

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

Authors : F. Gallop, C. Ward, M. Zaky, M. Vaghela, R. Sabaratnam

Abstract : Nitrous oxide (N₂O) 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 N₂O 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 N₂O cases during one week: this recorded demographics, N₂O indications, clinical management, and total N₂O consumption in litres. In addition, N₂O 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 N₂O, 63% (n=12) of these in dental theatres. Common N₂O indications were induction speed (37%) and rapidly increasing anaesthesia depth (32%). In adult cases, N₂O was always used intraoperatively rather than solely at induction. 74% (n=14) of anaesthetists reported environmental concern over using N₂O. The week's total N₂O usage was 8109 litres, amounting to 421,668 litres annually. However, the annual N₂O pipeline supply is 2,997,000 litres; an enormous 1.8 million Kg of CO₂. Our results supportively demonstrate that the N₂O 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 N₂O pipeline supply in minimally used areas, eliminating 1.5 million Kg of CO₂ emissions. High usage clinical areas could consider portable N₂O cylinders as an alternative. In Sweden, N₂O destruction technology is routinely used to minimise CO₂ emissions. Our results support National Health System investment in similar infrastructure.

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

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