Hixon Center for Urban Sustainability

FACT SHEET

Reducing Emissions from Surgical Care

Healthy City

Climate Issue: Healthcare Emissions

- Patient care before, during, and after surgery greatly contributes to hospitals' waste and greenhouse gas (GHG) emissions
- Operating rooms produce one quarter of all hospital waste. Up to 25% of that is from anesthesia use alone
- Anesthesia use often relies on gases like desflurane and nitrous oxide, which have high GHG emissions intensity
- Assessing the environmental impacts of surgical care drugs and equipment can inform system-level sustainable change.

What is a Life Cycle Assessment (LCA)?

LCA is a method for evaluating the environmental 'footprint' associated with all stages of a product's life, from raw material acquisition to waste disposal or recycling. LCA can support sustainable decision-making by identifying ways to optimize resource use and reduce environmental impacts.

Reducing Emissions from Anesthesia Use

- Applying LCAs to surgical care can help practitioners identify the least harmful drug, equipment, or procedure to utilize
- For example, using anesthetic drugs with lower GHG emissions, such as sevoflurane over desflurane, can ensure safe and effective care with fewer environmental impacts
- LCAs also show that low-flow anesthesia techniques can reduce GHG emissions without compromising patient care.

A Framework for Waste Prevention

Using LCAs to apply the framework of "avoid, reduce, reuse, and recycle" can help critical care units significantly lower their overall waste and GHG emissions. This can guide system-level sustainable change across healthcare facilities.

Avoid

- Eliminate unnecessary travel by implementing telehealth services and teleconferencing
- Avoid medically ineffective operations and critical care admissions.

Reduce

- Promote rational resource use through stock volume management while maintaining or improving care
- Reduce water use and prioritize water conservation methods during droughts.

Reuse

- Increase access to reusable medical devices like surgical gowns, drapes, and instruments
- Implement systems for reusing equipment across departments.

Recycle

- Develop specific recycling streams for medical products whenever recycling is an option.

IN A NUTSHELL

- Critical care, including anesthetic use, greatly contributes to healthcare facilities' waste and GHG emissions
- Life cycle assessments (LCAs) can reveal the environmental impacts of single-use medical devices and anesthetic drugs with high GHG emissions
- The framework of "avoid, reduce, reuse, and recycle" can mitigate environmental impacts across healthcare facilities.

WHAT CAN YOUR HEALTH SYSTEM DO?

INCORPORATE life cycle assessments (LCAs) into drug and equipment selection to minimize environmental impacts

AVOID medically ineffective tests and procedures

REDUCE resource and water use while improving care

INCREASE access to reusable medical devices and equipment

DEVELOP specific recycling programs for paper, plastic, and metals whenever possible.

To find out more information on this fact sheet, contact **Dr Jodi Sherman** at **jodi.sherman@yale.edu**. Fact sheet based off McGain F, Muret J, Lawson C, Sherman JD. Environmental sustainability in anaesthesia and critical care. Br J Anaesth. 2020 Nov;125(5):680-692. doi: 10.1016/j.bja.2020.06.055. Epub 2020 Aug 12. PMID: 32798068; PMCID: PMC7421303.