CASCADES

# SUSTAINABLE PERIOPERATIVE CARE

Project Charter Summary

REDUCE & MANAGE WASTE

## Biomedical Waste Management


PROJECT CHARTER: See the full version of the project charter for more change ideas, details, and a complete list of references.

Biomedical waste must be incinerated (only required for the treatment of pharmaceutical, cytotoxic, and pathological waste) or sterilized (commonly via steam autoclave, and used to dispose of other biomedical waste). Improper waste segregation results in overutilization of these two carbon-intensive processes. Moreover, mixing general waste into biomedical waste unnecessarily inflates waste hauling fees.

This issue is particularly significant to ORs, which generate up to 30% of hospital waste. In the OR, waste must be segregated into various streams for appropriate disposal. Unfortunately, a large volume of non-hazardous OR waste is unnecessarily discarded into the biomedical waste stream. One study found that up to 92% of discarded biomedical waste was non-hazardous.

Waste disposed of incorrectly has been attributed to poor understanding of the waste categories, improper segregation of waste, and inadequate staff training. Disposing of biomedical waste is an expensive and polluting process, and proper segregation can reduce both fiscal and environmental impacts of hospital waste.

**GOAL:** Reduce the volume of biomedical waste sent unnecessarily for incineration or sterilization

**PROJECT SCOPE:** All waste generated within perioperative care areas

**EMISSIONS SCOPE:** Scope 3 (emissions arise from activities or products related to health sector activities, but not owned or controlled by your organization)

## ESTIMATING IMPACT

### ACTIVITY/OUTCOME METRIC

1A. Weight of biomedical waste (kg) generated per month
and
2A. Difference in weight from previous month

- Source from a waste audit, waste hauler data, or financial data (hauler fees).
- Number of bags/bins of recycling will do if you can get average weight per bag/bin from the hauler or your own audit.

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### RELATED ENVIRONMENTAL METRIC

1B. 1.833 kg $CO_2e$/kg for hazardous waste (incineration)
and
2B. 1.190 kg $CO_2e$/kg for regular waste (incineration)
or
2C. 0.461 $CO_2e$/kg for regular waste (autoclaving then landfilling)

- All metrics are adapted from kg $CO_2e$/tonne, and may not precisely reflect every center (varies with factors like distance from site to waste treatment facilities).

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### ENVIRONMENTAL IMPACT

Estimation of total impact in kg $CO_2e$

- Calculation #1 will estimate environmental impacts of biomedical waste. Waste removed from the biomedical stream will still produce emissions (as regular waste), so environmental savings can be calculated by subtracting calculation #2 from #1.
  - This should reduce over time as waste practices improve.
- Use the Natural Resources Canada Greenhouse Gas Equivalencies Calculator to translate your results to stakeholders.

Project Charter developed in collaboration with: Dr. Syed Ali Akbar Abbass and Ivy Lam (St. Joseph's Health Centre), Dr. John Vecchio (London Health Sciences Centre), and Allen Bridge (Alberta Health Services). Charter summary developed by Dr. Connor Brenna.

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## Root Causes and Change Ideas for Biomedical Waste Management


PLAYBOOK: View the playbook for other perioperative sustainability opportunities and resources.

VIDEO: Waste Segregation with Dr. Ali Abbass

VIDEO: Follow the Waste with Dr. Ali Abbass

### EDUCATION & AWARENESS

There are inconsistent definitions of what constitutes biomedical waste requiring incineration or sterilization, and a lack of awareness around the cost and environmental implications of incorrect waste segregation.

- Conduct a waste audit to determine and raise awareness of the extent of inappropriate waste disposal (by weight and/or item type).
- Incorporate education on proper waste segregation into onboarding and continuing education for staff.
- Put posters on or close to waste receptacles showing which items should go into biomedical waste bags/bins.
  - See this example from St. Michael's Hospital.

### CLINICAL WORKFLOW

Usually due to a lack of time, staff put waste in the bag closest to them; large waste bags can lead to inappropriate disposal by making it easy to dump everything into one bag. Regulations and guidance for biomedical waste vary across Canadian jurisdictions, and many do not maximize opportunities for sustainability.

- Involve occupational health and infection prevention and control teams as primary stakeholders from the beginning, to gain their support for subsequent changes to waste handling policies.
  - Create green teams in your centers, including these stakeholders.
- Revisit OR counting policies if bins are to be kept in the room between cases. Bins can always be stored outside of ORs or brought in during changeovers if counting policies cannot be changed.
- Create an organizational policy that clearly defines biomedical waste and supports environmental sustainability.
  - See CASCADES' Hazardous Medical Waste Primer.

### FINANCES & PROCUREMENT

The cost of reusable bins is higher than for plastic bins/bin liners: these bins are not owned by the hospital, they are provided by the vendor, used, and replaced.

- Complete a cost-benefit analysis for the expense of reusable linerless bins as an alternative to plastic bags.
  - Measure over time as upfront costs of bins will be greater than the purchasing of bags.
  - Be sure to include cost savings from reduced waste hauler fees.

### INFRASTRUCTURE

Many hospitals use coloured plastic bags (e.g., yellow) instead of biomedical waste bins, which more effectively promote proper waste segregation. Bins of only one size or colour may be suboptimal or confusing. Policies that require biomedical waste bins containing countables to be removed after each case is a barrier to replacing bags with reusable bins.

- Implement visually distinctive biomedical waste bins that encourage staff to actively consider where to deposit OR waste.
- Standardize bins across ORs and other clinical areas.

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