Applying Lean Thinking to a Surgical Instrument Sterile Processing Department

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Objectives

After completion of this self-study activity, the learner will be able to:
1. Discuss the concept of lean thinking.
2. Describe how lean tools can be applied to surgical instrument sterile processing.
3. Explain the benefits to be gained by implementing lean thinking.
4. Describe the benefit to strategic partnering.

Test Questions

1. Lean thinking is a management philosophy that focuses on a work process with the goal of eliminating wasteful activities and preserving the parts of a process that add value.
   A. True  B. False

2. What is a methodology focused on eliminating all waste in processes by identifying waste from the customer perspective and then determine how to eliminate it?
   A. Lean  B. PDSA  C. Total Quality Management  D. Waste Management

3. What defines value?
   A. Cost  B. Value  C. Customer Expectation  D. Improvement

4. What is any activity that takes up time, resources or space but does not add value to the product or service?
   A. VSM  B. 5S  C. Standard Work  D. Waste

5. Which of the following is NOT a 5S?
   A. Scrub  B. Standardize  C. Straighten  D. Sustain

6. What type of activities do we try to eliminate from our process?
   A. Necessary  B. Waiting  C. Non-Value Added  D. Transportation

7. What is defined as “a way of visually communicating the right thing to do”?
   A. Kanban  B. Andon  C. Visual Control  D. Shadowing

8. What tool would you use to insure equipment is returned to the same place every time?
   A. Shadowing  B. Value Stream Map  C. Pull  D. Critical to Quality

9. What describes the best sequence of activities necessary to accomplish work?
   A. Value Stream Map  B. Work Standards  C. 5S  D. Standard Work

10. What tool would you use to graphically see the activity for a particular area, instrument packing for example, throughout each part of the day to get a better understanding of when the work is occurring?
    A. Value Stream Map  B. Swim Lanes  C. By-The-Hour Chart  D. Spaghetti Map
Introduction

Lean thinking was used in the Perioperative Enterprise Sterile Processing Department at The University of Texas MD Anderson Cancer Center in Houston, Texas to improve process capability, as well as staff and surgeon satisfaction by improving department performance. Lean thinking is the integration of the concepts of eliminating waste which means eliminating or at least minimizing as much as possible anything that does not have value. This project implemented lean concepts to increase instrument set pack capacity, reduce pack errors, and reduce time required to put away and pull instruments for a case. This in-service discusses the process and results of lean thinking in the processing of surgical instruments at this healthcare facility.

Use of Quality Tools

Lean thinking is a management philosophy that advocates the elimination of wasteful steps in work processes and to keep and advance the value-added steps. Value added steps are those parts of a process that matter to the customer. Think if the customer knew every step of your process, what parts would they be willing to pay for? Would anyone, once they knew all the intricacies of your processes, willingly pay for extra searching for instruments, extra walking, extra sorting, or anything else that may seem unnecessary? By removing wasted time and effort from a process, quality improves, moral improves, on-time performance improves and things that aren’t going well within the work process are made visible. When issues are visible we can more quickly take action to improve work processes further.

Lean thinking includes many tools and techniques that can be applied in the quest to eliminate waste and preserve the value added steps of a process. Next we will illustrate the lean tools used by the Perioperative Enterprise Sterile Processing Department.

5S

The lean program for workplace organization that fosters effectiveness is called 5S. The 5S techniques help enable an area to manage their physical space for reducing waste and optimizing productivity. This is achieved through maintaining an orderly workplace and using visual cues to achieve more consistent operational results. Implementation of this method “cleans up” and organizes the workplace basically in its existing configuration, and it is typically the first lean method which organizations implement. The idea is that if a work area is more orderly then waste will be reduced due to less searching, transporting, handling of instruments, waiting, etc (see Figure 1).

Here are the five steps of the 5S process:

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>Sort</td>
<td>Keep only what is required.</td>
</tr>
<tr>
<td>Straighten</td>
<td>Arrange and identify for ease of use, organize.</td>
</tr>
<tr>
<td>Shine</td>
<td>Clean regularly. Clean up everything that’s left.</td>
</tr>
<tr>
<td>Standardize</td>
<td>Insure 1st three steps are followed, ways include utilization of SOP’s and visual controls.</td>
</tr>
<tr>
<td>Sustain</td>
<td>Set discipline, plan, schedule, train... AND STICK TO IT!</td>
</tr>
</tbody>
</table>

Sort and Straighten cover the initial process of determining what really needs to be in the work area. A further determination is done to identify what is needed within reach at the workstation (used for every task) verses what needs to be in the room (used once or twice a day) verses what may only need to be in the general area (used once a week). The Straighten step is also where you want to setup tools and supplies in the order of use to minimize unnecessary movement. For example at a pack workstation, maybe you lay out things from left to right, such as cleaning items, then filters, then internal chemical indicators and then the locks for the rigid sterilization containers. One may also find it useful to utilize a technique called “Shadowing.” Once the ideal placement of an item is identified, a “shadow” graphic of the item can be placed such that when that item is in use or not returned to its ideal location that location is visually marked by the shadow. This shadowing helps to insure items are returned to their proper place.
Shine, Standardize and Sustain are the parts of the program that focus on insuring the improvements in layout and organization of the work area will be sustained over time. In Standardize, you want to setup procedures such that tools and supplies are returned and stocked in their respective homes. This can include a picture, placed at the workstation, showing what the workstation should look like and reinforced through a procedure that might dictate an end-of-shift 5S review.

**Standard Work**

The concept of “Standard Work” refers to management and staff determining the best way an activity can be completed, and documenting that method as standard work. This standard work document can then be used for training of new and existing employees (see Figure 2). Standard Work can also be used as a job guide and used by management as an audit tool as well as a baseline document for future process improvements. A standard work document is most effective if it includes, at a minimum, the following: process scope, the steps to complete the activity, a graphic illustrating the critical points in the process and for certain steps the “why” we are doing a step or task a certain way.

So how do you develop standard work? Here is a step by step framework for developing and implementing:

1. Select the right people
2. Define scope and level of detail
3. Generate possible steps to complete task
4. Determine and document best method
5. Communicate and train
6. Update standard work when needed

MD Anderson has applied Standard Work in the Sterile Processing department in the following ways:

- Developing procedures for decontamination area, pack and wrap functions, instrument set storage put-away and case cart picking activities
- Standardizing placement of chemical integrator (see Figure 3)
- Standardizing the placement of used tools and instruments on the return cart from the operating room to sterile processing

In summary, Standard Work is a precise description of tasks in sequential order that make up a work process in order to minimize waste and maximize productivity and needs to be updated any time the process changes.

**Visual Control (or Visual Management)**

Visual Control is a way of visually communicating whatever is necessary to help insure standard work is being followed. Visual Control can be described as the art of placing instructions into the workplace so that anyone can see how to do things right, know how to keep from doing things wrong, and has the information needed to proceed to the next step in the process. The nice thing about visual controls is that they can be simple, quick and cheap to produce, and can be understood and followed by anyone (see Figure 4). Also, if the process changes or there is a need to update a particular visual control all that’s needed is to pull it up on the computer, make the edits, save, print and replace the existing version.

Some guidelines when creating visual controls include asking your team:

1. What needs to be known, what needs to be shared?
2. Where is the best place for the instruction?
   a. Is it close to the point of action?
   b. Can color codes or diagrams make it more obvious?
3. Is it public friendly?
   a. Tasteful, discrete, transparent to the public eye?
   b. Does it clearly indicate the next step (e.g. job aids)?
The University of Texas MD Anderson Cancer Center’s Sterile Processing department has embraced the concept of Visual Control in several ways:

- Storage locations are color coded by service.
- Standard cart pictures are placed in the OR and return elevator for the nurse, scrub tech, and nurse assistant to see when closing out a case and returning the instrument cart.
- In pack stations, pictures of each instrument have been added to the set packing software system. Now when packing a set a technician can visually compare the set prepared to the set in the software system to insure correct instruments are used. This can also be verified using the existing method of verifying by instrument catalog number.
- Decontamination area has visual controls placed for supplies replenishment and identification of expensive items that are not disposable.

**Overall Strategies for Storage Optimization**

**Sterile Storage Area (See Figure 5)**

- Grouping instruments used within the same service or procedure for easier management
- Ergonomics—storing heavier items in the “strike zone” (waist level) to lessen the chance of injury when placing or removing instrument sets from storage shelving
- Grouping smaller, “peel pack” items together within a service to minimize searching
- Assigning dedicated storage locations and adding that location name to the shelf and set tag for fewer errors and quicker put-away of sterilized instruments

- Adding shelf location to preference card pick list to minimize pick time
- Placing “high-runners” at the end of the aisles to minimize overall walking distance when putting away or picking for case carts

**Pack Area**

- Sorting through and consolidating backup instruments and placing them closer to the pack workstations in a vertical carousel for less walking and searching (see Figure 6).
In lean thinking, removing waste is the main focus, and one reason for removing waste is to promote flow of the product. In the case of sterile processing that product is surgical instruments. Tracking, predicting and, where possible, smoothing the peaks and valleys of the flow of work is much easier when you have information. This is where IT enters the picture. You can collect and track this information manually. But if IT can help create reporting tools for you by querying workload information that you already have in an electronic source, such as the program your department is using to pack instrument sets, then you have the ability to more easily identify changes to eliminate waste and improve processes.

A useful tool in reporting is what is called a “by the hour” chart because it breaks out the workload in a way that lets one visualize the workflow throughout the day (see Figure 7). This can help a department make better decisions about staffing and more importantly identify opportunities to balance the work more evenly across a day or week.
**Performance reporting**

With the support of MD Anderson’s IT group we have been able to develop reports that help manage such things as staffing, which quality issues to focus our efforts, and instrument utilization.

Specific reports include:

1. By the hour charting:
   a. Used set receipts from the OR: tracks returns so that staffing can be reviewed and adjusted to insure sterile processing is balanced with the return flow.
   b. Pack activity: track what is packed, who and how long a particular type of set takes to get packed. Useful in scheduling staff and reviewing individual competencies.
   c. Case cart picking activity.

2. Utilization:
   a. Instrument set usage: calculates the number of sets used each day including maximum number used, days at maximum number and days over maximum number. This is a tool used for making decisions on when to add sets or decrease the number of available sets.

3. Error tracking:
   a. A database has been created where management can input and track any quality issues discovered in sterile processing or reported from the OR.

**Completion Timeline**

This is the timeline for this phase of the lean thinking project:

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>12/2/10</td>
<td>Incident Tracker db Active</td>
</tr>
<tr>
<td>12/7/10</td>
<td>Pack Productivity Tracking</td>
</tr>
<tr>
<td>5/20/11</td>
<td>5S Implementation</td>
</tr>
<tr>
<td>9/29/11</td>
<td>Work Area Procedures</td>
</tr>
<tr>
<td>4/2/12</td>
<td>Improved Case Cart Picking</td>
</tr>
<tr>
<td>7/5/12</td>
<td>Backup Instrument Solution</td>
</tr>
<tr>
<td>8/24/12</td>
<td>New Scope Process</td>
</tr>
</tbody>
</table>

**Results**

The following specific results obtained include:

- **Backup Instrument Retrieval:** Travel distance from 108ft to 32ft for a 70% reduction, resulting in annual labor savings of 127.5 hours.

- **Scope Processing:** Travel distance through sterile processing reduced from 270ft down to 110ft for a 59% reduction, resulting in an annual labor savings of 34.6 hours.

- **Reduced Case Cart Picking Time:** Per cart time reduced from 72sec/line to 26sec/line for a 64% reduction, resulting in annual labor savings of 2492 hours.
Next Steps

Next steps are to continue the process of removing waste and standardizing processes. Specific projects include incorporating bar code scanning into the instrument set putaway and pick process as well as establishing standard pars for the individual instrument peel pack area to better balance supply with demand.

Summary

Houston we had a problem. We had challenges with meeting our customer’s expectations, inconsistent processes and workflow, resource imbalances and breaking the barrier from the old way. We had to make change so we partnered with our Process Improvement Team. Through this collaboration we learned about lean thinking and how it could be applied to Sterile Processing. By utilizing the 5S, Standard Work, Visual Control, and Utilization of Technology we were able to identify gaps and eliminate non-value waste. By utilizing lean thinking we have been able to standardize work processes improving operational effectiveness; increase customer’s satisfaction, balance work flows, decreased non-value added staff time and improve decision making by utilizing data. Use this in-service to recognize the benefits of strategic partnering, lean thinking tools and the importance of data to address a challenge you are faced within Sterile Processing.

Definitions

5S: a method of creating a clean and orderly workplace that exposes waste and errors.
Capacity: the ability of a machine and or person to do work, the maximum possible output of a system.
Lean: a way of thinking where the focus is on the systematic reduction of waste and improving the flow of the product.
MLP: Material Location Plan, a graphic that illustrates on a map or picture the proper location of each item or tool.
Non-Value Added: an activity that does not add value from the perspective of the customer.
PDSA: plan/do/study/act, this is an improvement cycle model.
Standard Work: outlines how the work is to be accomplished, agreed upon current best way of completing a task.

Value-Added: that portion of a process that provides a product or service which increases value to the customer.
Value Stream: all the activities that a company must perform in order to produce a product or provide a service to a customer.
Value Stream Map: an illustration that uses simple graphics or icons to show the sequence and movement of information, material and actions in a company’s value stream.
Waste: an activity that takes time, resources, or space, but does not add value to a product or service.
Work Standard: how much work an individual or group is to produce.
Visual Control: the placement in plain view information, tools or items at the point of use to help insure standard work is being adhered to.
Utilization: amount or proportion of the total resource being used.

References

Answers

1. A
2. A
3. C
4. D
5. A
6. C
7. C
8. A
9. D
10. C

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David Bivens, MS is a Senior Quality Engineer, Quality Measurement and Engineering and
Lisa McMillian, BBA is the Associate Director POE Materials Utilization and Sterile Processing, Perioperative Enterprise were part of the team involved in the lean thinking project at The University of Texas MD Anderson Cancer Center, Houston, Texas.
Sterile Process and Distribution CE Information

CE Applicant Name: ____________________________ City: ____________________________

Address: ____________________________ State: ____________________________ Zip Code: ____________________________

The CBSPD (Certification Board for Sterile Processing and Distribution) has pre-approved this inservice for 1 contact hours for a period of five (5) years from the date of publication. Successful completion of the lesson and post test must be documented by facility management and those records maintained by the individuals until re-certification is required. DO NOT SEND LESSON OR TEST TO CBSPD.

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IAHCSMM has awarded 1 approved contact points for completion of this continuing education lesson toward IAHCSMM recertification.

Nursing CE Application Form

This inservice is approved by the California Board of Registered Nurses, CEP 5770 for 1 contact hour. This form is valid up to five (5) years from the date of publication.

1. Make a photocopy of this form.
2. Print your name, address and daytime phone number and position/title.
3. Add the last 4 digits of your social security number or your nursing license number.
4. Date the application and sign.
5. Answer the true/false CE questions. Keep a copy for your records.
6. Submit this form and the answer sheet to:
   3M Infection Prevention
   Attn: HC4160
   RR Donnelly Fulfillment Services
   585 Hale Avenue North
   Oakdale, MN 55128-9935
7. For questions please call the 3M Healthcare helpline: 1-800-228-3957.
8. Participants who score at least 70% will receive a certificate of completion within 30 days of RR Donnelly's receipt of the application.

Application  Please print clearly or type.

Name: ____________________________ Daytime phone: ( ____________________________ )

Mailing Address: ____________________________ Position/Title: ____________________________

City: ____________________________ Social Security or Nursing License Number: ____________________________

State: ____________________________ Zip Code: ____________________________ Date application submitted: ____________________________

Country: ____________________________ Signature: ____________________________

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