COVER LETTER

Going Green: Improving your Endoscopy Unit's Carbon Footprint

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Abstract: Hospitals, in particular operating rooms and procedural areas, produce massive amounts of waste annually. Sustainability efforts are known to have environmental benefits and can result in large scale cost savings for health care facilities. Much focus has been placed environmental stewardship in operating rooms, but endoscopy units and other procedural units have a large potential for improving overall hospital sustainability efforts.

Keywords: Sustainability, Endoscopy, Waste, Environment, Recycling

INTRODUCTION

Hospitals in the United States produce approximately 4 billion tons of waste annually (1). Hospital waste disposal is not only responsible for massive carbon emissions and toxic waste production but also massive costs due to the need to sanitize hospital waste to prevent landfill contamination. Improved sustainability efforts in hospitals not only have tremendous environmental benefits, but also huge cost saving potential for hospitals, estimated to be millions of dollars annually. This toolbox provides a useful framework for your hospital or practice to achieve the worthy goal of improving your carbon footprint.

TOPIC OVERVIEW

Climate change is an increasingly recognized public health issue. There are many reasons gastroenterologists and endoscopy units should reduce waste and make a positive impact on climate. Our environmental stewardship responsibilities include minimizing the toxins we are exposing the public and our patients to and acting as a positive example to other health care facilities. Interestingly, while one of the largest obstacles to “going green” are the perceived increase costs associated with these efforts (2) the truth is the opposite. Reducing toxic waste saves money. As we focus on improving the carbon footprint of our facilities, the operating rooms (OR) and procedural areas emerge as prime targets for improvement as they produce over half of overall hospital waste (3).

AN OUTLINE OF THE "GO-GREEN PROJECT"

1.Appropriate waste allocation (Reducing the red-bags): Regulated Medical Waste (RMW) is hazardous and/or infectious waste that poses a threat to the public if placed in landfills, and thus requires special handling and elimination. OR and procedural areas are the largest producers of RMW, which is placed into designated red bags and "sharps containers" and are often referred to as "red bag waste" (RBW). Hospitals typically set a goal for the amount of waste that should be placed into these red bags or bins, (often <15%) (4) but some hospitals dispose of up to 70% of their waste into these containers and up to 90% of the materials disposed of in red containers does not require special handling (3). Typically incinerated after being transported to often distant facilities, this waste produces a large amount of dioxin and carbon emissions and pollution and cost up to 30 times more to process than regular waste. Endoscopy unit materials meant for red bag containers include containers with free-flowing blood or blood products, items saturated with blood, soiled materials from patients on contact precautions, suction cannisters. Disposable gloves and gowns utilized for endoscopic procedures (unless drenched with blood), should not be placed into these containers. Proper education on appropriate usage of these containers is paramount to reducing environmental waste and can result in very large cost savings (4, 5). A dedicated team including physician and nurse leadership to go to each department and introduce a customized introduction into what the faculty and staff can specifically do to improve waste allocation. At New York University Langone Medical Center, I personally make rounds at various procedural units and educate clinical staff on appropriate allocation of RMW. Incorporating proper waste management into the hospital quality measures is an important step in improving performance.

2. **Reusable gowns**: Endoscopy units are not sterile, yet many units utilize sterile gowns which include bulky packaging full of single use plastic that will not be recycled and will take up space in a landfill for up to 1000 years. Reusable, washable gowns are a wonderful way to reduce your carbon footprint and reduce costs, with one hospital reporting an annual 50,000 pound decrease in waste and $60,000 decrease in cost following transition to reusable gowns (3).

3. **Double sided printing**: Despite most hospitals transitioning to electronic medical records, there still remains a large amount of paper waste. Using double sided printers is a straight forward and easy way to reduce unnecessary paper usage. When the option is present, 100% recycled paper is optimal for reducing greenhouse emissions (3, 6).

4. **Recycling clean medical plastic**: Nearly every endoscopic tool from biopsy forceps to endoscopic suturing devices is manufactured in bulky plastic wrap. Diverting non-soiled plastic waste from trash to recycling within the endoscopy unit will prevent a large amount of plastic from remaining in a landfill for up to 1000 years, with man-made plastic making up approximately 25% of US landfill space and the prime pollutant in our oceans (7, 8). Ideally, industry standard would transition to biodegradable plastic usage, as they degrade within months into non-toxic compounds (8). Until then, placing recycling bins within endoscopy units, educating clinical staff on appropriate allocation of non-soiled plastics into recycling containers and meeting with waste management in your facility to ensure your hospital has recycling capabilities will improve your endoscopy units carbon footprint.

5. **Endoscopic Decontamination/Processing**: Inquire with your hospital if there are alternative eco-friendly, green options for cleaning solutions utilized for scope processing without compromising infection control. With the emergence of single use endoscopes, particularly duodenoscopes, it begs the question of the impact this will have on sustainability. Up to 90% of these scopes will be sanitized, reprocessed and recycled. Alternatively, duodenoscopes with replaceable caps are also being introduced with assist with the infection control issue while reducing the volume of waste produced by single use

scopes. If widely accepted, single use scopes will still increase the carbon footprint of endoscopy units given the fact that current scopes do not yield any solid waste.

6. **Single Use Devices**: Reprocessing traditionally single use devices can markedly decrease cost and reduce the amount of plastic being placed into landfills. Items such as pulse oximeters can be reprocessed by the manufacturing company or a third party reprocessing company (overseen by the Food and Drug Administration) and resold at a lower cost (often less than half) to the health care facility (9,10). Pulse oximeters are disinfected, the adhesive portion replaced and inspected for proper function prior to being redistributed for use.

7. **Lighting**: Closed endoscopy units are often locked at night with limited access. Leaving the lights on in each procedural room unnecessarily increases energy expenditure. Enforcing "lights off" at night, installing motion detector lights that turn off with inactivity and utilizing low energy light bulbs are all options to improve energy costs.

In the era of COVID19, hospital centers have seen a sizable increase in the volume of medical waste due to increased use of personal protective equipment (PPE) and proper disposal of items exposed to infected patients. Prior to the pandemic, standard hospital procedure involved separating items soiled with bodily fluids or infectious agents, despite candidacy for recycling, into RMW bins for incineration to avoid landfill contamination. Due to the proposed risk of exposure to items exposed to the coronavirus virus by those handling them, a much larger volume of materials are being deemed contaminated RMW in the healthcare setting to avoid spread of the virus. Items that may have been previously deemed reusable, able to be reprocessed or recyclable that may have been exposed to a patient with COVID19 are now no longer considered to be due to safety concerns. In Wuhan, China – hospitals are cited as having generated 6 times the amount of medical waste during the height of the pandemic than prior (11). Although many businesses and commercial centers are seeing a reduction in waste due to people working from home and social distancing in alignment with COVID 19 restrictions, hospitals are not in this category and thus the previous amount of waste still exists - compounded by the additional disposal of PPE which is being used in much larger volumes. Most elective procedures requiring single use items that were on hold during surge may slightly off set this hit to sustainability efforts, but only time will tell what the ultimate damage the pandemic has caused on this front.

CONCLUSION:

Improved sustainability efforts benefit not only the hospital but also the community. Health care providers have a duty to protect the people we serve within our facility and surrounding it. The simple steps outlined in this article will reduce energy consumption and waste and have a significant and lasting positive impact on the environment.

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