Climate, Health & Sustainable Care

2025 Annual Symposium

UNIVERSITY OF TORONTO | COLLABORATIVE CENTRE FOR Climate, Health + Sustainable Care

Panel Session: **Reducing Environmental Harms of Care**

Anita Rao

Panel Moderator

Panelists

- **Alina Zgardau** - Optimizing the head and neck minor dissecting surgical tray: A quality improvement initiative to reduce costs and carbon footprint using Kotter's change model
- **Hilalion (San) Ahn** - Sustainable scopes: Tap water as a cost-effective, eco-friendly alternative in endoscopy
- **Michelle Sheojung Shin** - Waste and disposal practices in the bronchoscopy suite
- **Elisabeth Perlikowski** - Not all operating room garbage is the same: The impact of properly sorting biohazardous waste
- **Mike Apostol** - Biodegradable PPE – Why greener isn't always better
- Danette Beechinor - Nitrous oxide waste reduction
- **Elaine Ng** - Greening the operating room – Experience at a tertiary care pediatric hospital

Optimizing the Head & Neck Minor Dissecting Surgical Tray:
QI Initiative to Reduce Costs & Carbon Footprint

Alina Zgardau, MSc[1]; Sukham Brar[1]; S. Danielle MacNeil, MD[2]; Adrian Mendez, MD[2]; Julie Richards[3]; Mac Barry[3]; Mike Apostol[3]; Jacob Davidson, MSc[3]; Claire Parent, PhD[3]; Julie E. Strychowsky, MD[2]

[1]Schulich School of Medicine, Western University, London, ON, Canada, [2]Department of Otolaryngology–Head and Neck Surgery, London Health Sciences Centre, London, Canada, [3]London Health Sciences Centre, London, Canada

Conflicts of Interest

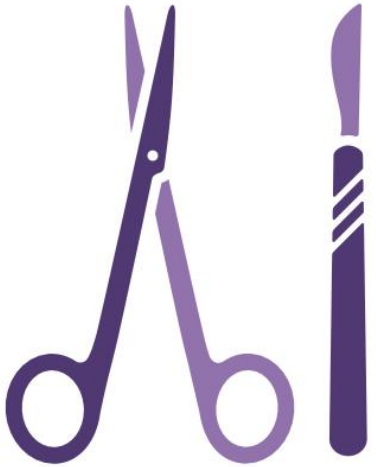
AMOSO Opportunities Grant (J. Strychowsky)

Introduction

Operating rooms (ORs) generate **20–30% of hospital waste** due to disposable and reusable sterile materials.

Optimizing Surgical Trays (STs):

- Reduces CO_2 emissions
- Cuts costs without compromising patient safety
- Improves efficiency



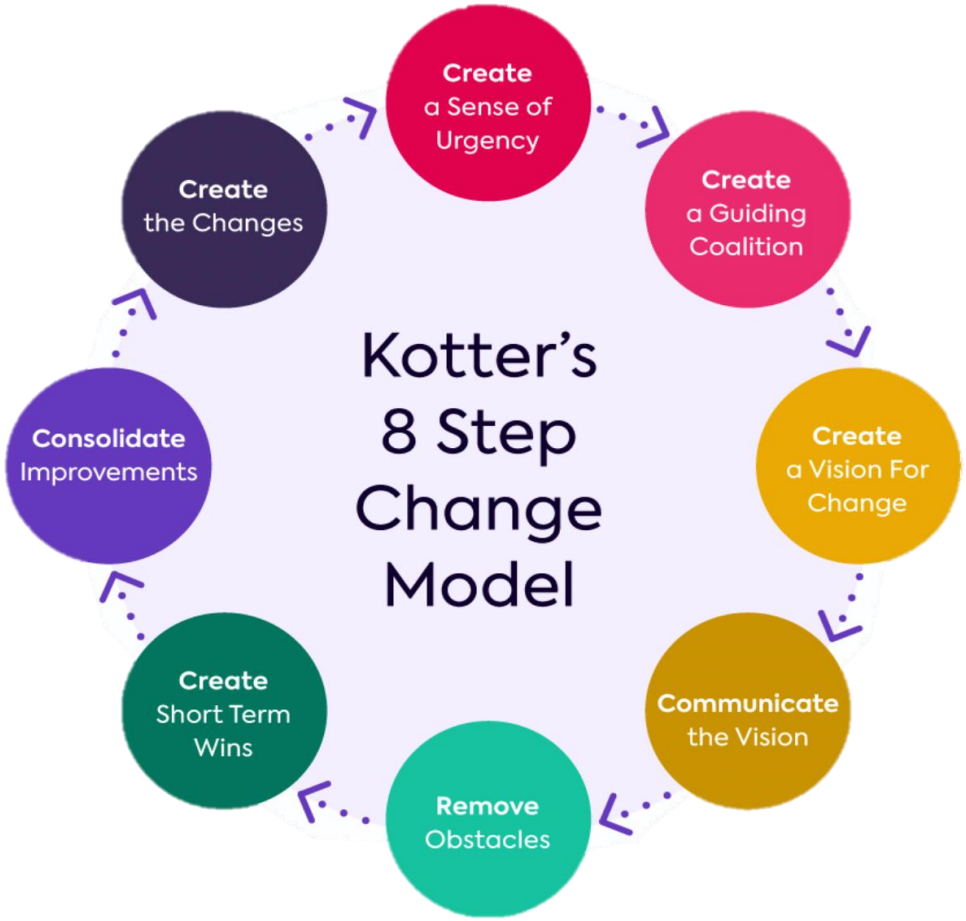
Objectives:

1. Optimize the Minor Dissecting Surgical Tray (MDST) using Kotter's Change Model (KCM)

2. Evaluate outcomes:
    - Instrument reduction
    - Processing time
    - Cost & CO_2 reduction
    - Provider satisfaction

3. Use MDST as a scalable model to guide optimizations across surgical specialties

Methods:



QI project framed using KCM

Goal: Currently extending approach to at least one high-volume ST per surgical specialty at LHSC

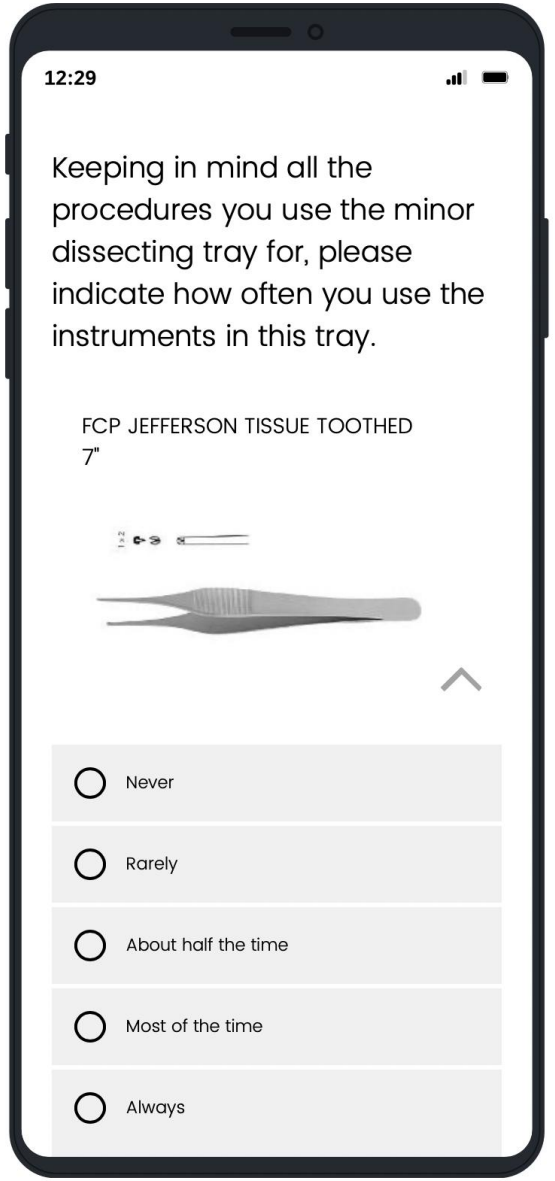
KCM 8-steps | Project Application:

Establish Urgency	Emphasize waste, cost, and environmental impact of unoptimized trays.
Create Coalition	Engage stakeholders: Surgeons, OR nurses, and MDR team

Data Collection:

1. **Pre-implementation survey**: Distributed to surgeons, nurses, and residents to evaluate instrument use.

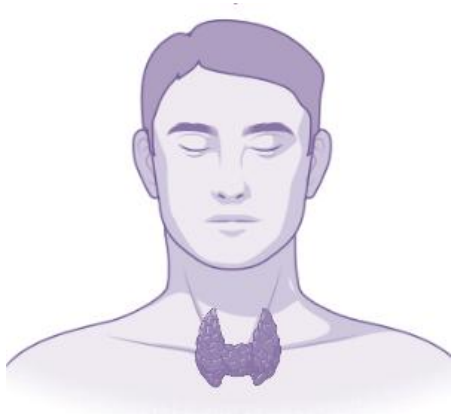
2. **Intra-operative audits**: Real-time observations to record instrument utilization.



MDST Survey Results:

15 Survey Respondents:

- 9 (60%) Surgeons
- 4 (27%) Nurses
- 2 (13%) Residents/Fellows



Most common procedures:

- Minor excision
- Thyroidectomy
- Parathyroidectomy
- Parotidectomy

Survey Results:

- ✓ Reducing number of redundant instruments (>1 per tray)

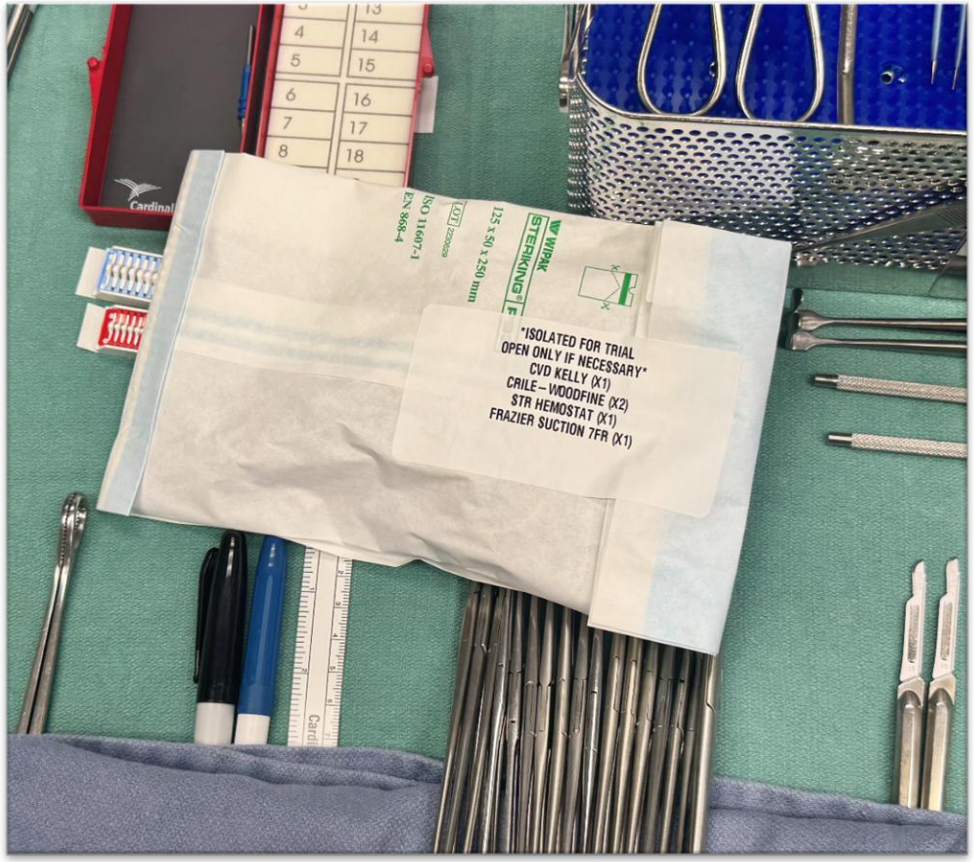
Surgical Audits:

6 Audits:

- Parathyroidectomy
- Total/Subtotal Thyroidectomy
- Parotidectomy

Instrument	#1	#2	#3	#4	#5	#6
FCP JEFFERSON TISSUE TOOTHED 7"	0/2	0/2	0/2	2/2	0/2	0/2
FCP ADSON 1 x 2 TOOTHED	2/2	2/2	2/2	0/2	2/2	2/2
FCP DEBAKEY TISS THIN 7 3/4AG	2/2	2/2	2/2	2/2	0/2	2/2
RETR LANGENBECK 8 1/2" BLADE 1/2" X 1 5/8"	0/2	2/2	2/2	2/2	0/2	1/2
RETR LAHEY 8" 1/4" X 1"	0/2	0/2	0/2	2/2	0/2	0/2
RETR SENN 3 PRONG (SHARP)	2/2	1/2	0/2	0/2	0/2	2/2
APPLIER HEMOCLIP MED BLUE 8"	2/2	2/2	2/2	2/2	0/2	2/2
APPLIER HEMOCLIP SM RED 8"	2/2	2/2	2/2	2/2	0/2	2/2
CORD MALIS BIPOLAR	1/1	1/1	1/1	1/1	0/1	1/1
FCP HALSTEAD MOSQ CVD 5	0/2	2/2	0/2	0/2	1/2	1/2
FCP PEDIATRIC MIXTER 5.25	0/1	0/1	0/1	0/1	0/1	0/1
FCP CRILE / HEMOSTAT STR 5 ½	1/3	0/3	1/3	0/3	0/3	0/3
FCP ROCHESTER-PEAN HEMOSTAT CVD 6 ¼	4/4	0/4	2/4	0/4	0/4	0/4
FCP ALLIS TISSUE 5 X 6 TEETH 6" REG WEIGHT	3/5	4/5	5/5	0/5	0/5	0/5
FCP BABCOCK TISSUE 6 ¼	0/2	2/2	0/2	0/2	0/2	1/2
NH CRILE WOOD FINE TC 6	3/5	0/5	3/5	2/5	0/5	2/5
FCP SPONGE STR SERR 9 ½	1/1	1/1	1/1	1/1	0/1	1/1
SCISS MAYO STR BEV 6 ¾	1/1	1/1	1/1	1/1	1/1	1/1
SCISS TENOTOMY JAMISON METZ CVD 6"	1/1	1/1	1/1	0/1	0/1	1/1
KNIFE HANDLE BARRON	1/2	0/2	2/2	2/2	0/2	2/2
HOOK JOSEPH SKIN DBL 10MM	2/2	2/2	2/2	2/2	0/2	2/2
TUBE SUCTION FERG FRAZ 7FR SZ 1	0/1	0/1	0/1	0/1	0/1	0/1
TUBE SUCTION FRAZIER 12 FR 7 IN	1/1	1/1	1/1	1/1	0/1	0/1
STYLETTE	0/1	0/1	0/1	0/1	0/1	0/1
FCP JEWELERS BIPOLAR 4.5" INSULATED, STRAIGHT MICRO TIPS	1/1	1/1	1/1	1/1	0/1	1/1
FCP ADSON INSULATED BIPOLAR 5"	0/1	1/1	1/1	0/1	0/1	1/1

MDST Optimization Trial:



5-week MDST Trial:

- x1 CVD Kelly was added back after the first week of trial

Instrument Reduction:

Reduced 5 instruments from the MDST!

Instrument	Pre-Trial	Post-Trial	Usage Insight
 FCP Rochester-Pean Hemostat CVD 6 ¼	4	3	Rarely used; minimal surgical utility.
 NH Crile Wood Fine TC 6	5	3	Frequently unused; low average utilization.
 FCP Crile Hemostat STR 5 ½	3	2	Frequently unused; low average utilization.
 Tube Suction Ferg fraz 7FR SZ 1	1	0	Never used; removed, kept on hold for specific cases.

MDST Optimization Results:

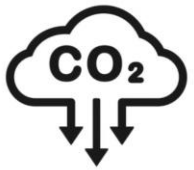
Metric	Findings
🔧 Instrument Reduction	↓ 11.8% (number of tools)
💰 Annual Cost Savings	~$52,360
🕑 Tray Assembly Time	↓ ~2 minutes per tray
🌱 CO_2 Emissions Reduction	↓ 106.5 kg/year
👩‍⚕️ Provider Feedback	Positive overall

- ✓ 45.6 L of gasoline
- ✓ 4.5 propane cylinders
- ✓ 0.242 barrels of oil

Discussion & Limitations:

Data-Survey Discrepancies

Survey responses did not always align with observed use → potential bias or recall error.



CO_2 Estimate Constraints

Based on Rizan et al., which may not fully align with institution.

Consensus Challenges

Tray optimization is a balancing act—trade-offs exist between efficiency and convenience

Scalability Potential

The optimized MDST model demonstrates potential for replication across surgical specialties, especially in high-volume areas.

Future Directions:

- ✓Initiate optimized tray trials in Orthopedics and Ophthalmology
- ✓Optimization of other surgical specialities

Service Line	**Name of Tray**
ENT	Tray Minor Dissecting ENT
Gen Surgery	Hernia Tray
GU	Tray GU Open Extras
Gyne	Tray D&C Tray Gyn Instruments
Neuro	Tray Neuro Load
Ophthalmology	Tray Recession
Orthopedics	Tray Dissecting Instruments Ortho
Plastics	**No tray selected yet*
Thoracic/Vascular	Minor Vascular Load
Peds Gen Surgery	Tray Paediatric Gen Surg

Thank You!

Gratitude & Acknowledgements:

- The surgical, nursing, and administrative teams involved in this study
- Master's students Nour Abdelrahman, Hamza Alsaied, Preetama Badyal, and Ashley Noor Khan for their invaluable help and dedication
- The Department of Otolaryngology – Head and Neck Surgery at London Health Sciences Centre for their support in facilitating data collection!

London Health Sciences Centre

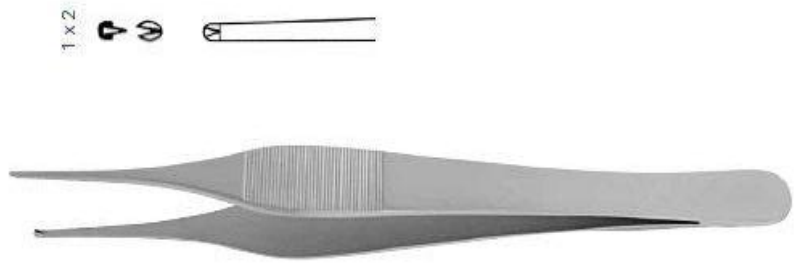
Schulich MEDICINE & DENTISTRY

Western

Contradictions between survey & observations:

FCP JEFFERSON TISSUE TOOTHED 7"

- Observations: 1 of 6 surgeries used 2/2 tools in the tray
- 5 of 6 surgeries used 0/2 Jefferson's
- Survey: 8/15 respondents put 2/2 tools used during surgeries
  - Only 3/15 put 1 tool used
  - 4/15 put 0/2 tools used



RETR LAHEY 8" 1/4" X 1"

- Observations: 1 of 6 surgeries used 2/2 tools in the tray
- 5 of 6 surgeries used 0/2 tools
- Survey: 11/15 respondents put 2/2 tools used during surgeries
  - Only 2/15 put 1 tool used
  - 2/15 put 0/2 tools used

Instrument Reduction:

FCP Rochester-Pean Hemostat CVD 6 ¼

- **Observations**: Mostly unused (0/4 for 4 surgeries, 2/4 for 1 surgery, 4/4 for 1 surgery),
- **Survey:** 14/15 respondents put up to 2 of 4 tools; only 1 respondent indicated 3.
- **Optimization:** Reduced from 4 tools to 2 tools → *3 tools after trial began*

NH Crile Wood Fine TC 6

- **Observations:** Max 3 of 5 tools used across observations; 2 surgeries 0/5.
- **Survey**: 13/15 respondents put up to 3 of 5 tools; only 2 indicated using 4.
- **Optimization**: Reduce from 5 to 3 tools in a tray

FCP Crile / Hemostat STR 5 ½

- **Observations**: Rarely used (only 2 surgeries used 1 of 3 tools; rest 0/3)
- **Survey**: Only 3 of 15 use 3 of the tools
- **Optimization**: Reduce from 3 to 2 tools in a tray

Tube Suction Ferg fraz 7FR SZ 1

- **Observations**: Never used
- **Survey**: Never used
- **Optimization**: Take out of the tray; keep on hold

The Ottawa Hospital | L'Hôpital d'Ottawa

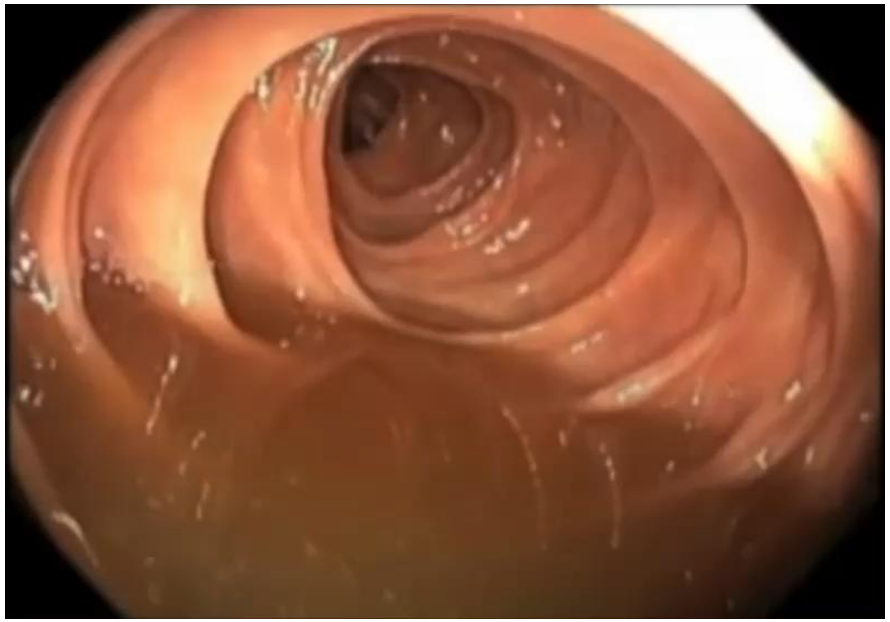
uOttawa

Sustainable scopes: Potable tap water as a cost-effective eco-friendly alternative

Hilalion (San) Ahn, Allison Williams, Karlie Kelly, Husein Moloo
The Ottawa Hospital
University of Ottawa, Faculty of Medicine
Ottawa, Ontario, Canada

COLLABORATIVE CENTRE FOR
Climate, Health + Sustainable Care

UNIVERSITY OF TORONTO
Collaborative Centre for Climate, Health & Sustainable Care



https://www.youtube.com/watch?v=odlUoUoBf5w

Qian N, Gao X, Lang X, Deng H, Bratu TM, Chen Q, et al. Rapid single-particle chemical imaging of nanoplastics by SRS microscopy. Proc Natl Acad Sci U S A. 2024;121(3):e2300582121.

Agrawal D, Crockett S, Palchaudhuri S, Hernandez L, Skole K, Shimpi R, Collins J, Von Renteln D, Pohl H. Ripple Effect: Safety, Cost, and Environmental Concerns of Using Sterile Water in Endoscopy. Gastro Hep Adv. 2025 Jan 25;4(5):100625. doi: 10.1016/j.gastha.2025.100625. PMID: 40297529; PMCID: PMC12036045.

uOttawa

Canadian Journal of Surgery
Journal canadien de chirurgie

Research

Testing the precautionary principle: a scoping review comparing potable tap and sterile water for irrigation in colonoscopy

Hilalion (San) Ahn, Alexie Leclerc, Jennifer Shamess, Jordi Pardo, Catherine Dube, Alaa Rostom, Natalia Calo, Kednapa Thavorn, Daniel I. McIsaac, David Smith and Husein Moloo

Can J Surg July 10, 2025 68 (4) E281-E288; DOI: https://doi.org/10.1503/cjs.012724

uOttawa

- In 6 months:
  - 2129 bottles eliminated
    - 1224 kgCO_2
    - 510 million microplastics and nanoplastics
- Projected 1 year = CAD$144250

Qian N, Gao X, Lang X, Deng H, Bratu TM, Chen Q, et al. Rapid single-particle chemical imaging of nanoplastics by SRS microscopy. Proc Natl Acad Sci U S A. 2024;121(3):e2300582121.

Agrawal D, Crockett S, Palchaudhuri S, Hernandez L, Skole K, Shimpi R, Collins J, Von Renteln D, Pohl H. Ripple Effect: Safety, Cost, and Environmental Concerns of Using Sterile Water in Endoscopy. Gastro Hep Adv. 2025 Jan 25;4(5):100625. doi: 10.1016/j.gastha.2025.100625. PMID: 40297529; PMCID: PMC12036045.

uOttawa

N. America ~18 million/year x CAD$49/case = **CAD$882 million/year**

Peery AF, Crockett SD, Murphy CC, Jensen ET, Kim HP, Egberg MD, Lund JL, Moon AM, Pate V, Barnes EL, Schlusser CL, Baron TH, Shaheen NJ, Sandler RS. Burden and Cost of Gastrointestinal, Liver, and Pancreatic Diseases in the United States: Update 2021. Gastroenterology. 2022 Feb;162(2):621-644. doi: 10.1053/j.gastro.2021.10.017. Epub 2021 Oct 19. PMID: 34678215; PMCID: PMC10756322.

uOttawa

- Sent to all endoscopy staff
- 39/101 (39%) response rate
  - 20 nurses, 13 physicians, 5 personal care assistants, 1 medical device reprocessing technician
  - 100% had no concerns for patient safety
  - Improved workflow efficiency, environmental and financial impact

uOttawa

“Simple, safe, much more resource friendly and environmentally friendly. Let's be honest, the tap water is cleaner than the colon water the patients come in with!”

uOttawa

Thank you!

Hilalion (San) Ahn, MD FRCSC
Colorectal Surgery Research Fellow
General Surgery
sahn@toh.ca
hilalionahn@gmail.com

Evaluation of Waste & Disposal Practices in the Bronchoscopy Suite

Dr. Michelle Sheojung Shin, MD, PGY5 Respirology

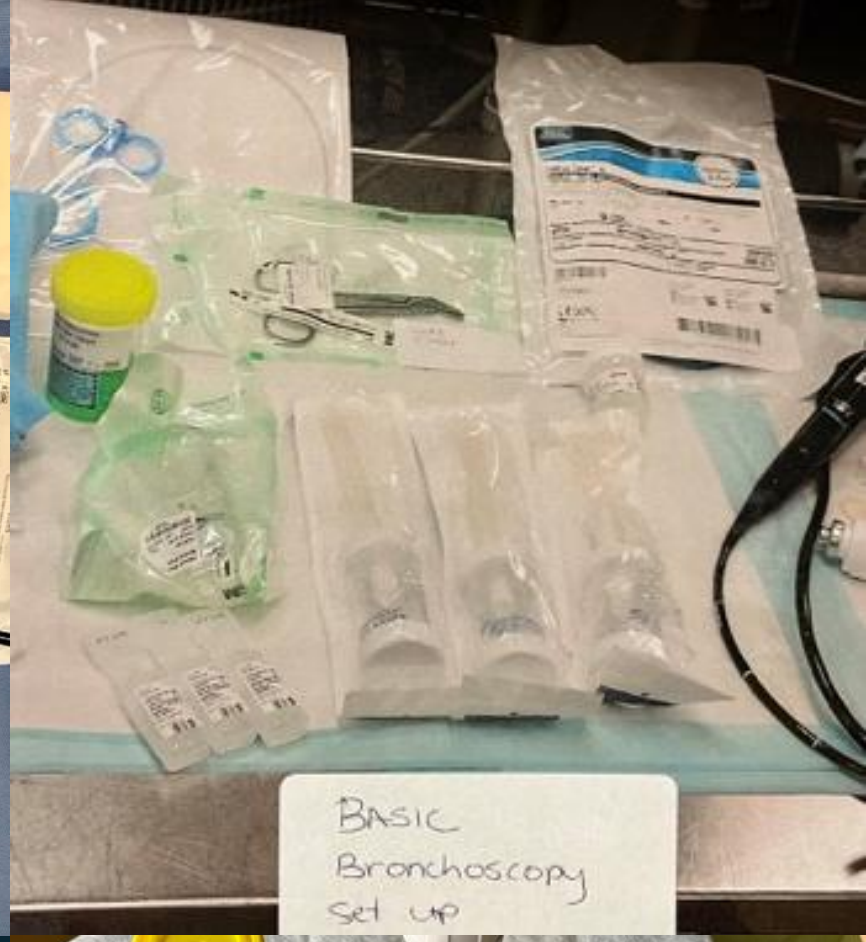
Supervised by Dr. Christine McDonald, MSc MD FRCPC, Interventional Pulmonology

Division of Adult Respirology and Department of Medicine

University of Toronto

Materials & Waste Audit

Total procedures	**14**
Bronchoscopy + EBUS linear probe	9
Bronchoscopy + EBUS radial probe	2
Bronchoscopy + Complex EBUS (linear + radial)	3



Bronchoscopy Setup

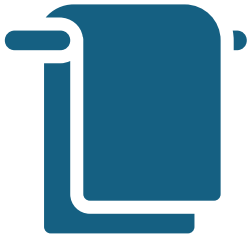
Single Use Disposable Items

	Total Used	Total Discarded Unused
Red cap blunt needle	31	1
Bite block	14	0
Lidocaine 10cc clear single use ampoule	43	11
Disposable plastic cup	6	0
5cc syringe	28	0
10cc syringe	40	4
20cc syringe	26	0
500mL 0.9% NS bottle	16	1
BAL trap container	27	15
Cytolyt container	33	0
Formalin container	4	1
Bronchoscopy suction valve (single use)	16	0
Bronchoscopy working channel valve (single use)	16	0
Biopsy needles	14	0
Suction syringe for biopsy	14	0
Oral suction catheter	15	0
Suction trap containers (red top)	28	0
Suction connector tube	28	0
Oxygen connector tube	14	0
1L sterile water (blue)	14	0
4x4 gauze	180	90
Paper requisition (in # of sheets)	60	2
Sample biohazard plastic bag (clear)	58	0
Waste biohazard plastic bag (yellow)	28	0
Blue plastic bag for reusable gowns	14	0
Pair of non-sterile latex gloves	78	0
Visor	49	0
N95 mask	78	0
Blue pad	31	1

Reusable Items

	Total Used	Total Discarded Unused
How many topical spray lidocaine bottles used?	5	0
How many reusable metal cups used?	14	0
How many reusable metal bowls used?	14	0
How many towels used?	15	1
How many reusable gowns used?	60	0
How many 1L bottles of 70% isopropyl alcohol used?	6	0

Burden of Waste



Average number of items used per case:

80.6 single-use items per procedure

8 reusable items per procedure

Per year estimate: 19, 666 single use items

Average number of PPE items used per case:

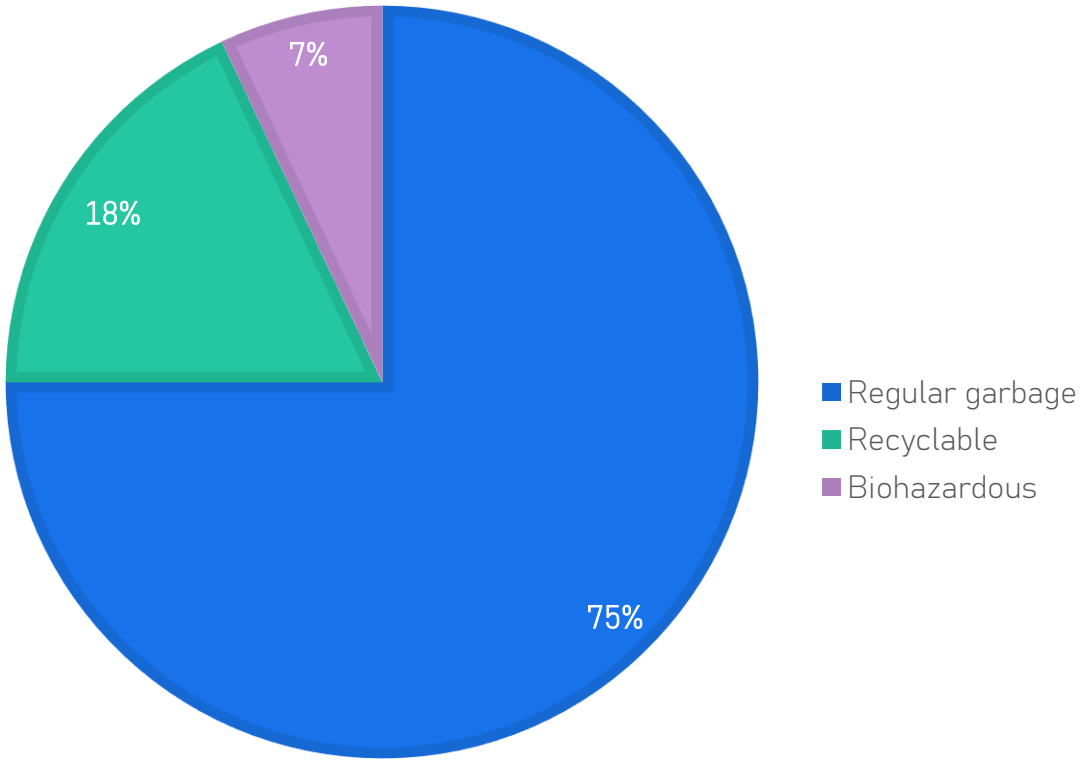
15 disposable, 4.3 reusable

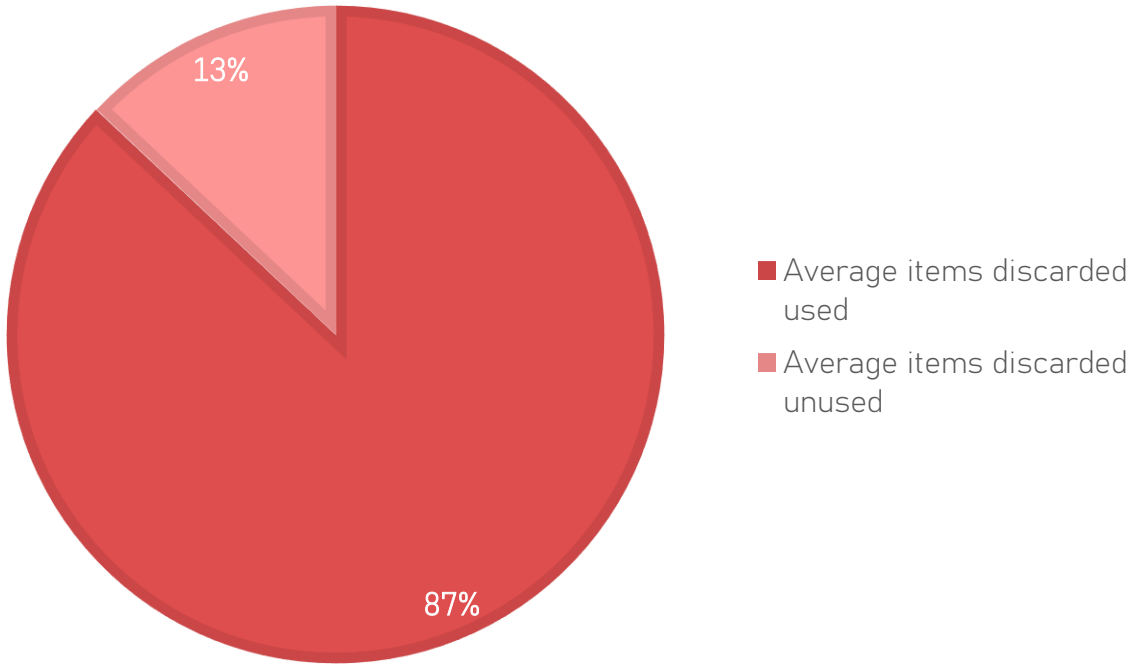
All waste placed in biohazardous bags


Bag #1
Single Use Aspiration Needle
NA-403D
PenView FLEX
16G
FULL TAB
FULL TAB


Bag #2

Observations





Observations

93% of total waste misclassified as biohazardous waste

1. Absence of waste sorting
2. No availability of recycling bins or regular trash bins
3. Staff knowledge gaps re. waste segregation
4. All bins are emptied after every procedure, and lined with new plastic bags, regardless of how full
5. Modifiable areas of waste (e.g. paper reqs, BAL traps)

The importance of waste sorting

1) Additional greenhouse gas emissions

- In addition to GHGs, incinerators are major sources of toxic air emissions (e.g. dioxins, Pb, Hg, NO_x and SO_x) and other organic pollutants

2) Water waste

- Autoclaves consume hundreds of thousands of litres of water and can produce leachate

3) Socioeconomic health implications

- In the USA, incinerators are primarily (79%) located in communities of color and low-income communities whose residents are subject to multiple, cumulative health impacts

4) Healthcare costs

- The cost for handling biohazardous waste is on average 10x the cost of handling general landfill waste

References:
1. Tangri N. Waste incinerators undermine clean energy goals. PLOS Climate. 2023;2(6): e0000100. https://doi.org/10.1371/journal.pclm.0000100
2. Talbot S, Moore D. Waste management in the operating theatre. Surgeon. 2024;22(4):248-252. doi:10.1016/j.surge.2024.06.004
3. Windfeld, E. S., & Brooks, M. S. (2015). Medical waste management - A review. Journal of environmental management, 163, 98-108. https://doi.org/10.1016/j.jenvman.2015.08.013

Thank you!

Questions?

Not all Operating Room Garbage is the Same
The Impact of Properly Sorting Biohazardous Waste

Elisabeth Perlikowski
Annie Fecteau, Elaine Ng, Leigh Cassils
Erin Hempel, Paul Regalado

SickKids®

Background & Objectives

Reducing Biohazardous Waste in the Pediatric OR

- **Biohazardous waste (BHW)** must be autoclaved before landfill disposal but was heavily contaminated with garbage and recyclables (**75% contamination rate**), increasing environmental impact and OR disposal costs.
- **Intervention:** Train OR staff on proper BHW disposal aligned with government guidelines, monitor contamination, and evaluate financial and environmental impacts.
- **Objective:** Reduce both the volume and contamination of BHW in the OR by at least 50%.

Methods

Audits & Data Collection

🗑️ **Audits:** Physical audits of BHW & garbage by surgical service

📊 **Monthly Data:** Surgeries, total BHW weight, cart count/weight, BHW per surgery, disposal cost

Interventions

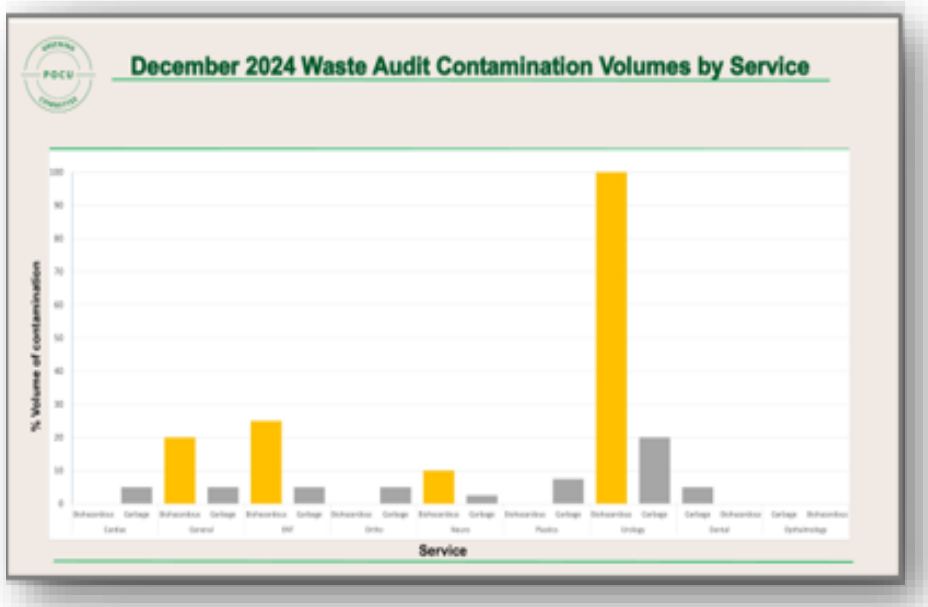
⭐ **OR Champions**

🗣️ **Training & Coaching:** Staff education + huddle coaching

🗳️ **Bin Reorganization:** Improved waste segregation

Staff Feedback & Data Sources

💬 **Feedback:** Regular Q&A to support adoption



Results

Key Metrics

📉 **BHW Weight:** 70% ↓ (5,263 → 1,571 kg/month)

⚖️ **BHW per Surgery:** 72% ↓ (5.5 → 1.5 kg/surgery)

💰 **Disposal Cost Savings:** $3,116.59/month; $3.37/surgery

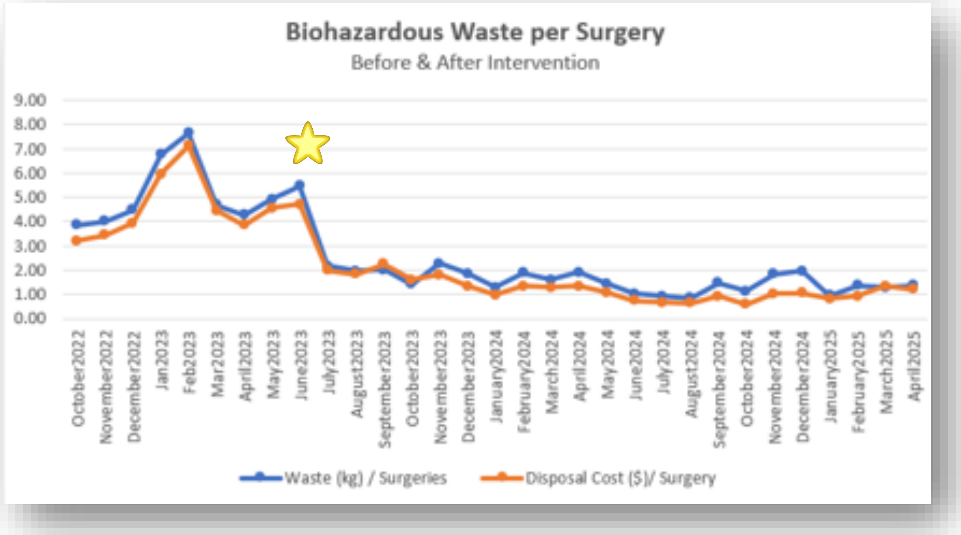
Annual & Environmental Impact

🏦 **Total Annual Waste Savings:** $29,000

♻️ **Contamination Reduction:** 49% ↓ (75% → 26%)

💧 **Water Saved:** 128,700 L/year (~1 household)

🚫 **Material Saved from Autoclaving:** 30 tons/year



ELEVATE QUALITY AND THE CARE EXPERIENCE

Lessons Learned

- **Collaborative Strategy:** Overcoming long-standing disposal practices requires a multifaceted approach emphasizing communication and continuous improvement.
- **Stakeholder Engagement:** Involving staff in new disposal procedures fosters environmental stewardship.
- **Data-Driven Success:** Tracking and reporting key metrics supports project success and informs quality improvement initiatives in healthcare and sustainability.

THANK YOU

Biodegradable PPE

Why Greener Isn't Always Better

MIKE APOSTOL, P. ENG, MES, CEM
ENERGY & ENVIRONMENTAL PROFESSIONAL

PRESENTATION FOR

UNIVERSITY OF TORONTO

COLLABORATIVE CENTRE FOR Climate, Health + Sustainable Care

The Vendor Pitch

Vendors are persuading healthcare sites to **switch to biodegradable PPE** for items like nitrile gloves and masks.

Their Pitch:

1. Saves landfill space!
2. Reduces microplastics and ocean contamination!
3. Creates renewable energy from captured landfill methane!

😊 **Save the planet** 😊

And all for **only a *little bit* more money**...

Healthcare leaders often view this as an opportunity to "***do something***" for the environment and promote a green initiative to their staff. ***But what does it do?***

PPE Waste Disposal

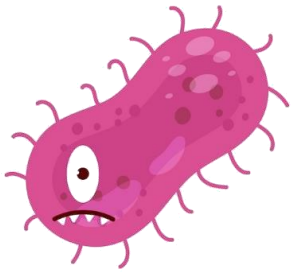
In Canada, almost all PPE waste ends up in our **landfills**

In this **anaerobic** disposal environment, **biodegradable PPE** quickly breaks down into **carbon dioxide** and **methane** – a greenhouse gas 87 times more potent than CO_2 over 20 years.

The realities of our Canadian landfills are:

- **Minimal methane capture:** Open landfill methane capture rates can be under 20%, so ***most methane escapes*** into the atmosphere before a landfill is closed and sealed.
- **This means very high GHG emissions from quickly decomposing items** like biodegradable PPE – ***adding end-of-life GHG emissions***.
- **Available landfill space is not a global healthcare issue like climate change**

The Vendor Claims Don't Hold Up



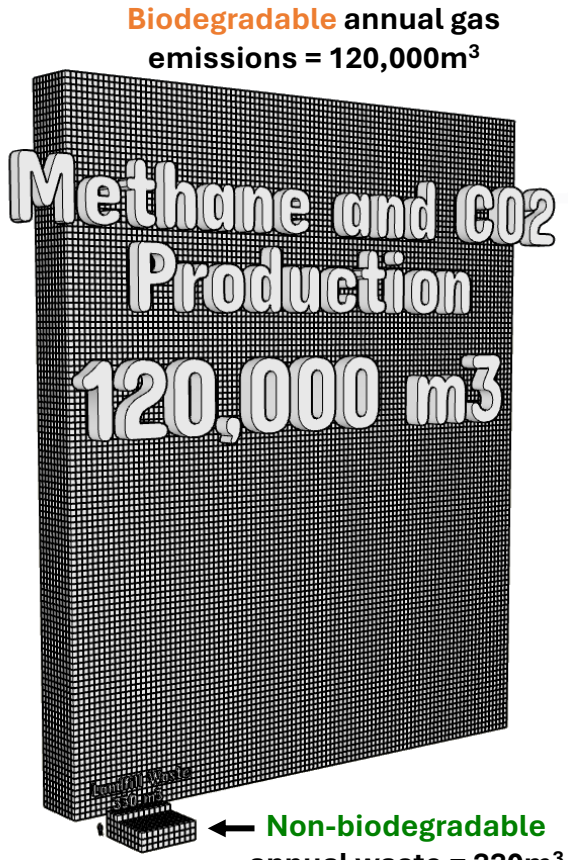
1. "It saves landfill space."

- True, but the "space savings" are negligible, and the greenhouse gas emissions far outweigh the space saving benefit in my view.
- **Ex:** Disposing 25 million nitrile gloves per year would take 38,000 years to fill a landfill, which are typically only open for 20 years.

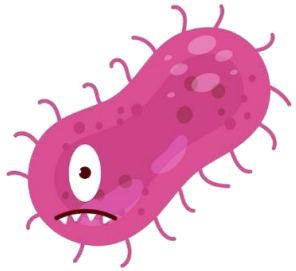
2. "It reduces microplastics and oceans contamination."

- Not an issue here – Canadian landfills are engineered to contain waste.
- We don't dump our waste into waterways.

Comparison of Yearly Waste Volumes for 25M Gloves



The Vendor Claims Don't Hold Up



3. "The methane becomes renewable energy."

- Only a small fraction is ever captured while the landfill is open; ***most leaks*** into the air long before energy recovery is possible.
- Generating electricity from landfill methane is far less efficient and **emits more greenhouse gases per kWh** than grid sourced electricity.
- **Ex:** Switching 25 million nitrile gloves (about 100 tonnes) to biodegradable would ***create*** around 4,000 tCO_2e every year – equal to ***adding 1,200 gas-powered cars back on the road***.
- **Rule of Thumb:** **1 tonne** of Biodegradable PPE = **40 tCO_2e**

Important Note
While capturing landfill gas helps reduce unavoidable emissions, the most effective solution is to keep biodegradable, methane-producing materials out of landfills altogether.

Lifecycle of Nitrile Gloves

Biodegradable Gloves

Regular Gloves

Landfill methane and CO_2 leakage

Greenhouse Gases

CO_2 from combustion

Landfill gas captured

PPE, like nitrile gloves, are **often made from fossil fuels**. When burned, **it is not "renewable energy"**.

Non-renewable and high-emissions electricity

Go For a Counterintuitive Win

When vendors are proposing both options, make the choice to purchase **non-biodegradable** PPE, **it could avoid tens of thousands of tonnes of future greenhouse gas emissions**.

This decision isn't flashy, but it is the right one for the planet, your budget – and for your healthcare facility's credibility.

Bottom Line

- Not every product labeled "biodegradable" or "compostable" is better for the environment.
- Sometimes, the most sustainable choice is the one that resists decay – and avoids turning into a potent greenhouse gas in our landfills.

What Can You Do?

Alternatives for Staff

- **Use PPE appropriately.** Overuse drives waste. Training and awareness campaigns, like those from CASCADES and the Canadian Coalition for Green Health Care, can help.
- **Choose reusables where possible.** They almost always have a lower environmental footprint.

Support fact-based procurement

- Ask for life cycle analyses, not just marketing claims. Get help investigating a choice as sometimes what the vendors tell you and reality aren't aligned.
- Reach out to your hospital's Green Team, Waste specialists, or organizations like CASCADES, CCGHC, and U of T's Collaboration Centre.

What Can You Do?

Consider how you can approach future PPE procurement

- Establish procurement policies to ***avoid*** biodegradable or compostable PPE, unless it will be managed in the appropriate waste stream to enable the intended environmental benefits (likely not).
- Share this information with PPE decision makers, like IPAC.

If you're already purchasing biodegradable or compostable PPE

- Evaluate if there is there an opportunity to switch back sooner within the contract obligations.
- **Reframe it:** Switching away from biodegradable PPE will…
  1. Reduce thousands of tonnes of GHG emissions per year
  2. Avoid greenwashing claims
  3. Save your hospital money!

Good intentions, bad outcomes.

It's one of **the easiest environmental projects** you could do that ***saves money*** in the process!

Questions?

25M Nitrile Gloves Comparison	Biodegradable	Non-biodegradable
Landfill Space Saved	✅ 330 m^3	❌ 0 m^3
Gas Emissions Volume	❌ -120,000 m^3	✅ 0 m^3
Microplastic Contamination	N/A	N/A
Greenhouse Gas Emissions	❌ 3,899 tCO_2e	✅ 0 tCO_2e

Non-biodegradable PPE avoids thousands of tonnes of GHG emissions per year

Similar results are expected with other biodegradable PPE, such as masks and gowns

A presentation with all calculations and more details is available!

Sunnybrook's Nitrous Oxide Journey

Danette Beechinor
BSc Pharm, Pharm D, CHPE, CD

THIS PLACE IS
SPECIAL

Sunnybrook

Build your team

It has to be Interprofessional

- Clinicians including – Anesthesia Assistants and Anesthesiologists
- Dentistry
- Mid-wifery as appropriate
- Plant Operations and Maintenance
- Vendor
- Communications
- Project management
- Someone to lead it

Set regular meetings

Action points with individuals responsible in your minutes

Know Your System

Bayview Site

Bulk Tank – back up tanks (with a back up

5000 Kg external bulk tank – temperature and pressure sensitive

Back-up system in the tank room Holland Orthopedic Centre – Tanks only

Sunnybrook

Outlets mapped

Nitrous Oxide Piped System in:

- 5 – 6 Cath Labs
- 27 ORs including 2 burn OR and 3 maternal OR
- Interventional radiology
- Cancer Program – procedure room
- Cancer Program MRI

Used portable tanks in

- Dentistry
- Birthing suites

Holland Centre

- 5 Orthopedic ORs

Sunnybrook

Started with a Pilot

Baseline Waste Measurement (the long hard road)

- Weigh the tanks on manifold
- Measure the usage from electronic records for 4 weeks
- Weigh tanks again
- Calculate how many Kg used and convert to litres.
- Calculate your waste: Amount which left the tanks – amount used clinically = waste/leaks

Pilot – Small tanks on the anesthesia machines (wall system is still pressurized) :

- Weigh small tanks
- Measure clinical usage
- Calculate your waste
- Occ Health measured our N_2O in the OR and no increased staff exposure.

- Compare small tanks to the large piped tanks: we had an **80% waste reduction**, despite the tanks being left open in between cases. Equivalent to planting 1450 trees per year and allowing them to grow for 10 years – at the small site.

May 31st 2024– turned the system alarms of the piped system off, and decommissioned the system – returned the tanks.

Sunnybrook

Sunnybrook Bayview Site

Get Sign off:

- Risk Management - storage
- Anesthesia – want the tanks left open between cases.
  - Cath labs
  - Maternal
  - Interventional radiology
  - MRI – no small tanks had to agree to go without
- RT assistants (Check machines, add pressure check and switch tank to the daily check)
- Anesthesia assistants
- Plant operations and maintenance – order tanks, work with AA and RTA to switch out, have spare tank supply
- Managers – find place to store spares.
- Occ Health- N2O concentration in the ORs.
- Biomed – because ti slightly changes the configuration of the anesthesia machines with the second tank.

Pilot – Switched to small tanks on Sept 17th 2024 – ensure logistics are smooth and then made a full scale switch and depressurize the piped system November 2024.

Sunnybrook

THIS PLACE IS

SPECIAL

Sunnybrook

Greening the Operating Room: Experience at a Tertiary Care Pediatric Hospital

Elaine Ng, Leigh Cassils, Erin Christensen, Annie Fecteau

Elisabeth Perlikowski, Paul Regalado

The Hospital for Sick Children, Toronto, Ontario

SickKids

UNIVERSITY OF TORONTO

Aim

Description of our journey in moving towards an environmentally sustainable Perioperative Care Unit.

- No disclosures

How we started...

UNIVERSITY OF TORONTO

SUSTAINABLE HEALTH SYSTEM COMMUNITY of PRACTICE

TAHSN

Sustainable Operating Room Scorecard

Ontario's Anesthesiologists
A SECTION OF THE ONTARIO MEDICAL ASSOCIATION

Environmental Sustainability Working Group

GREENING POCU COMMITTEE

CASCADES

UNIVERSITY OF TORONTO
Collaborative Centre for Climate, Health & Sustainable Care

2020
Co-chairs
Stakeholders
Guest speakers
Sustainability Interns

Impact

- Desflurane
  - ↓ ~ 11 tonnes GHG emissions
- Low flow rates on anesthesia gas delivery
  - ↓ > 20 tonnes of GHG emissions
- Biohazard waste (BHW) management
  - ↓ BHW monthly weight by 70%
    = $29000
    128,700 litres of water saved
- Stop routine placement of
  3-way stopcocks on Intravenous lines
  - ↓ > 6000 kg of waste, and 6 tonnes of GHG emissions

- Redesign of a surgical tray
  - ↓ 1.2 tonnes of GHG emissions

https://www.icumed.com/en-ca/products/infusion-therapy/infusion-consumables/large-bore-hi-flo-stopcocks/

Lessons learned

- **Just do it!**
  - Maintain progress and initiate other changes
  - Snowballing effect

- **And Keep at it!**
  - Ongoing engagement with stakeholders
  - Audits to track progress

SickKids

https://about.nike.com/en/newsroom/collections/nike-inc-logos

UNIVERSITY OF TORONTO

Takeaways/ Reflections

- A multidisciplinary greening committee is essential to managing sustainability projects in POCU
- Collaboration within and outside of our hospital allowed us to be informed of current practices and opportunities
- Ongoing education of our sustainable practices is necessary for incoming trainees and new hires and reinforcement of information