

## Executive Summary Waste Anesthesia Gases

- Immediate postoperative patients exhale anesthetic gases 95% unmetabolized into the breathing zones of nurses and associated healthcare personnel in the Post-Anesthesia Care Unit (PACU). These are defined as Waste Anesthetic Gases (WAGs) and this occupational exposure can negatively impact health of nurses.
- Occupational exposure to waste anesthetic gases include nausea, dizziness, headaches, fatigue, and irritability, as well as sterility, miscarriages, birth defects, certain cancers, and liver and kidney disease, among operating room staff.
- These gases are Scope 1 greenhouse gases and may make up more than 5% or more of a hospital's entire carbon footprint as these gases are exhausted out of hospitals into the atmosphere virtually unchanged.
- The global warming impacts of these gases vary, with atmospheric lifetimes between 1–5 years for sevoflurane and 114 years for Nitrous Oxide. Many also deplete the ozone.
- A recent study reported that PACU that general dilution ventilation, at current air exchange rates, may not be enough to reduce WAG exposures below the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs), or the American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values/Time-Weighted Averages (TLVs/TWAs). Because of this deficiency, market available source control scavenging systems that control WAGs at the patient's breathing zone may be more effective in reducing and containing these emissions in the PACU hence protecting nurses from this occupational exposure.
- There are no federal Occupational Safety and Health Administration (OSHA) standards for WAGs in the PACU. However, OSHA (1970b) may issue citations under the General Duty Clause (5a1), which states that employers "shall furnish to each of his employees'... a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees" ([osha.gov/laws-regs/oshact/section5-duties](https://www.osha.gov/laws-regs/oshact/section5-duties)).
- There are not federal standards to control WAGs in PACU, healthcare administrators are hesitant to implement such controls related to costs of implementing scavenging systems. Educating and raising awareness about source control solutions to control and prevent WAG exposures in the PACU is a critical step toward improving patient and nurse health and safety.
- NIOSH recommended that workers should not be exposed to halogenated agents at concentrations of 25ppm when used alone, or 2 ppm when used in combination with nitrous oxide, over a sampling period not to exceed 1 hour.
- Other countries guidelines for occupational exposure standards, ranging from 25 ppm (the Netherlands) to 100 ppm (Italy, Sweden, Norway, Denmark, Great Britain) (Gardner, 1989; HSAC, 1995). While these occupational exposure standards vary, they all agree that the process of scavenging WAGs should be utilized.
- Recently Scotland has become the first country in the world to stop its hospitals using the anesthetic **desflurane** because of the threat it poses to the environment. NHS data suggests the gas, used to keep people unconscious during surgery, has a global warming potential 2,500 times greater than carbon dioxide.

## Our ASKS

- 1) Encourage OSHA to extend current regulations of WAGS in the OR to the PACU.
- 2) Encourage the healthcare industry to implement these source control scavenging systems and prevent WAG exposures among nurses in the PACU.
- 3) Perform periodic monitoring of WAG levels near the patient's breathing zone to assure these controls are working in addition to ambient air.
- 4) Develop a reporting system of nurse adverse health symptoms and trends due to exposure to WAGs.

## **Resources**

AIHA & ASPAN Whitepaper on Waste Anesthetic Gases and ASPAN Position Statement on WAGS supported by AIHA located at: <https://www.aspan.org/Publications-Resources/White-Papers>

NIOSH and CDC information of Anesthetic Gases and Reproductive Health located at: <https://www.cdc.gov/niosh/topics/repro/anestheticgases.html>

Occupational Safety Health Administration Overview on Waste Anesthetic Gases located at: <https://www.osha.gov/waste-anesthetic-gases>

British Broadcasting Corporation health reporter covers Scotland first to ban environmentally harmful anaesthetic, located at: <https://www.bbc.com/news/health-64347191>