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CORRESPONDENCE

Greener Gases Starter Pack: a tool for transitioning to more sustainable anesthetic volatile agents

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To the Editor,

Climate change has been recognized as a significant global health threat, with recent reports from the Intergovernmental Panel on Climate Change predicting that global warming will exceed 1.5°C by 2040.[1] Currently, Canada has the third-highest per-capita health care-associated emissions, which account for 4.6% of our national emissions.[2]

Numerous contributions to the anesthesia literature, including a dedicated Special Article by Rübsam *et al*. in this issue of the *Journal*,[3] have recognized the harmful emissions produced by desflurane and have called for its limitation or even elimination. Desflurane has a global warming potential over 100 years (GWP100) of 2,540 and atmospheric lifespan of 14 years, whereas sevoflurane has a GWP100 of 130 and atmospheric lifespan of one year.[4] When used at the same fresh gas flow for the same length of time, desflurane has been shown to release 50 times the carbon dioxide equivalents of sevoflurane. In addition to environmental benefits, sevoflurane is often cheaper. Reducing desflurane has been associated with savings of as much as USD 25,000 per month, as reported by the University of Wisconsin.[5] Given the harms of desflurane, some Canadian institutions, including in London, Vancouver, and Toronto have begun to phase down its use, while other systems such as Health Sciences North in Sudbury, Ontario, or the Yale-New Haven Health System in the USA have eliminated it entirely from their hospital formularies. Nonetheless, efforts in Canada to reduce desflurane are currently neither widespread nor coordinated.

Reducing desflurane use can be challenging when there are established practice patterns, limited resources, or competing priorities. To help alleviate some of the initial work in promoting volatile agent change, we have created a Greener Gases Starter Pack that contains the resources developed by the Greener Gases project at McMaster University. This project was publicly launched in February 2021, supported by the Canadian Federation of Medical Students *Project Green Healthcare* program. Although we are still in the first year of project implementation and data collection is still currently underway, the urgency of climate action compels us to share the resources we have developed to help Canadian health care institutions shift to reduce desflurane use.

The project was based on the success of a similar project at the University of Wisconsin that reduced the average per-case emissions by 64% through a combination of provider education and point-of-care labels.[5] As such, our starter pack includes a white paper of up-to-date evidence,

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a PowerPoint (Microsoft Corporation, Redmont, WA, USA) presentation introducing the project, anesthetic machine labels, and infographic posters. The package also includes a provider survey to help evaluate attitudes, knowledge, and beliefs pre and post intervention, as well as an easy-to-read narrative guide describing tips, recommendations, and lessons learned. The starter pack can be found at the Greener Gases website: http://www.greenergases.ca/. Users are encouraged to adapt resources to their local needs as well as share their resources on this platform.

In releasing this starter pack, we recognize that reducing desflurane use is only the first step to improving anesthetic sustainability. Other simple but high-impact strategies include the consistent use of low fresh gas flow (< 1 L·min^{-1}) anesthesia as well as minimizing nitrous oxide (N_2O), a potent ozone-depleting agent. Recent correspondence by Hönemann *et al.* in the *Journal* highlight alternatives to N_2O in pediatrics and obstetrics, which they have used since their elimination of N_2O since 2003.[6] Furthermore, installation of desflurane capture and recycle technologies and an increase in total intravenous anesthesia and regional technique use can further improve sustainability in practice. A comprehensive list of recommendations can be found at the American Society of Anesthesia's *Greening the Operating Room* guidelines.[7]

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