PROJECT CHARTER

Plastic Waste in the Operating Room

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Executive Sponsor:

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Due to the complexity of this issue, this charter is a working version.

A modifiable PPT version of this project charter can be downloaded to be applied to your own healthcare setting. To access all downloadable project charters featured in this playbook, click here.

Please contact CASCADES@utoronto.ca if you have any questions or suggestions to improve the contents of this charter.

NAVIGATION

Goal & Scope

1 What do you want to achieve?

Where plastic waste is unavoidable, reduce the amount of recyclable plastic waste incorrectly placed in the regular waste bin by ___% over the next _____ months.

2 Define the limits of what you want to be included in the project and consider the environmental impacts you are targeting for change.

Project Scope: All plastic waste eligible for recycling generated within the operating room (OR).

Emission Scope: Scope 3; these emissions arise from activities or products that are related to health sector activities, but not owned or controlled by the organization, such as pharmaceuticals and other medical products and devices.

Problem/Opportunity Statement

3 Briefly state the problem you want to solve or the opportunity you want to realize.

In the interests of addressing health system waste, prevention, reduction, and reuse should be **prioritized** through public health measures, avoidance of unnecessary care, and medical product reuse (see charters on unnecessary care, custom pack optimization, reusable LMAs, reusable gowns, bring your own reusable bag). When waste is unavoidable, appropriate management of plastic, paper, aluminum and glass waste should be implemented. The management of plastic waste of particular concern given the persistence of plastics in the environment and their damaging effects on human and environmental health (1).

Within the health sector, plastics account for approximately 30% of waste. (2) Surgical departments in particular favour plastics for their convenience, sterility, and single-use quality assurance. (3) But beyond plastic devices and implements, plastics are also used in packaging – most anesthesia supplies, for example, are sealed in disposable plastic wraps, such that "packaging from a single major surgical case can easily fill up several large waste bags" (1) In the OR, all types of plastic (resin codes 1–7) are generated. These come in rigid, semi-rigid and flexible forms, such as irrigation bottles, intravenous (IV) fluid bags, and soft-edged flexible plastic packaging, respectively. Some are labelled and others are not (4).

Not all plastic waste can be recycled depending on the locale-specific markets for medical plastics, but it is estimated that up to two thirds of plastic waste generated in the OR is eligible for recycling. (5) However, plastics that CAN be recycled are often incorrectly disposed of in the regular or biomedical waste streams. Implementing an effective recycling program in the OR can drastically reduce the amount of plastic being sent to landfills and reduce waste processing costs for the hospital.

Problem/Opportunity Statement

3 Briefly state the problem you want to solve or the opportunity you want to realize.

Identifying a hauling partner willing to recycle clinical plastics and having a sense of what can be recycled are critical to a successful OR recycling program. Practice Greenhealth has published a **step-by-step guide** to plastic recycling in the OR. (6) You will need to engage with your hospital's existing waste hauler or recycler to determine their capacity for clean clinical plastics, or you may need to establish new contacts. It is important to understand the types and volume of plastic waste your OR generates by mapping out the supply purchasing or by doing a waste audit. (6)

Plastics 1, 2, 4 and 5 are recycled by the same vendor who recycles paper, glass and aluminum. Plastics 3, 6 and 7 are not accepted by regular recyclers. Some vendors allow commingling of paper, cardboard, aluminum, glass and plastic. Others may want some segregation of recycled materials, such as mixed paper and mixed containers (**see waste streams from BC Greencare**).

An example of a specialty recycling program is the polyvinyl chloride (PVC) 123 recycling program that was started in Toronto in 2020 via the Canadian Vinyl Institute to divert PVC products, which are notoriously difficult to recycle, from landfills. This program partnered St. Joseph's Health Centre and Humber River Hospital as leads for the pilot. (7) PVC waste generated in the OR includes intravenous (IV) bags, oxygen masks, and oxygen tubing waste, which can be remanufactured and "upcycled" into useful materials such as hoses, tubing, automotive supplies, and sound-dampening products (7).

Current State of the System/Process

4 What do things look like today?

1. Plastic-containing products and packaging are ordered for the OR
2. Unsorted plastic waste is disposed before, during, and after surgery in the most easily accessible bins.
3. In places where there is a lack of plastic recycling, recyclable plastic waste is disposed of in the general garbage
    - Unclear visual distinctions between recycling and garbage bins, leading to ineffective recycling
    - Non-biomedical plastic waste may be wrongly disposed as biomedical waste, increasing environmental impact and waste management fees
4. In places where there are recycling bins, these are collected by custodial staff and disposed according to hospital protocol. However, several problems exist:
    - Plastic waste that is not clearly identifiable as recyclable is thrown into garbage
    - Plastics identified for special recycling (i.e., PVC) end up in regular recycling/garbage

Root Cause Analysis

5 What gets in your way?

Education & Awareness
- Lack of awareness about which items are recyclable (8)
- Lack of awareness about the extent to which recyclable items are being placed in the wrong waste streams
- Concerns regarding the lack of effectiveness of recycling (i.e. the belief that recyclable waste will be mixed with regular waste after pick-up, so why make the effort to recycle?).

Clinical Workflow
- Lack of hospital policy on recycling procedures.
- Lack of hospital policy for using reusable products that can reduce single-use plastic devices.
- Implementing a specific plastic recycling program can be expensive.
- Plastics that require specialized recycling end up in regular recycling.

Infrastructure
- Lack of recycling receptacles in the OR.
- The bags used to collect recycling can be mistaken as regular garbage by custodial staff.
- Difficulty recycling certain types of plastic waste (e.g. PVC).
- Plastic waste not accepted by municipal recycling programs.

Design the Improvement & Define Change Ideas

6 What are your ideas to achieve your goals, address your root causes and close the gap from your problem statement?

Education & Awareness

- Crucial first step: Determine which types of plastics can be recycled in your OR
  - Get a handle on your hospital's needs for plastic recycling (volume and types of plastic). You will need to determine the types and volumes of plastic waste your OR generates by analyzing supply purchasing or by doing a **waste audit**.
  - Collaborate with your existing waste hauler/recycler to better understand available opportunities to recycle, and/or connect with new facilities or programs.
  - Refer to BC Greencare's **Clinical Recycling Trainer Program Guide** and Practice Greenhealth's **Medical Plastics Recycling in the OR Guide** (6) for ideas of how to establish a recycling program for medical plastics
- Create visual reminders and educational materials for clinical areas, such as a waste disposal charts.
- Embed education in all operating room staff orientation and onboarding (nursing, surgery, anesthesia, and care attendants). (**Resource: Recyclable and Non-Recyclable Items at SickKids PPT**)
- Involve custodial/housekeeping staff in recycling education and interventions.
- Identify environmental champions within the OR that can educate staff in the moment on correct plastic segregation

Design the Improvement & Define Change Ideas

6 What are your ideas to achieve your goals, address your root causes and close the gap from your problem statement?

Clinical Workflow

- Studies have found that up to 40% of regulated medical waste generated in ORs is packaging material (8).
  - Packaging used for devices can be safely collected at the beginning of surgery and placed in the recycling bin to reduce the risk of contamination from bodily fluids
- Implement recycling bins for plastic, then specialty recycling programs (e.g., blue wrap, PVC).
- Implement a **PVC 123 recycling program**, if available in your area (5). (**Resources: PVC 123 recycling program video**; **CASCADES Cases & Faces of Sustainable Helathcare: PVC 123**)
  - Segregate PVC waste to be recycled separately.

Infrastructure

- Establish clear visual markers to differentiate plastic waste from other waste.
- Use a unique colour bag (e.g., blue) and a visually different reusable bin to collect plastic recycling.
  - Include a colour coded bag within the visually distinct bin to ensure the bag reaches the proper disposal destination (e.g., blue bag in a blue recycling bin). The bag must be identifiable after collection by custodial staff and then onward by other staff taking it from the soiled utility room to the proper compactor/bin at the loading dock.
  - Distinct bag colours allow haulers to audit their large (20–40 ft) bins to ensure there are no non–recycling bags in the recycling bin and no recycling bags in the garbage bin.

Finances and Procurement

- Since as much as 50% of OR plastic waste may come from packaging (3), procurement offices can upstream pressure on vendors to rethink the design and packaging of products to reduce plastic waste, and/or facilitate easier recycling of plastic waste

Measure & Test Impact

7 How will you estimate the environmental impact of your changes?

Activity/Outcome Metric

1. **Weight (in kg) of plastics sent for recycling per month**
2. **Difference in weight (in kg) from previous month**

Source(s):
- Waste-audit
- Waste hauler data
- Financial data (waste hauling fees)

Considerations:
- For 1. A monthly count of the number of bags/bins of recycling will also be sufficient if you can obtain an average weight per bag/bin from the waste hauler or your own waste audit.
- For 2. It is assumed that this waste would otherwise have been disposed of as regular or biohazardous waste, but is now being disposed of in the recycling bin
- Monthly counts are recommended to observe progress, but data can be processed for any given time frame.

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Related Environmental Metric

1. **– 0.282 kgCO2e/kg (open loop recycling of average plastics)**
2. **a)1.833 kgCO2e/kg (incineration of hazardous waste/kg)**
   b) 1.179 kgCO2e/kg (incineration of regular waste)
   OR
   c) 0.461 kgCO2e/kg (autoclaving then landfilling of regular waste)

Source(s):
- 1,2,3a: MacNeill, et al. 2017 (9) (Adapted from kg/tonne)
- 3b. Zhao, Wei, et al., 2009 (10)
- All metrics adapted from kg CO2e/tonne

Considerations:
- The above metrics may have limited applicability to any one site (especially given the variability in distance from site to waste treatment facility)

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Environmental Impact

Calculation 1 should give you an estimate of the environmental impacts associated with your recycling.

However, this number should INCREASE as you improve waste sorting practices and place more eligible waste into the recycling bin.

In order to calculate the environmental savings associated with your efforts to increase recycling, you should multiply the difference in weight (in kg) from the previous month by metric 1 (calc 1), and by metric 2a, 2b, or 2c, depending on how that waste would have been treated had it not been properly disposed of in the recycling bin (calc 2).
- Subtract Calc 1 from Calc 2 to get a sense of actual environmental savings associated with improved recycling practices

Considerations:
- These calculations should yield NEGATIVE numbers as net recycling emissions account
- Use the Natural Resources Canada Greenhouse Gas Equivalencies Calculator to translate your results to stakeholders.

Embed & Spread

8 What steps have been taken to ensure lasting change? How could it be spread to other contexts?

Micro (What can you do?)
- Conduct waste audits to ensure all eligible items are being recycled
- Create disposal charts and educational posters to put up in OR.
- Create education curriculum for perioperative staff that outlines correct waste segregation practices.

Meso (What can you do within your organization?)
- Advocate and engage leadership to create a hospital-wide plastic recycling policy for **all** recyclable materials.
- Look into implementing a program similar to PVC 123.

Macro (What can your organization do?)
- Lobbying for vendors to reduce the amount of plastic (especially virgin plastic) used in packaging and products.
- Lobby for continued governments support of recycling programs such as PVC 123.

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