



November 2024

ANZCA statement on desflurane

ANZCA is supportive of continued education and actions to reduce desflurane usage. The college recognises the need for urgent action on climate change, and mitigating the effects of desflurane on planetary health is one initiative of a wider comprehensive suite of strategies.^{1,2} Anaesthetists will continue to demonstrate leadership to decarbonise healthcare.

In 2021, ANZCA released a statement recognising climate change as a public health emergency¹, in keeping with multiple other national and international medical organisations (WHO³, The Lancet⁴, RACS⁵, RACP⁶). The rapidly evolving situation requires urgent and decisive adaptive changes, including from the healthcare sector.⁷ This statement seeks to balance the current evidence and perspectives on administration of the greenhouse gas desflurane as an anaesthetic agent and to reinforce our ability as clinicians to exert positive change and mitigate environmental impact.

Clinical/social effects

Patient safety and optimal outcomes are a clinician's priority. Importantly these priorities can occur while concurrently minimising anaesthesia's adverse environmental impacts. Desflurane, in comparison to sevoflurane, has been marketed for its lower solubility and faster offset, leading to a more rapid emergence, especially in patients living with obesity or for longer-duration surgeries. Meta-analyses of randomised controlled trials (RCTs) have confirmed that desflurane produces a faster time to recovery of consciousness and tracheal extubation, but the magnitude of this effect is minimal, being only a few minutes in most circumstances⁸. Of note, this minimal initial benefit does not then result in a shorter length of stay in the Post Anaesthetic Care Unit (PACU). Studies have also shown no difference in postoperative complications, when comparing sevoflurane with desflurane⁹.

Clinical disadvantages include desflurane's pungent odour, resulting in respiratory irritation and an association with increased perioperative coughing.¹⁰ Desflurane has also been linked with increased postoperative delirium in older patients, compared with propofol anaesthesia.¹¹ Its comparatively potent vasodilatory properties may contribute to intraoperative hypotension and reduce peripheral tissue perfusion¹². Overall, there is little evidence of benefit to patient safety or quality of care, from administration of desflurane as the anaesthetic agent, and there are well-documented disadvantages.

Economic effects

Desflurane is also a non-essential healthcare expense. Desflurane costs around \$A420 per bottle, compared with \$A95 for a bottle of sevoflurane. Converting to cost per hour (1 MAC at 1L/min of fresh gas flow) it is \$A33.58 for desflurane and \$A2.23 for sevoflurane (Queensland data).¹³



Environmental effects

Desflurane is, like sevoflurane and isoflurane, one of many short-lived climate pollutants (SLCPs) in the atmosphere. It exists at relatively small concentrations and there is no straightforward way to compare it with long-lived climate pollutants, such as CO₂. Among climate scientists, there is an ongoing conversation on appropriate comparative metrics,^{14–16} acknowledged also by the Intergovernmental Panel on Climate Change (IPCC) in 2018, which has since avoided comparing short-lived and long-lived mitigation pathways together over the last decade.¹⁷

It is preferable to compare like for like – e.g. sevoflurane with desflurane – but regardless of the metric used, desflurane is a much more potent greenhouse gas than easily available clinical alternatives. The global warming impact of desflurane, scaled for potency, amounts to 40-50 times that of sevoflurane.¹⁶ Peer reviewed scientific evidence affirms the reasoning behind scaling down the use of desflurane in preference to clinically appropriate and safe alternatives.^{9,18}

As the timeframe available to achieve the Paris Agreement goals has become more compressed, both the urgency for mitigation efforts wherever possible and the relative importance of addressing SLCPs has increased¹⁹ – a strategy supported by WHO policy.²⁰ Reducing SLCPs can shut off their contribution to global warming relatively quickly, compared with CO₂ emissions which have a long-lived atmospheric time.¹⁶

Summary

Desflurane contributes a relatively small share of overall health-system greenhouse gas emissions (the same can be said for many other sources when observed in isolation). A net zero health system will only be achieved, however, if feasible individual small contributors are addressed. We must recognise the proportion of each source to overall emissions, but also prioritise opportunities that exist for reduction, especially when relatively straightforward (or clinically equivalent) alternatives are available.^{2,7,21}

Reducing emissions from desflurane administration is a single (but important) part of the overall work to decarbonise health services and one of 49 different actions towards “sustainable, resilient, high-quality net zero health systems” in Australia’s National Health and Climate Strategy.²² Reducing its use represents a “quick win”, that is easy to maintain and well within our direct control as anaesthetists. Clinical, economic and environmental considerations are aligned in this case, making it an excellent example of strategic action for health service organisations.²³



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