

Global Warming—Blame Anesthesia?

A Primer on the Environmental Rationale for the Practice of Low-Flow Anesthesia

by Elizabeth E Hansen, MD, PhD

The environmental impacts of greenhouse gases (GHG) are well known and include planetary warming causing rising sea levels and extreme weather events. Morbidity and mortality are associated with the resulting changes in vector ecology, food and water insecurity, extreme heat, increasing allergens, environmental degradation, and air pollution. Inhaled anesthetics are potent greenhouse gases (GHG) and contribute to the climate crisis.

Anesthesia and surgical care are lifesaving interventions yet highly energy and resource intensive. The US has the highest healthcare associated emissions per capita, but despite this, does not achieve the best health outcomes.

There is great variability in the environmental impact of anesthetic care depending on how that care is delivered and which anesthetics are administered. The relative greenhouse impact of anesthetic gases is compared to carbon dioxide using a measure called global warming potential over a 100-year time horizon (GWP100) to account for variable persistence in the atmosphere. Desflurane has a GWP100 of 2540, meaning it is 2540 times as potent as CO₂ over a 100-year time horizon. Isoflurane's GWP100 is 510, sevoflurane's is 130, and nitrous oxide's is 298. Isoflurane and nitrous oxide also deplete the ozone layer. Emissions from volatile anesthetics can be as much as 5–7% of a hospital's total emissions.

Strategies to reduce the environmental impact of inhaled anesthetics include:

- Eliminate the use of the highest-impact gases —Desflurane and Nitrous Oxide
- Decommission centrally piped nitrous oxide due to the significant leakage in these systems
- Lower fresh gas flows (FGF) while using volatile anesthetics to minimize the environmental impact. To learn more follow the link to the course on practicing low-flow anesthesia at apsf.org/TEI/LFA.

Incorporating these strategies into your practice can dramatically reduce emissions while preserving a safe and effective patient experience. Plus, they won't be able to blame us for global warming either!

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