Leaning the Right Way:
Applying Lean Principles to Pharmacy Processes

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Learning Objectives

By the end of this module, learners will:

- Understand the historical context and fundamental purpose of lean methodologies
- Gain a basic understanding of lean terminology and methodologies
- Be able to apply basic lean principles to reduce waste, minimize errors, and improve their work processes

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Historical Perspective

Modern-day Lean is widely accepted as being derived from the Toyota Production System (TPS), developed by Kiichiro Toyoda and Taiichi Ohno beginning in the 1930s. Toyoda and Ohno had looked at Henry Ford's production methods and determined that a few simple innovations around supply and production flow could vastly improve the automobile manufacturing process.

The thought process of Lean was more thoroughly described by James P. Womack, Daniel Roos and Daniel T. Jones in the definitive books "The Machine That Changed the World" (1990), and "Lean Thinking" (1996).

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Historical Perspective cont.

Womack, Roos and Daniel's "Five Lean Principles"

1. Specify the values desired by the customer
2. Identify the value stream for each product providing that value and challenge all of the wasted steps currently necessary to provide it
3. Make the product flow continuously through the remaining value-added steps
4. Introduce "pull" between all steps where continuous flow is possible
5. Manage toward perfection so that the number of steps and the amount of time and information needed to serve the customer continuously falls

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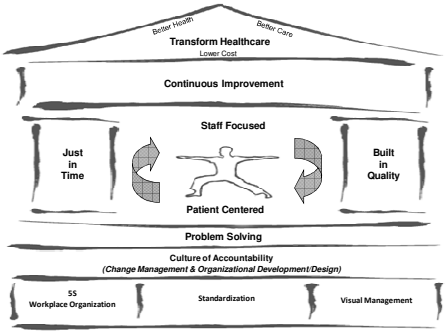
The Lean House



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Lean = Remove as much Waste as Possible.

The short definition of Lean:
A process of continuously identifying, reducing and eliminating **waste**.

The short definition of Waste:
Anything other than the minimum amount of equipment, materials, space and staff time that are absolutely essential to add value to the product or service, based on the customer's perspective.

"Medicare and Medicaid could **save $250 billion** a year by **eliminating waste –** that is, activities that don't have any value." Dr. Donald M. Berwick, former CMS Administrator

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The Longer Definition of Waste

- There are 8 specific categories of waste in Lean, creating the acronym **DOWNTIME:**
  - **D**efects (dosage errors, wrong medication, wrong amount, rework)
  - **O**ver production (duplicate documentation, surplus output)
  - **W**aiting (wait for batch, med availability, question/response)
  - **N**on-Utilized Resources (new experience, lack of collaboration)
  - **T**ransportation (circular travel, mis-delivery, equipment movement)
  - **I**nventory (seldom/non-used items, outdated items, unorganized)
  - **M**otion (circular walking, turning, bending, moving objects)
  - **E**xcess Processing (illegible orders/notes, duplicate info gathered)

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Lean Tools and Processes

Lean provides -

- Principles, concepts, & techniques used for elimination of waste

That -

- Result in processes that give customers
  - exactly what they need,
    - when they need it,
      - in the quantity they need,
        - in the right sequence for their use,
          - defect free, and
            - at lowest possible cost

"There is nothing so useless as doing efficiently that which should not be done at all."
Peter F. Drucker

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Focus on the Process

Typical Paradigm

"I don't care how you get the job done, just do it."

- Produces variation in outcomes
- If something goes wrong, ask "who did it?"
  - The person failed

Lean Paradigm

"Let's agree to the best way to do the job, do it that way every time, and continuously seek to collaboratively improve the process."

- Eliminates irrational variation
- Produces predictable outcomes
- If something goes wrong, ask "which part of the process failed?"
  - The process failed, not the person

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Basic Lean Tools

Some powerful, but easy to use Lean Tools

1. Value Stream Process Mapping
2. 5S
3. Visual Management
4. Process Problem Solving (PPS)

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Mapping the Value Stream

1. Map the Current State
2. Standardize and Establish Baseline Measures
3. Define and Map the Future State
4. Identify the Gaps and Define Process Improvements
5. Standardize, Train to New Standard and Implement
6. Measure and Continuously Improve

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What is "Value"

Value Added Process Steps

- Any activity or operation performed that helps transform a product or service from its raw state into its finished form
- Completed right the first time
- Activity that adds value as customer perceives value
- Activity required to ensure that a product or service is delivered in conformance to specification

Non-Value Added Process Steps

- Any activity that doesn't directly help to transform a product or service into its final form
- Activity not performed right
- Activity that does not add value as customer perceives value
- This includes:
  - Unnecessary process steps
  - Movement of inventory, paperwork, etc.
  - Re-work, corrections, etc.
  - Storage between operations, batching inventory
  - Wait times, delay times, idle times

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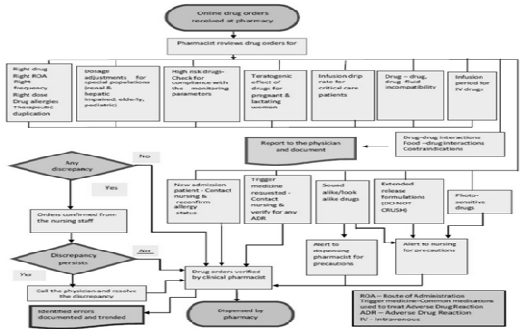
Process as Value Stream

Basic Flowchart.



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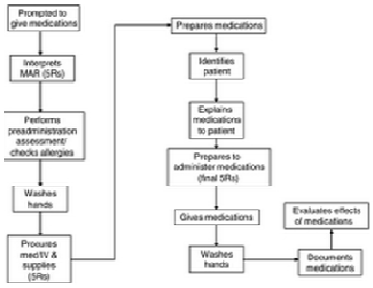
Process as Value Stream

High-level Flowchart



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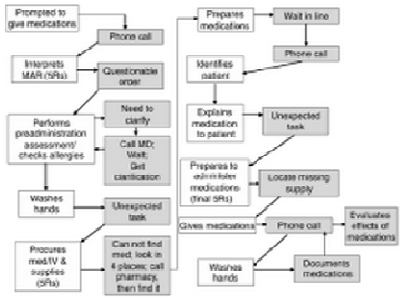
Process as Value Stream

High-level Flowchart with Interruptions



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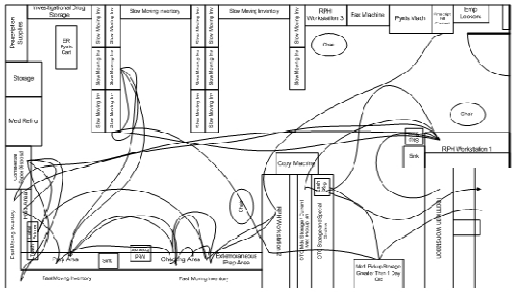
The Process Includes Movement

"Spaghetti" Mapping

Before:



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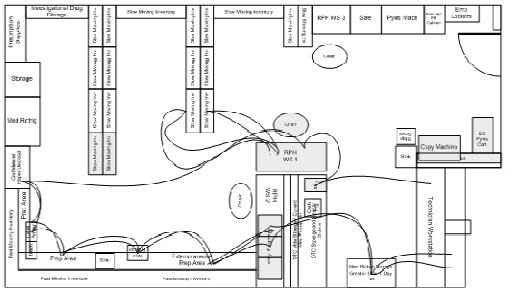
The Process Includes Movement

"Spaghetti" Mapping

After:



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Lean Tools: 5S

1. **S**ort
   a) Decide what is needed
   b) Decide what can be permanently removed
   c) Temporarily hold the "not sure" items somewhere else for further review and decision
2. **S**traighten
   a) Organize the items that stay
   b) Use appropriately sized bins / containers
   c) Begin applying Visual Management (color coding, legible labeling, FIFO / LIFO)
3. **S**hine
   a) Clean the environment
      - Remove unnecessary shelves, cabinets, doors, etc
      - Identify safety issues
4. **S**tandardize
   a) Have all key stakeholders agree to the first 3 S's
   b) Create documentation explaining the new layout
   c) Communicate the new standards to everyone involved or impacted
5. **S**ustain
   a) Regularly scheduled maintenance of the new layout
   b) Routinely audit the area for adherence to new standards
   c) Hold regular collaborative discussions regarding improvement

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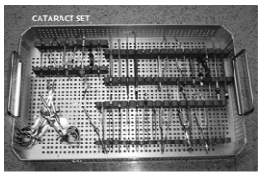
5S – Sort, Straighten, Shine, Standardize, Sustain

- Sets the standard for workplace organization
- Removes clutter and unneeded items
- Encourages safety, cleanliness and orderliness



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5S - Workspace

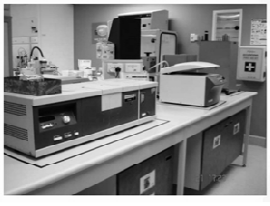
Before

After

5S – Lab Bench

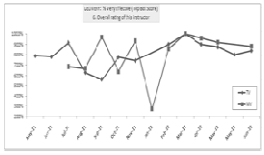
Before

After



Visual Management

Colors and ***graphics*** are used to make it easy to tell normal from abnormal



- *Easy to tell where items belong*
- *Easy to tell which items are missing or need to be replenished*

- *Easy to tell how well we are doing*

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Lean Tools: 5S & Visual Management

5S Color Code Standards

Designations		Color Standards	
Labels	Supplies/Office Equipment Labels	White Label With Black Lettering	LABEL
General Floor & Wall Tape	Floor Tape – Equipment, Trash Cans, Storage Bins, Racks, etc.	Blue	
	Fire Items	Red & White Stripe	
	Caution	Yellow & Black Stripe	
	Dirty Ink Line from Ceiling	Red	
Inpatient Supply Bin/Storage	Product Category	Examples	Color Code
	Nurse Server	Soaps, Gloves, Syringes, Needles, Sharps	Ivory
	Respiratory	Masks, Breathing circuits, Nasal cannula, Trach supplies, Ox-sensors	Green
	Dressings	Tegaderm, Sutures, Gauze, Dressings, Ostomy supplies, Chlorapreg, Staple Removers	Blue
	Misc Items	Electrodes, Postmortem bags, Bio bags, Batteries, Blood pressure cuffs, Procedure Trays	Black
	Isolation	Masks, Gowns, Caps, Booties	Grey
	IV Starting & Blood Tubing and Lab	IV start kits, Blood & Pump tubing, IV Cath safeguard, Stat locks, Lab supplies & Tests	Red
	Feeding and Suction	NG tubes, Suction tubing, Yankauers, Oral care	White
	Active Daily Living	Personal hygiene supplies, Chucks, Emesis basin, Water pitcher, Baby supplies	Terra Cotta
	ENT	Nose bleed supplies, Eye, Bite sticks, Probe covers, Ear plugs	Teal
	Critical Care	Central lines, Swan ganz, Manometers, Pleur-E-Vac, Laryngoscopes, Broselow supplies	Purple
	Equipment and Ortho	Splints, Braces, Med lifts, EZ slings, Abductor pillows	White and Black
	Urinary	Foley cath, Urinals, Bed pans, Enema, Pads, Panties, Speculums	Yellow
	Solutions	Normal Saline (NS), Lactatec ringers (LR), D5W, D10, Irrigation water & NS	Orange

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Visual Management Before & After

Before

After

5S & Visual Management

Benefits: Improve workplace organization, minimize search time for medications, and ensure appropriate inventory levels and rotation are established/maintained.

Before ***During*** ***After***

5S & Visual Management
MV OR Room 7

Before

After

Lean Tools: Standardized Work

1. Regulates every process
   a) Determine the best way to do the work, based on best practices or collaborative analysis
   b) Standardize and document the agreed upon process
   c) Train all involved in the new process
2. Maintains Standards to be adhered to
   a) Process maps and Standardized Work Instructions document and inform
3. Serves as a foundation for Continuous Improvement
   a) Standardization minimizes process variations, making it easier to identify opportunities for improvement
4. Provides a starting point for Problem Solving
   a) Standardization eases the identification of specific points

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Lean Tools: Standardized Work

Document the Process for all to follow

STANDARDIZED WORK SHEET

AREA	PROCESS NAME:	TAKT TIME	DATE	DEPARTMENT	APPROVAL (SIGN OFF'S REQ'D)	1st Supr	2nd Supr	3rd Supr	Mgr.
TVICU	Fiadoscopy - Hand Hygiene		6/13/2013	Enco					

No.	WORK ELEMENT	EQUIPMENT SYMBOL	WORK TIME	WAIT TIME	WALK TIME	KEY POINTS	TEAM MEMBER MOTION (OR PICTURE)
1	Prep for exam; take equipment to ICU						
2	Make sure all objects in hallway are cleared					Picture 1	
3	Push equipment to tool outside the patient's room						
4	Perform Hand Hygiene					Clean hands with sanitizer until dry or soap and water for 20 seconds	
5	Don gloves; disinfect equipment; wash traps					Clean the high touch areas of the equipment including the handles. Allow to dry for 1 minutes - Picture 2	
6	Dispose of gloves and disinfectant wipes						
7	Perform Hand Hygiene					Clean hands with sanitizer until dry or soap and water for 20 seconds	
8	Pull cart/Exam through door of the room into the patient's room						
9	Enter patient's room; introduction to patient and set up for the procedure						
10	Perform Hand Hygiene					Clean hands with sanitizer until dry or soap and water for 20 seconds	
11	Put on Gown and Gloves						
12	Perform Procedure						
13	Dispose of gloves						
14	Perform Hand Hygiene					Clean hands with sanitizer until dry or soap and water for 20 seconds	
15	Don gloves; Clean up patient environment and disinfec equipment before leaving pt room					If C Diff patient use bleach wipes; Clean the high touch areas of the equipment including the handles. - Allow to dry for 1 mins - Picture 2 and Picture 3	
16	Dispose of gloves and disinfectant wipes						
17	Perform Hand Hygiene and push equipment back to endo unit					With hand sanitizer until dry or soap and water for 20 seconds; if C-Diff patient wash hands with soap and water	

REVISION RECORD

#	CHANGE REASON	DATE	SIGNATURE

SYMBOL LEGEND

	SUB TOTAL	0 WORK	0 WAIT	0 WALK	GRAND TOTAL	0

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Lean Tools: Process Problem Solving (PPS)

1. Recognize, Define and Analyze the Problem
   a. What should be happening?
   b. What is actually happening?
   c. What are the gaps?
1. Identify Immediate Actions (if necessary)
   a. Is a short-term solution necessary and appropriate?
   b. Develop, document, train and implement
2. Determine the Root Cause(s)
   a. Identify potential cause for each gap
   b. Evaluate and record result
3. Identify Solutions
   a. Collaboratively define potential solutions
4. Test and Implement
   a. Test potential solutions
   b. Agree on a specific solution
5. Standardize and Share
   a. Document the chosen solution
   b. Train to the new standard
   c. Measure results

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Lean Tools: Process Problem Solving (PPS)

Topic/Theme: Problem Solving Activity

Date Identified: PS Leads: Team Members:
Date Assigned:
Date Solved: PS Coach: Leadership Sponsor:

1. Recognize a Problem | 2. Define the Problem | 3. Analyze the Problem | 4. Determine Root Cause(s) | 5. Identify Solutions | 6. Test & Implement | 7. Standardize & Share

1. RECOGNIZE: WHAT IS THE PROBLEM? (compare to what should be happening)

Clarify the Situation:

What should be happening (WSBH)?:
What is actually happening (WAH)?:
What is the gap (problem)?:
Potential for harm/damage: **HIGH** **MEDIUM** **LOW**

2. DEFINE: IMMEDIATE ACTION (actions to happen right now to reduce risk/harm if problem occurs again)

Status	What	Who	When	Outcome
○				
○				
○				
○				

2. DEFINE: HOW BIG IS THE PROBLEM? (background, frequency, location)

State the Process: *What are you doing/trying to accomplish?*
Are there auditing documents for this process?(policy & procedure, education, standardized work, etc.) Process Owner Name:

Frequency of Process:	Daily	Weekly	Monthly	Annually	Intermittent	Rare/Never
Shifts:	Day	Night	Weekend	All		
Frequency of Problem:	Daily	Weekly	Monthly	Annually	Intermittent	Rare/Never
Staff:	Day	Night	Weekend	All		

Other Key Metrics: *supporting data and qualifying information to aid in narrowing the investigation focus)*

Continue Problem Solving? Y / N
Linked to organizational (system, department, entity, etc.) metric: Leader Sign Off:

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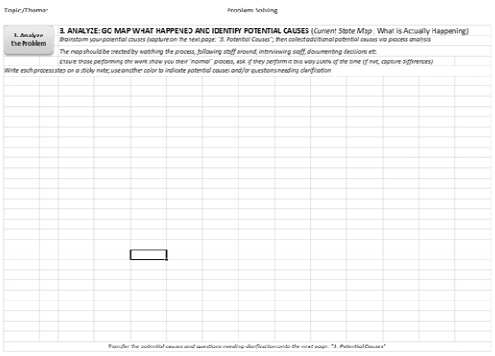
Lean Tools: Process Problem Solving (PPS)


Topic/Theme: Problem Solving

3. Analyze the Problem

3. ANALYZE: GO MAP WHAT HAPPENED AND IDENTIFY POTENTIAL CAUSES (Current State Map: What is Actually Happening)

Brainstorm your potential causes (capture on the next page: "3. Potential Causes"; then collect additional potential causes via process analysis

The map should be created by watching the process, following staff around, interviewing staff, documenting decisions etc.

Ensure those performing the work show you their "normal" process, ask if they perform it this way 100% of the time (if not, capture differences)

Write each process step on a sticky note; use another color to indicate potential causes and/or questions needing clarification

Transfer the potential causes and questions needing clarification onto the next page: "3. Potential Causes"

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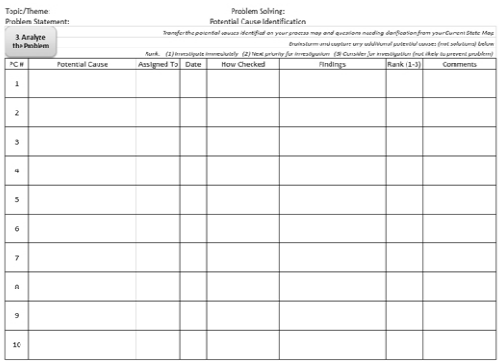
Lean Tools: Process Problem Solving (PPS)


Topic/Theme: Problem Solving:
Problem Statement: Potential Cause Identification

3. Analyze the Problem

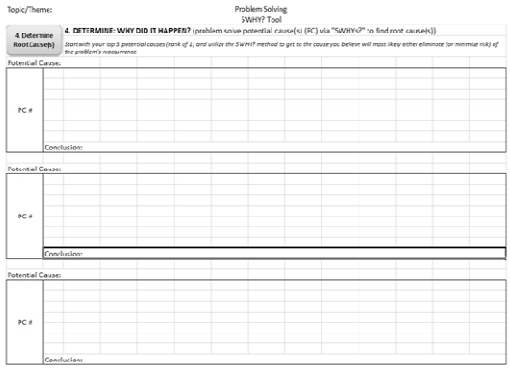
Transfer the potential causes identified on your process map and questions needing clarification from your Current State Map

Brainstorm and capture any additional potential causes (not solutions) below

Rank: (1) Investigate immediately (2) Next priority for investigation (3) Consider for investigation (not likely to prevent problem)

PC #	Potential Cause	Assigned To	Date	How Checked	Findings	Rank (1-3)	Comments
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Lean Tools: Process Problem Solving (PPS)


Topic/Theme: Problem Solving
5WHY? Tool

4. Determine Root Cause(s)

4. DETERMINE: WHY DID IT HAPPEN? (problem-solve potential cause(s) (PC) via "5WHYs?" to find root cause(s))

Start with your top 3 potential causes (rank of 1, and utilize the 5WHY? method to get to the cause you believe will most likely either eliminate (or minimize risk) of the problem's reoccurrence

Potential Cause:

PC #

Conclusion:

Potential Cause:

PC #

Conclusion:

Potential Cause:

PC #

Conclusion:

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Lean Tools: Process Problem Solving (PPS)

Topic/Theme: Problem Solving
Problem Statement:

5. Identify Solutions — 5. IDENTIFY SOLUTIONS: GO MAP NEW PROCESS RECOMMENDATIONS (remap the current process into the ideal process)
Incorporate changes needed to eliminate contributing factors and the root cause into the process map (eliminate other points of process waste)
Include all stakeholders in rebuilding the process (i.e. IT, Legal, Pharmacy, Lab, Quality and Patient Safety, HR, other service line departments, Maintenance, etc.)

Make a copy of your original process map with steps- use the same post-it notes to map the components of the process you plan to keep; eliminate all additional steps that are unnecessary; replace as appropriate with new steps to develop your IDEAL process:

Authorization to Test:

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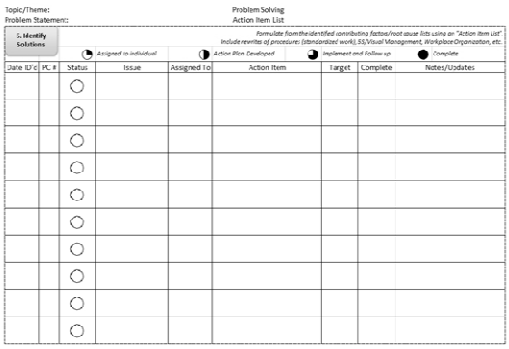
Lean Tools: Process Problem Solving (PPS)



Topic/Theme: Problem Solving
Problem Statement: Action Item List

5. Identify Solutions — *Formulate from the identified contributing factors/root cause lists using an "Action Item List"*
Include rewrites of procedures (standardized work), 5S/Visual Management, Workplace Organization, etc.

Assigned to Individual | Action Plan Developed | Implement and Follow up | Complete

Date ID'd	PC #	Status	Issue	Assigned To	Action Item	Target	Complete	Notes/Updates
		○						
		○						
		○						
		○						
		○						
		○						
		○						
		○						
		○						
		○						

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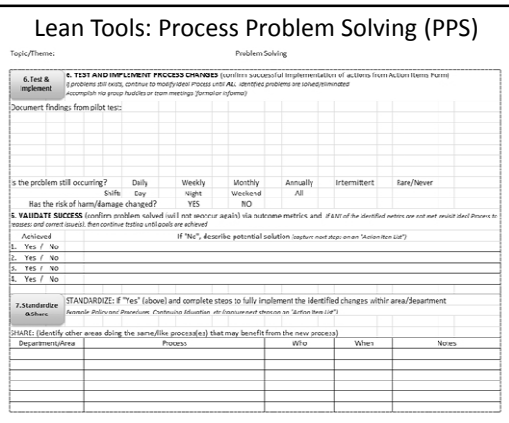
Lean Tools: Process Problem Solving (PPS)



Topic/Theme: Problem Solving

6. Test & Implement — **6. TEST AND IMPLEMENT PROCESS CHANGES** (confirm successful implementation of actions from Action Items Form)
If problems still exist, continue to modify ideal process until ALL identified problems are solved/eliminated
Accomplish via group huddles or team meetings (formalize schema)

Document findings from pilot test:

Is the problem still occurring? Daily | Weekly | Monthly | Annually | Intermittent | Rare/Never
Shifts: Day | Night | Weekend | All

Has the risk of harm/damage changed? YES | NO

5. VALIDATE SUCCESS (confirm problem solved (will not reoccur again) via outcome metrics and *if ANY of the identified metrics are not met revisit Ideal Process to reassess and correct issue(s), then continue testing until goals are achieved*

Achieved — If "No", describe potential solution (capture next steps on an "Action Item List")

1. Yes / No
2. Yes / No
3. Yes / No
4. Yes / No

7. Standardize & Share — STANDARDIZE: If "Yes" (above) and complete steps to fully implement the identified changes within area/department
Example: Policy and Procedure, Continuing Education, etc (improvement changes on "Action Item List")

SHARE: (identify other areas doing the same/like process(es) that may benefit from the new process)

Department/Area	Process	Who	When	Notes

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Leaning the Right Way:
Applying Lean Principles to Pharmacy Processes

Questions?

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