




The effects of desflurane withdrawal from the hospital: a call for a national ban of desflurane

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To the Editor,

There is worldwide recognition that volatile anesthetics have significant global warming potential (GWP) and contribute to anthropogenic climate changes.¹ Although GWP is, indeed, an oversimplification of the atmospheric impact of the release of volatile anesthetic agents,² it allows comparison of aspects of similar products. A concerted effort to switch to more environmentally conscious anesthesia techniques has ensued. Among volatile agents, desflurane has a carbon footprint 20 times higher than that of sevoflurane (GWP₂₀ at same fresh gas flow and minimum alveolar concentration). Desflurane use has already been halted by several hospitals, health care systems, and jurisdictions,³ including Yale New Haven Health System (2013), Kaiser Permanente California (2018), and the National Health Service in the UK (led by Scotland in 2023, with the rest of the UK following in 2024).⁴ The European Union intends to make a similar move in 2026. In the absence of territorial action, local hospitals are taking action.⁵

Education and department consensus can reach a ceiling in curbing desflurane use, as it did at our institution. Many were discouraged to see the impact of what our marginal

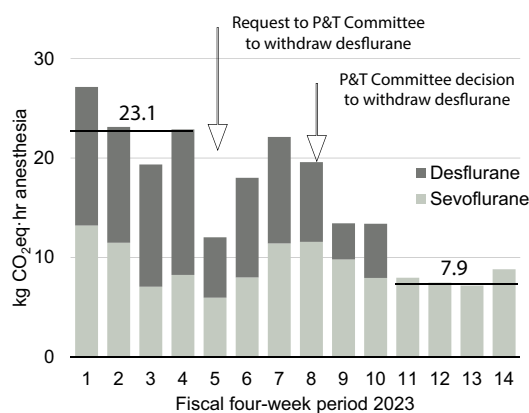
use of desflurane entailed. Calls for a top-down approach began to multiply. In this Letter, we report the effects of the withdrawal of desflurane in our hospital (10 operating rooms).

A formal request to withdraw desflurane from the formulary of our hospital for environmental reasons was made on 10 May 2023. This was done after deliberation and consultation among our anesthesiologists. The institution's Pharmacy & Therapeutics (P&T) Committee agreed to withdraw desflurane from the drug formulary of our hospital on 1 August 2023 and the ordering of desflurane ceased. Nine remaining bottles from the existing stock were used after the ban. Vaporizers were progressively withdrawn, and the supply chain ran dry within two months. Pharmacy-reported anesthesia volatile gases delivered per four-week fiscal period for the calendar year 2023 and the operating room electronic health record were queried for the same dates to calculate the total number of volatile general anesthetics provided during the same period. Volatile anesthetic gases' GWP at 20 years (GWP₂₀) was reported per hour of general anesthesia for each fiscal four-week period over 2023.

During the four periods prior to the P&T request, an average of 988 volatile anesthesia hours were provided per period. Desflurane was used in 6.1% of these, contributing to 57.4% of the volatile-related greenhouse gas (GHG) effect. After P&T's decision, it took 2 months to effectively stop desflurane use. The average volatile-associated carbon footprint was 23.1 kg CO₂eq·hr⁻¹ during this prewithdrawal period. During the four last periods after the desflurane ban, the carbon footprint dropped by 66%, to 7.85 kg CO₂eq·hr⁻¹ (Figure). No significant adverse effects were noticed. There was no effect on postanesthesia care unit stay duration.

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P&T = Pharmacy & Therapeutics

Figure Effects of desflurane withdrawal on anesthesia gas-related greenhouse gas emissions

P&T = Pharmacy & Therapeutics

In view of the clinical sevoflurane to desflurane equipoise, and significant different environmental impact, the continuous use of desflurane cannot be further supported. Limitations of our report include the fact that pharmacy supplies may not represent the effective bedside use during the same period. Even if GWP is an “easy proxy” for the climate impact of desflurane² and their atmospheric lifetime is short, it remains an easy-to-avoid GHG release.

Withdrawal of desflurane from our hospital formulary reduced our volatile agent-associated carbon footprint by two thirds. Open dialogue with our peers within the department highlighted that the overwhelming majority were very concerned about our imprint. The proposal of this simple move empowered our members to move beyond concern, and into action. It has spurred others to go even further. For example, to minimize the GHG effect, the undersigned (D. B.) has switched his practice to total intravenous anesthesia. This, he based on recent data by Bernat *et al.*, suggesting close to 1 kg CO₂eq·hr⁻¹ for total intravenous anesthesia vs 10 kg CO₂eq·hr⁻¹ for sevoflurane.⁶

Hopefully, more centres and jurisdictions in Canada will follow the growing body of those implementing moratoriums on the use of nitrous oxide and/or desflurane for ecological reasons, and explore alternative anesthesia techniques that fit into one’s daily practice.

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