



Climate, Health & Sustainable Care Inaugural Symposium



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climate.health@utoronto.ca 

Sustainable & Climate Conscious Clinical Care

Grace Kuang, Charmi Shah, Pierrette Price-
Arsenault

Moderator: Karen Born



**Climate, Health &
Sustainable Care**
Inaugural Symposium

How can we prevent heat-related illness in people with Severe & Persistent Mental Illness?

Drs. Daniel Rosenbaum
Samantha Green, Michaela Beder, Sarah Levitt, Talveer Mandur, Palika Kohli, and Grace Kuang



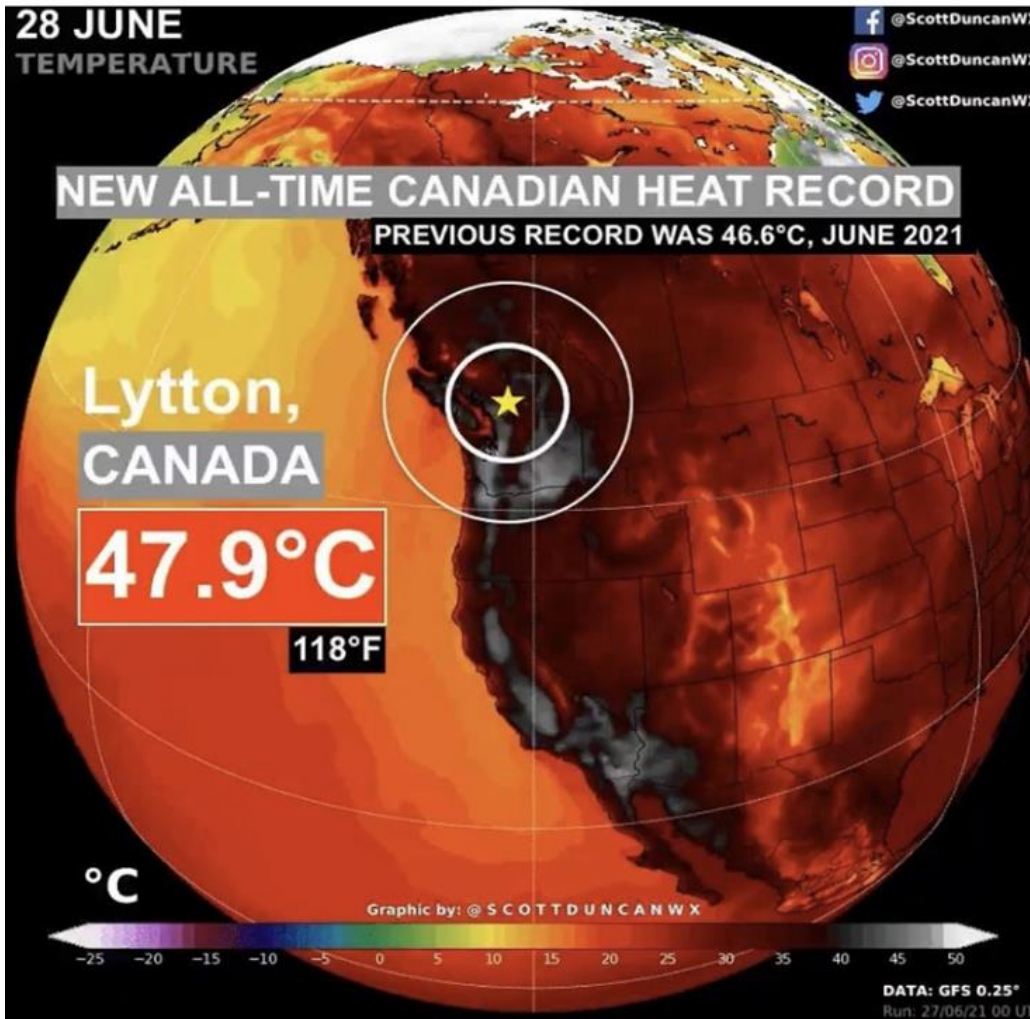
Disclosures

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- Grants/Research Support: None
- Speakers Bureau/Honoraria: None
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- Patents: None
- Other: None

Learning Objectives

1. Gain a high-level understanding of the signs & symptoms of heat-related illness, which patients are most at risk, and methods to intervene at the micro, meso, and macro policy levels
2. Describe the barriers and facilitators to developing and implementing a novel pilot intervention to reduce heat-related morbidity and mortality amongst people living with SPMI in Toronto
3. Outline the evaluation methods and preliminary results of our education-based quality improvement project

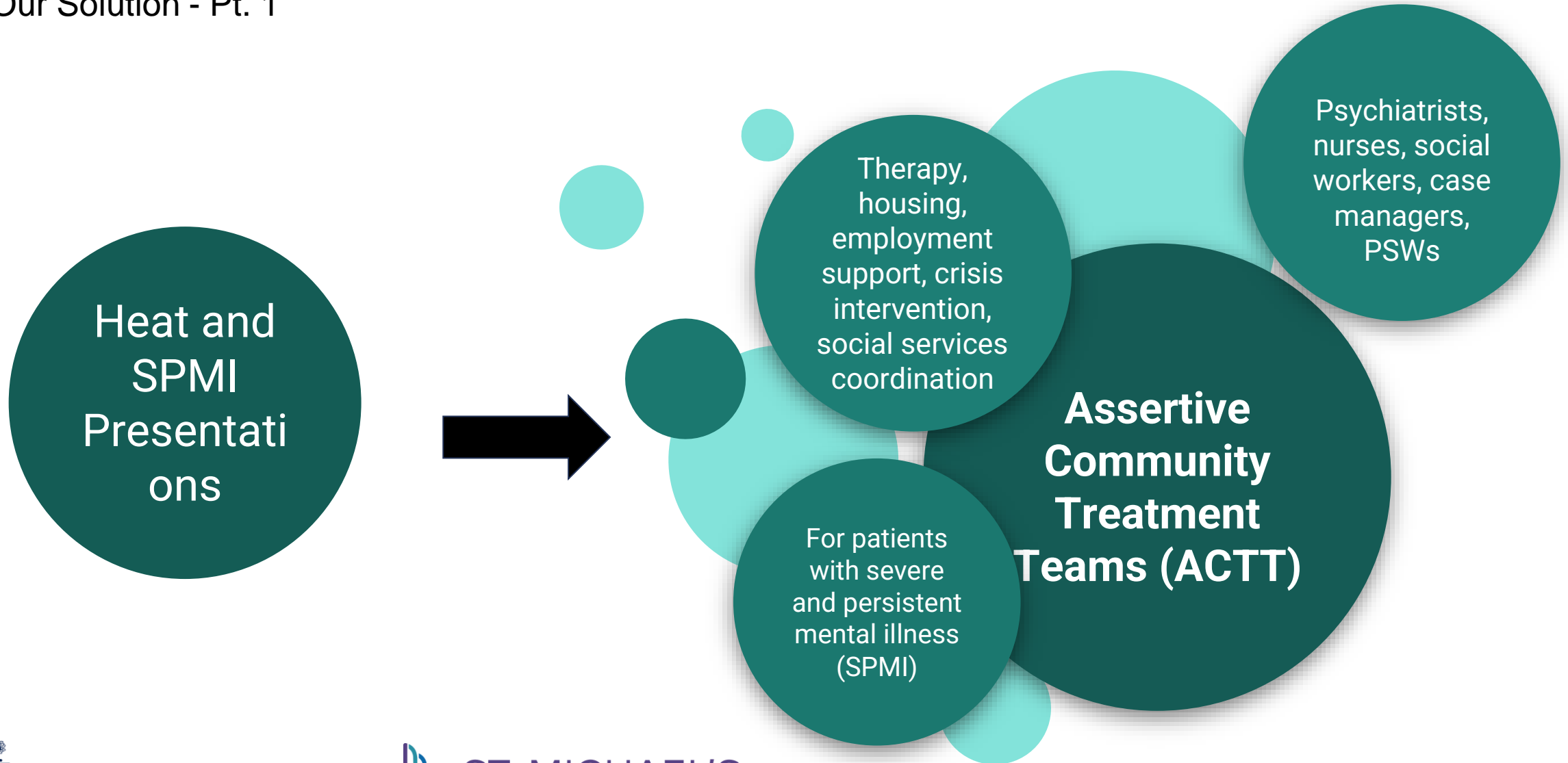


The Issue

- SPMI = Severe and Persistent Mental Illness
- During the 2021 BC Heat Dome event, individuals experiencing schizophrenia faced the highest increased risk of mortality (OR 3.07)



Our Solution - Pt. 1





Heat Presentation Tracker - 2024



File Edit View Insert Format Data Tools Extensions Help

Sheets home

100% | \$ % .0 .00 123 | Arial | - 10 + | B I

A20:J20 | CMHA - West

	A	B	C	D	E	F	
1	Agency/Team	City/Region	Contact	Emails for Surveys	Heat Team Member contact	Date of request	D
2	Cornwall Hospital	Cornwall	Julie Dumoulin	julie.dumoulin@cornwallhospital.ca		May 22	M
3	The Royal for the Community	Ottawa	Paula Walsh-Bergin	paula.walsh-bergin@theroyal.ca		May 22	M
4	Reconnect	Toronto	Saglal Mohamoud	smohamoud@reconnect.on.ca		May 21	M
5	The Royal for the Community	Ottawa	Paula Walsh-Bergin	Paula.Walsh-Bergin@theroyal.ca	Dan	May 30	J
6	SMH Grand Rounds	Toronto	None	None			J
7	Wellesley ODSP/OW office	Toronto	Jordan Nott	jordan.nott@ontario.ca	Samantha	May 29	J
8	Pinecrest-Queensway	Ottawa	Carla Larose	c.larose@pqchc.com, pqactt@pqchc.com	Samantha	June 5	J
9	Reconnect	Toronto	Colleen Lelievre	colelievre@reconnect.on.ca, smohamoud@reconnect.on.ca	Talveer	May 31	J
10	ICHA Lunch	Toronto			Dan		J
11	ACTT - CMHA Kenora	Kenora	Mary Carter	astoyakovich@cmhak.on.ca	Samantha	May 23	J
12	SunPACT, Toronto (Sunnybrook)	North Toronto	Catarina Lemos	Shing.Cho@sunnybrook.ca	Grace	June 12	J
13	St. Mikes AFHT (Social Prescribing)	Toronto	Nassim Vahidi	nassim.vahidi-williams@unityhealth.on.ca	N/A	June 25	J
14	UHN ACTT (IMPACT)	Toronto	Patricia Melville	sheree-Anne.badere@uhn.ca; arth	Michaela/Dan	June 17	J
15	Central Neighbourhood House - West	Toronto	Safia Hirsi	Safia.Hirsi@tngcs.org	Samantha/Grace	June 20	J
16	NYGH ACTT	North York	Michael Barberio	Michael.Barberio@nygh.on.ca	Grace	June 28	J
17	CMHA - EMACTT	Toronto	Kate Galloway	katie.memoria@gmail.com	Grace	June 17	J
18	CMHA - NDACT	Toronto	Kate Galloway	katie.memoria@gmail.com	Grace	June 17	J
19	FOCUS (St. Mike's ACTT)	Toronto	Natalie Wong	Natalie.Wong2@unityhealth.on.ca	Michaela	June 22	J
20	CMHA - West	Toronto	Sharon Blom	sblom@cmhato.org	Grace	July 22	A
21	F/ACT Conference	Utopia, Ontario	N/A	N/A	Michaela	N/A	S

Our Solution - Pt. 2

Letter Template for AC/fan funding from ODSP or OW



LETTERHEAD

DATE

Re: NAME

DOB:

To whom it may concern,

We are writing to support X's request for an air conditioner [or fan]. This letter has been written with X's consent. X is a client of the X program at X hospital/program. This program serves people who are living with severe mental illness in the community. On our team, X receives care from a psychiatrist and social worker.

Due to the client's required medications, X is at risk for inability to regulate body temperature and requires an air conditioner. We are requesting that X receives the necessary funds in order to purchase an air conditioner, costing approximately \$400 for purchase and installation.

Having an air conditioner will allow X to keep their unit cool during the hot summer months and help preserve their health and stability.

Sincerely,

Our Solution - Pt. 2

Resource List to Presentation Participants



Extreme heat:

NCCEH Extreme Heat Event (5 pages, how to conduct a health check during a heat event, rapid assessment checklist for health workers):

https://ncceh.ca/sites/default/files/NCCEH%20Extreme%20Heat%20Event%20-%20Health%20Checklist%20WEB_0.pdf

BC resource Extreme heat preparedness guide (16 pages, client/patient-facing):

https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/preparedbc/preparedbc-guides/preparedbc_extreme_heat_guide.pdf

Toronto “staying healthy in hot weather” page:

<https://www.toronto.ca/community-people/health-wellness-care/health-programs-advice/hot-weather/>

Americares climate hand-outs for providers & patients:

<https://www.americares.org/what-we-do/community-health/climate-resilient-health-clinics/>

Climate Psychiatry Alliance resources (single page):

<https://www.climatepsychiatry.org/heat-wave-resources>

PEARLS: Preparing patients with serious mental illness for extreme HEAT:

<https://cdn.mdedge.com/files/s3fs-public/CP02109027.pdf>

For workers: <https://www.ohcow.on.ca/heat-stress-toolkit/>

Very detailed heat stress calculator for workers:

<https://www.ohcow.on.ca/resources/apps-tools-calculators/heat-stress-calculator/>

Wildfires & smoke:

UCSF wildfire/smoke-related resources:

<https://climatehealth.ucsf.edu/wildfires-health-education-hub#>

Our Solution - Pt. 3

How to Survive Extreme Heat

The infographic is a circle divided into six segments, each with an illustration and a tip:


- Top-left:** Illustration of a person holding a white cloth to their forehead. Text: "Do outdoor activities before 11am or after 6pm".
- Top-right:** Illustration of a person checking a smartphone. Text: "Check local weather apps for heat warnings".
- Middle-right:** Illustration of a person drinking from a water bottle. Text: "Drink lots of water".
- Bottom-right:** Illustration of a person taking a shower. Text: "Take cool showers".
- Bottom-left:** Illustration of a person wearing a hat and sunglasses. Text: "Wear sunscreen and a hat".
- Middle-left:** Illustration of a person standing in front of a shopping mall. Text: "Go to a cooler place".


Additional text in the top-left segment: "Know the symptoms of heat stroke".

Additional text in the top-right segment: "WARNING" (with a warning icon).

ST. MICHAEL'S UNITY HEALTH TORONTO

Warning Signs of Heat Stroke

Find a list of cooling centres in Toronto here 

Early signs
increased sweating, muscle cramps 

Heat Exhaustion
heavy sweating, thirst, fatigue, decreased urine, headache, nausea or vomiting, cold, clammy skin, dizziness or fainting

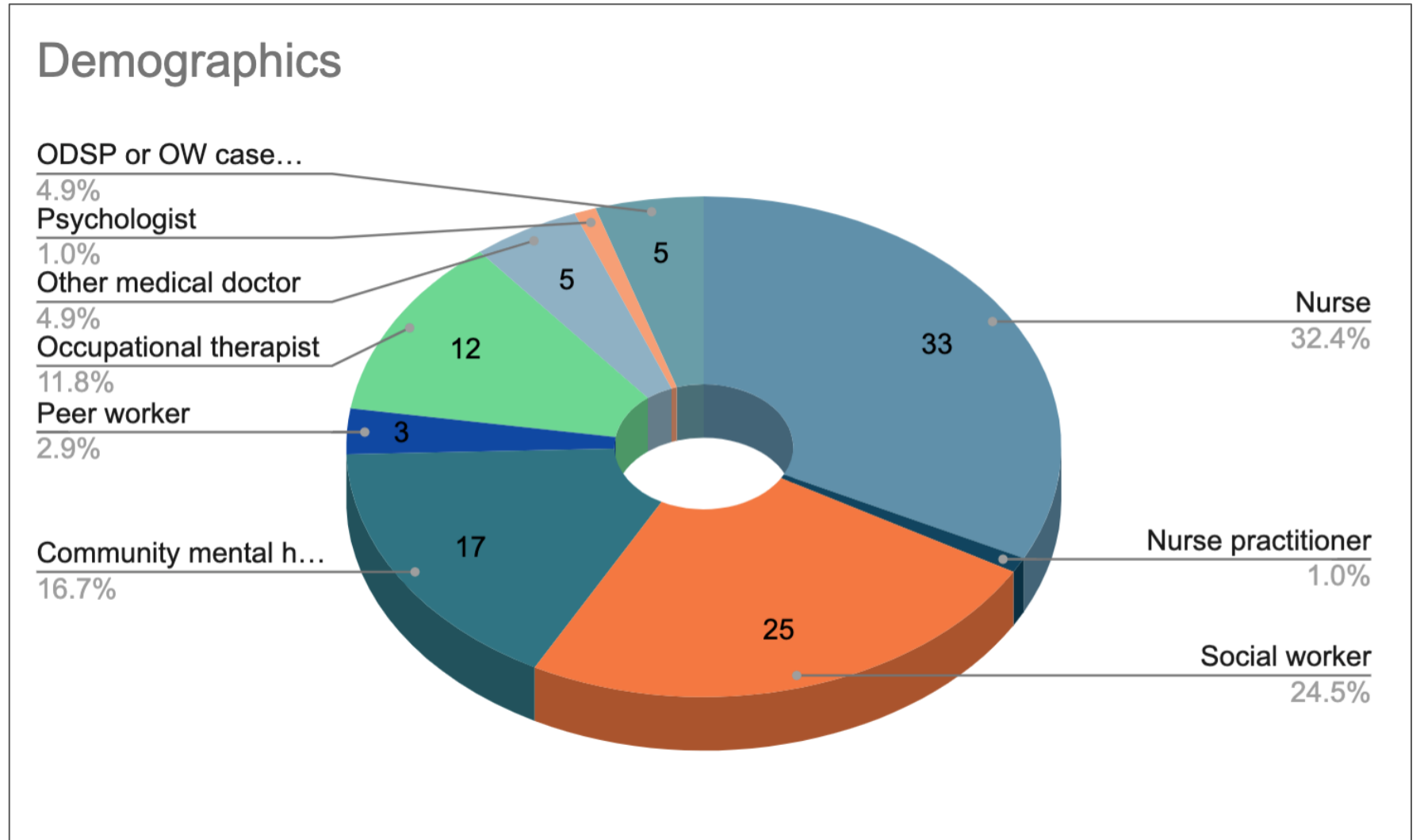
Heat Stroke
throbbing headache, fast strong pulse, hot flushed dry skin (skin may be damp), confusion and loss of consciousness

ST. MICHAEL'S UNITY HEALTH TORONTO

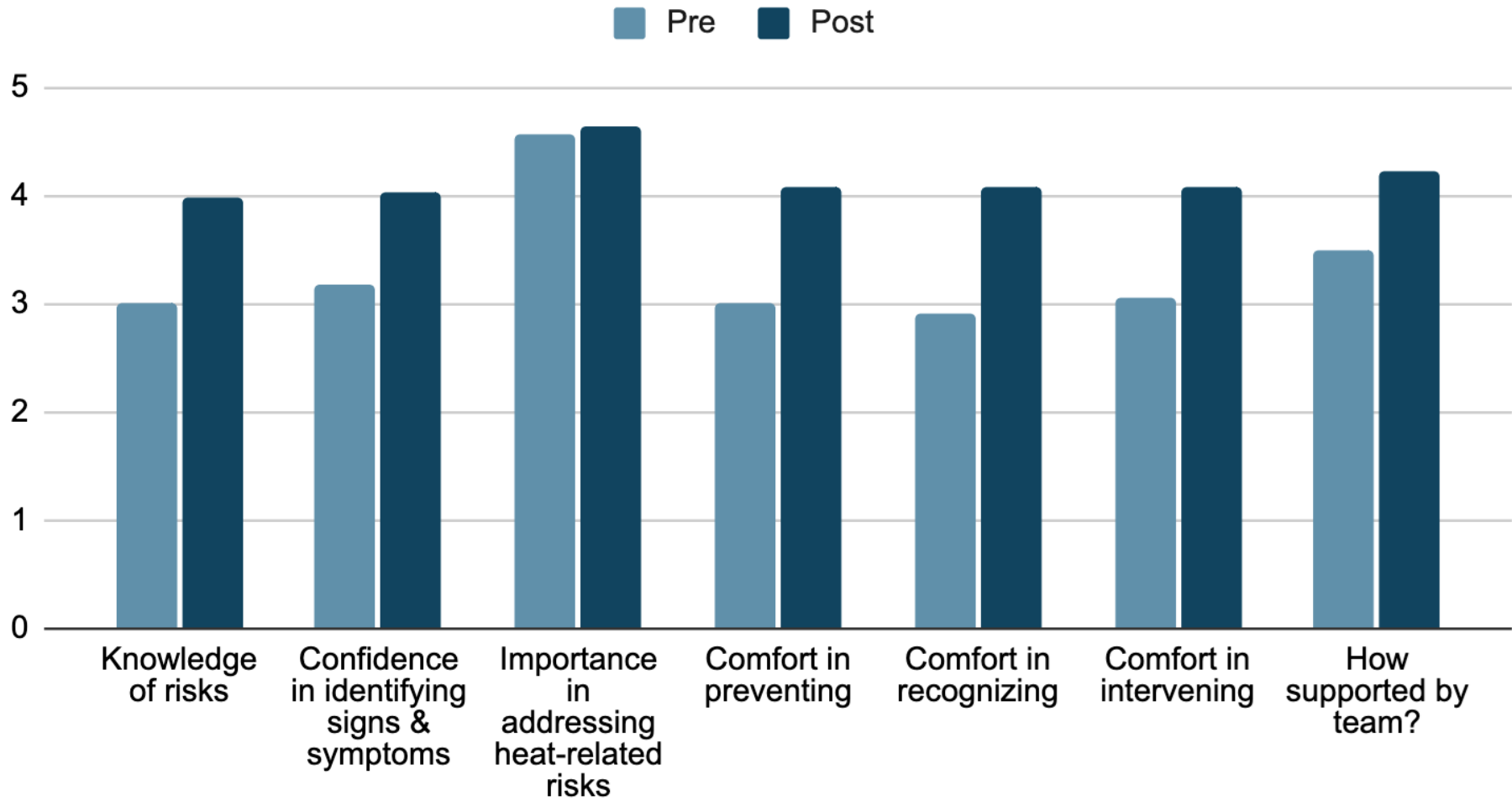
Our Solution - Pt. 3



Eval of our QI project



Likert Scales



Qualitative Responses

What resources would help you in preventing, recognizing, and intervening in heat-related illness in those with SPMI?

“Toronto "Staying Healthy In Hot Weather" page”

“A little cheat sheet that I could attach to my beds - similar to the Codes and Fire response cards we have on our badges”

“City bi-laws re heat maximums”

“Handouts with visuals, signs and symptoms as well as interventions to provide to service users/supports.”

“The slides will be super helpful- THANK YOU!!”

Are there interventions that you are already doing to prevent, recognize, or intervene in heat-related illness in those with SPMI?

“Running psychoeducational groups on heat safety”

“Safety checks on clients, sunscreen, water, bringing fans, advocating for funding with ODSP for AC”

“Encourage clients to drink more in the heat, limit physical exertion when there is intense heat, review patient safety checklist with clients, encourage to take showers to cool off and dress lightly”

6

Education as a low-value improvement intervention: often necessary but rarely sufficient

Christine Soong ¹, Kaveh G Shojania²

¹GIM, Mount Sinai Hospital, Toronto, Ontario, Canada
²Department of Medicine, University of Toronto Faculty of Medicine, Toronto, Ontario, Canada

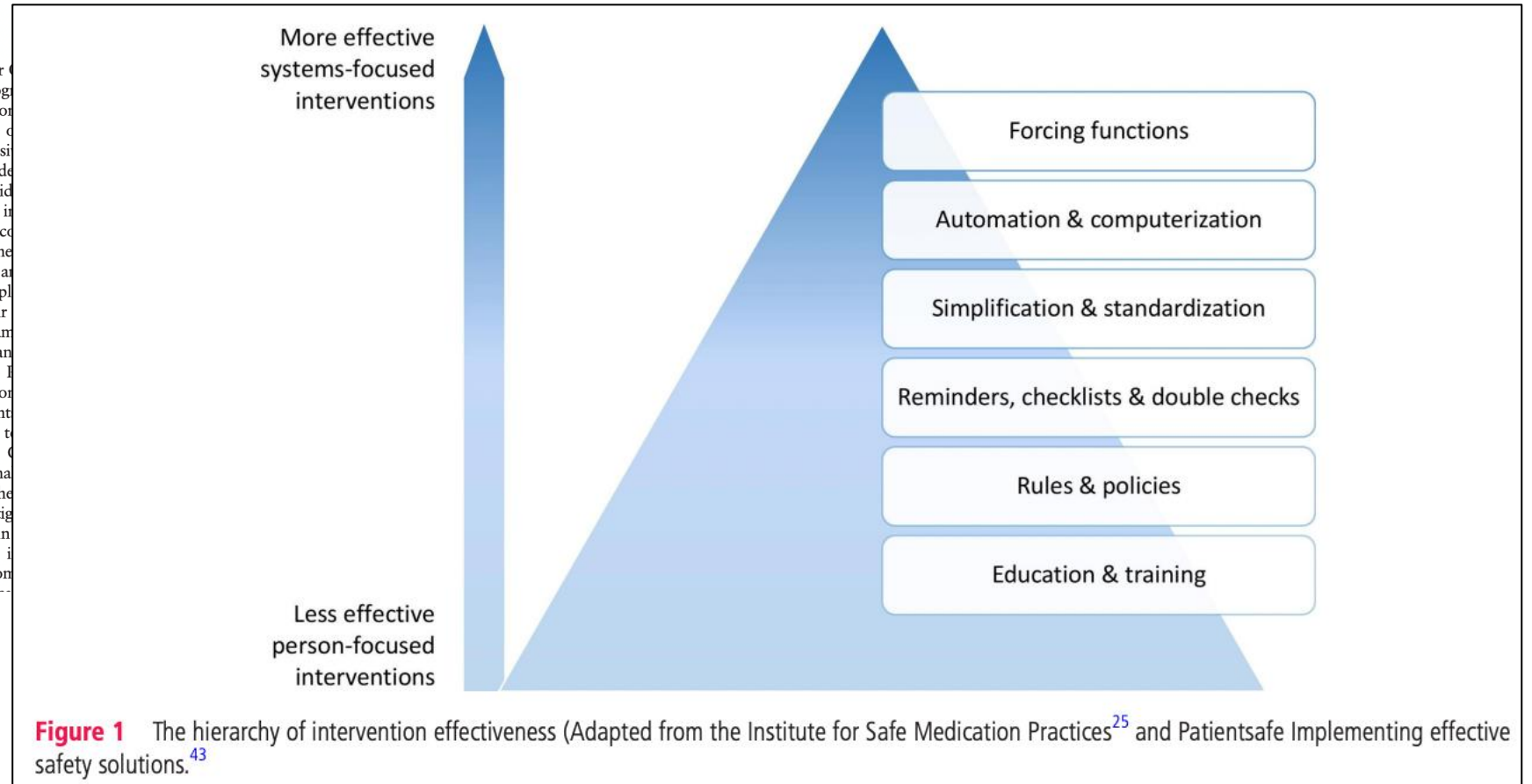
Correspondence to
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Since the launch of Choosing Wisely in the United States,¹ efforts to raise awareness about avoiding low-value care have spread internationally,² prompting numerous commentaries,³⁻⁷ descriptive studies and improvement interventions,⁸⁻¹⁰ as well as inspiring new hospital job descriptions (eg, Chief Value Officer), journal sections¹¹ and conferences devoted to the ‘Less is More’ paradigm. Low-value clinical care refers to services or interventions that provide little to no benefit to patients in specific clinical scenarios, may cause harm and/or incur unnecessary cost.^{6,12,13}

One example of a commonly encountered low-value practice is the continuation of proton pump inhibitors (PPIs) in patients without indication for ongoing use. Following completion of a defined period of therapy for appropriate indications (eg, peptic ulcer disease), continued use of PPIs provides little value, yet de-prescribing occurs infrequently. Moreover, this low-value use unnecessarily exposes patients to associated PPI-related adverse events such as pneumonia and

with other... of the prog... intervention... a mixture o... nents. Passi... tion includ... mailed evid... and other in... Active co... programme... included: an... GPs to upl... 10 of their... and dynam... dations; an... related to I... expert con... component... incentive t... activities, C... professional... Over the... the investig... decrease in... reduction i... control com... -- identifia...



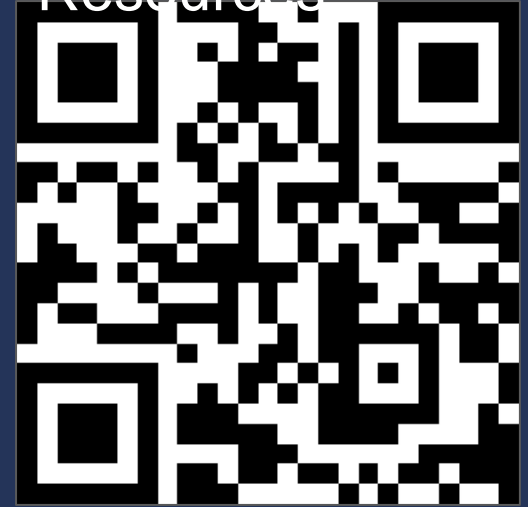
Next Steps

- Tailor our presentation for clients/patients with lived experience
- Deliver education to all those who work with SPMI i.e. housing providers, other social service workers
- Collaborate with an experienced researcher to scale up the intervention
- Include physical heat resilience toolkit in future intervention

Thank you!

Questions to samantha.green@unityhealth.to

Resources:



There Is No Planet B: Operating Room Sustainability Pilot Project in Paediatric Surgery

Presenting Author: Charmi Shah, MSc^{1,2}

Supervisors: Joshua Ramjist, MD¹, and Annie Fecteau, MD¹

¹Division of General and Thoracic Surgery, The Hospital for Sick
Children, Toronto, ON, Canada

²Temerty Faculty of Medicine, University of Toronto, ON, Canada



Disclosures

- I have no other disclosures for this presentation.



How can we reduce overage?

Methods

Step 1: Gain baseline. Quantify & catalogue overage in general surgery cases.

- Conducted a **waste audit** of **appendectomies** and **open inguinal hernias repairs (IHR)** at a single institution
- **Data collection:**
 - **Laparoscopic procedures** require a **large disposable instrument tray**, while **open procedures** utilize a **single tray**. All procedures required a **disposable pack**.
 - **Unused disposable items:** Categorized and weighed. The environmental burden was calculated by material type.
 - **Reusable instrument:** Photographic analysis of the postprocedure tray. Verified with a postoperative checklist sheet.



Overage in Disposable Packs



General Mini Instrument Tray

Disposable PackS

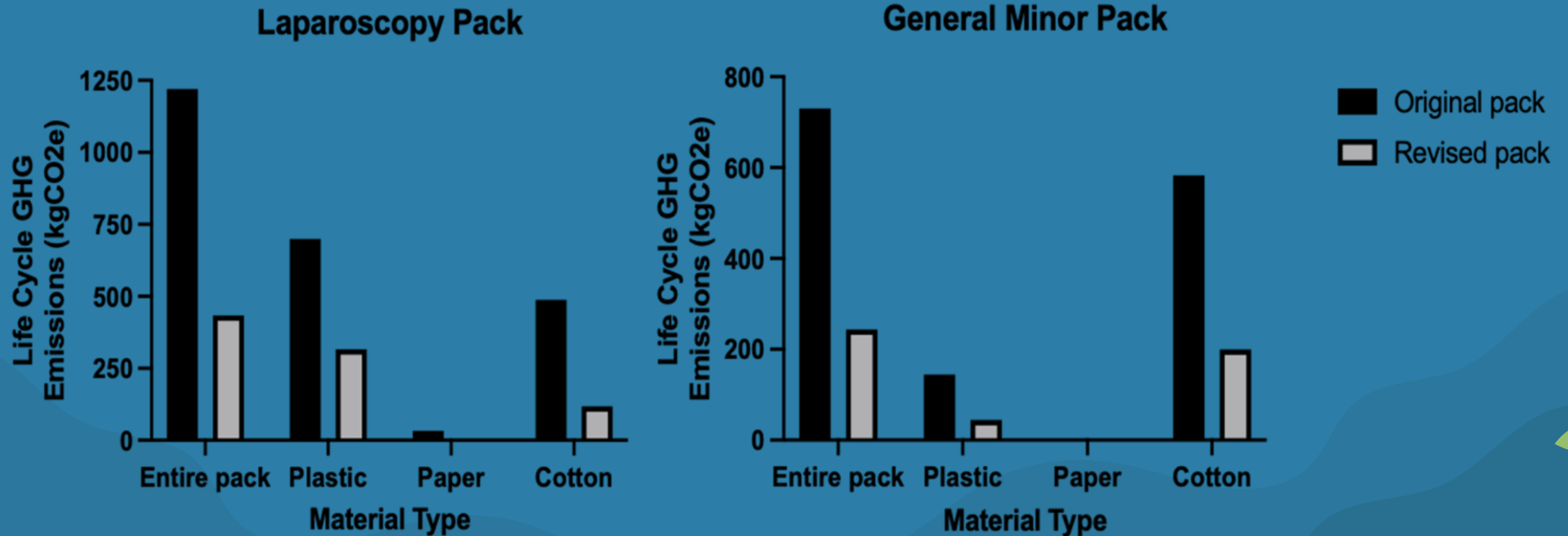


Figure 1: Annual CO₂ reduction with re-designed disposable packs. Demonstrates the theoretical CO₂ reduction with implementing a conservative reduction in disposable use is approximately 1274 kgCO₂e. Eliminating the overage for both procedures will annually reduce 484 kgCO₂e from plastic material, 36 kgCO₂e from paper material, and 754 kgCO₂e from cotton material. This is approximately the greenhouse gas emissions released driving from Phoenix to Chicago and back.

Disposable PackS

Figure 2: GHG emissions from disposable unused waste

In 2022, 340 IHR and 350 appendectomies were conducted at SickKids, which signifies the magnitude of the environmental impact we will create if we reduce the disposable overage. For reference, the GHG emissions we can eliminate is greater than the greenhouse gas emissions released from driving from **Vancouver to Québec City**.



Financial impact

- Disposable packs are purchased from external suppliers.
- By optimizing the Laparoscopy Pack and General Minor Pack to reflect procedure needs, we are saving the hospital: **\$6723.50 and \$681.60**, respectively.



Reusable: resource utilization 3-port vs TULA “Appy”

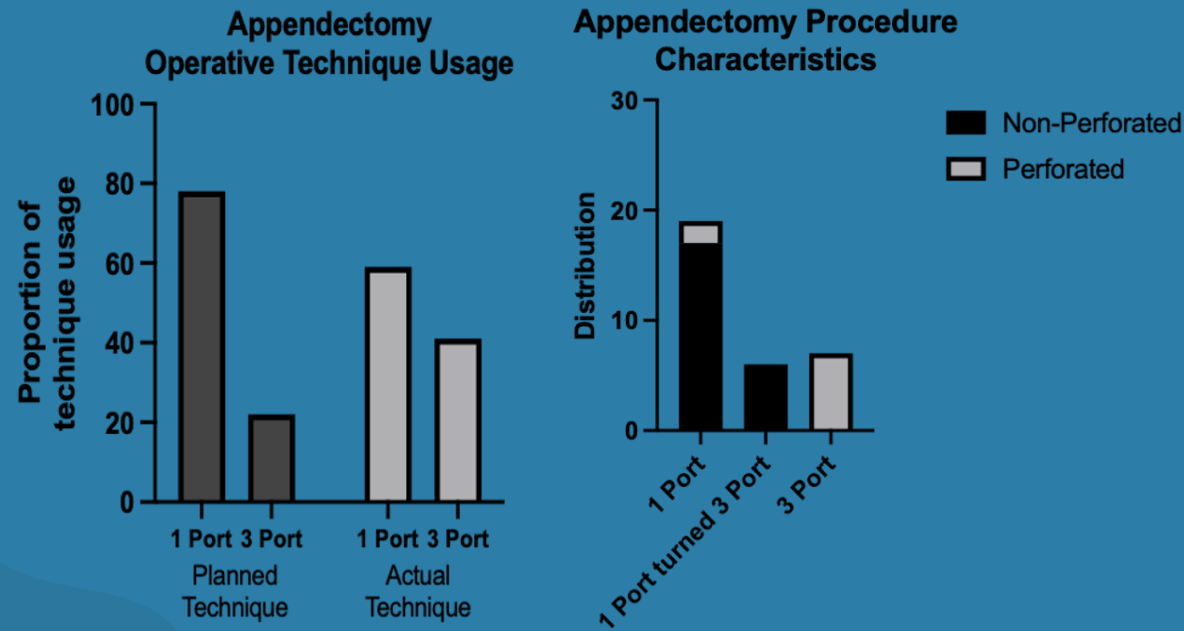


Figure 3: Single-Port vs Three-Port Operative Technique Usage. The single-port technique was planned for 78% of the cases, and of these planned single-port techniques, only 24% turned into a 3-port technique, indicating a lower conversion rate.

Figure 4: Operation characteristics for appendectomies. The single-port appendectomy technique was used primarily in non-perforated appendectomies, while the three-port appendectomy technique was used in 100% of perforated appendectomies, indicating a predictable conversion rate

- **TULAS** utilize 19% of the instruments in the laparoscopic set
- **3-PORT** utilize 49% of the instruments in the laparoscopic set

Reusable: General Mini Set

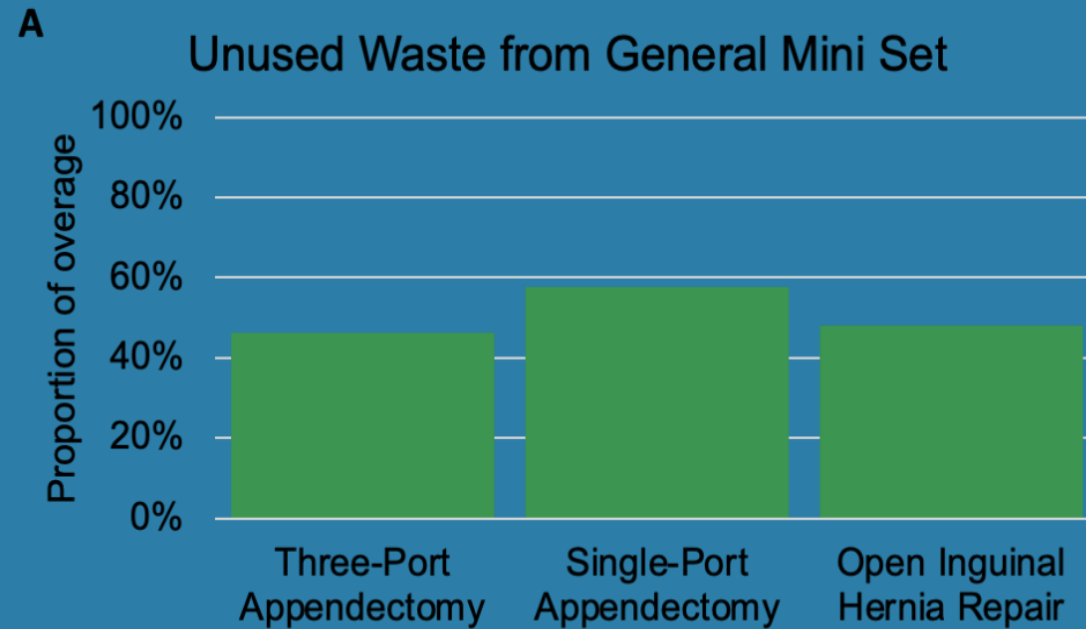


Figure 5: Routinely unused instruments from reusable sets in general surgery. The TULA utilizes 19% of the instruments from the 5MM Laparoscopic Set and 42% of the General Mini Set. The three-port appendectomy technique utilizes only 49% of the instruments from the 5MM Laparoscopic Set and 54% of the General Mini Set. The open IHRs utilize 52% of the instruments from the General Mini Set.

Annually, approximately 340 IHR and 350 appendectomies are performed at our institution, from which we are saving **~28511 individual instruments** from being unnecessarily washed per year

Financial impact

- The estimated cost of sterilization is \$0.66/instrument (USD) according to the Nast 2019 study.
- With the two new instrument trays, we are saving 28511 individual instruments from being unnecessarily washed per year, which leads to an **annual saving of ~\$18820**.



Conclusions



- Reducing overage in the reusable sets and disposable packs proves to significantly reduce CO2 emissions.
- By revising the contents of current instrument sets and disposable packs, hospitals can reduce the amount of opened and unused material.
- Along with the positive environmental impact, significant savings can result from this judicious supply and instrument selection, therefore, OR waste reduction is financially beneficial.



Future Directions



01

Streamline Waste Audits

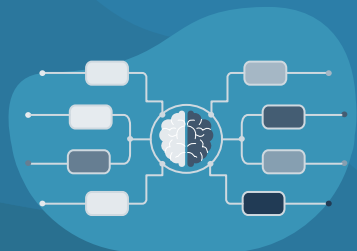
How can we decrease the resources required to complete frequent audits?



02

Collaboration

How would this study look in other disciplines?



03

Mathematical model

How can we quantify the impact of our work to understand the complete organizational benefits?



04

Broad Impact

Further explore the impact of our work in the OR, hospital, and planet.

RESOURCES

1. Pacific environmental services inc herndon va. Medical Waste Incinerator Waste Management Plan, Malcolm Grow Medical Center, Building 1056, Andrews Air Force Base, Maryland [Internet]. 2001 [cited 2024 May 2]. Available from: <https://apps.dtic.mil/sti/citations/tr/ADA393684>
2. Albert, M. G., & Rothkopf, D. M. (2015). Operating room waste reduction in plastic and hand surgery. *Plastic Surgery, 23*(4), 235-238.
3. Braschi C, Tung C, Chen KT. The impact of waste reduction in general surgery operating rooms. *The American Journal of Surgery*. 2022 Dec 1;224(6):1370-3.
4. Champion, N., Thiel, C. L., Woods, N. C., Swanzy, L., Landis, A. E., & Bilec, M. M. (2015). Sustainable healthcare and environmental life-cycle impacts of disposable supplies: a focus on disposable custom packs. *Journal of Cleaner Production, 94*, 46-55.

DISCLOSURES: The authors have no financial disclosures or conflicts of interest to declare.



- Supervisors
 - Annie Fecteau, MD
 - Joshua Ramjist, MD
- Research Team
 - Gregory Gismondi
- OR Team
 - General surgery scrub nurses, fellows, residents
- OR attendants
 - Paul Regalado
- Ryan Campbell
- MDRD
 - Louis Konstant
- Environmental Sustainability Team
 - Elisabeth Perlikowski
- Perioperative Services 2024 & 2023: Summer Student Program



**Happy to answer
your questions!**



RESOURCES

1. Pacific environmental services inc herndon va. Medical Waste Incinerator Waste Management Plan, Malcolm Grow Medical Center, Building 1056, Andrews Air Force Base, Maryland [Internet]. 2001 [cited 2024 May 2]. Available from: <https://apps.dtic.mil/sti/citations/tr/ADA393684>
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Background and Hypothesis

Reusable Instrument Trays

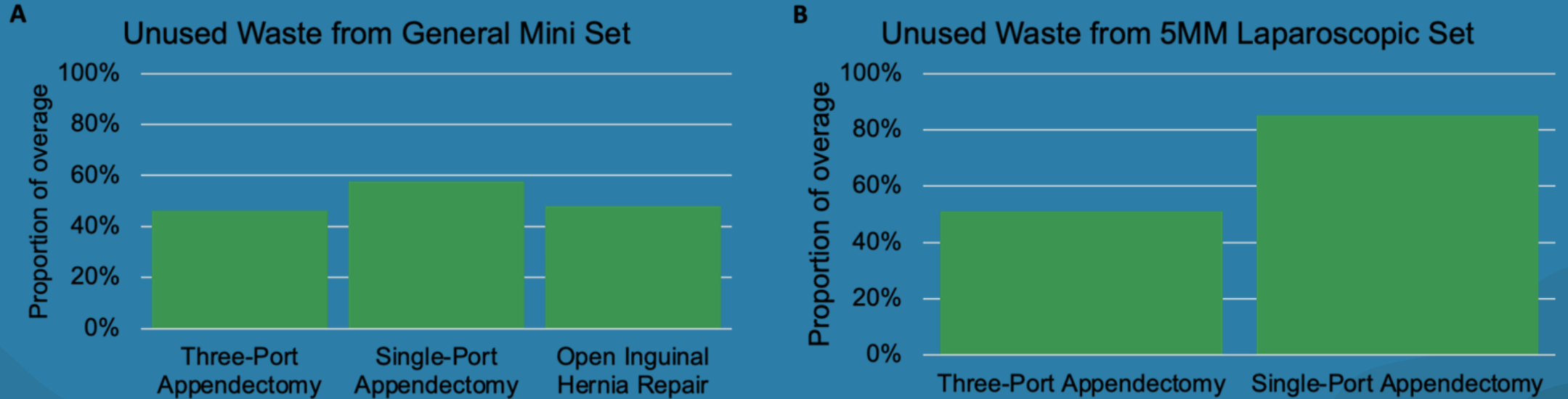


Figure 1: Routinely unused instruments from reusable sets in general surgery. The TULA utilizes 19% of the instruments from the 5MM Laparoscopic Set and 42% of the General Mini Set. The three-port appendectomy technique utilizes only 49% of the instruments from the 5MM Laparoscopic Set and 54% of the General Mini Set. The open IHRs utilize 52% of the instruments from the General Mini Set.

Annually, approximately 340 IHR and 350 appendectomies are performed at our institution, from which we are saving **~28511 individual instruments** are unnecessarily washed per year

Methods

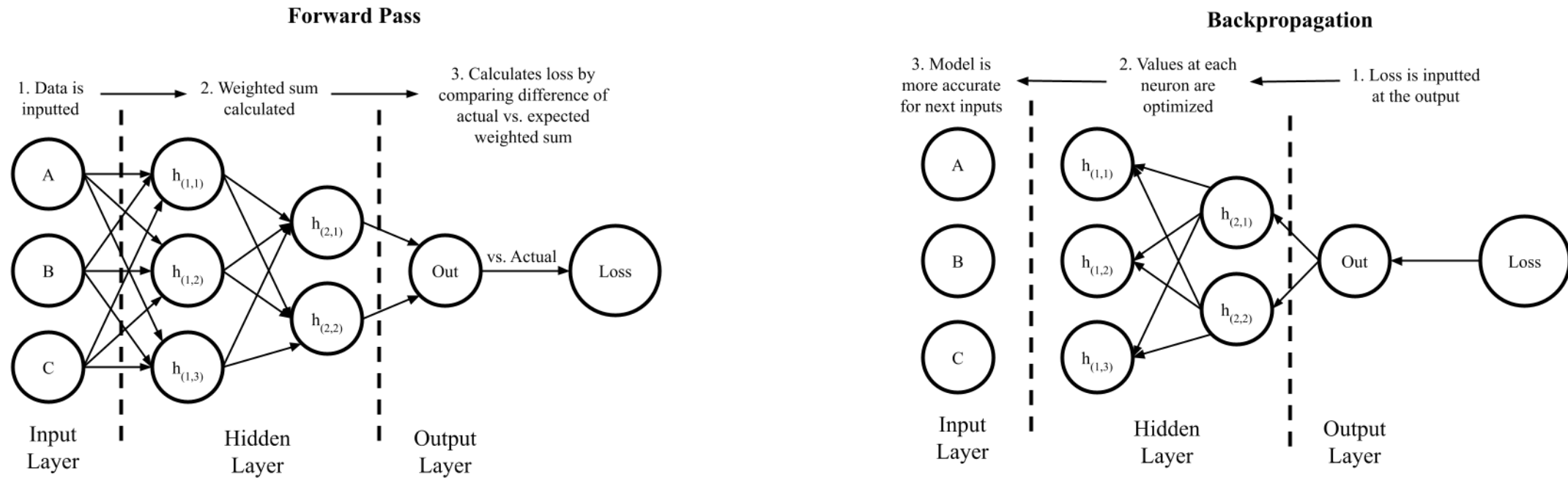


Figure 2: Schematic of the forward pass and backpropagation processes of CNN. The CNN evolves through the usage of forward passes and backpropagation processes. The forward pass is the process of passing a labelled image into the input layer of the CNN. Once the classification reaches the output layer, the difference between the actual and expected weighted sum is calculated. This is called the loss. Backpropagation is the process of travelling backward from the output layer to the input layer, changing the statistical functions at each neuron so that the calculated loss can be minimized. This is repeated hundreds of times over a dataset of labelled data.

Results

A total of 28 different surgical instruments are used in this work, which were used from the general mini instrument tray used for frequent minor procedures at our institution.

In total, there were approximately 540 images used, split into 340 unique images and 200 digitally altered copies. The total 540 images were split into:

- 372 used for training (19 per instrument)
- 84 used for validation (4 per instrument)
- 84 used for testing (4 per instrument)

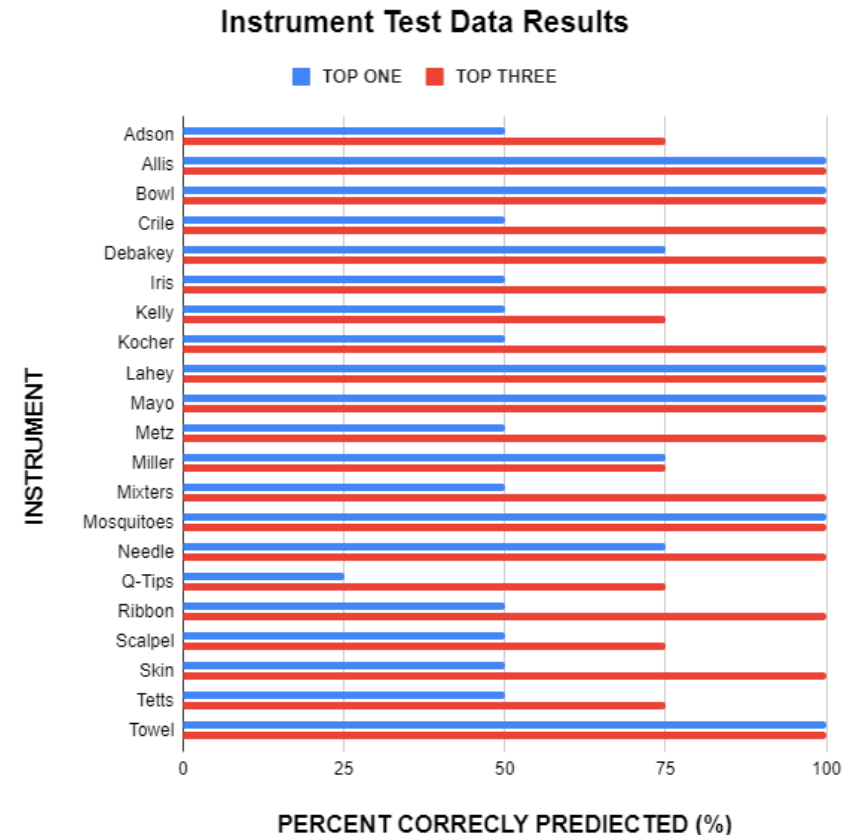


Figure 5: Top one and top three accuracy for general mini set surgical instrument. The top three and top one accuracy results are shown.

Conclusion

- Our previous work highlighted the benefits of climate-smart surgeries in being environmentally and financially beneficial.
- With the creation of an AI model for the visual detection of surgical instruments, we hope to implement routine sampling of instrument utilization across a wider spectrum of procedures and specialties, this would ultimately maintain a judicious supply of instruments to reduce costs and CO2 emissions.

Cut the Carbon: **Reducing Surgical Waste**

Towards a sustainable healthcare system

Pierrette Price Arsenault | September 24, 2024



**Ontario
Health**

Hospital Waste



**Dutch spatial artist
Maria Koijsck**

**Artwork with trash
from her surgery
and anesthesia**



Maria Koijsck and Eva Glasbeek, From: Environmental Footprint of Anesthesia:
More than Inhaled Anesthetics! *Anesthesiology*. 2021;135(6):937-939.

The Case for a Greener OR

Health care accounts for 4.6% of global greenhouse gas emissions



Operating rooms generate up to one-third of total hospital waste



The Case for a Greener OR

Sevoflurane
has an atmospheric
lifetime of 2 years

Desflurane has an
atmospheric lifetime of
14 years

Nitrous oxide
has an atmospheric
lifetime of *114* years!

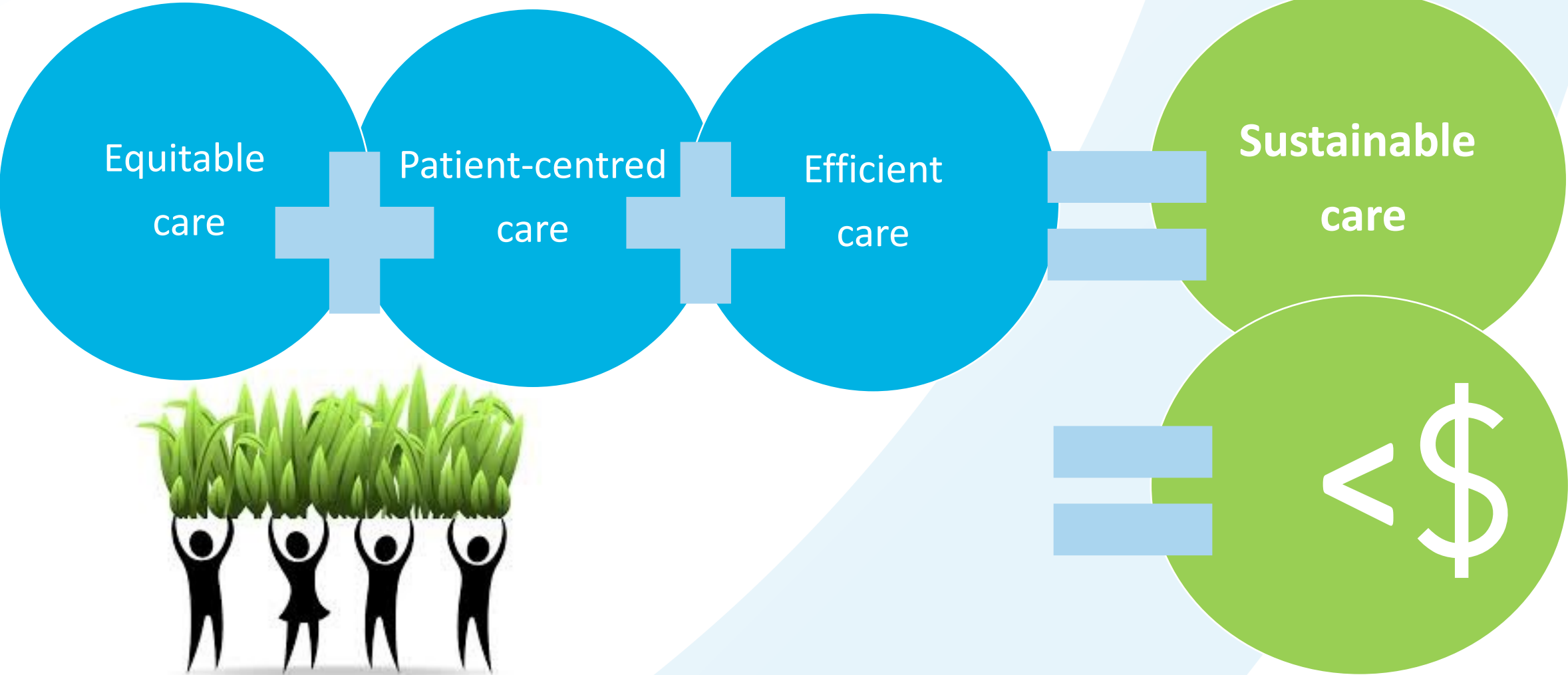


Ontario Surgical Quality Improvement Network

Cut the Carbon:

Reducing Surgical Waste

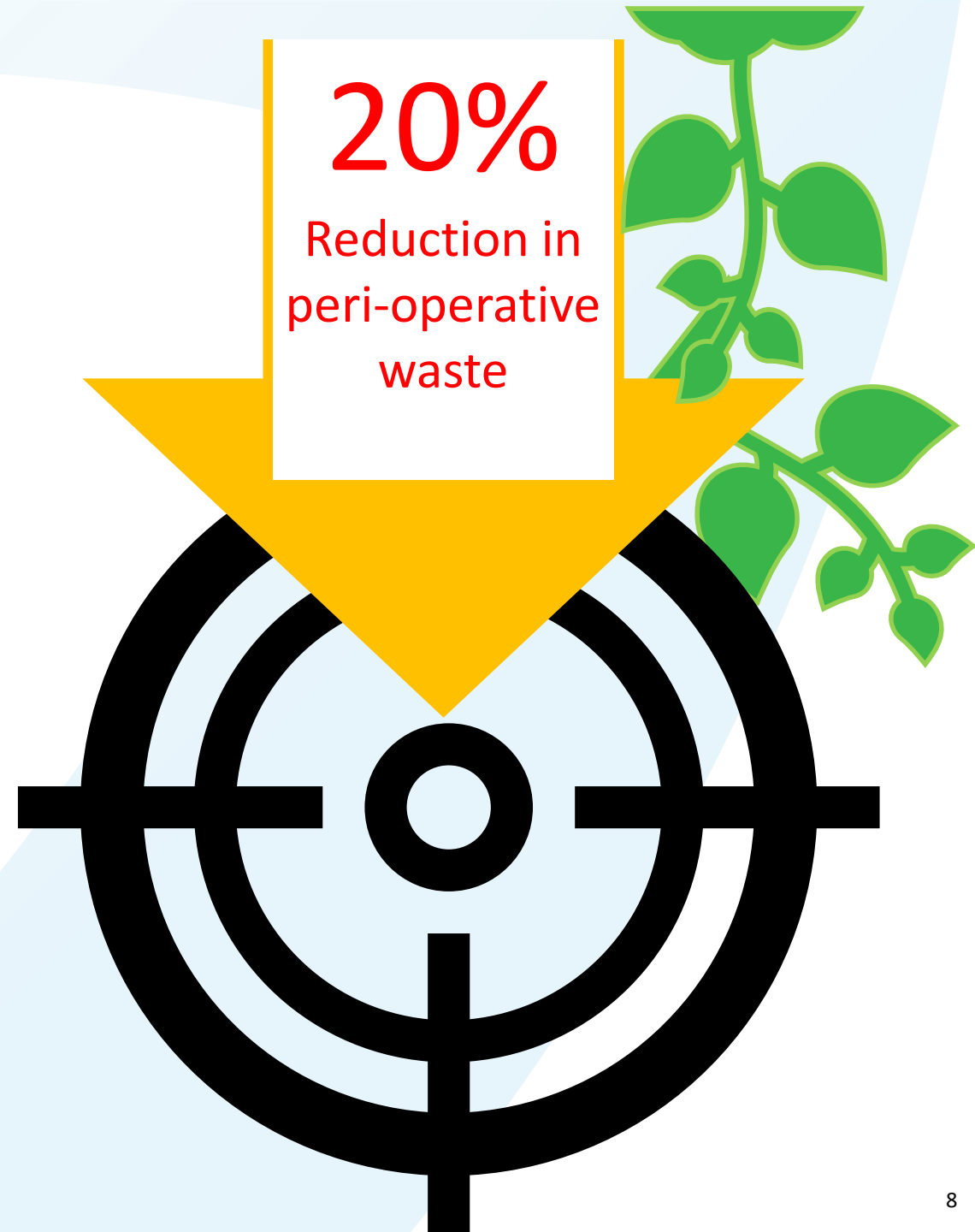
Establishing Buy-in



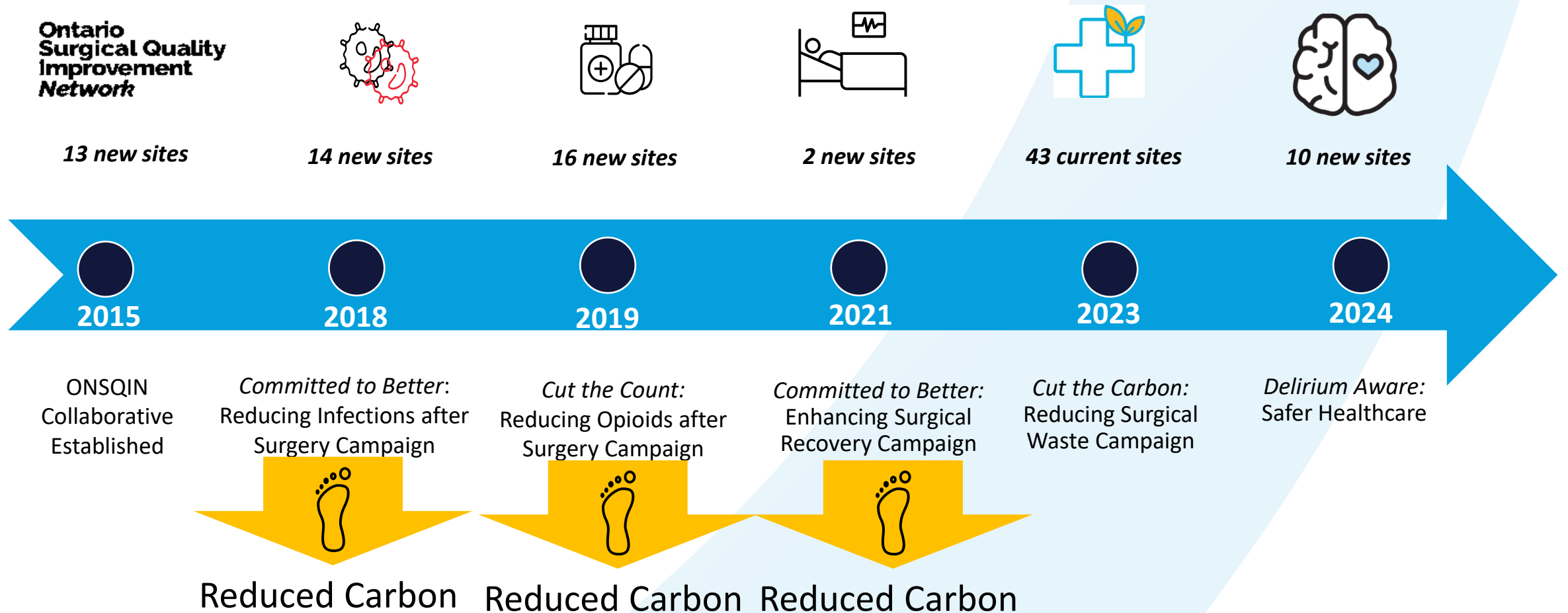
Campaign Goal

Recognizing that efficient care often means less waste, this campaign encourages the continued implementation of **equitable, patient-centered, and efficient care** but *with a green focus*.

The goal is to improve the patient's journey from pre-admission through the preoperative, intraoperative, and postoperative phases of surgical care *while reducing surgical waste*.



Leveraging Previous Campaigns



Methodology

Status Options:



NOT WORKING ON



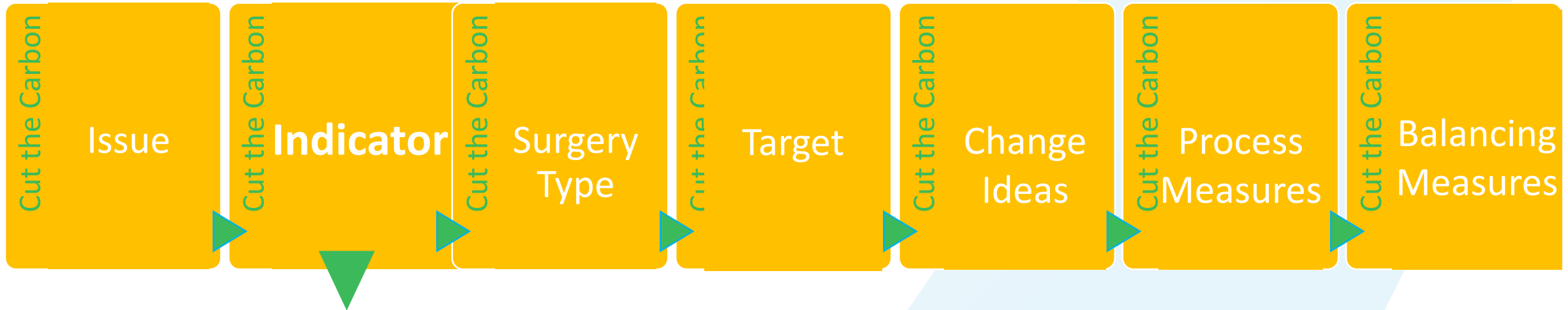
WORKING ON (NOT YET PARTIALLY ACHIEVED/ACHIEVED)



PARTIALLY ACHIEVED



ACHIEVED



Sustainability Leadership
Low Value Care
Anesthetic Gasses
Reusables
Waste

Ontario Health supports:

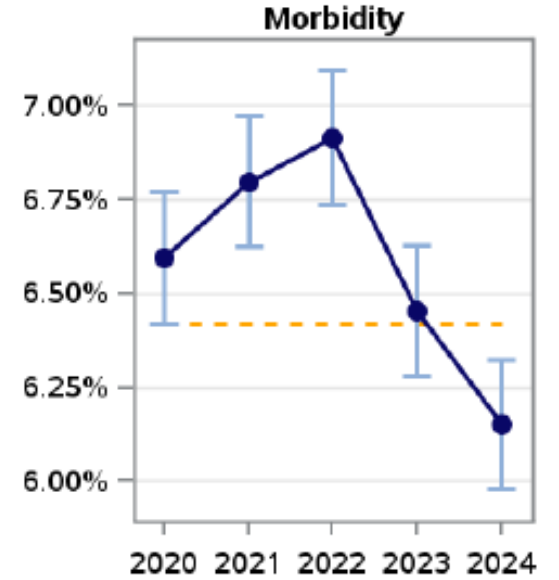
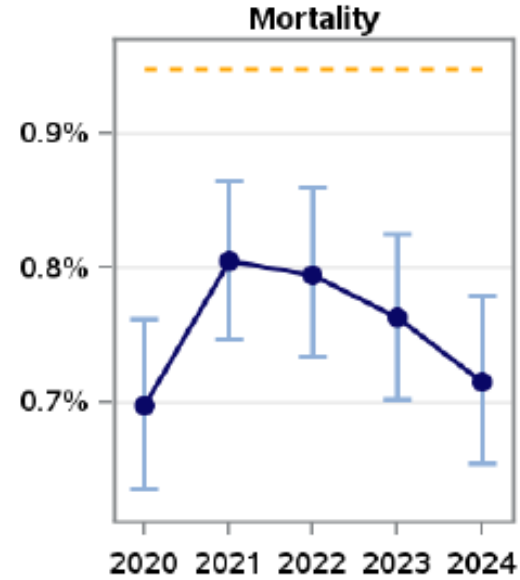
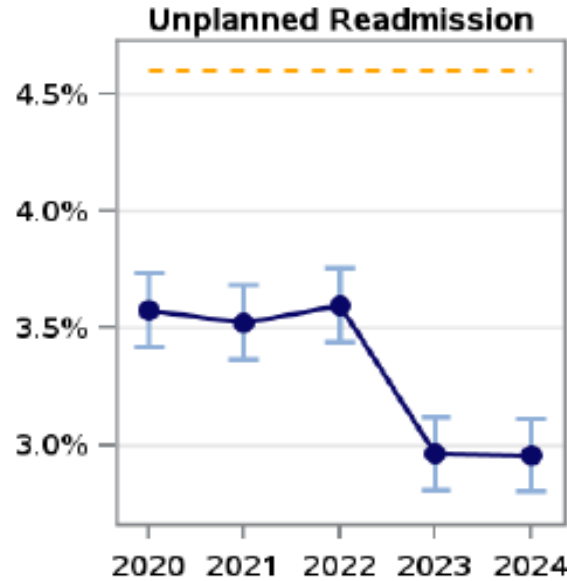
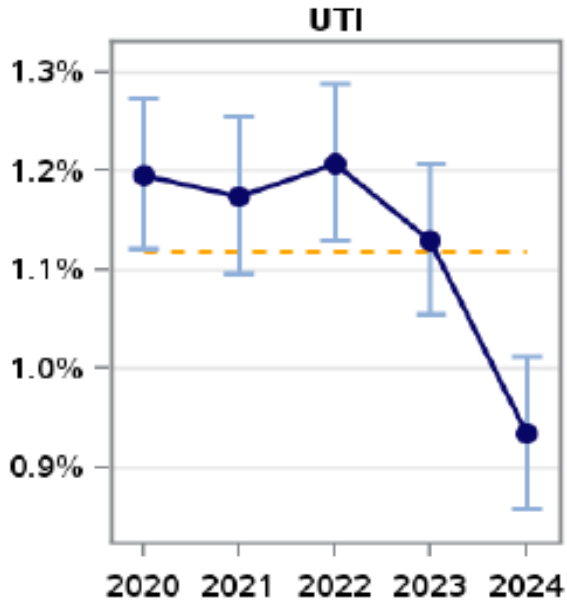
- Guidance resources
- Hosting educational webinars
- Networking/ mentorship

Ontario Surgical Quality Improvement Network



Results and Potential Impact

2023-2024 Results



30
TEAMS

included a sustainable initiative on their Surgical Quality Improvement Plan

7
TEAMS

completely removed desflurane from their hospital formulary



64%

of patients brought their own reusable bag to their surgical procedure

34%

of patients brought their own reusable water container to their surgical procedure

63%

reduction in plastic bags purchased in surgical departments

85%

of patients are receiving a nondesflurane anesthesia



32,000+

surgeries performed without a postoperative complication

2024-2025 Results so far

- 103 unique Cut the Carbon Scorecard change ideas

Baseline	Red – 39		Orange - 30		Yellow - 29	
Progress Report Update	Stayed Red	11	Stayed Orange	4	Stayed Yellow	10
	To Orange	5	To Yellow	18	To Green	17
	To Yellow	11	To Green	4		
	To Green	9				

- 71% improved the baseline Red scoring
- 73% improved the baseline Orange scoring
- 59% improved the baseline Yellow scoring

Potential Impact

Median number of days of an extended length of stay due to an adverse event such as SSI is **7.5 days = 45kg CO₂e**

45kg CO₂e x 7.5 days
= 337 kg CO₂e

Or

The equivalent of driving the approximate **distance between Toronto and Charlottetown, PEI (1387 km)**

16 hr 50 min
1,697 km



1 acute hospitalization day due to a postoperative issue is estimated to generate **45kg CO₂e.****



If all 53 hospitals in our network were able to reduce even 5 adverse events that could be the equivalent of **367,581 km** or **circling the planet 9 times*****

*<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8243999/>

**<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>

***<https://www.space.com/17638-how-big-is-earth.html>

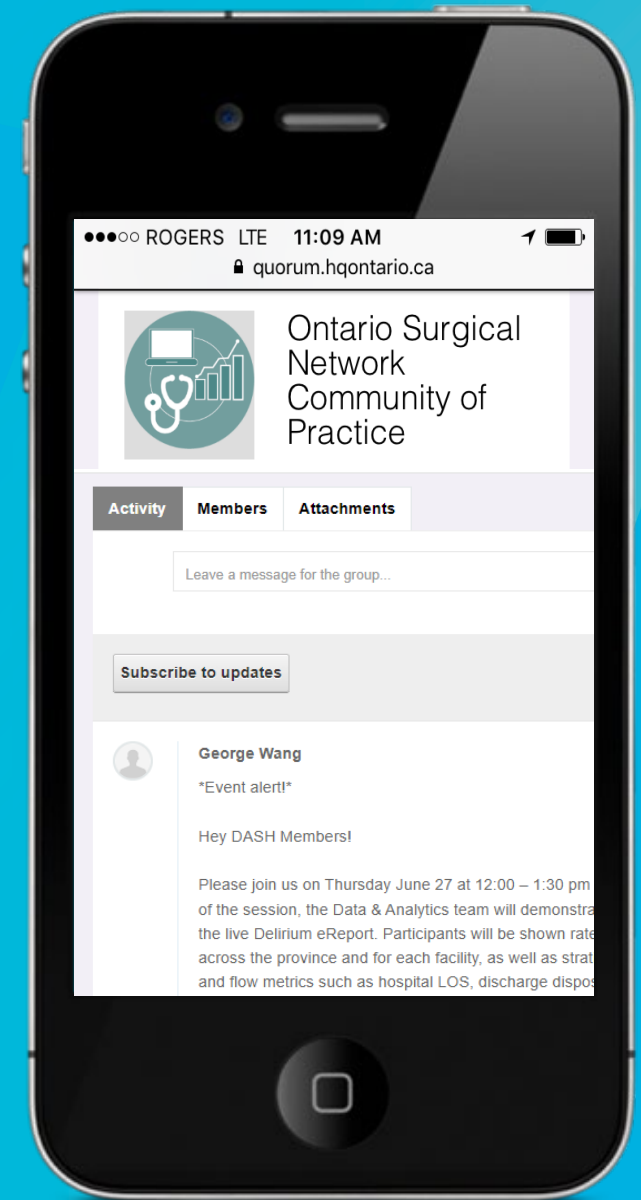
Follow the Fun



**The antidote
for *eco-anxiety*
is *eco-action*!**

Thank You.

CONTINUE the
CONVERSATION



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