

Carbon Footprint Reduction associated with Multidisciplinary Pediatric Airway Clinics



Alina Zgardau, MSc¹, Kalpesh Hathi, MD², James Fowler, MD³, Tara Mallowney, MD⁴, April Price, MD⁴, Murad Husein, MD³, M. Elise Graham, MD³, Agnieszka Dzioba, PhD³, Edward Madou, MSc³, Julie E. Strychowsky MD, MAS³
¹ Faculty of Medicine, Schulich School of Medicine & Dentistry, Western University, ² Division of Otolaryngology-Head and Neck Surgery, Department of Surgery, Dalhousie University, ³ Department of Otolaryngology-Head and Neck Surgery, Western University, ⁴ Department of Pediatrics, Division of Respiriology, Western University

Background

- **Climate change** is the **most significant global threat** to environmental & human health.
- Healthcare is a significant contributor.
- **Multidisciplinary clinics (MDCs)** provide collaborative care from multiple medical specialties.
- **MDCs may reduce carbon emissions** by combining multiple appointments into one.

Objectives

Our Program Evaluation Study assessed:

-  Carbon emissions savings
-  Financial savings

First study to quantify the carbon footprint associated with MDCs.

Methods

- All **pediatric patients** (<18 years old) who attended a pediatric airway MDC from January 1, 2018 to December 31, 2022.
- Pediatric airway MDC involves two specialties:
 1. Otolaryngology
 2. Respiriology
- Each appointment saved the patient one trip to the hospital.
- Postal codes of the patient and hospital and the price of parking were used for analysis.
- **CASCADES virtual carbon accounting tool** assessed the carbon and financial savings in Canadian Dollars (CAD).
- CASCADES is an initiative funded by Environment and Climate Change Canada to transition healthcare into a high quality, low-carbon, sustainable resilient system.

Results

560 MDC appointments for 300 pediatric patients

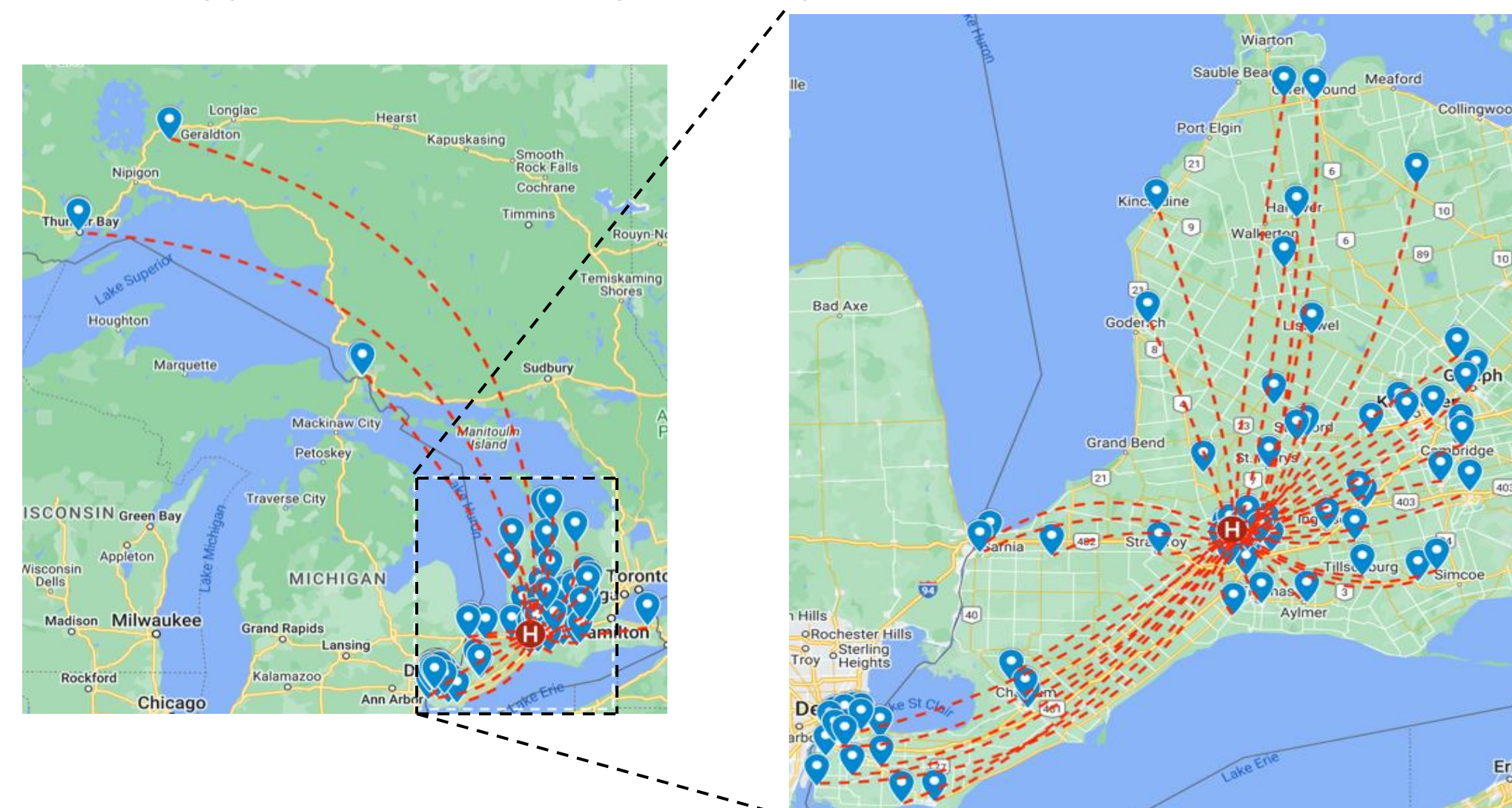


Figure 1. Distance travelled by patients to hospital for MDC appointment

Type of Transportation Users	Percentage (%)	Transportation	Distance travelled
Total transportation users	100	Round-trip with a private vehicle	56,517.89 Km
Sustainable transportation users	27.3	Round-trip with public transit	5,636.08 Km
Unsustainable transportation users	72.7	Round-trip with Carpooling	10,439.58 Km
Public transport users	7.2	Round-trip with Walking	4,314.77 Km
Carpooling users	13.4	Round-trip with Cycling	876.23 Km
Commuters who walk	5.5	Total distance (KM) saved	77,785 Km
Commuters who cycle	1.1		

Tables 1 and 2. Percent of transportation users and distance (Km) travelled by each

GHG emissions (g)	
Emissions (g) saved using a private vehicle	14,694,650.75
Emissions (g) saved using public transit	612,750.56
Emissions (g) saved using carpooling	904,763.29
Total emissions (g) saved	16,212,164.60
Financial savings (CAD)	
Travel costs saved without parking (CAD)	\$28,891.83
Travel costs saved with minimum parking fee (CAD)	\$30,519.40
Travel costs saved with maximum parking fee (CAD)	\$33,774.55

Table 3. Greenhouse gas emissions (g) and financial savings for patients attending MDCs

<p>Total CO₂ emissions saved is equivalent to:</p> <ul style="list-style-type: none"> ✓ 5 passenger vehicles ✓ 6,906L of gasoline ✓ 10.8 homes' electricity/year ✓ 36.6 oil barrels ✓ 675 propane cylinders 	<p>Average savings per patient:</p> <ul style="list-style-type: none"> ✓ \$95.03 CAD (no parking) ✓ \$100.39 CAD (min. parking fee) ✓ \$111.10 CAD (max. parking fee)
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Discussion

- Previous studies focused on how **telemedicine** decreases carbon emissions, however some appointments are not amenable to such care (i.e., upper airway endoscopy and chest auscultation).
- To support **transition to net-zero healthcare**, our study proposes the use of MDCs.
- **MDCs benefit patients** → offers coordinated care, reduces time and travel costs.
- **MDCs barriers** → implementation requires rigorous coordination between specialties and highly comprehensive administration.

Strengths

- First study to quantify the carbon footprint associated with MDCs.
- Access to large cohort using healthcare administrative data.
- Avoided biases associated with self-reported data.
- Potential for replication in locations across North America.

Limitations

- Did not complete a comprehensive chart review of all 300 patients
 - Audit of 10% of records; <5% may represent an overestimate.
- Estimated prediction of unsustainable (vehicles) and sustainable (transit, walking, cycling) transportation.
- Pandemic caused significant modifications to outpatient services
 - Sub-analysis found monthly decrease of approximately 2.5 appointments peri-pandemic.

Conclusions

- MDCs effectively reduced carbon emissions and offered patients financial savings.
- Similar models can be adapted across institutions to help mitigate climate change.

References

