Communique – Desflurane

Purpose

This communique has been developed to raise awareness about the environmental impact of the inhaled anaesthetic gas Desflurane.

Issue

Climate change poses an existential threat to global health[1,2]. Evaluation of carbon footprint in potential hotspots allow for a targeted approach to reducing Carbon Dioxide emissions (CO_2e) contributing to pollution and climate change.

Inhaled anaesthetic agents (IAAs) are potent greenhouse gases (GHG) that carry significant global warming potential (GWP) by entering the troposphere and trapping heat[3].

IAAs contribute up to 5% of the total carbon footprint of a hospital.

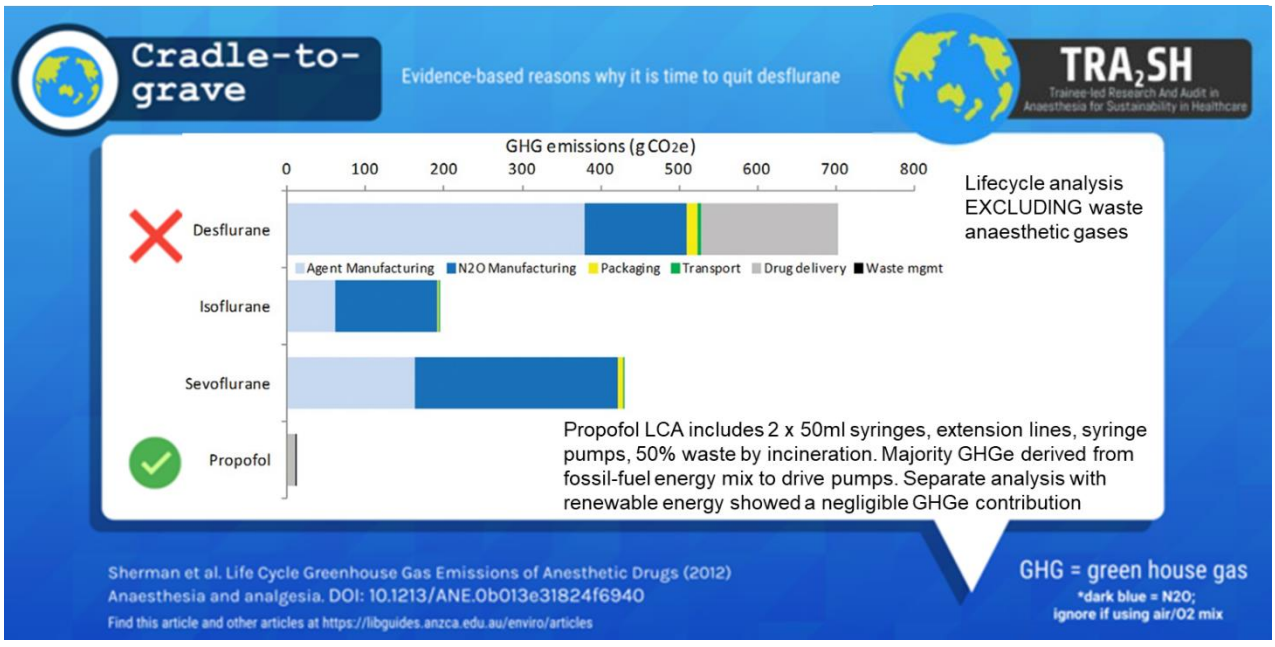
Supporting information

The tropospheric lifetime of Desflurane is 14 years compared to 1.5 years for Sevoflurane. Desflurane carries 2540 times the global warming potential of CO_2 over 100 years (GWP100). CO_2e per bottle Desflurane equates to 893kg CO_2 emitted compared to 49kg CO_2e per bottle Sevoflurane.

There is also considerable financial impact with cost per bottle Desflurane at $420 and Sevoflurane at $95. The cost per hour (1 MAC at 1L/min FGF) is $33.58 and $2.23 for Desflurane and Sevoflurane respectively.

In terms of life cycle analysis comparing different IAAs and Propofol, Desflurane is the worst performing[4].

The evidence demonstrates that it is time to quit Desflurane:



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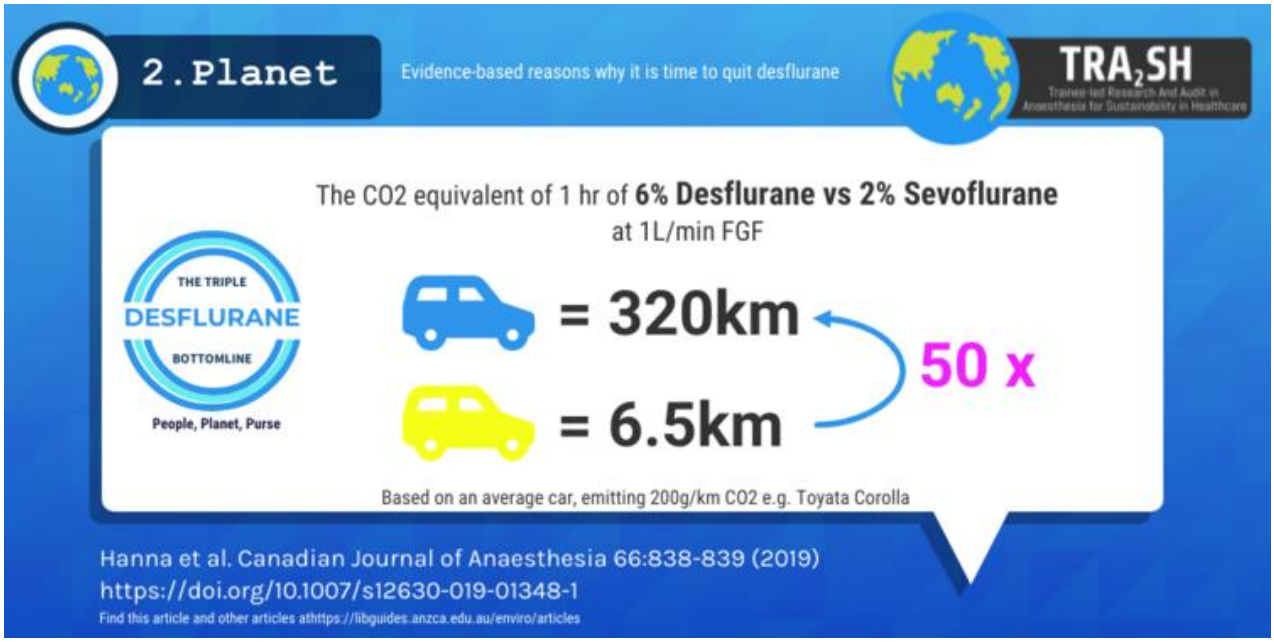

Recommendations

Proposed departmental quality improvement interventions:

1. Raising awareness about environmental impact of inhaled anaesthetic gases.
2. Face to face staff education.
3. Distribution of information material via email and newsletter.
4. Display of posters and infographics.
5. Encouraging use of low fresh gas flows with IAA.
6. Encouraging use of end-tidal control mode to deliver volatile anaesthetic agents.
7. Configuring anaesthetic machines to recirculate sampling gas.
8. Promoting regional anaesthesia and TIVA.
9. Progressive removal of Desflurane vaporisers from individual operating theatres.
10. Consider pledging to be Desflurane free (TRA2SH – Take the Des-Free Pledge).

References

1. Campbell MP, J.M. Tom. Atmospheric science, anaesthesia, and the environment. BJA Education. 2015;15(4):173-179.
2. Malik A, Lenzen M, McAlister S, McGain F. The carbon footprint of Australian health care. Lancet Planet Health. 2018;2(1): e27-e35.
3. Sulbaek Andersen MP, Sander SP, Nielsen OJ, Wagner DS, Sanford TJ, Jr., Wallington TJ. Inhalation anaesthetics and climate change. Br J Anaesth. 2010;105(6):760-766.
4. Sherman J, Le C, Lamers V, Eckelman M. Life cycle greenhouse gas emissions of anesthetic drugs. Anesth Analg. 2012;114(5):1086-1090.