

The Benefits of Standardization: Anesthesia Cart Standardization in 62 Operating Rooms Over 5 Surgical Sites

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One of Arizona's largest health systems, Scottsdale Healthcare is a nonprofit, community-based health system with three hospitals, outpatient surgery centers, home health services, community health education and outreach services, as well as clinical and research services not typically found in community health systems.

In 2009 the organization started an aggressive Lean/Processes Improvement (LPI) program to further enhance and improve patient care services. As part of this program, special emphasis was placed on the concept of "standardization" of services and care processes. One of the main areas where standardization is being applied is in perioperative services, and in particular, the anesthesia carts used throughout Scottsdale Healthcare's five surgical sites.

Scottsdale Healthcare's Five Surgical Sites

Name	Number of Operating Rooms	Avg. Number of Surgeries/Month
Osborn Medical Center	9	650
Shea Medical Center	16	996
Thompson Peak Hospital	6	399
Greenbaum Surgical Specialty Hospital	11	619
Piper Surgery Center	10	772
Anesthesia carts outside of Surgical Sites (i.e. MRI, Endoscopy etc.)	10	1000s of procedures

The idea of standardizing anesthesia supply carts throughout the system was raised by anesthesiologist Timothy Beger, MD after he attended a presentation on Lean/PI and the importance of standardization during a Perioperative Surgical Committee meeting.

"Why can't we do this with our anesthesia supply carts?" he asked. "Every cart in every room in every site is set up differently and we always have to search for items, and there are always items in the carts that we rarely use."

Simultaneously, Scottsdale Healthcare's pharmacy team was preparing to launch a new initiative to install small Pyxis machines at every surgical suite throughout the system. This was being done to enhance the

process of capturing medications that are used by anesthesiologists during a procedure. The Pyxis machines had their own carts and each cart had five drawers.

Scottsdale Healthcare's anesthesia, OR, supply chain and Lean/PI teams decided to combine efforts to standardize anesthesia supply carts systemwide, including areas outside surgical suites, such as Endoscopy, MRI and Cardiac Catheterization.

A planning and implementation team was established to oversee the project. The team consisted of individuals from all sites, in roles including:

- Anesthesiology, including physicians and technicians
- Pharmacy
- Supply
- Surgery
- Lean/PI consultants
- Vendor

The primary objectives were:

- Obtain agreement between anesthesiologists on what items should be placed in which drawers
- Develop an A3 as a problem solving and planning document
- Develop a plan of action with a timeline
- Establish and implement an education plan
- Implement the plan of action
- Conduct follow-up and evaluation
- Provide continuous communication to all stakeholders

The team staged the implementation on six different dates and decided carts outside perioperative areas would be handled at the end of the project. The following Lean tools were used in the preparation, implementation and follow-up phases:

- **The 3 Actuals:**
 - 1) *Talking to the actual people who work in the process,*
 - 2) *visiting the actual places where the processes take place, and*
 - 3) *observing the actual processes*
- **Process mapping the current processes by following the 7 types of flows:** *Patient, Provider, Medication, Supplies, Information, Equipment and Processes*
- **Identifying the eight types of waste:** *Transport, Over Processing, Correction, Inventory, Wait, Search, Space and Complexity*
- **Developing the A3:** *Figure 1*
- **5S:** *Sort, Simplify, Sweep, Standardize and Sustain*
- **Measurement:** *Baseline data, post-implementation data and pictures before and after*
- **Spaghetti Diagram:** *Observing and recording the physical movements of staff when they want to retrieve medications and supplies*

1. *The Need for Change*
2. *Stakeholders*
3. *5 Essential Change Elements:* Process Design/Mapping; Communication & Education; Reporting & Accountability; Best Practice Identification and PDSA
4. *Training and Support*
5. *Tasks and Implementation*
6. *Follow-up and Sustainability*

Each of these categories was included an explanation about the nature of activity that will be undertaken and the name of the process owner or point person for each category.

Results

This has been a successful project. Initial results were very encouraging, which provided extra incentives for all stakeholders to move forward and at a faster pace.

Joseph J. Sandor, MD, an anesthesiologist and medical director of Scottsdale Healthcare's Piper Surgery Center said, "Standardization of the anesthesia carts, including Pyxis access for drug access in every operating room, is proving to save time and expense to the system. From the perspective of an anesthesiologist moving from one anesthetizing location to another within the hospital, the consistencies in the anesthesia machines and carts creates a significantly higher level of safety for the patients we are asked to provide anesthesia for."

Dr. Sandor noted that plans call for expanding the standardization of the anesthesia carts to other areas of the hospital, such as endoscopy, cath lab, interventional radiology, CT and MRI. "It allows us to practice in a more efficient environment," he said.

Some specific results of the anesthesia cart standardization project include:

- 80+ percent reductions in medication discrepancies between used and recorded
- Physician and staff satisfaction was very obvious, with reduced need to walk by an average of 50 miles per month.
- Anesthesia physicians and technicians are happy they don't have to waste time looking in every drawer to find an item. These professionals were involved in determining the specific item to be stocked in specific drawers.

Scottsdale Healthcare Anesthesia Department Chairman Greg Morris, MD said, "This was a perfect target for the Lean process. It has simplified stocking, reduced waste, saved money and ultimately will improve patient care and safety."

Anesthesia Cart



Various Bins/Layout (by room & by site)

(6) Drawers

Pyxis Machine



(2) 4-bin cabinets
(1) 5-bin cabinet

(2) Wire Baskets attached to the side

(2) Bottom Drawers

Figure 2: Before

Figure 3: After



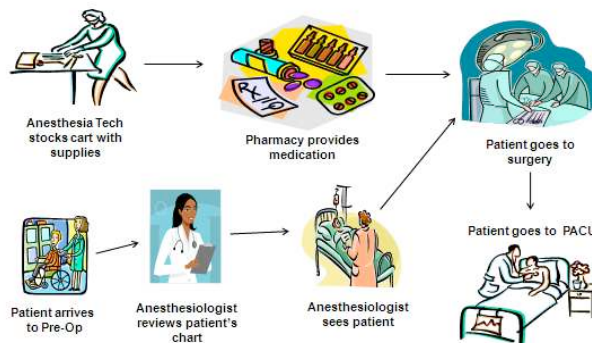
Lack of standardization of supply layout or par levels across the system



Figure 4: This "Before Picture" shows the same drawer from three different sites. No two drawers contained the same items.

Figure 5: This "After Picture" demonstrates how all items in the carts were standardized across the system in terms of type, quantity and location.

Figure 6: High Level Flow



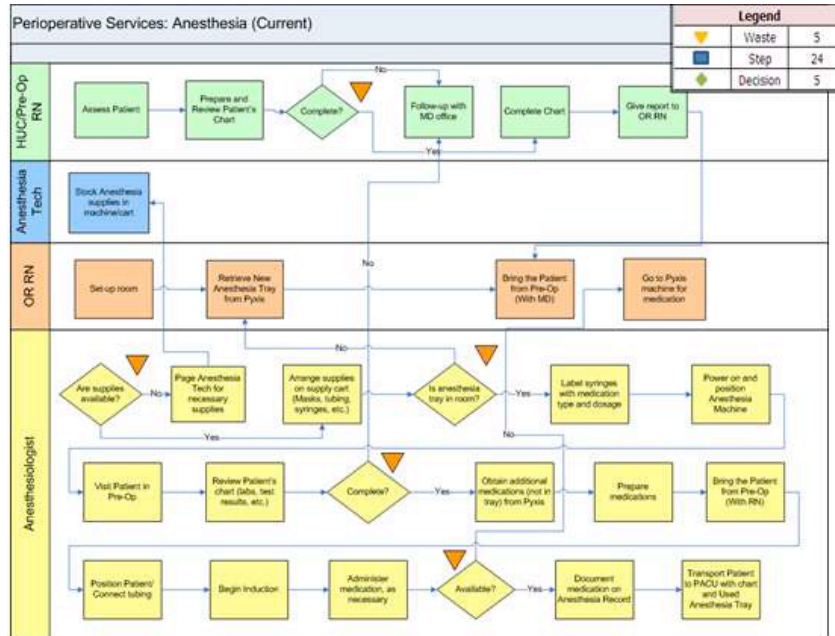


Figure 7: Detailed Level Process Flow Map

Shea OR

Average distance to Pyxis = 278 ft.
 278 ft. X 996 cases/mo. = 277,137 ft.

277,137 ft = 52.49 miles/month

Save 630 miles/year

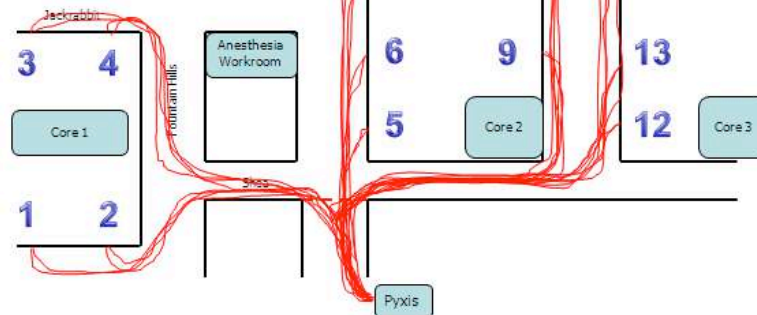


Figure 8: Spaghetti Diagram. Red lines show the route that physicians and staff had to walk prior to standardization and Pyxis implementation.

Lessons Learned

- What was considered impossible became a reality thanks to organizational buy in, the active participation of physicians, and the leadership and involvement of frontline staff.

Thomas Wareing, MD, chairman of the Surgery Pre-OP Committee at Scottsdale Healthcare Osborn Medical Center said, “I have only gotten positive feedback from the anesthesiologists at Osborn regarding the Pyxis machine even though many were skeptical at the outset.” He added, “I notice that the circulators seem to be in the rooms more often and the anesthesiologists are able to stay in the room before the case starts. Both of these things contribute to the efficiency of the OR.”

- Include all representation from all departments and roles.
- Stage the implementation, by starting at one site and then spreading the standardization to other sites. The team learned this lesson from the first implementation at Osborn Medical Center, which helped to refine and improvement the carts and the process, ensuring a high level of success.
- Maintain constant communication between the different stakeholders and maintain the focus on identified goals.

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