

ABO NON-CLINICAL IMPROVEMENT IN MEDICAL PRACTICE ACTIVITY

Topic

Title of Project:	Report of Efforts to Reduce, Recycle, and Repurpose Medical Waste for Routine Cataract Surgery at an ASC by Single Surgeon
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Project Description

<p>Describe the quality gap or issued addressed by this activity. (Included in your response to this question should be a description of the resources that informed your decision to pursue this topic, a description of what the literature says about the issue you identified, and the rationale for choosing to address this clinical project</p>	<p>Cataract surgery is a high frequency procedure in the United States. Over 3 million cases are performed yearly. Cases are mostly performed in outpatient settings like Ambulatory Surgery Centers. Cataract surgery is a very "clean" surgery with minimal blood and body fluid contamination. Many of the gowns, drapes, wrappings, extra materials, and plastics containers are untouched and still clean when they are placed in the trash. The amount of medical waste produced by a single surgeon for routine cataract surgery was measured and analyzed at a community multi-specialty ASC. Total amount of medical waste was calculated for one year's worth of cataract surgery (about 500 cases for surgeon). Multi-step attempts to reduce pack contents, recycle, and repurpose clean medical waste will be described. Photography of materials and repurposed materials will be submitted. Total reduction in medical waste for a year's worth of cataract surgery will be re-calculated after the intervention. Reproducibility and sustainability of intervention will be discussed.</p>
<p>Background Information: The month you pulled the baseline IRIS performance report and any additional information that me be pertinent:</p>	<p>Routine cataract surgery has a high carbon footprint according to a 2013 study from the United Kingdom. One cataract surgery was reported to have a carbon footprint of 181.1 kg carbon dioxide equivalent. Part of waste with cataract surgery was attributed to packaging and procurement of supplies. Aravind Eye Hospital in India has a low carbon footprint compared to the United States.</p> <p>Much of their waste is recycled. In western hospitals and ASC almost all materials from any type of surgery goes into the trash and then the landfill. There is discussion and debate in the literature on how to make routine cataract surgery more "eco-friendly."</p>
<p>Project Setting: (Please select from options below):</p> <ul style="list-style-type: none"> • Group Practice • Healthcare Network • Hospital • Multi-Specialty Group • Solo Practice • Surgical Center • Other 	<p>Solo Practice</p> <p>Surgical Center</p>
<p>Study population: (describe the type of patient for whom the care process will be improved, e.g., all patients in your practice, patients with diabetes, patients presenting for emergency care:</p>	<p>Routine cataract surgery at an outpatient ASC in the community. All patients presenting to single surgeon (JKB) over the study period of March 2019 and ending in March 2020 with the COVID 19 crisis.</p>

Quality Indicators / Performance**Measures:**

It is important to carefully define outcome or performance measures that will be quantified at baseline (before the care process is changed) and at re-measurement (after you have implemented the proposed improvement) to quantify the impact of your care process change. There are two basic types of performance measures - process of care measures and outcomes of care measures.

- Process of care measures (e.g. timely treatment of diabetic retinopathy) can influence outcome measure (e.g. decreased risk of severe vision loss);
- Outcome measures can be linked to processes of care that can be improved. Generally, performance measures are expressed as rates, often as percentage rates. For example, if the intent of a project is to improve the quality of glaucoma care in your practice, you may choose to improve your rate of establishing a goal IOP in patients with newly diagnosed glaucoma, measured over a 3-month period.
- The numerator of this process measure would be the number of newly diagnosed patients during this time who have a goal IOP recorded in the medical record.
- The denominator would be the total number of patients diagnosed during that same time period.

Continuous variables (e.g. the refracted spherical equivalent after cataract surgery) can often be simplified and transformed then into percentage rates by setting a quality threshold (within 0.5 diopters in the intended spherical equivalent) which, if attained, would qualify the patient to be in the numerator (e.g. number of patients within 0.5 diopters / total number of patients). It can be advantageous but not mandatory to have more than one quality measure in order to gauge the impact of your process change. In the example above, an additional outcome measure might be the percentage of patients in whom the goal IOP is attained within the first 6 months after diagnosis. If possible, measure quality indicators for at least 30 individual patients or data points during the baseline and again during the follow up period.

Measure Type: Process**Measure Name:** Total weight of medical waste from one routine cataract case.**Numerator Statement:** Reduction in weight per case.**Denominator Statement:** All routine cataract patients in the study period.

We realize that this may not be feasible or appropriate for all projects. Please indicate at least one measure below; either a process or outcome measure:

Example Measure:

- . Measure Type: Process Measure
- . Measure Name: Patient pain level during intravitreal injection
- . Numerator Statement: Number of patients in who pain levels decreased by 2 points on a 1-10 scale
- . Denominator Statement: 30 consecutive patients undergoing intravitreal injection.

<p>Project Interventions: Quality improvement requires that you analyze your care delivery processes and identify changes, which if implemented, will improve care and outcomes. Generally, educational interventions are thought to be weak and demonstrate little impact. The introduction of tools, strategies or systematic approaches to care delivery is more powerful. A tool is a thing, for example a preoperative checklist, or written standardized process or protocol. Strategies include changes in procedures or policies like the introduction of a surgical time out before surgery is initiated. Systematic approaches to care delivery involve a comprehensive analysis of care process and the introduction of a combination of tools and strategies designed as a complete process. Please describe the changes to your care processes you intend to introduce:</p>	<p>This project turned into a nearly one-year effort to maximally reduce the amount of cataract surgery materials committed to landfill waste. I started by visiting veterinary clinic and asking if they could use any of my materials. I visited art classroom and science classroom to see if any of the plastic containers (phaco pack trays, light handle cover containers) could be reused. I visited paint stores to see if they had any interest in my materials and spoke with some aircraft industry personal. I also visited a community recycling center, ProKan Recycling, and evaluated which materials were suitable for community-based recycling i.e. what was considered mixed paper and recyclable plastics. It took almost 6 months of trial and error to determine where the materials could actually be utilized consistently.</p>
<p>Project Team: (include roles for yourself and all members of your team): List the individuals who will be involved in your quality improvement project (i.e., solo project, partners in practice, office staff, OR personnel, anesthesiologists) and the roles they will contribute.</p>	<p>I will be analyzing my surgical packs, evaluating redundant materials, findings community sources for repurposing materials, and measuring the pre and post weight of the surgical waste. I will have the cooperation of OR staff and the OR supervisor at the ambulatory surgery center.</p>
<p>Will any other ophthalmologists be requesting MOC credit for participation in this SD-PIM?</p>	<p>N/A</p>

Project Outcomes/Results

Project Summary	In the following sections, please prepare a brief summary of the project highlighting the data collected, effectiveness of your measurement approach, interventions, and the overall impact of the project.
Baseline Data: Quantify each of the quality indicators / performance measures described above for the baseline period (before interventions for improvement were introduced). Report the numerator, denominator and the calculated percentage rate for each measure.	<p>Phase 1: <u>Reduce cataract surgery pack materials:</u> The first phase was to evaluate all materials in my cataract surgery pack for redundancy and necessity. Reductions to the cataract surgery pack were made to eliminate any excess materials. A significant reduction to pack contents was made specifically in the size of patient drape.</p> <p>Phase 2: <u>Recycle and repurpose Surgical Waste from Procedure:</u> Prior to intervention, all cataract surgery materials were placed in the trash for landfill designation. Prior to intervention, trash weight measured on average at least 6.5 lbs. per case. All cataract surgery materials were then evaluated for potential recycling or upcycling potential. A simple sorting system was set up in the operating room to segregate materials into 3 major categories: Trash, Recycling, Upcycling. The <i>trash category</i> consisted on any materials that were unrecyclable or materials that were in direct patient contact or considered biowaste. The <i>recycling category</i> consisted of plastics stamped with a recyclable numbers (1,2,5,6) that were acceptable by a commercial waste management provider. Also, mixed paper, non-plastic lined paper, and paperboard were included into this category. Finally, the <i>up-cycle category</i> consisted of surgical gowns considered "clean", back table covers, blue instrument wraps, unused blue towels, unused wipes. In the operating room three separate containers were set up and all materials were placed in one of the three. All materials were sorted during the day's cases and saved separately.</p>

Follow-up Data:

Quantify each of the quality indicators / performance measures described above for the re-measurement period (the period following implementation of the interventions for improvement).

Intervention was continued until March 23rd, after which, all elective surgeries were suspended at the surgery center do to the COVID 19 crisis.

Phase 1: The large body length patient cover drape was replaced by a much smaller (1/4) size transparent drape. (see photo). Redundant towels, plastic cups, sticker labels, syringes, and extra cotton tipped applicators were eliminated from the cataract surgery pack. The replacement of the large body drape alone substantially reduces the volume of waste per case. It took several elimination cycles to reduce the cataract pack contents until the final contents were considered essential without waste.

Phase 2: The reduction in landfill dedicated cataract surgery waste was reduced by 46 -50% by weight after reducing, recycling and repurposing the materials. The starting average trash weight per case 6.5 lbs. At the end of the study, the average trash weight per case was 3.5 lbs. This included the "wet weight" of the unused irrigation fluid, which was the bulk of the trash weight. Over 500 cases were completed during the intervention period. The estimated reduction in landfill designated waste was at least 1500 pounds from a single surgeon. No complications occurred. No injuries occurred. No complaints were made by any of the receiving end users.

Project Impact

Compare the baseline data to the re-measurement / follow-up data and quantify the impact of the process of care changes (your project interventions). The project hopefully resulted in improvement; however, some projects may result in a diminution in quality. If a lack of improvement or reduction in quality occurred, suggest other strategies that might be more effective.

This exercise shows the possible and dramatic reduction in cataract surgery waste that can be accomplished by the approach of reduce, recycle, and reuse. Over the course of one year, by repurposing medical gowns and "blue materials", and recycling appropriate plastics and paperboard, the amount of waste placed in the landfill was reduced by nearly 50% per case based on weight. Additionally, the up-cycled medical gowns and other "blue" drapes, wraps, and coverings that were repurposed to the Kansas Humane Society and saved them over \$10,000 in supply costs. The possibility of up-cycling disposable non-contaminated gowns and other materials for animal rescue/veterinary use could be further explored as a potential way to reduce cataract surgery waste on a larger scale. Furthermore, the #6 plastic phaco trays and #5 blue square containers can have a long life after leaving the cataract surgery room. After setting up the sorting process in the OR, segregating the materials became automated for the staff. The most difficult part of the process was transferring the materials to the surgeon's vehicle and then to the end user and/or recycling bin. Since the surgery center did not have a comprehensive recycling program, the materials that were designated recyclable had to be placed in the surgeon personal home container. This project has significant implications for general cataract surgery and the reduction in medical waste that can be obtained by simple interventions. Cataract surgery consumes a tremendous amount of medical materials just by the sheer volume of cases performed annually. Interestingly on the last week of the study, the medical gowns that were designated to go to the Humane Society were given to an area hospital and were re-sterilized for PPE during the COVID 19 crisis. In summary, it is possible to significantly reduce the amount of materials used in routine cataract surgery from ending up in a landfill with interventions of reduce, recycle, and reuse. It does take leadership and effort from the surgeon and cooperation from the ASC staff.

Project Reflection

Did you feel the project was worthwhile, effective?	YES
How might you have performed the project differently?	<p>I would have been nice to have better scales to weigh the materials, I used the patient scale at the surgery center. I could have weighed the unopened, phaco packs at the very beginning of the study and compared it to the unopened phaco packs at the end of the study, but that wouldn't have included all of ancillary trash and liquids and other materials that are included in just one case. I took all the trash for the day and weighed it and divided that weight by the number of cases to obtain an average weight per case. At the beginning of the project I probably missed some of the materials that were opening in the prep room. I think I underestimated the initial weight per case but as the year progressed, I became very comprehensive in identifying all the materials involved in routine cataract surgery. What was not included were the pre-op oxygen nasal cannulas, the IV tubing. These items were not specific to cataract surgery. The project evolved over time and I became more aggressive with determining which materials were truly un-recyclable. I tried to up-cycle several smaller plastic items (not stamped with a recycle triangle) for art school purposes, but I could not find a consistent end user for the material. Those disposable items ended up in the landfill trash container. Additionally, I learned that sticker labels were also un-recyclable and could NOT be placed in the "mixed paper" bin. Lastly, I took multiple photos to document the visual volumetric reduction in the trash.</p>
Please offer suggestions for other ophthalmologists undertaking a similar project.	<ol style="list-style-type: none">1. Check with your local Humane Society or Animal rescue organizations. They are very grateful for these materials.2. Try to up-cycle the plastic phaco and blue rectangular trays to science classrooms or art classrooms.3. Reduce the giant body drape to a modest 1/4 transparent drape.4. Recycle the IOL paper boxes / paper pamphlets and the #1 stamped plastics into a commercial single stream container (if possible)5. Encourage the ASC staff to gather other plastic trays and clean unused materials for repurposing into the community6. Eliminate un-necessary materials from your routine cataract pack