Achieving LEAN sterile processing

by Dan Johnson

The factors that put pressure on sterile processing departments (SPDs) in today’s healthcare environment are the same ones that have impacted them for several years. They include:

- High surgery volumes
- Inadequate sterile processing capacity to meet current volume
- Inadequate instrument inventory
- Uncertified or undereducated staff
- Available outsourcing alternatives for sterile processing
- Transparent hospital infection rates

These are ongoing issues in today’s hospitals and surgical centers. Administrators have learned that simply increasing spending on capital equipment, space, instrumentation and human resources has not assured the long-term solutions needed to effectively address these concerns. Some healthcare administrators are now assessing their SPDs in the same way that manufacturing executives evaluate their factories. They are embracing manufacturing concepts to deal with similar types of concerns. One concept that applies well is the process improvement method known as LEAN. Lean concentrates improvement efforts along a workflow (often known as the value stream), to identify and drive out waste and variability from processes.

Lean SPD efforts are being directed toward improving the circular flow of reprocessing work, from the surgical suite through the SPD, and back. The goal is to produce more, and higher quality, work with the same resources by improving process efficiency throughout the operation. Workflow optimization is all about developing processes to promote a rational, logical and efficient flow of work. In a hospital SPD, the process is about determining what is of value to your customers, how to deliver more value to them, how to accomplish more with the resources available, and how to satisfy the supply needs of the operating room.

Why is workflow important?

An optimized workflow relieves your staff of non-productive repetitive tasks and helps cultivate an environment in which staff seeks to improve efficiency, strengthen customer relationships and reengineer processes to be more productive. In addition, the costs associated with inefficient workflows often go unmeasured, and therefore unmanaged. In an increasingly competitive world, poor workflow compromises the effectiveness of the operation and impacts the level of customer service that you can provide. Conversely, open, efficient and effective workflow positions you for growth, operational cost savings and a competitive advantage.

Workflow can affect many aspects of a healthcare organization, including central sterile staff, surgical nurses, healthcare processes and even the facility’s technologies. An effective sterile processing workflow incorporates all the specific functions of your reprocessing operation and its related systems, automates wherever possible, and eliminates redundancy and process variability. This all helps to reduce errors and improve speed and quality.

Eli Goldratt’s business objective in his book, “The Goal,” is “to reduce operational expense and reduce inventory while simultaneously increasing throughput.” This statement aligns very well with the goals for a sterile processing department. Ultimately the goal of your workflow should be to provide your customer with the best quality product, at the volume required, at the proper time, at the proper cost. This translates into a central sterile customer service goal that has been defined by a leading sterile processing improvement consultancy as 100% clean and sterile, 100% complete, delivered to the OR 100% on time.

What do optimal workflows look like?

There are three key characteristics of effective workflows:

1. They are compatible with current systems and they streamline existing methods.
   This limits the additional investments that must be made and the systems that must be learned by employees.
2. They can be applied across similar functional departments. The same workflow should be effective in an on-site sterile...
processing department, an off-site reprocessing center or a reprocessing room in the surgical suite.

3. They are consistent. Reprocessing tasks are simple, repeatable, reliable and efficient.

and who won’t get caught up in each day’s distractions. It can be extremely helpful to engage the services of a knowledgeable change agent to facilitate the improvement process, plan and lead improvement activities, and demonstrate and teach effective techniques.

**Step 1: Map your central sterile workflow**

Optimizing sterile processing functions begins with understanding your workflow; the path instruments take as they cycle through their daily routine. The first step in this process is to develop a process flow and map. The process map is a visual representation of the surgical instrument reprocessing cycle. The key to successful process mapping is to get the primary process steps down, then dive deeper into each piece of the map, ultimately uncovering each step and layer of complexity. A sample process map in its initial simplified state is shown in Figure 1.

Performing this mapping activity will help you to identify all of the actions required to bring an instrument set through its entire reprocessing cycle. It will also help you analyze these activities to determine whether or not every activity has value. Activities that add value to a product or service are those that the customer would be willing to pay for, that physically improve the fit, form or function of an item, or that are done correctly the first time. Non-value-added activities take time, resources or space but do not add value to the product. Typical examples are: performing rework at any point in the process; searching or waiting for instruments or supplies; waiting on machine cycles; or double handling.

Each activity on the process map is timed and charted. This enables you to clearly identify actions that are wasteful. Waste is anything that impedes the flow of product as it is being transformed in the value stream. This means anything that may prevent the department from efficiently delivering 100% clean, sterile and complete instruments to the operation of your department. Your goal is to identify and eliminate unnecessary non-value-adding activity.

- **Identify waste:** Experienced sterile processing consultants routinely reveal waste in the process flow and work that helps managers streamline activities. Some typical examples of waste that have been identified in SPDs are:
  1. **Labor**
     - Quality inspections after the set is complete versus IT solutions and certification to ensure proper set preparation
     - Time spent looking for a missing item that should be readily available
     - Improperly staffed SPDs or surgical reprocessing rooms
  2. **Overproduction**
     - Excessive stat washes or immediate use sterilization in the OR (done frequently but not used only for an immediate procedure)
  3. **Space**
     - Non-linear workflow from decontamination to sterile storage, requiring storage racks and transportation routes
     - Supplies unrelated to processing being stored in work areas
  4. **Defects**
     - Sets put together with missing instruments, extra instruments or wrong instruments
     - Improper count sheets or documentation
     - Instruments not returned to decontamination in their original container
     - Sets returned with instruments missing
  5. **Time**
     - Staff scheduling doesn’t match workload demand
     - Assemblers waiting for a set from the decontamination area
     - Miscellaneous material (linens) arriving in containers from the OR that slows decontamination
  6. **Safety**
     - Ergonomically poor workstation layouts create reaching and excessive movement

**Step 2: Improve functions and workflow**

Once the process and value stream maps are completed, you can begin the improvement processes. The activities that contribute to effective workflow optimization are:

- **Streamline; eliminate or minimize non-value-adding steps:** Although it’s not critical to your success, there is some logic to streamlining and simplifying the work processes before performing the other activities. By streamlining and simplifying first, you avoid factoring steps into the other activities that you may find unnecessary.

It’s also important to note here that there may be activities classified as ‘non-value-adding’ that should not be eliminated. Some of these, such as in-service training, safety meetings and inspections, may be essential to the operation of your department. Your goal is to identify and eliminate unnecessary non-value-adding activity.

**Important advice for managers**

To ensure process improvement success, there are three things sterile processing managers need to know. First, take action: don’t be paralyzed by what you don’t know, or think you don’t know. The key is to gather all the information that you can within a reasonable time, analyze it, determine the action steps needed and implement them. Then do it again. First results may not be complete or perfect, but you will have made a positive change. To quote an axiom borrowed from manufacturing, “Now and better is better than perfect and never,” or in the fabled manufacturing, “Now and better is better than perfect, but you will have made a positive impact. These are your most creative resources. Make good use of them.”

- **Don’t be paralyzed by what you don’t know,** or think you don’t know. The key is to gather all the information that you can within a reasonable time, analyze it, determine the action steps needed and implement them. Then do it again. First results may not be complete or perfect, but you will have made a positive change.

- **Identify waste:** Experienced sterile processing consultants routinely reveal waste in the process flow and work that helps managers streamline activities. Some typical examples of waste that have been identified in SPDs are:
  1. **Labor**
     - Quality inspections after the set is complete versus IT solutions and certification to ensure proper set preparation
     - Time spent looking for a missing item that should be readily available
     - Improperly staffed SPDs or surgical reprocessing rooms
  2. **Overproduction**
     - Excessive stat washes or immediate use sterilization in the OR (done frequently but not used only for an immediate procedure)
  3. **Space**
     - Non-linear workflow from decontamination to sterile storage, requiring storage racks and transportation routes
     - Supplies unrelated to processing being stored in work areas
  4. **Defects**
     - Sets put together with missing instruments, extra instruments or wrong instruments
     - Improper count sheets or documentation
     - Instruments not returned to decontamination in their original container
     - Sets returned with instruments missing
  5. **Time**
     - Staff scheduling doesn’t match workload demand
     - Assemblers waiting for a set from the decontamination area
     - Miscellaneous material (linens) arriving in containers from the OR that slows decontamination
  6. **Safety**
     - Ergonomically poor workstation layouts create reaching and excessive movement

**See SELF-STUDY on page 48**
- Sharps, fluid and other hazardous material in containers at the decontamination stage
- Simplify the work process: The intent of simplification is to promote full-capacity use of equipment and facilities by reducing bottlenecks, and to develop a smooth flow of materials, work and communication. Simplification focuses on the elimination or reduction of unnecessary work, rework, fatiguing motions, long transports and complicated paperwork by using easier methods and mechanization. It improves quality by improving work practices and inspection techniques, and reduces accidents and infections by eliminating hazards, reviewing work conditions and encouraging proper cleaning within the SPD.
- Work simplification can only be accomplished with an open mind, and no work process can be taken for granted. The steps to work simplification are straightforward:
  1. Select the job or function to be improved. The basic principles for developing a new process can handle twice as much, or more, as the other steps. This imbalance causes waste in the over-capacity areas and backlogs, clutter, and late deliveries in the under-capacity areas.
  2. Break the job down in detail. Make a process chart that shows the entire cycle. Be certain to note the time and distance associated with each step in the process. Only then can you account for improvement.
  3. Question each detail; is it necessary and does it add value for the customer?
  4. Develop the new method. The basic process chart include:

   - Arrange the steps in the best order (ask why it is done there, why in this order, why is it designed this way?)
   - Make the steps as efficient as possible
   - Reduce handling
   - Combine steps
   - Shorten moves
   - Provide the most economical means to move the set through the process

5. Implement the new process, ensuring that all involved persons are adequately trained in the new process and have the opportunity to provide feedback on the changes.
6. Review, measure and repeat. Continuous improvement is a never-ending cycle.

- Balance the Capacity Line: Reprocessing capacity refers to the ability of the process to handle the workload that is expected of it, matching the output of the preceding operation and the requirements of the next. SPD process flows can show capacity variations of 100% or more, meaning that a single step in the process can handle twice as much, or more, as the other steps. This imbalance causes waste in the over-capacity areas and backlogs, clutter, and late deliveries in the under-capacity areas.

   Too often managers think in terms of maximizing the use of a piece of equipment rather than optimizing capacity for the entire process. For example, the production capacity of an SPD’s washer-disinfectors and sterilizers is often found to greatly exceed the capacity of technicians to assemble sets between the disinfection and sterilization processes. Many CS managers neglect to address the growing backlog of work in the assembly area.

   There are two linked elements to the capacity picture. The first element is the capacity analysis, which will tell you the number of pieces of equipment (washers, sterilizers, etc.) and instrument set assembly workstations that are required to meet a given level of demand. The second element is the identification of bottlenecks and proper use of those areas.

   Analyze Capacity: A capacity plan or model for an SPD begins with an accurate

Instrument Set Assembly

<table>
<thead>
<tr>
<th>Set is complete, point Count Sheet</th>
<th>Scan individual instrument multiple scenarios</th>
<th>Repair Maintenance flag for instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set missing instruments</td>
<td>Instrument replacement available</td>
<td>Instrument returned or scan to peg board</td>
</tr>
<tr>
<td>Supervisor decision</td>
<td>Scan instrument From “Pegboard” to set</td>
<td>Track PAR levels of instrument stock</td>
</tr>
<tr>
<td>OFF Site works with Osiris to find instrument left at hospital</td>
<td>Make substitution written on Count Sheet if needed</td>
<td>Set placed in container or wrapped – quality check performed</td>
</tr>
<tr>
<td>2D mark read on instrument</td>
<td>Raimark performed and instrument returned to use</td>
<td>Instrument used to complete sets or scan to peg board</td>
</tr>
<tr>
<td>Extra instruments or peel packed instruments in set</td>
<td>Extra belongs in another set</td>
<td>Instruments used to complete sets or scan to peg board</td>
</tr>
<tr>
<td>Extra is a single item</td>
<td>After assembly scan to Extra Blue Bin</td>
<td></td>
</tr>
<tr>
<td>Extra belongs in another set</td>
<td>After assembly scan to Extra Blue Bin</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2
workload picture. In most cases this workload is the direct result of a given number of OR procedures. The steps taken to determine workload are:
1. Identify the sources of instrument reprocessing for the SPD.
2. Determine the number of procedures within these identified sources.
3. Determine the number of instrument sets, rigid containers, single instruments, etc. commonly associated with these cases.
4. Document the timing of the workload arriving in the CS.

This information can then be analyzed in conjunction with data on the department’s reprocessing equipment load capacities, cycle times, etc. Ultimately the capacity analysis provides you with a picture of your SPD’s washer, assembly station and sterilizer requirements.

Identify bottlenecks: In ‘The Goal’, the bottleneck is defined as “any resource whose capacity is equal to or less than the demand placed upon it. A non-bottleneck is any resource whose capacity is greater than the demand placed on it. Bottleneck flow should be on par with demand. The key is to balance flow, not capacity.”

Determine the process point that is least capable of meeting demand, the bottleneck, and manage that point. The first step is to ensure that the bottleneck operation is properly scheduled and staffed to handle the reprocessing workload that is coming into it. This includes having needed supplies available. Next, ensure that the operation, and its equipment, is functioning at peak performance. The last place in your process that you want mechanical troubles is at your bottleneck. Thirdly, acquire additional pieces of equipment or staff to meet demand, if need is determined from the capacity analysis. Finally, manage the remaining process to the level of throughput you are capable of at the bottleneck operation. Balancing flow is much like conducting an orchestra. All parts need to be in sync, and no musician gets extra credit for finishing first.

Step 3: Sequence and set up the workstations
In general, the most effective SPD is laid out in a somewhat departmentalized, linear flow. This is contrary to Lean philosophy, but is necessary in order to separate the clean and dirty areas within the sterile processing environment. Typically a decontamination room is set up to handle dirty instruments and supplies. Then partitioning walls are placed to separate dirty and clean areas, and the mechanical washers are placed behind these walls. Next, an assembly area is normally set up as a separate department, followed by the quality check and sterilization functional areas.

In addition, each workstation must be set up and arranged so that all necessary and frequently used items are within arm’s reach and always available. Items that are less frequently used can be placed in cabinets or drawers, or on shelves at the workstation, and any item that is not used routinely can be removed and placed in an easily accessible storage area. Properly designed seating, floor fatigue mats and ergonomically arranged workstations help create a safe, clean and relatively pleasant work environment. These elements, in conjunction with well-defined processes and expectations and management support, help to ensure that employees are consistently productive and efficient in their processes.

Step 4: Standardize work practices
Standardized work practices define and document the most efficient way to complete a task. It is impossible to establish a baseline or best practice and make consistent across-the-board changes when people perform the same task differently. Without standardized work practices, continuous improvement is not attainable and abnormal events may go undetected.

Standardized work practices must be developed and documented as procedures and work instructions by those performing the tasks. These documents should include detailed diagrams and training aids. All employees should then be trained in the acceptable practices, and management should follow up to ensure that they are adhered to. This approach provides clear, up-to-date guidance that can be followed by even the most inexperienced CS technician, and thereby helps the department keep up with the surgical department’s ever-changing needs. It also helps identify problems in the process or practice. Process changes and improvements are continually encouraged, and they are documented and trained as they occur.

Rather than stifling creativity, the continuous improvement process empowers employees to offer solutions and make choices within optimal boundaries.

Step 5: Develop a scheduling process
The sequence of the SPD operation must be logical and easily understood, and must flow without interruption or delay. It is important to “push” instrumentation through the decontamination function immediately and on a first come, first-served basis, since it’s important to remove biohazardous material from instruments as quickly as possible. However, once the instruments have been pushed through the decontamination process, the assembly technicians can apply the “pull” method to prioritize their work according to customer demands. At this point, they have the option to choose which instruments to process and thereby pull them through the process based on the OR schedule, their order of priority and any missing instrument needs from the OR.

Step 6: Measure process performance
Processes must be supported with strong metrics that align with a hospital’s values. We all measure what we value. For example, most people value their personal financial solvency, so they measure their money in the form of income and bank account balances, and adjust activities and expenses to stay solvent. Measures like this create a link between what we value and appropriate action.

In this case, SPD managers need to measure what matters to the SPD and its customers. Effective metrics for SPD processes help to establish the difference between perception and reality. They provide data that lead to sound decision-making, help identify process bottlenecks, and determine customer satisfaction levels. Metrics also provide a baseline against which to measure performance and track whether improvements are temporary or sustained. Furthermore, the use of consistent metrics can help measure the impact of improvement. They weave accountability into the initiative and provide a tangible picture of the organization’s efforts. To begin measuring, a baseline must be determined at the start of the improvement effort, or it must be ascertained by methodical review of past records.

The second purpose of measurement is to sustain and then drive additional improvements within the same processes. According to the authors of “Six Sigma,” the breakthrough management strategy, organizations “need to establish improvement goals, referred to as stretch goals, which focus people on changing the process rather than tweaking the existing processes. This can lead to exponential improvement.”

The right measurements: There is a rule of process improvement that states, “We can’t change what we don’t measure,” and its corollary: “Don’t measure what you won’t change.” It is important that measures be properly focused on elements of the operation that reflect what you value and want to improve. For example, if customer satisfaction is valued by your SPD, then there must be a way to continually measure that value. First, identify what steps in your processes are critical to customer satisfaction. Next, correlate your process map to the elements that are critical to improving customer satisfaction.
Performance factors should be tracked, post-
• If equipment utilization is the key mea-
• Piece count is used as a measure of
• Customer satisfaction and quality; the
as output or results per hour.
and productivity should be clearly defined
understanding of what is expected of them,
appropriate corrections and impact results
once a month; by then, the data is “old
news” and they are focused on the current
months’ issues. A manager or employee
who is aware of poor trends early can make
appropriate corrections and impact results
early. Department staff should have a clear
understanding of what is expected of them,
and productivity should be clearly defined
as output or results per hour.
Some key metrics that can be used within
an SPD are:
• Customer satisfaction and quality; the
100% goal metrics. This includes mea-
sures of cleanliness, sterility and complete-
ness of instruments and sets presented to
the OR, and the timeliness of delivery.
• Demand; the workload volume and timing of
receipt into the department. This metric
assists you in understanding bottlenecks and
staffing requirements.
• SPD hours per procedure; a benchmark by
which to compare your staff performance
level against that of other institutions.
(A caution about using this performance
indicator as a staffing level determinant:
not all SPDs perform identical tasks, and
therefore the metric may not be exact.
For example, one SPD we encountered
during a project employed SPD staff as
runners, to collect instrumentation and
durable medical equipment from 5 OR
floors, bring it to CS, clean the durable
medical equipment, and then return the
items to central supply. This represented
also a considerable workload expansion that
we have not observed in other hospitals.)
• Productivity; items or tasks completed
within a given time frame. This measure
ensures that your department is perform-
ing effectively and requires that reasonable
expectancies (standards) be established for
each key task included in the workload.
• Skill mix and competency; a measure of skill
attainment, both individually and organi-
zationally. Identifying skill sets required
for the successful operation of an SPD and
the competency rating of each employee
provides powerful insight to training needs
and your ability to move cross-trained
employees to understaffed areas during
peak demand. There are variations of these
metrics, as well as additional measures that
can be used. Select those that best suit your
organization and its objectives.

Step 7: Actively manage and supervise
• Communication and supervision - Man-
agement’s daily interaction with their
sterile processing workforce is often
undervalued or neglected. Typical com-
ments from supervisors include: “I don’t
have time to spend with my people,”
or, “my people all know what to do, I
don’t need to follow up,” or even “that’s
micro-managing.” A cycle of supervisor-
to-employee communication, especially
effective assignment-giving and routine
follow-up is critical to the success of the
SPD. Regular interaction ensures that
the standardized processes and practices
that have been established are being followed,
and that problems are being identified
and acted upon quickly. In the absence
of ongoing supervision SPD staff, with the
very best of intentions, will often begin to
do things their own way, causing deviation
from the standardized procedure and pro-
cess drift. No aspect of process or practice
should be taken for granted by supervisors
or employees.
• Problem resolution and documentation -
Another process improvement rule states:
“If it isn’t written, it isn’t done.” In other
words, if the task isn’t important enough
to write down and follow up on, it likely
won’t be important enough to complete.
Beginning with the waste and bottlenecks
discovered by process mapping and work-
flow optimization activities, all improve-
ment data and tasks must be set down in
a document to assure effective control and
follow-up. When problems arise, an
action item list containing a description of
the problem, the name of the person
who brought it to the improvement team’s
attention, planned resolution steps, assign-
ment of responsibility and due date should

Ready for improvement?
The forces acting upon hospitals now are
the same ones that have existed for years.
However, in today’s economic and legislative
climate, increased transparency and account-
ability for factors that contribute to produc-
tivity and infection rates have led to a greater
sense of urgency to improve processes and
practices. The inability to perform at expected
service levels because of dysfunctional or
wasteful processes must be addressed; and
the sooner the better.
But it doesn’t have to take a stressor or a
crisis. Forward-thinking managers can
drive a change effort by recognizing that
their current processes are less than perfect.
Organizations that are healthy are often in a
better position to make dramatic improve-
ments simply because the resources are
available and the process can move forward
without an extreme sense of urgency. We’ve
discussed many elements for optimizing
workflow and have looked at what it takes
to employ these elements in your own SPDs.
Take the first step by understanding your
process as it exists today and identify the first
opportunity for improvement. Now you are
on your way down the workflow optimiza-

References:
5. Mikel Harry, Ph.D., Richard Schroeder, Six Sigma, the Break-
6. Yasuhiro Monden, Toyota Production System. Industrial Engi-
CONTINUING EDUCATION TEST • SEPTEMBER 2011

Achieving LEAN sterile processing

Circle the one correct answer:

1. Workflow optimization in the SPD can help address which of the following challenges?
   a. Process inefficiencies
   b. Varying reprocessing demand
   c. Poor resource utilization
   d. All of the above

2. Two of the best sources of ideas for process improvement are:
   a. CS supervisors and technicians
   b. CS technicians and OR staff
   c. Instrument vendors and hospital management
   d. a and c

3. Value-Added activities are those that take time, resources or space, but do not add value to the product.
   a. True
   b. False

4. Assembly of sets missing instruments is an example of value-added work
   a. True
   b. False

5. Which of the following SPD workload functions are best scheduled and prioritized using a Pull system?
   a. Transport of dirty instruments to the SPD and decontamination
   b. Assembly and sterilization
   c. Decontamination and sterilization
   d. Case cart assembly and decontamination

6. A process map is:
   a. A map showing transportation routes from the OR to CS
   b. A visual representation of the surgical instrument reprocessing cycle
   c. A document providing work instruction to the CS technician
   d. None of the above

7. SterilTek Inc.’s 100% SPD goal includes:
   a. 100% clean and sterile instruments
   b. 100% complete instrument sets
   c. 100% on time delivery to the OR
   d. All of the above

8. Primary tools used to optimize workflow include:
   a. Streamlining and work process simplification
   b. Capacity line balancing and standardized work practices
   c. Workstation layout and staff scheduling
   d. All of the above

9. A bottleneck is any resource whose capacity is equal to or less than the demand placed upon it.
   a. True
   b. False

10. Why are metrics and performance measures important in SPD?
    a. To measure the impact of improvements
    b. To identify tasks that may be eliminated
    c. To sustain gains made and encourage additional improvement
    d. a and c

---

Request for Scoring

☐ I have enclosed the scoring fee of $10.
   (Payable to KSR Publishing, Inc. We regret that no refunds can be given. Multiple submissions may be paid with a single check.)

Detach exam and return to:
Continuing Education Division
KSR Publishing, Inc.
2477 Stickney Point Road, Suite 315B
Sarasota, FL 34231
PH: 941-927-9345 Fax: 941-927-9588

Please print or type. Return this page only.

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
</tr>
<tr>
<td>Hospital Name</td>
</tr>
<tr>
<td>Mailing Address</td>
</tr>
<tr>
<td>Apt/Suite</td>
</tr>
<tr>
<td>City, State, Zip</td>
</tr>
<tr>
<td>Daytime Phone</td>
</tr>
<tr>
<td>E-mail</td>
</tr>
</tbody>
</table>