

IMPLEMENTATION MODULE:

Medical Plastics Recycling in the OR

Solid Waste in the OR

The culture of waste in the OR is driven in large part by the increasing volume of disposable or “single-use” medical products on the market today, many of which are specifically targeted to the OR. The reasons for the transition to disposable items are many, including concerns around sterility and infection prevention, ease of use and not to be discounted—manufacturers’ awareness that disposables posed a regenerative revenue stream. Growth in disposables remains steady with the market predicted to grow by 4.6% annually to \$59 billion in 2013.¹

Packaging for the myriad of disposable products in healthcare is ubiquitous, with the intention of safeguarding sterility leading to wraps and overwraps in addition to cardboard or plastic packaging of the outer container, and finally the shipping carton. While there has been some effort by distributors to use reusable totes for delivery, the significant amounts of individual packaging continue to bring large volumes of waste into the operating room, much of which heads straight for the landfill or medical waste treatment. Anesthesia waste is also a significant contributor to the waste stream with one study from Western Hospital in Australia finding that the anesthesia waste stream represented 25% of the total operating room waste. The study also noted that 60% of the anesthesia waste was recyclable.^{2,3}

ORs have not historically been a target for large scale recycling efforts—due in part to the notion of the OR being a closed system where an additional layer of complexity or sorting would be seen as something that could interrupt patient flow or surgical procedures. An additional complexity of recycling materials in the OR is that the materials are largely medical plastics—and are not similar in shape, size, volume or even sometimes plastic type

to the plastics being commonly collected through community or commercial recycling operations. In some instances, there was a stigma attached to medical plastics, as there were worries that environmental compliance officials might see these items in the recycling stream and flag it for medical waste contamination concerns. Likewise, in some instances, there were either very limited or no existing recycling hauling capacity or markets for certain kinds of plastic being generated—such as #5 polypropylene blue wrap. This has resulted in the OR being largely ignored while traditional recycling programs have rolled out across healthcare facilities.

Recent hospital data demonstrates that recycling in the OR can generate large volumes of recyclables—in excess of 1000lbs of medical plastics weekly at one large NYC institution with more than 40 ORs/surgical procedure areas.⁴ At an average cost of \$121 per ton for solid waste disposal and a price tag of \$68 per ton for recycling the same material,⁵ a hospital might pay nearly twice the price for medical plastics disposal if the facility does not choose to recycle. In a more typical scenario, however, many of these medical plastics are ending up in red bag trash, which on average costs about \$963/ton.⁶ Estimating conservatively that 25% of those plastics end up in the RMW container rather than recycling, a hospital is now looking at \$583 vs. \$136 monthly (a four-fold increase in price) for disposal of 2 tons of medical plastics. Multiplied across a year, that’s \$6996 vs. \$1632—a difference of \$5364 annually hospitals could be saving by recycling medical plastics in the OR. While there are some upfront costs for setting up a program—including recycling containers or hampers with colored liners as well as training materials—it is possible to develop robust recycling programs for medical plastics generated in the OR.

How then does a facility begin to operationalize a recycling program for medical plastics in the OR? There are several finite steps an organization can follow to set up and implement a medical plastics recycling program in the OR.

Step 1: Enlist Allies

As the OR begins a recycling program, it will be important initially to develop some key allies and to enlist different stakeholders in supporting the new program. Reach out to Environmental Services, Infection Prevention and Nursing. Seek out staff in the OR who have expressed an interest in seeing recycling take place. Anesthesiology is a key stakeholder. Take the time to get this important element of the OR on board. Think about other employees who may be affected by the new program. By understanding the initial concerns of different groups, the organization has a better chance of being able to address those concerns in the program formation and roll-out. A team approach can be incredibly powerful—allowing different individuals to focus on different elements of the program development while still staying connected. Even if it ends up being a single individual doing much of the legwork, the effort can only benefit from getting a variety of input as it gets started.

Step 2: Identify Hauling Partner

This early step may be the most difficult—identification of a party willing to recycle the clinical plastics. Ask the EVS Director for access to the hospital's current waste hauler or recycler. Some hospitals have found that their existing waste hauler or recycler is eager to sit down and discuss the opportunity to accept additional plastics from clinical areas. Other recyclers may be reticent to accept plastics from clinical areas or may be utilizing a single-stream process that cannot or will not accept medical plastics. Don't be discouraged initially. Remember, finding the RIGHT hauler may be a trial and error process. The EVS Director can be critical ally in this endeavor and may even be willing or able to take the lead in determining hauling capacity for clinical plastics—especially if there is interest in capturing these same plastics in other clinical departments such as ICU, ED, NICU and Labor and Delivery.

It's important to take haulers on a tour of the OR or other clinical areas. Help them understand these are clean and sometimes sterile plastics with no contamination issues. Sometimes gowning up the recycler and allowing them to watch a procedure set up will be the convincing factor. If conventional waste haulers and recyclers are unwilling or unable to take the medical plastics—think creatively. Reach out to your local or state environmental agency to see if they have ideas. Call national haulers who focus on recycling to ask if they provide service in the area or know of others who do. You can even work with your EVS Director to reach out to local manufacturers to see if they are aware of anyone who is interested in exploring the capture of clean, medical plastics.

Visit the hauler's recycling site. A site visit should be a must for any place the hospital is sending its waste. Take a look at the safety standards being utilized for workers, the flow of materials. Sloppy waste handling procedures or lack of personal protective equipment can be a red flag for troubles down the road. Ensure the hauler is bonded and insured. The hospital will also want to get a commitment from the hauler to educate its staff about the influx of medical materials that will now be coming into the recycling facility. Recycling staff should be empowered to call attention to any inappropriate materials that make their way into the recycling stream. A process should be put into place with the hauler up front that allows the two organizations to address any missteps in a collaborative manner. Skipping this step could result in inadvertent harm to staff at the recycling facility or an alarmed call to environmental officials should contamination occur.

Step 3: Have a Sense of What Can Be Recycled

A critical step in setting up a recycling program in the OR is to understand what materials the OR is trying to recycle. There are several ways to determine what recyclable materials the organization generates. Some hospitals have found it most successful to put together a team comprised of OR staff, Materials Management, Environmental Services and the potential hauler.



blue wrap



pour bottles



rigid plastics



soft plastics

Photos courtesy of Cleveland Clinic Health System, © 2010.

Go through the supply room. Discuss different high volume supplies and how they are used, when they are used, likelihood of contamination with blood or body fluids and how they are typically disposed of. Work with Materials Management to determine the volume of various supplies the organization is currently purchasing. Is blue wrap purchase increasing or decreasing? Has the organization begun a program to review custom packs to reduce excess supplies? These pieces of information will be helpful when trying to gauge the volumes of material the OR will produce.

A somewhat different strategy is to look at what is already being produced as a means of defining opportunities. This involves reaching out to the Environmental Services Director and investigating the potential for a mini-waste audit of solid waste coming out of the OR. Have EVS pull several bags of solid waste (or clear bag trash) coming out of the OR. Make sure all participants have on personal protective equipment. Then spread waste out on tarps and sort waste into categories. If possible, sort plastics based on their recycling number: many plastics are labeled 1-7 using a common labeling system. You may find however, that some plastics are not labeled. Where possible, sort them into similar materials—rigid plastics like trays, basins or molded plastic packaging, soft plastic overwraps, blister packs, Tyvek and blue sterile wrap, to name a few commonly found items. Try opening and sorting several bags, possibly from different times of day to accurately assess the kinds of clean plastics coming out of the OR.

The hauler may be willing to do additional research to develop recycling outlets for other materials the facility can generate in large volumes. Having a sense of the kind of volumes the department (or in EVS's case—the organization) generates will help the hauler understand what markets are available. For example: there are markets for #5 plastic—polypropylene—which comprises blue sterile wrap. Because recycling often goes to market based on weight, and blue wrap is a very light material, large volumes are necessary to bale and sell it on the market. Having a sense of generation rates over a set time period is helpful.

Talk to the hauler and EVS about potential strategies to get materials out of the building, which can sometimes be complicated. Does the hauler need the material baled? Can EVS making baling work with other priorities at the back dock? Addressing some of these tensions early can lead to a more successful program later on. Lastly, be patient. Over time additional market opportunities may materialize for items that may be unrecyclable to begin with. Both strategies for identifying materials can achieve your desired result, but you may get more cooperation using the first strategy due to squeamishness about opening bags of trash.

Step 4: Work with EVS to Define Containers and Collection Schedule

After identification of recyclable plastics and a willing hauler, it is critical to sit down with EVS and discuss how to structure segregation and collection of recyclables from the various locations within the OR. This initially involves determining the right container or bag color in which to segregate the recyclables. Some hospitals have found that OR space is so limited that an actual recycling container (of the sort found throughout hospitals and public spaces) is not feasible. Other options have included stainless steel linen hampers where a recycling bag can share space with linen and solid waste containers, or simply tying an extra bag onto the supply cart to collect recyclables. Whatever container is selected, ensure standardization among the suites to ease education, training & compliance. The color of trash liner used to collect recyclables will also be important. Many hospitals have chosen to use a unique colored liner to indicate to EVS staff that the materials inside are bound for recycling rather than solid waste.

Once an appropriate collection receptacle has been determined, a collection procedure will need to be identified. Again, collaboration with Environmental Services will be key. EVS must determine—in concert with OR staff—where recyclable material is placed after the procedure and how it will be distinguished from solid or regulated medical waste. Collection schedules will be paramount, as there is little room in the OR for additional waste storage capacity. EVS will need to determine how often they can collect materials from the OR and whether adding recyclables will alter their existing collection schedules. Collection schedules may also fluctuate as the program gets up and running. Consistent communication between the OR and EVS will ensure due diligence in setting up a process that works for both departments. The colored bags will facilitate commingled removal and transport, and separation into various streams at the final storage location. Remember, the volume of material being transported is not actually changing, but the change in material flows will have a significant impact on the work being done by EVS staff.

Hospitals have found that using a unique color trash liner for recycling can aid in organizational recognition of recycling receptacles across the facility while also allowing EVS to easily commingle trash and sort it at the dock.

Step 5: Develop Signage to Highlight New Segregation Practices

Some hospitals have found it exceptionally helpful to develop signage to indicate new segregation procedures for recyclables or other kinds of waste. Many people are visual learners or need a visual guide to refer to during segregation. A simple poster should include visual representations and/or lists of what kinds of materials can and cannot be placed into the recycling container. In some instances, the OR or EVS has been able to work with Media Relations or other in-house design teams to layout the signage. Signage should be posted either on the recycling receptacles or immediately adjacent to them for maximum comprehension and referral.

Step 6: Educate and Engage Staff on Appropriate Segregation Procedures

Like any new procedure or practice, education will be a critical element in determining the success of the recycling program. Reach out to staff and explain the new segregation procedure. Run short In-Services for staff at the beginning of each shift. Help staff understand the reasons for the change. Pass around different plastics so people understand which materials are acceptable to recycle and which are not. Consider a pilot period where the staff can experiment with container placement, sizing and materials segregation. The more prepared staff is for the new practice, the smoother the transition. Find a champion on each shift who is willing to assist teammates in understanding the new segregation procedures. Work with EVS to train EVS frontline staff on the new recycling initiative. This program needs to be introduced, explored, and vetted with staff in both OR and EVS in order to ensure a smooth process. Often EVS professionals can act as the first line of defense by performing a visual inspection as they pick up bags so there is some quality assurance that the wrong material does not end up in the recycling bag, especially as the program rolls out. It is also important to ensure that the hospital is training the waste crews who come to pick up the materials. Work with EVS and the hauler to ensure that everyone is clear on how the waste is to be handled during pick-ups.

Step 7: Divert Recyclable Waste Pre-Incision

Many hospital begin their recycling programs in the OR starting with diversion of recyclables during procedure set-up. During surgical set up, the case cart is unpacked, kits and supplies are opened and lots of packaging, rigid plastics, and blue sterile wrap are thrown into the trash. With proper training and/or signage, staff should have an understanding of which plastics are recyclable and which material should go into the regular trash. Having a nurse champion present, especially



One hospital separates clean plastics from the OR for recycling.

during the roll-out period, can be especially helpful. Ensure a recycling receptacle with the agreed upon trash liner color is accessible to staff during set-up. Hospitals often tie the recycling bag off before the patient enters the room to ensure no cross-contamination with infectious materials.

Step 8: Segregate Recyclable Waste After Procedure

After the surgical procedure is complete and patient has left the operating room, there is an additional opportunity to capture remaining recyclables used during the procedure. Recycling bag can be reopened or new bag used depending on organizational preference and feasibility. Due diligence should be taken to ensure that no infectious materials make their way into the recycling container if segregation is taking place post-procedure. Some hospitals are reticent to let recycling containers remain accessible during the procedure for fear of cross contamination. Recyclers are extremely cautious about receiving any kind of contaminated material, as their workers are often not appropriately protected to deal with infectious or hazardous waste, for example. Ensuring that no contamination of recycling materials occurs will be critical to developing a long-term partnership with the hauler. Depending on how well trained and engaged staff is, segregation practices can be limited or used more expansively.

Step 9: Problem Identification and Resolution Plan

Expect stumbling blocks. Whether it is in determining a hauler, replacing an unsuccessful hauling partner, working through the scheduling issues with EVS or just getting staff to understand the difference between recyclables and non-recyclables, there will be challenges to overcome. Have a plan of action to resolve problems. Use setbacks as an opportunity to reengage staff on how they are contributing to the organization's sustainability goals. Maintain good communication with the EVS department. Work through the barriers and be willing to compromise. Hold refresher in-services to re-engage and retrain staff if necessary. Many hospitals have founds that documenting problems with a photograph, and cataloging them according to shift or procedure works best, if possible. Demonstrating visually what should NOT be happening can also help other OR staff be on the lookout for improper segregation issues. Consider adding training on proper waste segregation to new employee training for the department and include re-training as part of annual education requirements for the OR.

Step 10: Track Progress and Recognize Success

Once the program is up and running and the organization has been able to troubleshoot implementation issues, consider developing a policy in the OR (or organization-wide, if applicable) that requires appropriate waste segregation—including recycling. A policy can sometimes build the program into the way organization runs and can outlast management changes. Communicate the successes of the recycling initiative back to OR staff. People like to know that the extra time they have spent on a new program or initiative was worth it. Work with EVS to capture data on pounds of waste diverted or disposal costs avoided. Share data with OR staff and recognize their efforts in an organizational newsletter, staff meetings or Earth Day events. If the organization has a Green Team or Sustainability Committee, make sure they know the OR is doing its part! Communicate successes to Media Relations. And use the momentum from a successful recycling program in the OR to tackle the next sustainability goal for the department.

For More Information: Go to www.GreeningTheOR.org for a list of key resources that can assist you in this program area. Because this list is updated often, we keep it online, so as not to date this implementation module. Also available are case studies on medical plastics recycling in the OR. Learn from your peers!

Endnotes

- 1 *Demand for Disposable Medical Supplies to Increase*. Specialty Fabrics Review. Oct. 2009. Available at: http://specialtyfabricsreview.com/articles/1009_sw14_demand.html. Accessed on Mar 19, 2011.
- 2 *Greening the Operating Room: Reduce, Reuse, Recycle and Redesign*. ASAHQ Committee on Equipment and Facilities. 2010. www.asahq.org/.../Greening%20the%20Operating%20Room_Final.ashx
- 3 McGain E, Hendel SA, Story DA. An audit of potentially recyclable waste from anesthetic practice. *Anaesth Intensive Care* 2009; 37:820-3.
- 4 Personal Communication- Stefanie Feldman. Waste Management Healthcare Solutions. March 2011.
- 5 Practice Greenhealth. Sustainability Benchmarking Report. 2010. Available at: www.practicegreenhealth.org
- 6 Ibid.



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