ANZCA
Australian and New Zealand College of Anaesthetists

Australian Society of Anaesthetists®

New Zealand Society of Anaesthetists
Ngā Ringa Tauwhiro o Aotearoa

Statement on decommissioning nitrous oxide medical gas pipeline systems

The Australian and New Zealand College of Anaesthetists (ANZCA), the Australian Society of Anaesthetists (ASA) and the New Zealand Society of Anaesthetists (NZSA) support:

1. Decommissioning nitrous oxide (N_2O) medical gas pipeline systems (MGPS).
2. Avoiding installation of new N_2O MGPS.
3. Utilising point of care cylinder supply where N_2O is required for clinical use.

Nitrous oxide (N_2O) is a greenhouse gas that contributes to climate change[1], and the healthcare contribution to its emissions requires urgent and decisive action. N_2O leaks in significant quantities from pressurised N_2O medical gas pipeline systems (N_2O MGPS)[2-5]. This leaked N_2O performs no clinical function yet still exerts a negative climate effect. ANZCA supported an amendment to the Australasian Health Facilities Guidelines in March 2025[6], which states that N_2O MGPS are no longer mandatory for any health service.

This is in line with statements released in 2024, from organisations for anaesthetists in the United Kingdom and Ireland[7], and the American Society of Anesthesiologists[8], advocating for decommissioning existing N_2O MGPS and not installing N_2O MGPS in new hospitals.

In September 2025, the World Health Organization added a qualifying statement to the Emergency Medicines List to be included from 2025 onwards stating "*Piped nitrous oxide (i.e., centrally supplied systems of delivering gas through buildings) is a major source of atmospheric pollution from healthcare facilities and therefore only point-of-care cylinders are recommended.*"

This statement does not propose to impact or change clinical indications for use of N_2O. Our understanding of clinical usage patterns of N_2O has grown substantially. It is clear that operating theatres administer less N_2O than other clinical areas, notably birth suites[9]. Birth suites and *Specialist hospital groups: Women's and children's hospitals*[10] are expected to have ongoing clinical demand for N_2O in significant quantities.

Currently, it is uncertain whether cylinder use of N_2O or N_2O MGPS, with rigorous attention to leakage identification and rectification, is more suitable in these high usage areas. The evidence to date consistently demonstrates that N_2O MGPS leak, and that the existing Australian Standards do not detect these leaks. We recommend that, at a minimum, these facilities undertake N_2O MGPS leakage assessment and consider full or partial decommissioning. When implementing the change from use of N_2O MGPS to cylinder supply change, relevant policy should be adhered to.

Leakage assessment of individual N_2O MGPS in Australian and New Zealand hospitals are ongoing, and internal audits and published reports have demonstrated 50-95% leakage rates[4-5], which is in keeping with the international experience of 47-100% leakage rates[2-3]. N_2O is responsible for 20% of the Australian healthcare sector's Scope 1 emissions*[11]: addressing this leakage by decommissioning N_2O MGPS would result in a significant decrease in Scope 1 emissions without any impact upon clinical care.

While the cost of N_2O per litre is relatively inexpensive, leakage from N_2O MGPS can result in substantial financial losses, often amounting to tens of thousands of dollars per year for a single site. N_2O MGPS also require regular maintenance, and decommissioning avoids this ongoing cost. Whilst the decommissioning process and changing to point of care cylinders has an up-front cost, organisations have reported a return on investment within two years. Avoiding the planning, installation and commissioning of N_2O MGPS will decrease associated costs in new builds[3].

The Australian Interim Centre for Disease Control released guidelines for detecting and reducing leakage from N_2O MGPS in 2024[12], and several hospitals in Australia and New Zealand have decommissioned their N_2O MGPS. With current evidence neither maintenance of N_2O MGPS, nor disconnection of N_2O delivery devices at the point of clinical care, reliably resolves leakage. In contrast, healthcare sites that have decommissioned their N_2O MGPS have substantially decreased the amount of N_2O purchased, achieving both environmental and financial improvements.

Worldwide, anaesthetists are key stakeholders and leaders in efforts to address this issue, prioritising safety and patient care during this period of change. Our three organisations jointly support the decommissioning of N_2O MGPS, recommend against the installation of new N_2O MGPS, and endorse the use of point-of-care cylinders as the preferred method of N_2O delivery in Australia and New Zealand.

---

* Scope 1 emissions (EPA): direct greenhouse gas emissions that occur from sources that are controlled or owned by an organisation (https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance)

References

1. Intergovernmental Panel on Climate Change. *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. IPCC, Geneva, Switzerland; 2023:1-34. doi: 10.59327/IPCC/AR6-9789291691647
2. Chakera A. *Reducing the impact of nitrous oxide emissions within NHS Lothian theatres to mitigate dangerous climate change*. Dissertation; University of Edinburgh; 2020. Accessed March 23, 2025. https://osf.io/4stx7
3. Chesebro BB, Gandhi S. Mitigating the systemic loss of nitrous oxide: a narrative review and data-driven practice analysis. *Br J Anaesth*. 2024;133(6):1413-1418. doi: 10.1016/j.bja.2024.08.028
4. Seglenieks R, Wong A, Pearson F, McGain F. Discrepancy between procurement and clinical use of nitrous oxide: waste not, want not. *Br J Anaesth*. 2022;128(1):e32-e34. doi:10.1016/j.bja.2021.10.021
5. Gaff SJ, Chen VX, Kayak E. A weighing method for measuring nitrous oxide leakage from hospital manifold-pipeline networks. *Anaesth Intensive Care*. 2024;52(2):127-130. doi:10.1177/0310057X231198123
6. Part B - Health Facility Briefing and Planning, 0520 – Operating Suite. In: Australasian Health Facility Guidelines. Australasian Health Infrastructure Alliance; 2025. Accessed May 3, 2025. https://healthfacilityguidelines.com.au/sites/default/files/HPU_B.0520_7_update%20nitrous%20oxide.pdf
7. Royal College of Anaesthetists, Association of Anaesthetists, College of Anaesthesiologists of Ireland, Association of Paediatric Anaesthetists of Great Britain and Ireland, Obstetric Anaesthetists' Association. *Consensus Statement on the Removal of Pipeline Nitrous Oxide in the United Kingdom and Republic of Ireland*. Media release, RCoA. 2024. Accessed March 19, 2025. https://rcoa.ac.uk/sites/default/files/documents/2024-07/Consensus%20statement%20on%20removal%20of%20pipeline%20nitrous%20oxide.pdf
8. American Society of Anesthesiologists. *Statement on Deactivating Central Piped Nitrous Oxide to Mitigate Avoidable Health Care Pollution*. Media release, ASA. October 23, 2024. Accessed March 19, 2025. https://www.asahq.org/standards-and-practice-parameters/statement-on-deactivating-central-piped-nitrous-oxide-to-mitigate-avoidable-health-care-pollution
9. Wong A, Gynther A, Li C, et al. Quantitative nitrous oxide usage by different specialties and current patterns of use in a single hospital. *Br J Anaesth*. 2022;129(3):e59-e60. doi:10.1016/j.bja.2022.05.022
10. Appendix D: Listing of public and private hospitals by peer group. In: Australian hospital peer groups. Australian Institute of Health and Welfare; 2015:138. Accessed June 6, 2025. https://www.aihw.gov.au/getmedia/79e7d756-7cfe-49bf-b8c0-0bbb0daa2430/14825.pdf?v=20230605174748&inline=true
11. Australian Government Department of Health and Aged Care. *National Health and Climate Strategy*. Australian Government Department of Health and Aged Care; 2023. Accessed April 8, 2025. https://www.health.gov.au/sites/default/files/2023-12/national-health-and-climate-strategy.pdf
12. Kayak E, McGain F, Burch H, et al. Detecting and reducing nitrous oxide leaks in healthcare facilities: a practical guide. Interim Australian Centre for Disease Control, Department of Health and Aged Care; 2024. https://www.health.gov.au/sites/default/files/2024-09/detecting-and-reducing-leaks-from-nitrous-oxide-in-healthcare-facilities-a-practical-guide_0.pdf. Accessed October 2024.