The case cart conundrum

An engineered approach to procuring, implementing, and managing a surgical case cart system

by Derrick Bransby

Stroll into any surgical facility that operates a case cart system and it's likely that you will find case carts strewn about the surgical floor, the sterile processing department, and every hallway in between. Even in the most well run perioperative systems case carts present a unique set of challenges; from storage and staging, to case picking, to transport, to system ownership. How can something so simple at first glance be so difficult in practice?

Too often such difficulties arise from inadequate and/or ineffective planning during the design, procurement, and implementation process. However, these headaches are avoidable. Investing time and effort in a thorough, well executed, systems approach to planning and design pays dividends in the future. Through application of industrial engineering (IE) concepts such as Lean methods, discrete event simulation, and operations research, just to name a few, a case cart system can be designed and optimized in such a way that allows for efficient, effective, and responsive operation. Such an operation directly enables the delivery of cost effective, high quality, patient-centered surgical care – the goal of all health care organizations.

Engineer the approach

Peter Senge, an American systems scientist who wrote the influential book *The Fifth Discipline*, defines systems thinking as, "...a way of thinking about, and a language for describing, the forces and interrelationships that shape the behavior of systems."[1] Systems thinking is extremely effective when solving complex, interrelated, multi-layer problems such as planning, implementing, and managing a case cart system. Systems thinkers not only examine system components, but also examine the interactions and relationships between these components; a step that is all too often omitted during the planning process. Obviously, before applying such an approach the system in question must be defined. Two IE tools – the value stream map and process flow chart – are particularly well-suited for this task.

A value stream map (VSM) is a Lean method for analyzing the flow and state of materials, resources, information, and related data through a system. A well-constructed VSM starts and ends with the customer. A process flow chart complements the VSM by defining the sequence of inputs, outputs, actions and decisions within a system. When creating a VSM and process flow chart for a case cart system consider the following:

- Who is my customer? Is it the patient? Is it the clinical staff?
- What materials flow through my system? (case carts, instrument kits, supplies, etc.)
- What resources flow through my system? (nurses, surgeons, patients, staff, etc.)
- What type of information flows through my system? (patient records, preference cards, verbal communication, etc.)
- Does the state of materials, resources and/or information transform within the system? (clean/soiled, available/occupied, etc.)
- What actions must be taken to prepare a case cart for a procedure? What decisions must be made during this process?

After creating a VSM and process flow chart, revisit each and apply systems thinking; identify and document the interactions and relationships within the system. How does one element within the system effect another? Doing so will ensure a comprehensive understanding of intended operations, identify system features that require in-depth analysis, and detect potential points of failure.

"Right Size" the fleet

Constructing a VSM and process flow chart in the early stages of planning is extremely worthwhile for all involved. These documents can be used by the design team to solicit feedback from stakeholders and generate valuable dialog. They can be used by equipment planners and procurement specialists to identify the quantity and duty of equipment required to enable case cart operations. They can even be used by OR managers and administrators to implement and manage their new case cart system. As an added benefit, a well-constructed VSM and process flow chart can be used to determine the optimal size, or "right size", a facilities case cart fleet. Not only does this ensure that the proper number of case carts

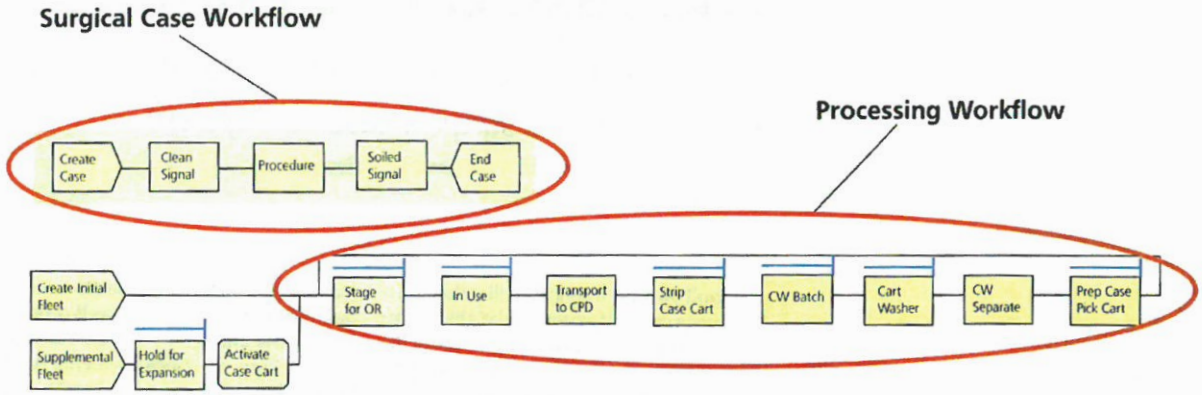

Figure 1: Discrete event simulation (DES) is a powerful tool used by engineers to define a complex process as an ordered set of distinct, well-defined events, much like those in a process flow chart.

are purchased, but also ensures that adequate staging and storage space is captured for carts within the sterile processing department and on the surgical floor.

A number of mathematical approaches – some simple, some complex – can be used to estimate the number of case carts required to serve a surgical platform. Simple calculations based on cases per day and carts per case can be used to quickly "bracket" the size of a case cart fleet. For instance, maximum fleet size can be estimated by assuming that every case will require its own case cart (i.e., no turn over; a case cart cannot be used more than once per day). In other words, the maximum fleet size is equal to the average number of daily cases. While useful in some instances, these estimates do not mirror reality. Surgical systems are notoriously complex; they have many components and are inherently variable. While the accuracy of simple calculations can be improved by considering additional information to include the number of carts per case (i.e., case complexity) and turn-around time (i.e., processing speed) they are far too simple to capture the interactions and relationships between the processes, resources, and information involved in a case cart system. Luckily, discrete event simulation is a perfectly suited mathematical tool.

Simulation and modeling

Discrete event simulation (DES) is a powerful tool used by engineers to define a complex process as an ordered set of distinct, well-defined events, much like those in a process flow chart. DES enables an engineer to quickly and efficiently study complex interactions and relationships between system components and account for variability while measuring their effect on system performance. (See Figure 1.)

Just like the systems they evaluate, every DES model is unique. No two institutions operate in the same manner, and therefore require a tailored solution. Despite this fact, the basic steps involved in DES modeling remain constant:

1. Define the system as a series of distinct events (i.e., processes, decisions, etc.).
2. Create statistical distributions that describe each event (i.e., length of case, type of case, processing time, etc.).
3. Constrain the system with resources and schedules (i.e., people and/or machines).
4. Run the model multiple times (referred to as replications) and collect model outputs.
5. Analyze outputs, adjust the model, and test alternatives as appropriate.

Outputs from such a model are often the subject of statistical analysis and used to generate key performance indicators (KPIs) that describe system performance. In turn, these KPIs can be used by the design team, project stakeholders, and facility leadership to make thoughtful, well-informed design, procurement, implementation, and management decisions. Furthermore, simulation allows one to experiment with design alternatives with little to no additional cost.

Case study: Case cart simulation in action

Calculating the number of case carts required to serve a surgical platform is crucial to making well-informed procurement and design decisions in a new facility. At one such facility, located in eastern Massachusetts, a simulation strategy was applied to right-size the cart fleet and ensure adequate staging and storage space for the fleet within the facility.

To begin, simple estimates were established by calculating maximum, medium, and minimum fleet size based on historical case history. Assumptions were made to simplify the calculations and quickly arrive at defined range.

- **Maximum (conservative)** – a case cart can be used only once per day.
- **Medium** – a case cart returned to the SPD before 9AM can be used again after 12PM.
- **Minimum (aggressive)** – a case cart used for a case before 12PM can be used again after 12PM.

Using the assumptions above, it was estimated anywhere between **24 and 76 case carts** would be required to serve the twelve (12) OR's planned for the facility. It was likely that the actual value would be near **64 carts**, as determined by the assumptions used in the medium scheme. (See Figure 2, page 65.)

After calculating an estimated fleet size, a DES model was constructed to further refine the fleets intended size. First, statistical distributions to describe surgical schedule, length of procedure, and case carts per case were constructed from historical data obtained from the institution. Such distributions are used by the model to generate demand all while accounting for variability and reflecting the unique needs of the facility. Next, a processing workflow was defined. This workflow accounted for the various steps involved in preparing a case cart (i.e., transport, stripping, washing, drying, picking, etc.), as well as the resources required to do so (i.e., sterile processing technicians, cart washer/disinfectors, etc.). Finally, the model was configured and verified against current state data and user expectations.

Outputs of the model were used to define the number of case carts required to serve the ORs planned for the facility, as well as the maximum number of carts that would could be expected to reside at any location in the facility, such as soiled utility rooms, the sterile processing department, or the sterile core. Upon completion, the simulation model indicated that **approximately 56 case carts, plus or minus 5**, would be required to serve the OR system. As expected, this value fit within the range determined by estimation, and was near to the medium scheme value. Statistical

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Case Cart Fleet Assumptions (Min)	OR	PR	UOM
Number of Rooms	*12.00*	*6.00*	*Rooms*
Stage to Room in AM	2.00	1.00	Carts
Case Cart Fleet Size	**24.00**	**6.00**	**Carts**

Case Cart Fleet Assumptions (Med)	OR	PR	UOM
Number of Rooms	*12.00*	*6.00*	*Rooms*
Cases Ending Before 9 AM	18.45		Cases
Cases Starting After 12 PM	9.10		Cases
Avereage Case Carts per Case	1.38		Carts
Case Carts Required Aftert 12 PM	12.56		Carts
Mix Cart Fleet Size	75.85		Carts
Case Cart Fleet Size	**63.28**	**6.00**	**Carts**

Case Cart Fleet Assumptions (Max)	OR	PR	UOM
Number of Rooms	*12.00*	*6.00*	*Rooms*
Daily Average Cases	54.96	27.48	Cases
Average Daily Cases per Room	4.58	4.58	Cases
Average Case Carts per Case	1.38	0.20	Carts
Case Cart Fleet Size	**75.85**	**5.50**	**Carts**

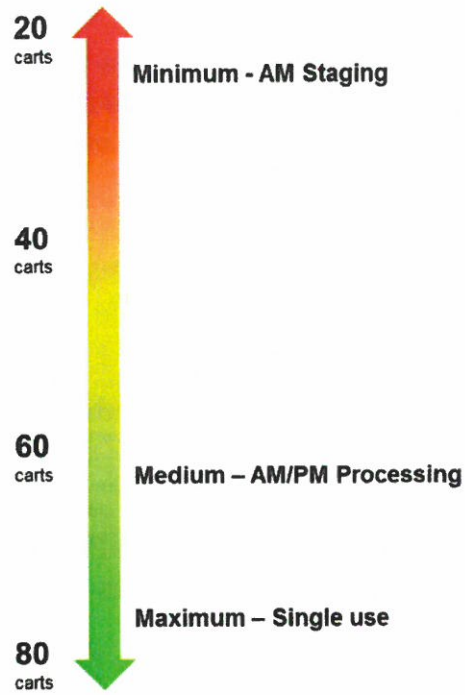

Figure 2: Estimating case cart fleet size based on simplifying assumptions is a straightforward method for quickly understanding the approximate size of a case cart fleet.

robustness added by the simulation model made it highly likely that the actual number of case carts required in the future would be near this value. In turn, these quantities were used by the projects equipment planners to budget for and procure case carts and by the design team to appropriately size the sterile core, sterile processing department, and soiled holding rooms.

Implement best practices

Even after creating a VSM, process flow chart, and discrete event simulation model there are still many industrial engineering concepts that can be applied to avoid headaches in the future. These concepts take the form of best practices, many of which find their roots within manufacturing and distribution systems – the traditional focus of industrial engineers. These concepts include:

1. **Slotting** – Slotting is an industrial practice whereby fast moving items are placed in locations that are easy to access and restock. Slow moving items are placed in less accessible locations that may require a staff member to travel a greater distance to acquire. A well slotted SPD will dramatically increase the overall performance of a case cart system.
2. **Just-In-Time (JIT) Processing** – JIT processing is a strategy developed and perfected by Toyota whereby efficiency is increased and cost decreased by receiving goods only when they are needed. A JIT case cart operation delivers instrumentation, surgical supplies, and case carts to the OR when needed, in the quantity needed, in the state needed. Implementing a JIT philosophy when implementing and managing a case cart system ensures that neither the surgical floor nor sterile processing department is overwhelmed by clean or soiled case carts.
3. **Eliminate Waste** – in any system, it is crucial to eliminate wasteful, non-value added activities to include excess travel, double handling, waiting, underutilized resources, and rework to name a few. Eliminating waste (sometimes referred to as "muda", the Japanese word for waste) increases efficiency while decreasing cost.

By no means are these the only principles that should be considered when planning a case cart system, however, it's likely that application of these three concepts will dramatically reduce the likelihood of implementation and management difficulties in the future.

Though a relatively new trend, engineers have adapted their skill set to the health care industry and have remained focused on increasing efficiency, quality, and patient safety while decreasing cost and errors. In a day and age when health care organizations are continually asked to do more with less in an ever increasingly complex environment, the role of a systems thinker is an important one. HPN

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1. Senge, P. M. (1994). The fifth discipline fieldbook: Strategies and tools for building a learning organization. New York: Doubleday/Currency

Case Cart Preparation

By Paul Wafer, BS, MBA, RN

Part Two: Surgical Preference Lists and Case Carts

Below I describe who, what, where, when and why (not in that order) of building a procedure case cart.

What

Prior to a procedure, the preference lists discussed in last month's newsletter, are pulled for the scheduled cases. All of the items on the list should be placed on a cart in an orderly manner so that the circulating nurse and the surgical technician can bring the supplies into the procedure room and open all of the supplies. At the end of the case, this same cart should be used for transporting either the left over supplies, or the dirty instruments to the appropriate area for further disposition.

There are 2 kinds of case carts:

- **Open carts** do not confine and contain the items pre or post-operatively. This means that it is possible for someone in a hurry to find a supply on an already prepared cart and take it. Additionally, at the end of the case, it is difficult to confine and contain dirty instruments on an open cart. We frequently see hospitals not in compliance with this recommended practice from AORN. There are disposable plastic enclosure bags that can be used for this purpose and should be implemented if this is your current process.

- **Closed carts** are typically made like a rolling cabinet with a door that closes and multiple shelves inside. There are a number of shapes and sizes available and they should be selected based on the types of cases performed at the facility, the available space for carts, the ability to clean the carts and the preference of the staff that use them. A seal can be place on them to identify if they have been opened, and they more easily confine and contain dirty instruments.

Where

It is important to plan where these case carts will be built and stored prior to the procedure, transported and cleaned after the procedure, and stored until use again:

Why

The most efficient way to pick a case cart is just shortly before the surgery for a number of reasons. Below are just a few:

- Case is less likely to cancel
- The surgical instrumentation has had sufficient time to be reprocessed and sterilized
- One person can pick the entire case in sequence and be totally accountable for its contents
- Less potential for someone to take an item off of the cart

If there are problems with inventory, this is a separate issue that needs to be addressed. We recommend a daily huddle to review the surgery schedule several days in advance and determine if there are an unusual number of cases that require the same resources. If that occurs, you should have sufficient time to order in additional inventory to meet the increased demand.

If you are having problems with your preference lists or case carts, give us a call, 888-632-5742 we can help.

Contact us with any questions:
Alpha Consulting Group, Inc.
888-632-5742
alpha@alphaconsultinggroupinc.com
www.alphaconsultinggroupinc.com

If you would like to continue to receive these tips, you do not need to do anything. If not, just unsubscribe at the link below.

Renovating, rebuilding SPD areas recharge quality focus

by Kara Nadeau Della Vecchia

As the healthcare industry focuses on the need to deliver higher-quality patient care in a more cost-effective manner, hospitals and health systems are investing in new spaces, processes and technologies to boost the efficiency and performance of their Central Service/Sterile Processing Departments (CS/SPD). In this article, ***Healthcare Purchasing News*** highlights ways in which healthcare organizations are enhancing patient care while tackling waste and inefficiencies through CS/SPD improvements.

Process efficiency

Because inefficiencies in process drive up costs and can lead to delays in supplying surgeons with the items they need for patient procedures, those planning CS/SPD renovations and rebuilds often focus on ways they can improve workflows through automation, standardization and better organization.

Organized spaces

CS/SPD leaders at Silver Cross Hospital, an independent 289-bed hospital in New Lenox, IL, recognized how the organization, or lack thereof, of the department's storage room made it challenging for staff to quickly locate items needed for cases. To address this issue, they designed their new department with a state-of-the-art storage space where sterile trays and disposables are stored together in the same aisles, which has increased case cart picking productivity.

Dehlia Hatten, SPD Supervisor for Silver Cross Hospital, explains how they implemented a "library style" design where each specialty has its own aisle with a legend that outlines the products within it. For each specialty, trays are housed on one end of the aisle and disposables on the other so a SPD staff member can have the entire case picked by the time he/she makes it to the end of the aisle.

Silver Cross Hospital's "library style" storage space

"It previously took 20 minutes to pick a case where it now takes an average of five minutes, at least for small cases," said Hatten. "Larger cases, such as a total joint, take a bit longer to pick but still significantly less time than it did before the redesign."

Standardization

In most facilities, CS/SPD staff members build case carts the day prior to the procedures in which they are used. While on the surface this seems like the optimal solution, ensuring items are available well ahead of case start times, there can be numerous inefficiencies underlying the process.

At Sanford Medical Center in Fargo, ND, a 583-bed hospital that provides care for patients from across the Midwest, staff would pick a case for a next-day procedure and then spend the next 19+ hours "babysitting" the cart, which included changing its parking spot, adding/removing items needed for the current day's work, documenting all alterations manually, creating turnover lists to manage resources, changing surgery start times, and putting away items for canceled cases.

The organization has reduced case cart through-put time from 22 hours down to just four hours by implementing a just-in-time (JIT) case picking process where carts are picked four-hours prior to the procedure. To boost efficiency, each case cart is picked and assembled from start-to-finish by a single CS/SPD staff member who is held accountable for the accuracy of the items within. When a case cancels, it typically happens before the items for it were picked, minimizing rework and restocking of items.

"JIT is one of our most successful improvement projects. It has sustained for over five years," said Sarah Puhalla, CRCST, Metrics/Data Specialist for Central Supply, Processing & Distribution, Sanford Medical Center. "JIT case picking is now our standard work; it is ingrained in our culture. We continue to analyze this work and make small incremental improvements each year."

Leesar: Decontamination – in-line sinks and high capacity STERIS Vision washer/decontaminators

Centralization

One way to standardize CS/SPD processes for greater efficiency is to establish a centralized service center that performs sterile instrument processing, instrument maintenance/repairs and supply distribution for multiple facilities. In 2011, LeeSar built a 50,000 square foot sterile processing center

Closed Cart

to serve this function for four Lee Memorial Health System hospitals: Lee Memorial, Cape Coral, HealthPark and Florida Gulf Coast.

LeeSar is transitioning each of the facilities to off-site CS/SPD operations one facility at a time, having recently completed the process for the first acute care facility. The LeeSar sterile processing center will house the majority of the facilities' surgical supplies, with its staff performing decontamination, sterilization and case cart picking to facilitate just-in-time delivery of surgical trays on the morning of the procedures. LeeSar has partnered with a surgical instrument repair business that has set up a full lab in the sterile processing center to facilitate all instrument maintenance/repairs.

"This model has greatly increased efficiency and provided a real labor savings for the facility," said Barb Adams, RN, MS, CNOR, Executive Director, Sterile Processing Operations, LeeSar Regional Service Center. "Circulators and scrub techs no longer spend their time chasing down instruments, and cases move through the ORs more effectively. Furthermore, because sterile processing staff are off-site they can focus on their job of providing surgeons with properly prepared and assembled trays."

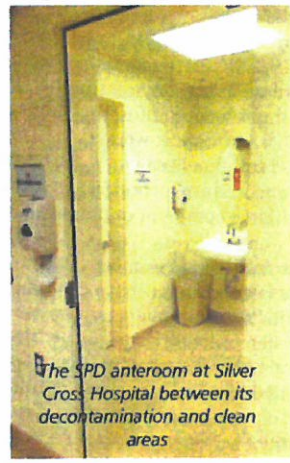
The right people, processes and technologies

When asked what processes and design elements healthcare facilities can put into place to improve efficiency, Sandesh Jagdev, Principal, Logimaxx, states:

"Improving efficiency in CS/SPD leading to reduced waste, better productivity and improved safety requires a multifaceted strategy. It starts with having the right management structure with well-aligned functional spaces and streamlined processes. Making the best use of existing technology coupled with precise communication protocol is also critical to the overall success. And finally, training of employees and monitoring performance are keys to implementing and managing change."

Preserving sterility

When renovating or rebuilding an existing CS/SPD, or designing a new department from scratch, finding ways to avoid recontamination of sterile instruments is a top priority. Establishing separate spaces with clearly defined boundaries for different functions, leveraging technologies for automation of processes and implementing standardized workflows are some of the ways that healthcare facilities are overcoming this challenge.



The SPD anteroom at Silver Cross Hospital between its decontamination and clean areas

Separate spaces

The new CS/SPD at Silver Cross Hospital features an anteroom between its decontamination and clean areas. The room contains a hand washing station and storage for gowns, covers and masks. Staff walking from the clean area to the decontamination area can use this room to gown up, while those transitioning from decontamination to clean can use this space to wash their hands. Personal protective equipment (PPE) is removed just prior to entering the anteroom.

At the LeeSar sterile processing center, even the trucks used to transport trays to and from the facilities it serves are divided into "clean" and "dirty". Within its fleet of trucks, there are those designated for delivering sterile trays to the ORs and others used only to transport contaminated loads from the ORs to the sterile processing center. The sterile processing center also has separate loading and unloading docks for clean and contaminated supplies so that sterile trays never cross with those that are dirty.

Leesar: Automatic load and unload sterilizer allows a load in the chamber and another queued while a completed load is ejected.

When asked what design elements and technologies healthcare facilities can put into place to protect sterilized instruments from contamination, Getinge USA Facility Designers Brian Putnam and Diane Lane offer this recommendation:

"The best way to facilitate ideal decontamination separation from the sterile area and prevent any cross contamination between the spaces is to utilize a 3-zone system. This system would consist of a barrier wall between the decontamination and clean space with double door washers and another barrier wall between the clean and sterile space with double door sterilizers. There should be no additional doors in the wall unless they are designed with an air lock and if any type of pass-through window is used it should be able to close automatically or be a chamber type design. Also within the 3-zone system the HVAC should be designed so that there is positive air pressure on the sterile side of the department to contain airborne pathogens."

While an ideal CS/SPD is designed to include separate rooms or areas for each function, most healthcare organizations face the reality of space constraints. To overcome this challenge, Jagdev offers this advice:

"When physical separation of decontamination area from sterile areas are not practical due to physical constraints, performing a risk analysis could lead to what process changes you could make to prevent cross-contamination and recontamination. Improving functional separation through airflow patterns or separation of activities are some primary steps in accomplishing the separation of decontamination areas from sterile areas."

He adds: "Another way to minimize decontamination from sterile areas is to have a resource available to review the latest guidelines on a periodic basis and help retrain employees that are affected by changes in the guidelines. The door and pass through window between clean and dirty is often left open, but per guidelines, both the door and pass through window need to be closed to maintain the airflow needed to prevent contaminants from escaping to the clean side. The objective of separation of dirty/clean/assembly is to limit environmental contamination by containment, which limits the bioburden on devices to be high-level disinfected or sterilized. Retrain-

*See **CS CONNECTION** on page 32*

members will have space, in Hatten's words, "to decompress."

"Often these spaces are overlooked or downsized when planning a sterile processing department and that's when you run into problems," said Jim Tyrell, SPD Manager for Silver Cross Hospital.

Ergonomics

The ergonomics of the workspace and equipment that CS/SPD staff members use to process instruments and devices can go a long way in improving comfort and boosting productivity. Adjustable workstations and automated equipment can relieve physical burden and reduce processing steps. Putnam and Lane comment on this approach:

"Equipment that reduces the number of processing steps is beneficial, for instance a tunnel washer with integral sonic cleaner will eliminate the step of loading and unloading a stand-alone sonic cleaner console. Automation is another way to improve efficiency and reduce processing steps. Not only does automation increase throughput but it reduces the amount of loading and unloading of equipment thus eliminating unnecessary motion which allows for better ergonomics."

The LeeSar sterile processing center features 16 ergonomic workstations in the assembly area. Staff members can sit or stand and adjust the chair and table height for comfort and convenience. The facility also features a system by which staff members use a rolling cart to transport trays from the washers to the work stations rather than having to lift the trays.

When designing its new CS/SPD, Silver Cross Hospital carefully considered how ergonomics could play a role in creating a more effective, efficient and agreeable work environment.

"We looked many places for getting the right kind of equipment and built work stations where staff have proper task lighting and height adjustable seating and tables," said Tyrell. "Sometimes staff members are there for eight hours a day so comfort is extremely important."

Advice to others

When asked what advice they had for healthcare facilities planning a CS/SPD renovation or rebuild, the experts offered these recommendations:

It starts with the CS/SPD

"Make sure the SPD team is on board and involved throughout the process from day one, and anticipate new service additions that will impact workflow," said Tyrell. "Because we implemented our robotic program a month after the move to our new hospital but more than a year after our space design was complete, we simply did not have adequate space from day one. We also underestimated how dramatically our volumes would increase as a result of our new facility, our medical staff increased and that included surgeons. Now, as the hospital plans the SPD redesign, our team is playing an active role in the expansion and making decisions on what makes the most sense from a workflow perspective."

Define objectives

"Foundation work for any major initiative like CS/SPD redesign has to start with what are the key goals or objectives that you are trying to accomplish as the end result," said Jagdev. "Goals may vary significantly based on whether you are trying to improve customer service or productivity; in many instances it is both. This usually relates to the problems or issues that you are aware of as part of the current process and what is desired in the future state. Improving turnaround time for reprocessed instruments, reducing flash sterilization, more storage spaces for instruments or supplies, minimizing clinician time in non-clinical activities, and improving staging space for case carts are some of the examples of defining objectives."

Get everyone involved

"It must be all inclusive," said Simpson. "When you start discussing this make sure you have senior support, including the CEO, VPs of Nursing and OR Directors. We met with members of the medical staff, including the surgeons, so that they could understand the changes. Make sure everyone is included in the entire process and keep that communication strong."

Leverage third party advice and resources

"If possible involve a consultant or architect early in the process," recommend Putnam and Lane. "They will be able to determine the viability of the renovation/ rebuild and give an idea of the construction costs associated with a project. The equipment vendor can also be a great resource. If involved early in the design/renovation process they can work closely the person at the facility, and the consultant or architect, to share their expertise in recommending the appropriate mix of equipment that would meet existing and future needs of the project and develop supportive design options at no extra charge to the facility, consultant or architect."

"We had one vendor perform a productivity study where they asked a lot of questions, such as our number of steam loads and projected volume for OR surgeries, and they really helped us set out what exactly what we'd need for that volume," said Puhalla. "It's in a facility's best interest to use vendor resources to their full extent."

Be open to new technologies

"There may be new technologies or methods for cleaning and sterilization that should be considered." said Austin. "For example, Miele offers small size washer-disinfectors that can be configured for ophthalmic instruments. Ophthalmic instruments are generally cleaned manually because they should be separated from other instrument types and because they are very delicate to be putting into a high-impingement washer-disinfector. A small system dedicated to these instruments can improve the process, and is an example of a product that might be missed in the planning phase because planners simply are not aware that product exists."

Consider going off-site

"Look for other solutions to processing your instruments," said Cunningham. "There are companies such as Synergy Health who offer a range of different services. For example, we partner with hospitals to build off-site processing centers and manage all instrumentation across the hospital system within the off-site center, helping to improve quality, reduce operating costs, increase efficiency, in addition to freeing up space within the existing hospitals. The concept of off-site processing is a common occurrence across Europe and Asia and an option that is growing traction in the U.S. within some large hospital systems. A renovation is a great opportunity to evaluate what new concepts/technologies are available for sterile processing and whether your hospital can take advantage of them." HPN

A Synergy off-site SPD facility in Sheffield, UK