PROJECT CHARTER

Perioperative Pharmaceutical Waste

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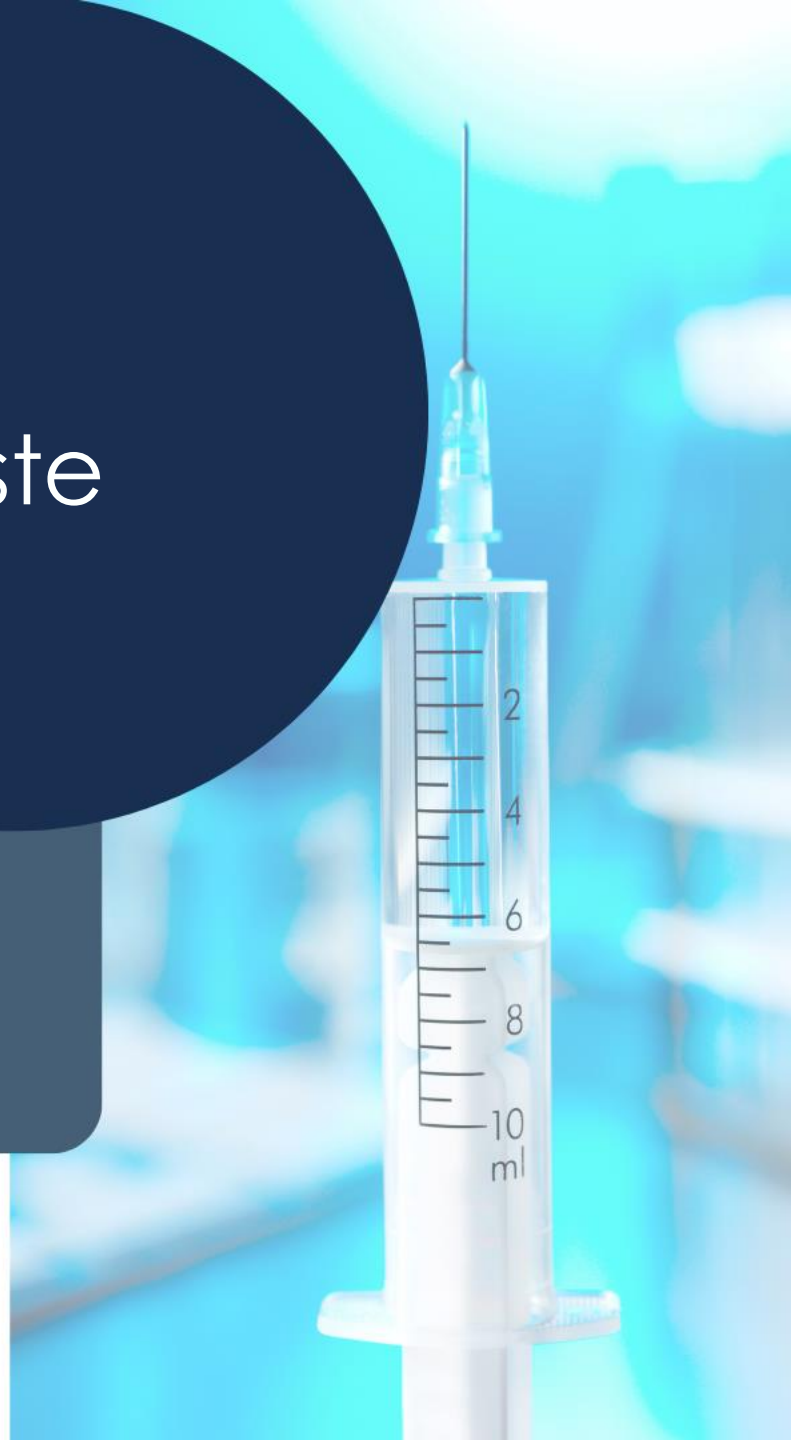

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Due to the complexity of this issue, this charter is a working version.

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?

Reduce the environmental impact of pharmaceutical waste generated by implementing processes to ensure appropriate disposal of non-cytotoxic pharmaceuticals.

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: Appropriate disposal of non-cytotoxic pharmaceutical waste produced in the perioperative areas (and beyond). Cytotoxic pharmaceutical waste is out of scope since it has guidelines for disposal in the red containers in the perioperative areas.

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.

The operating room (OR) is a significant source of pharmaceutical waste (1, 2). There is a lack of legislation or guidance on the management of pharmaceutical waste; as a result, staff may dispose of unused pharmaceuticals in a variety of improper ways, including: in the drain, where they enter the water ecosystem; in garbage bins, where they end up in landfill; or in the sharps container, which is sent for autoclaving before disposal in landfill. None of these are acceptable means of disposal for pharmaceutical waste, which must be incinerated. (2)

Improper disposal is dangerous to the environment and to human health (3, 4). Many commonly used anesthetic drugs are harmful to groundwater. Propofol, the most widely dispensed and wasted drug, is very toxic to aquatic organisms, does not degrade, and accumulates in fat (5). Bupivacaine and ephedrine are both toxic to aquatic organisms such as plants and fish. Other pharmaceuticals may be endocrine disruptors, carcinogenic, mutagenic, and destructive to all forms of life (6). It is therefore imperative that pharmaceutical waste be properly segregated so that it is appropriately disposed of through incineration (7).

At the same time, it is also important to keep non-pharmaceutical waste (such as empty syringes or vials) out of the pharmaceutical waste bin. This results in unnecessary incineration of that waste, which, if plastic, will release harmful toxic chemicals, such as dioxins and furans, into the atmosphere (7). There are ways to safely segregate waste produced in relation to pharmaceuticals. For example, the blunt drug draw needle can be capped and removed; the needle should then be disposed of in sharps, the drug in the pharmaceutical waste bin, and the empty container, in this case, a syringe, in the general waste or recycling bin.

*Note: In the absence of Canadian legislation, we can reference relevant legislation from elsewhere, such as the United States' **EPA – 266.507 Residues of Hazardous Waste Pharmaceuticals in Empty Containers (2019),** which does not regulate residues in stock bottles, dispensing bottles, vials, or ampoules as hazardous waste. Therefore, empty stock, dispensing, and unit-dose containers can be disposed of as general waste or recycling, depending on the vendors and the material. (8)*

Current State of the System/Process

4 What do things look like today?

- Non-cytotoxic drug is drawn up from vials via syringe as an intravenous (IV), or administered as a liquid, pill or inhaled drug.
- Most hospitals do not have pharmaceutical waste bins available to clinical staff, therefore the waste is being disposed of in the drain, other waste bins or the sharps container.
    - Some hospitals do have a single-use pharmaceutical waste bin. This container and all its contents are incinerated.
        - Although the disposal of the drug into the pharmaceutical waste bins is the policy at some hospitals and best practice, some staff dispose of the entire syringe or vial, with medication inside, into the most convenient waste bin and not the designated pharmaceutical waste bin.
    - Other hospitals have a reusable container labeled "pharmaceutical sharps waste" for the collection of sharps and pharmaceutical waste. The contents are incinerated, and the container is washed and decontaminated before reuse.

  NOTE: The pharmaceutical sharps waste container is not legislated and not best practice. Regardless of how the bin is labeled, combining pharmaceutical waste and sharps is not appropriate due to the unnecessary incineration of sharps.
- The vial, IV bag, inhaler and or pill bottles are disposed of in their respective containers but are not always appropriately segregated.
- There is no legislation in Canada defining what constitutes an "empty" medication container that can be safely disposed of in non-pharmaceutical waste bins, leaving the definition of "empty" to the discretion of hospital administrators or the clinical staff. This lack of regulation leads to increased volumes of "empty" containers in the pharmaceutical or sharps bins when they should be placed in the garbage or recycling bins.
- All waste bins are collected by custodial staff and then picked up by the waste hauler.
    - Single use pharmaceutical waste, bins and contents are incinerated.
    - Reusable pharmaceutical waste bins, contents are incinerated.
    - Single use sharps containers, contents and bins are autoclaved and then sent to the landfill.
    - Reusable sharps containers, contents are autoclaved and then sent to the landfill.
    - Garbage waste bins, contents are sent to the landfill.
    - Recycling bins, contents are sent to recycling facilities.

Root Cause Analysis

5 What gets in your way?

Education & Awareness

- Lack of knowledge about drug toxicity which should be kept out of the natural environment by incineration instead of disposal in landfill or water ecosystems.
- Lack of knowledge about existence of pharmaceutical waste bins for clinical areas.
- Absence of government regulations defining "empty" medical containers or managing pharmaceutical waste in clinical practice areas.
- Inappropriate use of pharmaceutical waste bins, where non-pharmaceutical waste (e.g., sharps, empty syringes with no needles, wrappers, empty vials) are disposed of in the pharmaceutical waste bins.

Clinical workflow

- Lack of clear signage and improper placement of bins discourages proper waste segregation.
- Fast paced environment can make it difficult to segregate waste properly.

Finances and Procurement

- Obtaining pharmaceutical waste bins in clinical areas increases the waste disposal costs, which some hospitals may be unwilling to pay due to the lack of legislation.

Infrastructure

- Lack or absence of pharmaceutical waste bins in the clinical areas.
    - There is no government legislation mandating the presence of a pharmaceutical waste bin in the perioperative care areas or proper pharmaceutical waste segregation guidelines for clinical staff to minimize volumes of pharmaceutical waste that is incinerated.

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

- Educational program (including training, posters, etc.) to ensure all perioperative personnel are aware of the following:
  - The impact of pharmaceutical waste on the environment (e.g., propofol toxicity).
  - Where and how to dispose of unused medications in the clinical areas.
  - What is considered an "empty" container that may contain trace volumes of non-cytotoxic drug that can be safely disposed of in general waste or recycling bins, depending on the material.
  - For drug draw needles, where the needle is not entering human skin and is capped and removed during workflow to connect the syringe to the iv tubing to inject medication, the capped needle should be removed at the end of use and disposed of in the sharps container. The syringe should be disposed of in the garbage bin. The unused drug should be disposed of in the pharmaceutical waste bins.

Clinical Workflow

- Sharps and pharmaceutical waste bins should be placed side by side in clinical areas
- Conduct a waste audit regularly to determine accuracy of waste segregation.
- Review hospital policy on pharmaceutical waste management to ensure practices are as sustainable as possible. **(Resource: UHN waste Policy)**

Finances and Procurement

- Use of pharmaceutical waste bins in clinical areas is best practice, even though there is currently no legislation mandating use.

Infrastructure

- Obtain a pharmaceutical waste bin for clinical areas and place in a location for optimal waste segregation and optimal workflow.

Measure & Test Impact

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

Activity/Outcome Metric		Related Environmental Metric		Environmental Impact
1. Weight of pharmaceutical waste (in kg) generated per month **2. Difference in weight from previous month**	×	**1. 1.833 kg CO2e (incineration of hazardous waste/kg)** **2. 1.190 kg CO2e if regular healthcare waste is incinerated** **OR** **0.461 kg CO2e if regular healthcare waste is sent to landfill after autoclaving**	=	• Calculation 1 should give you an estimate of the environmental impacts associated with your pharmaceutical waste generation • However, the waste you have removed from the pharmaceutical waste stream will still produce emissions when it is treated as regular waste. Therefore, in order to get a sense of actual environmental savings associated with improved pharmaceutical waste management practices, you should subtract your result for #2 from your result from #1
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 pharma waste 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 is still being generated, but is now being disposed of in the regular waste stream • Monthly counts are recommended to observe progress, but data can be processed for any given time frame.		Source(s): • 1. MacNeill, Lillywhite, and Brown, 2017(15) • 2. Zhao, Wei, et al., 2009 (16) • All metrics adapted from kg CO2e/tonne Considerations: • This metric comes from DEFRA greenhouse gas life-cycle conversion factors for waste disposal, and may have limited applicability to any one site (especially give the variability in distance from site to incineration facility) • Metric includes GHGs generated upstream in the supply chain as well as in the downstream disposal		Considerations: • There should be a REDUCTION in both numbers over time as pharmaceutical waste management practices improve • 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?)
- Embed education in all new perioperative personnel orientation and onboarding on proper pharmaceutical waste segregation processes.
- Identify environmental champions within the perioperative care team that can educate staff in the moment on correct pharmaceutical waste processes.

Meso (What can you do within your organization?)
- Advocate to create a hospital wide pharmaceutical waste policy.
- Advocate for appropriate pharmaceutical waste bins in clinical areas (e.g., reusable pharmaceuticals only waste bins)
- Advocate for haulers to collect "empty" glass vials (8). (**Resource:** ***EPA – 266.507 Residues of Hazardous Waste Pharmaceuticals in Empty Containers)***

Macro (What can your organization do?)
- Lobby governments to develop waste segregation guidelines, with a robust sustainability lens, that governs clinical staff.
- Lobby governments to extrapolate from existing regulations (e.g., United States EPA) to define empty containers allowing for trace amounts of non-cytotoxic medication to be disposed of in non-pharmaceutical waste streams in Canada (8).

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