process in review

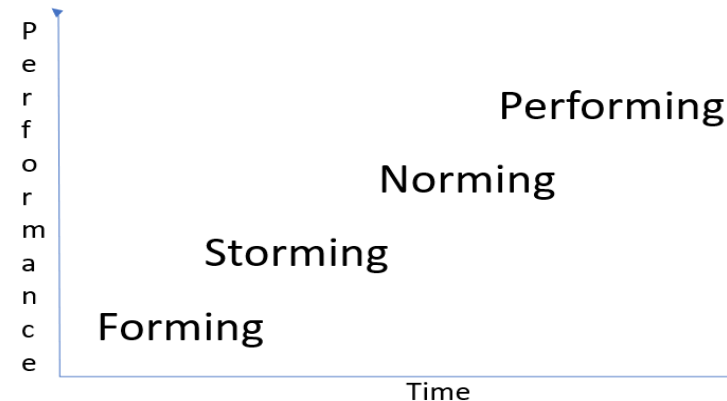
Subject Matter Experts (Internal and External)

- Related to the tools (hardware, software, mechanical etc....)

The recorder/scribe (minute taker)

- Record discussions, action items and provide recap when necessary.

- Most teams go through four development stages before they are able to be considered effective
- As members are added and/or removed from a team, they may go through these stages again, as follows:



Practical Applications and Tools (Show me the Money!!)

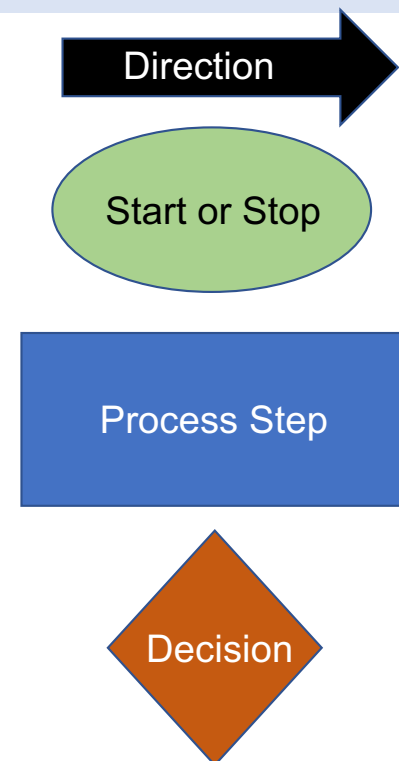
Lean Six Sigma (LSS) Tools, Methodology, Practical Applications

LSS Tools	Application
Process Mapping	Visualize Oncology Medical Home Processes
Value Stream Mapping	New Patient Registration Throughput
Takt Time	Nurse Acuity Based Staffing
5S and 5 Why's	Clinic Appearance and Standardization, Root Cause Assessment
Andon Cord	Staff Empowerment/Ownership of Process
Activity Based Costing	Cost of a PET/CT

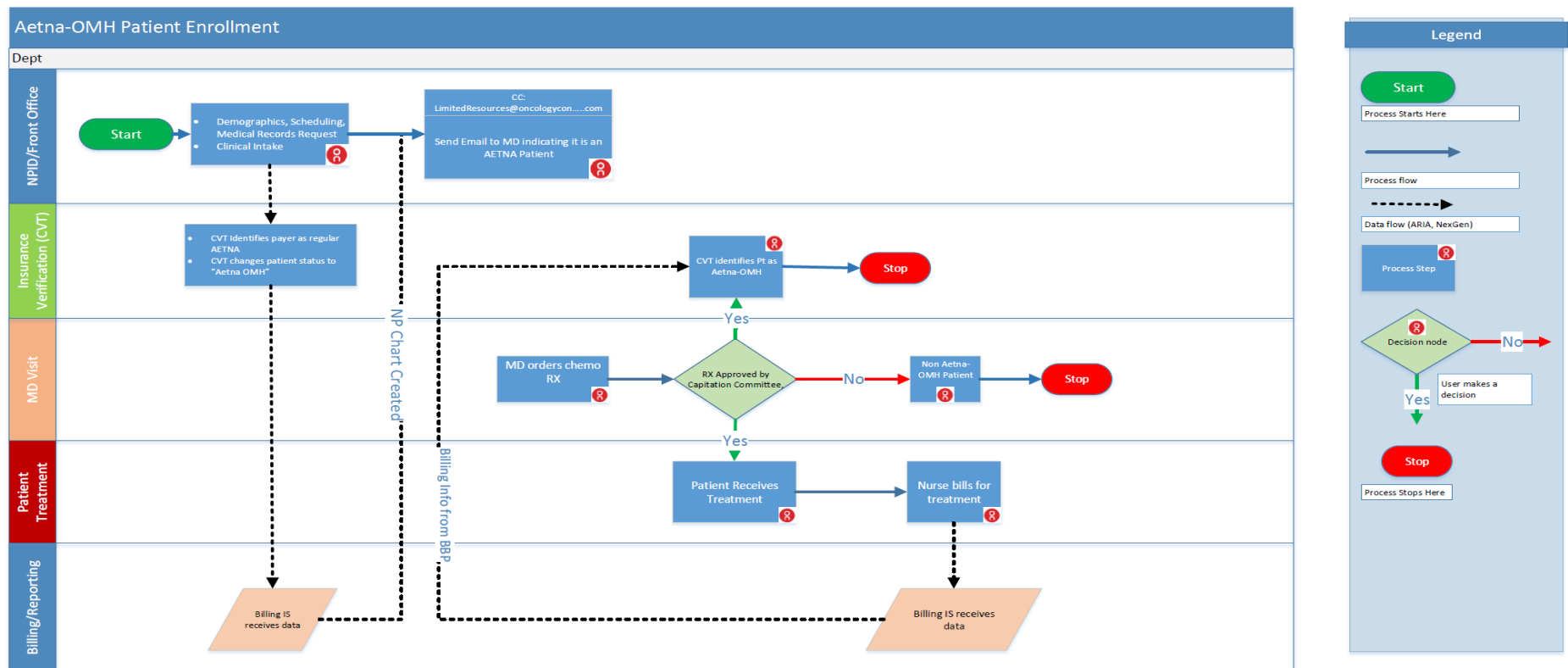
Process Mapping

Process Maps

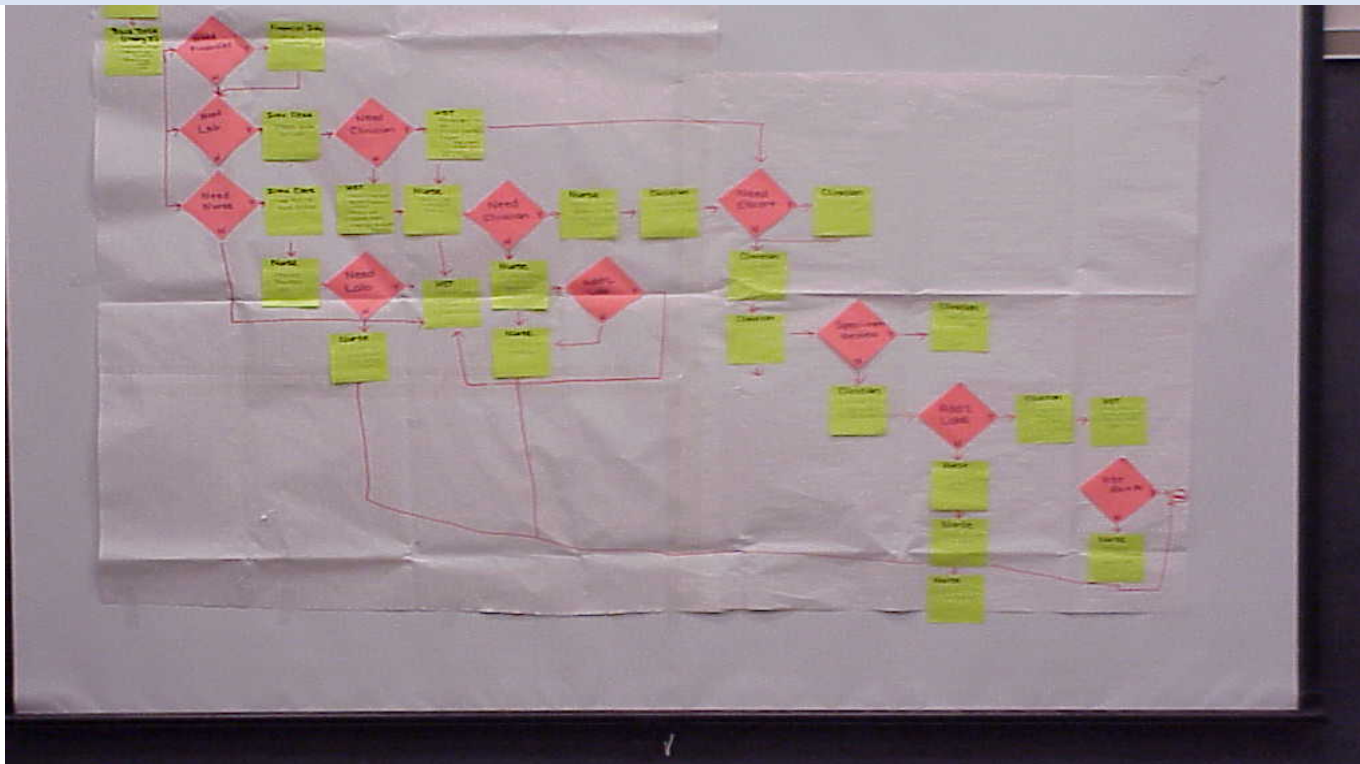
- Process maps are mostly used in various fields of engineering, manufacturing, aerospace, automotive and computer science.
- Four main types of symbol utilized
- Provides a total view of the process
- Graphically depicts the process flow facilitating interpretation and discussion
- Easy to create new process steps
- Identify opportunities for process improvements... error prevention feedback loops
- Provides a view of process dependencies (upstream or downstream of process)



Process Maps – Patient Medical Home Identification



Process Maps, Does not always need to be “High Tech” approach



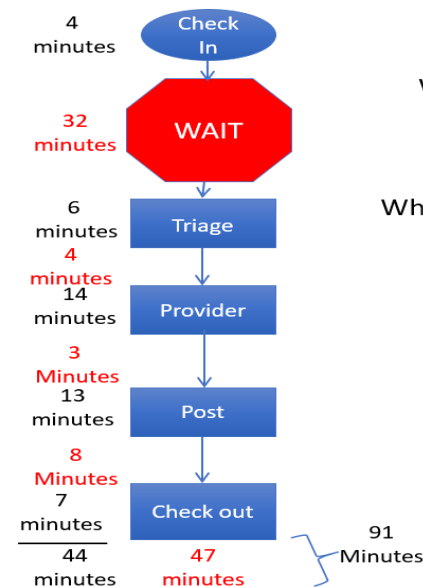
Value Stream Mapping (VSM)

VSM Methodology

Value Add vs Non Value Add Steps

1. Value Added
 - Delivers value to the patient (directly or indirectly)
2. Non Value Added (Business Essential)
 - Does not deliver value but needed for core business function
 - Could be eliminated/replaced/automated
3. Non Value added (Non-Business Essential)
 - Eliminate

Visualize in a flow chart



What is value added?

What is business value added?

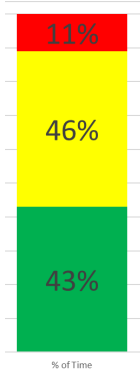
What is non-value added?

What is the process cycle efficiency?
(48.3%)

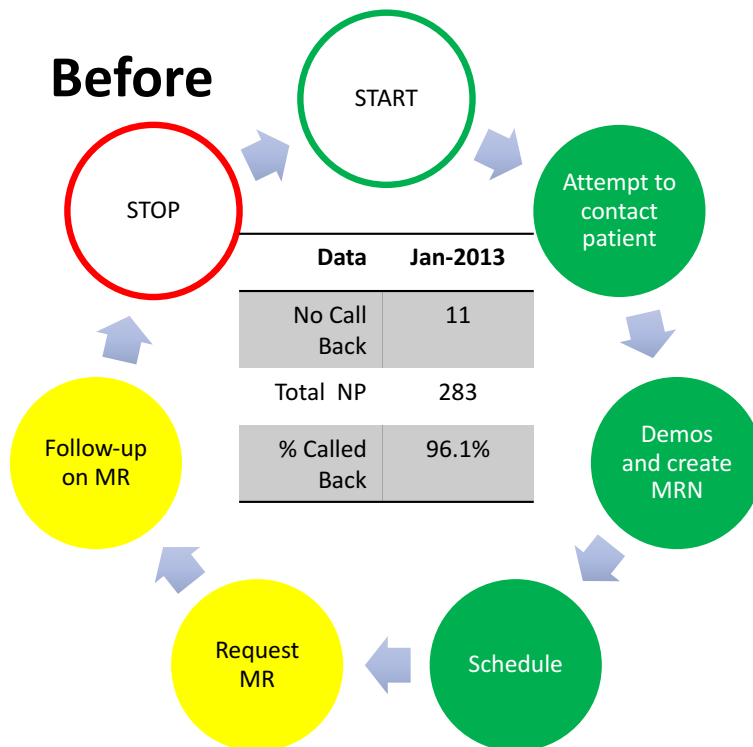
New patient Registration, Value Stream Mapping

(New Patient surveys indicate complaints of multiple calls to schedule the first appointment)

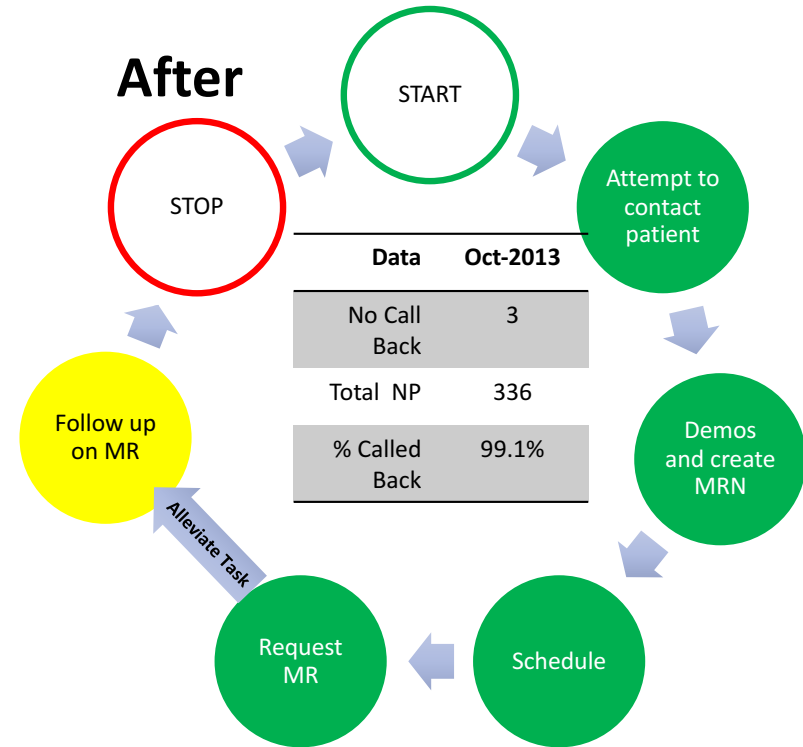
Value Analysis



Before



After



Takt Time

Takt Time

- Time available
- Services performed
- TAKT Time: Time to complete service or step/volume demand

Includes:
Prep
In Room
Documentation

Eight hour day	480
25 patients to be seen	
Minutes per patient	19.2
30 minute break	-30
Time Available	450
No break	18.0
Six hour day	360
Minutes per patient	14.4

Takt Time: Treatment Types (based on time) and FTE Weight

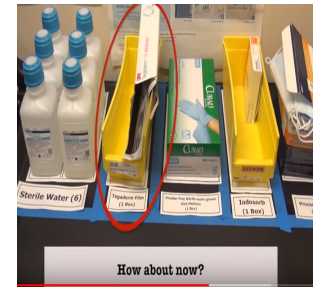
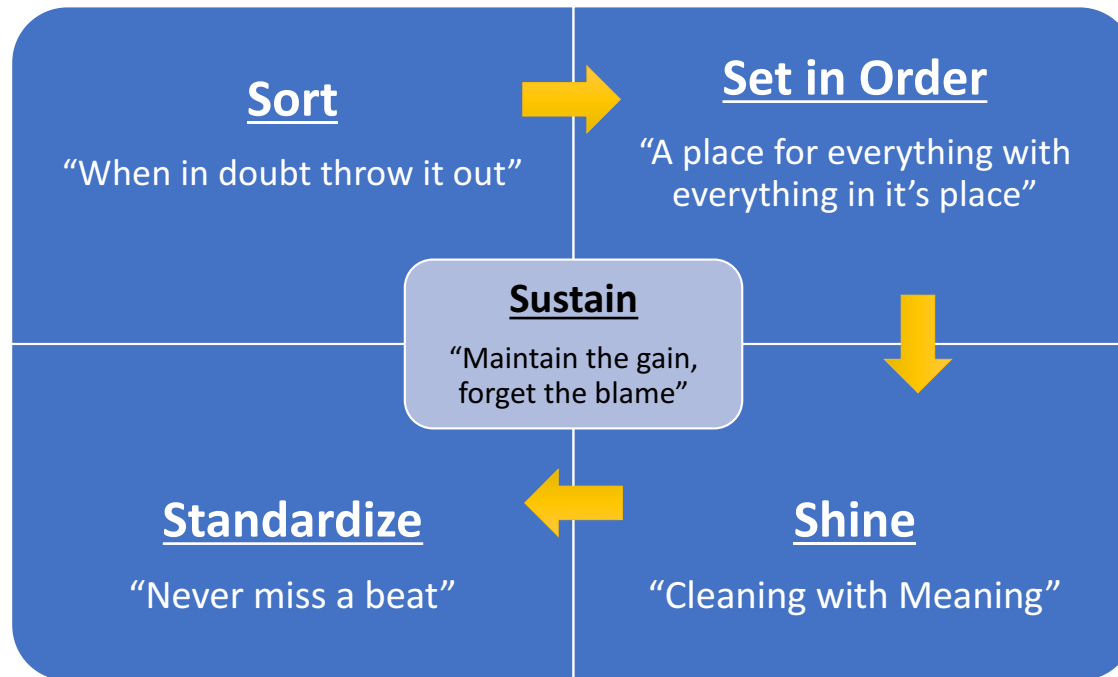
ACUITY LEVEL	ASSIGNED FTE Weight
I = 0-15 minutes	0.015
II = 16-30 minutes	0.045
III = 31-60 minutes	0.095
IV = 61-120 minutes	0.185
V = 121-240 minutes	0.375
VI = >240 minutes	0.75

- 4 Patients each needing Level VI Treatments
 - $.75 \times 4 = \underline{\mathbf{3 \text{ FTE}}}$
- 2 patients needing Level 1 + 1 patient needing Level 2 + 1 patient needing level 3
 - $(.015 \times 2) + (.045 \times 1) + (.095 \times 1) = \underline{\mathbf{.17 \text{ FTE}}}$

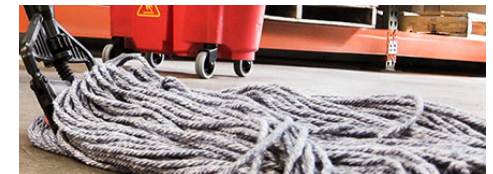
		Infusion Nurse		
	Average # of Patients	Actual		Required
CCO	41.68	5.4	✗	6.4
KTO	20.41	3	✓	2.8
MCO	34.09	4.8	✗	5.4
NWO	6.82	1	✗	1.4
SGO	16.50	3	✓	2.3
SWO	8.95	1.6	✓	1.3
PRO	10.58	0.8	✓	1.0
SEO	14.19	1.8	✓	1.5
WBO	12.09	2	✓	1.6

5S and 5 Why's

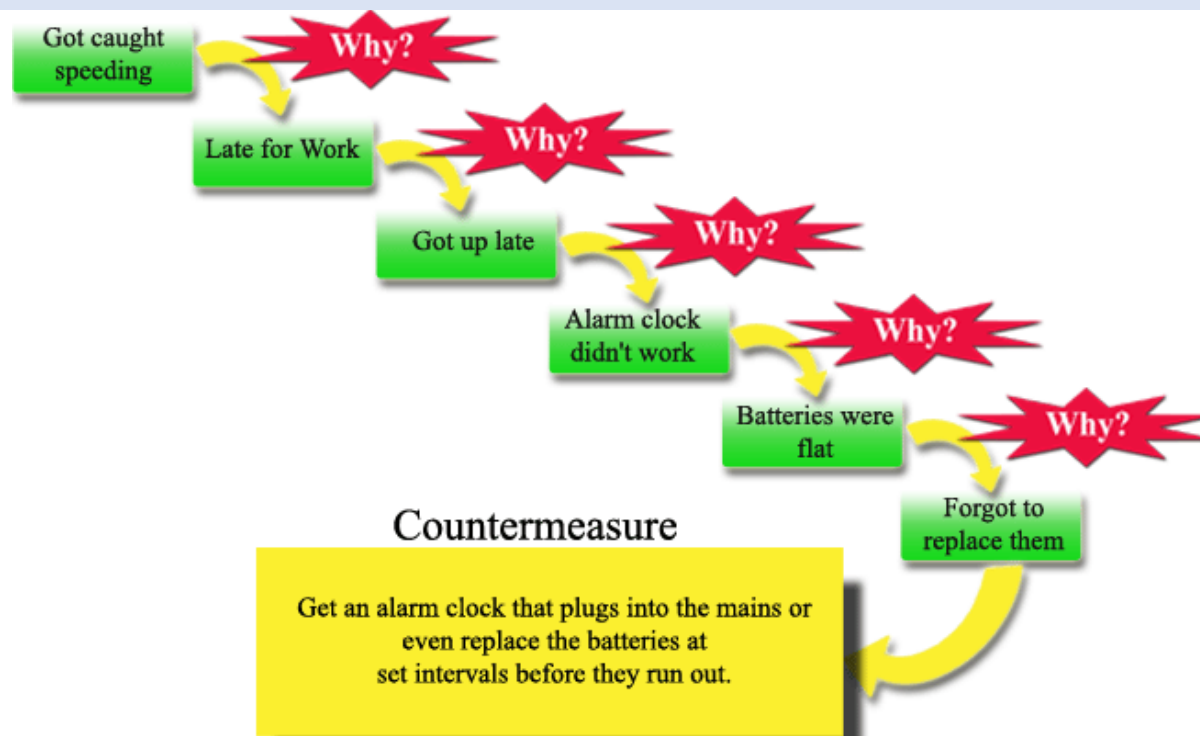
5S



- Origins in Toyota Production System (TPS)



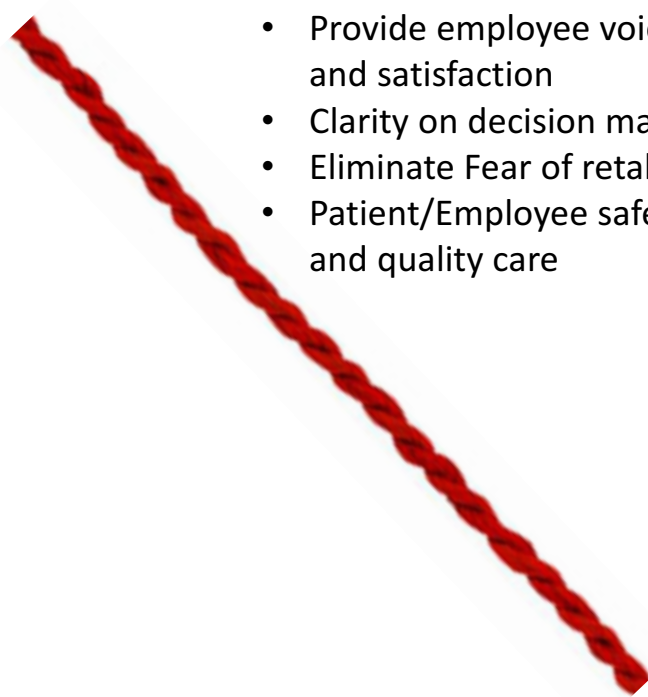
5 Why's



Andon Cord: Hold the Line

Overview

- **Hold the Line** - any staff member is free to request an urgent review of a decision or order made by a supervisor or physician that they feel is questionable
- Exists to any level of staff to ensure the duties he or she is asked to perform by their supervisors does not exist outside their scope of work or brings potential harm to themselves or others.
- Procedure
 1. First, express concern with the supervisor or physician.
 2. If no resolution, bring to Hold the Line committee
 3. Committee investigates and evaluates based on policies, laws, or other resources. Response is considered urgent and acted upon as soon as possible.
- Provide employee voice and satisfaction
- Clarity on decision making
- Eliminate Fear of retaliation
- Patient/Employee safety and quality care



Hold the Line Patient Cases

Imaging Procedure

- Summary: Imaging tech was to perform a PET procedure, but patient was noticed to be coughing vigorously. After reviewing the chart, there was a statement that indicated there was a precaution for potential TB.
- Intervention: Education and discussion with all providers on the importance of notifying appropriate staff of patients with potentially communicable diseases.

Patient Treatment

- Summary: Attending physician instructed nurse to continue treatment of a patient with unsafe vital levels.
- Intervention: After the nurse called Hold the Line, the committee physician champion evaluated the vital levels of the patient and assessed that the patient needed to stop treatment and go to the E.R. The physician champion then discussed the risk to patient safety of his decisions with the attending physician on a peer to peer level. No incidents from that physician has occurred since.

Activity Based Costing(ABC) – Imaging Costs

Methodology Comparisons

Traditional Costing

- Uses Unit Based Costing
- More simplistic and less accurate than Activity-based Costing
- Assigns overhead costs to products based on an arbitrary average rate
- Geared to manufacturing environments
- Useful in a one product/service environment
- Result in significant under-costing and over-costing
- External reporting focus
- Potential for poor decisions due to product cross-subsidization

Activity Based Costing

- Recognizes activities are the causes of costs
- More complex, more accurate and costly to implement (more precise breakdown of indirect costs)
- Concepts can be implemented outside manufacturing
- Valuable in a multi-product or service environment
- Used as a tool for planning and control
- Internal management decision making focus
- Potential to cut costs by identifying the "true" costs of the product....
- Increase Profitability

ABC

Key Terms

- **Unit-level activities**: costs of activities performed on each individual unit of a product or service.
- **Batch-level activities**: costs of activities related to a group of units of products or services rather than the individual unit.
- Set-up costs as this cost is incurred once for each batch, regardless of the size of the batch.
- **Product-level activities**: costs of activities undertaken to support individual products or services regardless of the number of units or batches produced
- **Customer-level activities**: activity that relates to specific customers, not specific products.
- **Facility support/Organization-sustaining activities**: costs of activities that cannot be traced to individual products or services but support the organization as a whole

Making a Turkey Sandwich

- **Unit-level activities**:
 - 1. Wash and slice all the vegetables.
 - 2. Toast the bread.
 - 3. Spread mayonnaise on one side of the bread.
 - 4. Place cheese onto the other slice of the bread.
 - 5. Place lettuce onto the mayonnaise and sliced turkey onto the cheese.
 - 6. Place tomatoes on top of the lettuce and cucumbers on top of the sliced turkey.
 - 7. Sprinkle salt and pepper to taste.
 - 8. Fold it together hold the sandwich.
 - 9. Cut the sandwich in half.
- **Batch-level activities**:
 - 1. Gathering Ingredients (bread, turkey, vegetables etc.)
 - 2. Find bread toaster
 - 3. Plating sandwich
 - 4. Cleaning up

Making a Turkey Sandwich

		\$0.17	3	\$0.50
Toast the bread		\$0.17	3	\$0.50
Spread mayonnaise on one side of the bread		\$0.17	1	\$0.17
Place cheese onto the other slice of the bread		\$0.17	1	\$0.17
Place lettuce onto the mayonnaise and sliced turkey onto the cheese		\$0.17	1	\$0.17
Place tomatoes on top of the lettuce and cucumbers on top of the sliced turkey		\$0.17	1	\$0.17
Sprinkle salt and pepper to taste		\$0.17	1	\$0.17
Fold it together hold the sandwich.		\$0.17	1	\$0.17
Cut the sandwich in half		\$0.17	1	\$0.17
Batch-level activities				
Gathering Ingredients (bread, turkey, vegetables etc.)	\$0.72	\$0.17	15	\$3.27
Find bread toaster		\$0.17	3	\$0.51
Plating		\$0.17	2	\$0.34
Cleaning up		\$0.17	10	\$1.70
Amount Consumed	\$0.72	\$2.18	45	\$8.32
Total Cost per Turkey Sandwich	\$8.32			

PET/CT Activity-Based Costing

	PET/CT SCAN							
	Skull Base to Thigh				Whole Body			
	Material Cost	Direct Labor Cost	Direct Labor (Mins)	Total Cost per activities	Material Cost	Direct Labor Cost	Direct Labor (Mins)	Total Cost per activities
Unit-level activities								
Authorization		\$0.36	15	\$5.40		\$0.36	15	\$5.40
Scheduling/create financial assessment		\$0.27	10	\$2.70		\$0.27	10	\$2.70
Chart Preparation - Clinical ¹		\$0.25	2	\$0.50		\$0.25	2	\$0.50
Chart Preparation - Admin ²		\$0.30	5	\$1.50		\$0.30	5	\$1.50
Patient Check-in		\$0.30	5	\$1.50		\$0.30	5	\$1.50
Patient Preparation ³		\$0.25	20	\$5.00		\$0.25	20	\$5.00
Uptake of Rp		\$0.00	45	\$0.00		\$0.00	45	\$0.00
Scan Time ⁴		\$0.61	30	\$18.30		\$0.61	35	\$21.35
Post Scan ⁵		\$0.61	10	\$6.10		\$0.61	10	\$6.10
Batch-level activities								
Medical Supplies ⁷	\$123.17	\$0.61	20	\$135.37	\$123.17	\$0.61	20	\$135.37
Quality Control ⁸		\$0.61	15	\$3.05		\$0.61	15	\$3.05
Professional Fees		\$130.00	1	\$130.00		\$130.00	1	\$130.00
Ship Report	\$0.00	\$0.00	0	\$0.00	\$0.00	\$0.00	0	\$0.00
Billing Tracking/Summary ⁹		\$0.61	2	\$0.41		\$0.61	2	\$0.41
Scanner Preparation ¹⁰		\$0.61	1	\$0.20		\$0.61	1	\$0.20
End of Day ¹¹		\$0.61	10	\$2.03		\$0.61	10	\$2.03
Amount Consumed	\$123.17	\$136.00	191	\$312.07	\$123.17	\$136.00	196	\$315.12
Total Cost per PET	\$312.07				\$315.12			

The Readiness Assessment

- Assess the outlook and goals of the organization
 - Is there a consensus of vision across Physicians and Management?
 - Do we have the resources to meet our goals?
 - Are we willing to do what it takes to change?
- Evaluate the current state
 - What do we look like *right now*?
 - What is our current level of efficiency? Measurable?
 - Do we have the resources to start the project?
- Review the capacity for change and improvement
 - How flexible are we when it comes to change?
 - What is our capacity for growth and improvement?
 - What existing issues exist that would constrain our efforts?

Thank you

- Questions....