

## Nitrous Oxide Wastage: Putting Strategies “In the Pipeline” to Reduce Carbon Emissions from Nitrous Oxide

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**Abstract :** Nitrous oxide (N<sub>2</sub>O) has been used in anaesthesia for over 150 years owing to advantageous physical and pharmacological properties. However, with a global warming potential of 310, we have an urgent responsibility to reduce its usage and emission. Anecdotal evidence in our hospital trust suggests minimal N<sub>2</sub>O usage, yet our theatres receive a staggering supply. This warranted further investigation. We used a data collection tool to prospectively capture quantitative and qualitative data regarding N<sub>2</sub>O cases during one week: this recorded demographics, N<sub>2</sub>O indications, clinical management, and total N<sub>2</sub>O consumption in litres. In addition, N<sub>2</sub>O usage in dental sedation suites and paediatric theatres was separately quantified. Pipeline supply data was acquired from British Oxygen Company accounts. We captured 490 cases. 4% (n=19) used N<sub>2</sub>O, 63% (n=12) of these in dental theatres. Common N<sub>2</sub>O indications were induction speed (37%) and rapidly increasing anaesthesia depth (32%). In adult cases, N<sub>2</sub>O was always used intraoperatively rather than solely at induction. 74% (n=14) of anaesthetists reported environmental concern over using N<sub>2</sub>O. The week's total N<sub>2</sub>O usage was 8109 litres, amounting to 421,668 litres annually. However, the annual N<sub>2</sub>O pipeline supply is 2,997,000 litres; an enormous 1.8 million Kg of CO<sub>2</sub>. Our results supportively demonstrate that the N<sub>2</sub>O pipeline supply greatly exceeds its clinical use. Acknowledging clinical areas not audited, the discrepancy between supply and usage suggests approximately 2.5 million litres of yearly wastage. We consequently recommend terminating the N<sub>2</sub>O pipeline supply in minimally used areas, eliminating 1.5 million Kg of CO<sub>2</sub> emissions. High usage clinical areas could consider portable N<sub>2</sub>O cylinders as an alternative. In Sweden, N<sub>2</sub>O destruction technology is routinely used to minimise CO<sub>2</sub> emissions. Our results support National Health System investment in similar infrastructure.

**Keywords :** anaesthesia, environment, medical gases, nitrous oxide, sustainability

**Conference Title :** ICSH 2021 : International Conference on Sustainability in Healthcare

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** December 20-21, 2021