

Background

Climate change directly impacts health and safety. Healthcare services are attributed to 8% of greenhouse gas emissions in the US, with operating rooms contributing up to 70% of all hospital waste.

This is the first study to explore the cost and carbon footprint of all opened, used and unused supplies during a standard tonsillectomy in a high-income tertiary care center.

Study Design & Methods

Prospective audit of all waste generated during a standard tonsillectomy between January 2023 and June 2023.

Surgeries met inclusion criteria if they were:

- tonsillectomy procedures performed on a pediatric patient using a monopolar cautery or cold steel technique
- A member of the team was present in the operating room to document supplies opened and used.

- All waste was weighed by type:
- landfill
- recycling
- biohazard

Kilograms of carbon dioxide equivalent were calculated using an estimate developed by the Yale Center for Climate Change based on hospital-provided costs of individual supplies.

Results

- 19 tonsillectomies met criteria for inclusion:
 - 9 cold steel
 - 10 monopolar cautery.
- No differences were found in average length of surgery, type and weight of waste generated, cost nor carbon dioxide equivalent between the two techniques.
- Overall, **46% of supplies opened were not used**. The overall cost of surgical supplies averaged \$320, while unused supplies averaged \$39.
- The most commonly **opened but unused** supplies were **sterile blue towels, tonsil sponges and x-ray opaque sponges** (74%, 63%, 79% unused, respectively).
- The **overall kilograms of carbon dioxide equivalents was 78**, with a 12.9% contribution from unused supplies and equipment.
- **80% of all supplies opened were single-use** disposable items, primarily made of plastic.

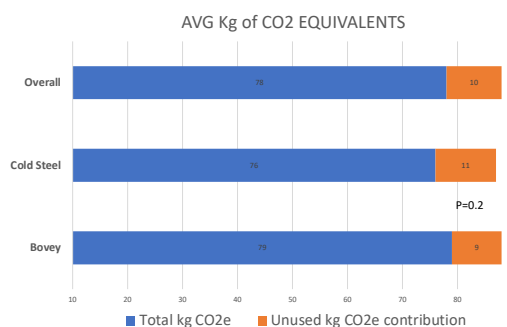


Figure 1. Avg Kg of CO₂

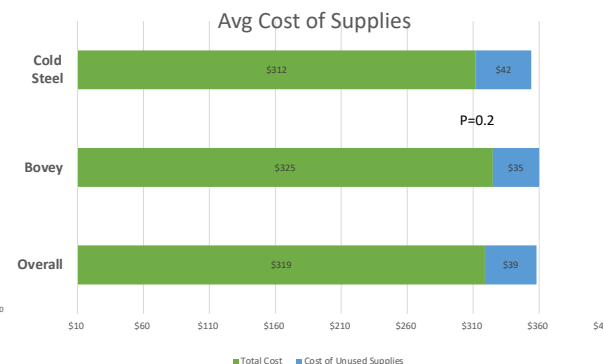


Figure 2. Avg Cost of Supplies



Step 2 - View results

11 Kilograms of Carbon Dioxide (CO₂) equivalent

This is equivalent to greenhouse gas emissions from:



Figure 3. Avg. CO₂E for UNUSED supplies in Cold Steel tonsillectomies in miles driven in gasoline-powered car

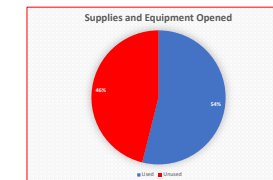


Figure 4. Supplies Opened and Used vs. Unused

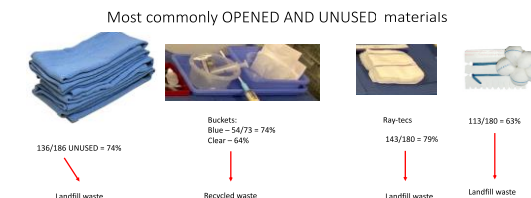


Figure 5. Most commonly opened and unused items

Discussion

There was no significant difference in cost and carbon footprint between monopolar cautery and cold steel techniques.

A significant portion of supplies opened were left unused and discarded. Surgeons should be aware of waste generated by their procedures.

Updating preference cards and downsizing tonsil ball, raytec and towel packs are simple steps to decrease wasted supplies.

Further research will characterize how operating room waste differs in tonsillectomies in Low and Middle-Income settings.

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