

A District General Hospital (DGH) Experience of Decommissioning the Nitrous Oxide (N2O) Cylinder Manifold: From Conception to Completion

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Background

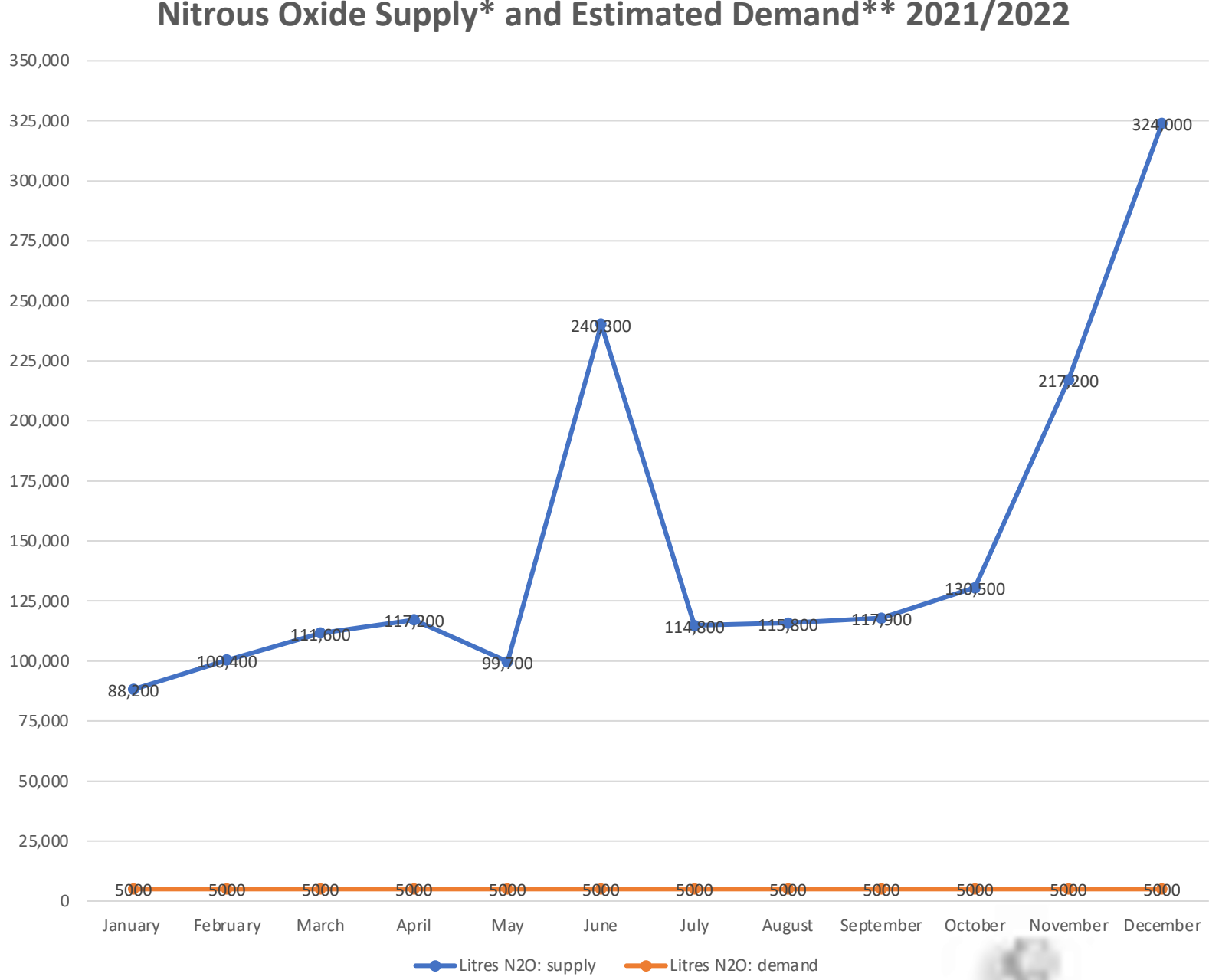
Nitrous oxide remains in the atmosphere for 114 years making its greenhouse effect equivalent to that of desflurane at clinically relevant levels¹ and a global warming potential of 300 times that of carbon dioxide².

Cylinder manifolds, the traditional storage unit of nitrous, leak significant amounts of the gas. Leakage may be more than is utilised in patient care³ leading to ongoing detrimental effects despite the reduction in consumption..

The Royal United Hospital (RUH) in Bath has seventeen operating theatres covering three areas delivering an average of 10,000 general anaesthetics per year, including 1200 paediatric cases⁴. It has a sustainability goal of becoming carbon neutral by 2050².

With the help of the nitrous oxide working group we have successfully decommissioned the nitrous oxide manifold and exchanged for a more economical and environmental option – portable size E cylinders.

Pre-intervention data: Supply and Demand

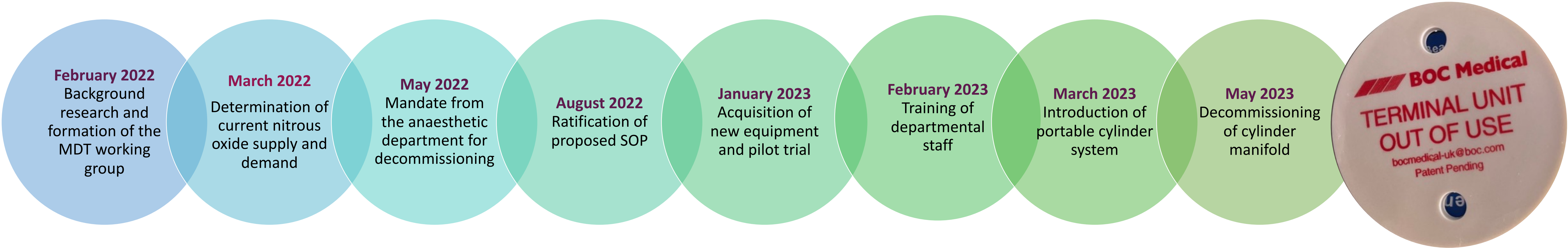


***Equivalent to 656 tonnes of carbon dioxide per year.**

****Calculated assuming that 1200 paediatric cases are spread evenly through the year and each one uses a gas induction.**
Liters nitrous oxide required during gas induction estimated at 50L, assuming flows of 15L/ min at O₂:N₂O mix of 30:70 and running for 5 minutes.

Acknowledgements

We would like to thank the sustainability team at the Royal United Hospital NHS Foundation Trust – Ruth McNabb, Katie Freemantle, Matt Schofield and Jonny Price. The gas guys – Scott Mitchell and Mike Maimone for their expertise and commitment. The procurement team who persevered despite the difficulties and the theatre team, Tracey Book and Bindu Baiju for their resourcefulness and dedication! Without this team this ambitious project would not have been possible.



Pre-intervention data: Departmental Use

Estimated Monthly Nitrous Use

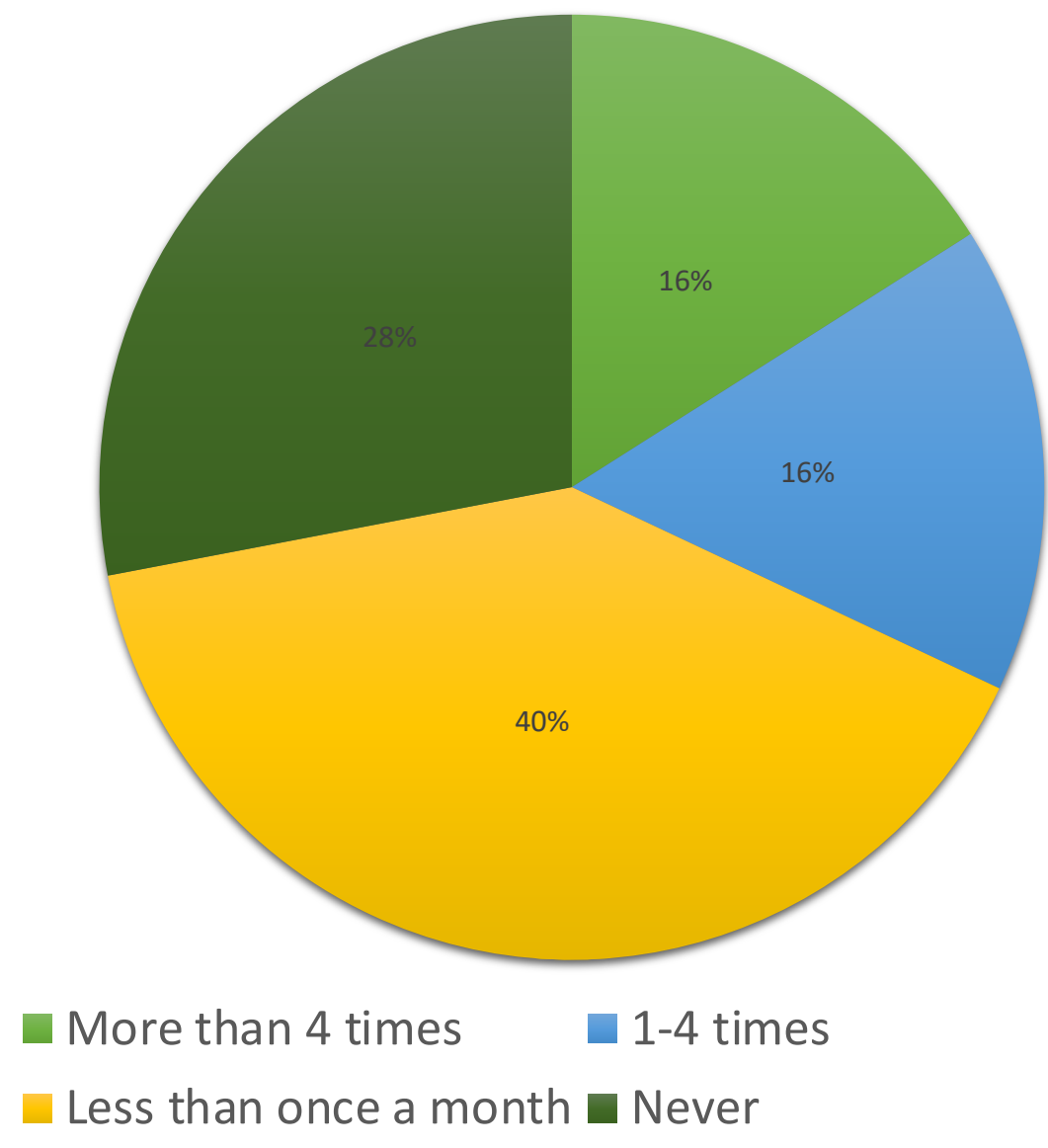


Figure 1: Survey of monthly nitrous use amongst anaesthetists at the RUH

Nitrous Use in Gas Inductions

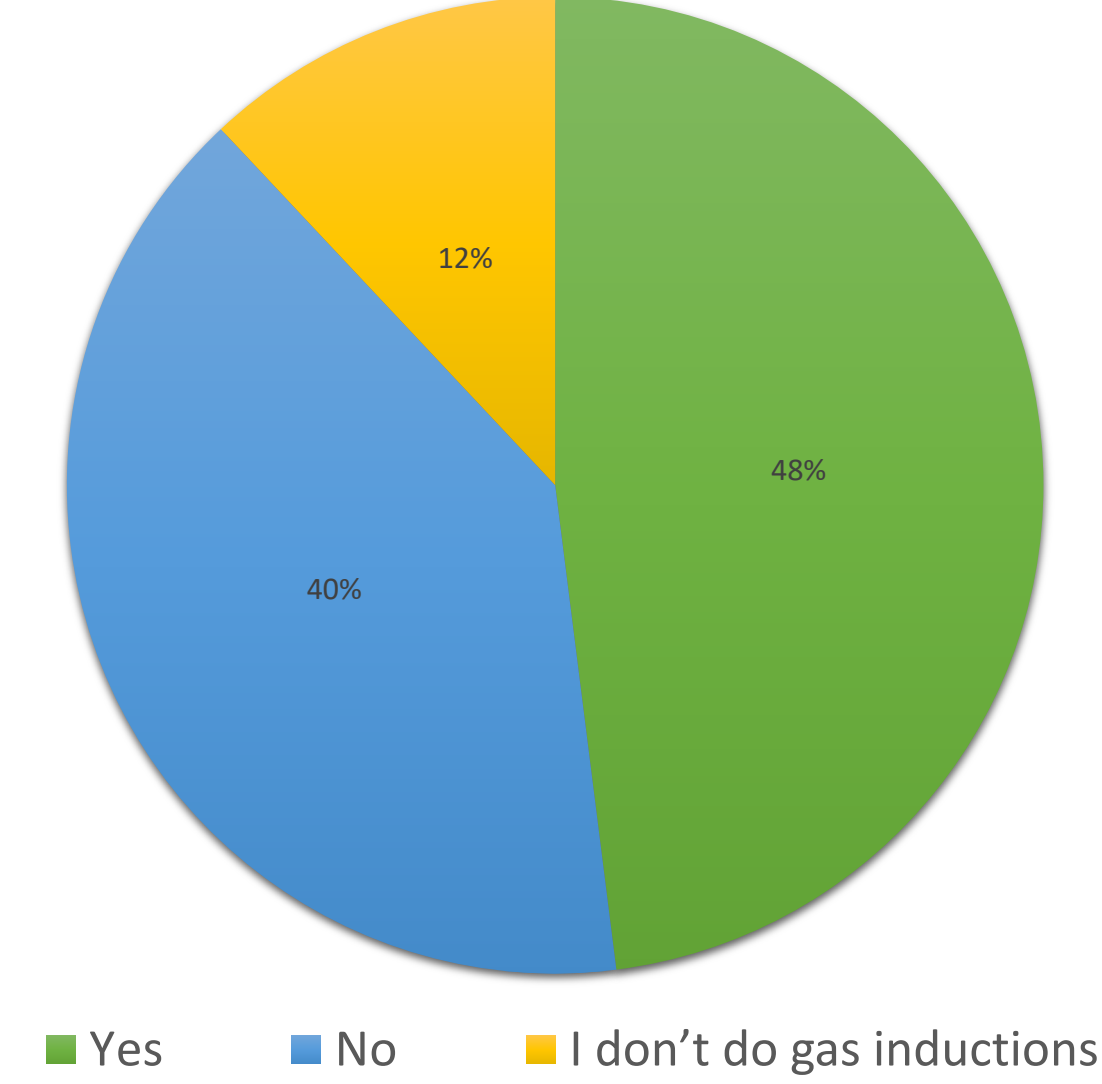


Figure 2: Survey of nitrous oxide in gas inductions amongst anaesthetists at the RUH



Figure 3: Tea-trolley training of portable nitrous oxide cylinders

Using the ‘tea-trolley training’ method, developed in the RUH, 99 members of the theatre MDT were trained to use the portable size E nitrous oxide cylinders. Tea-trolley training gives workplace ‘bite-sized’ sessions well suited to practical hands-on training⁵.

Members of the MDT, including ODPs and gas porters, made up the teaching team in addition to anaesthetic trainees.

The nitrous oxide checklist (Figure 4) is found next to the cylinders for use every time cylinder is accessed.



Figure 4: Portable nitrous oxide checklist

Education and Training: Follow-up and Future Recommendations

1. Have you had any problems since N₂O outlets were capped off and we started using cylinders?

[More Details](#)

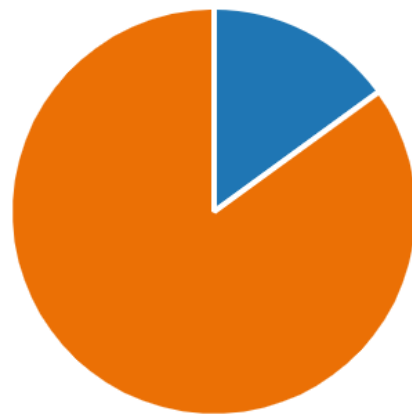


Figure 5: 8 week follow up questionnaire: Issues encountered with new system

5. Removal of piped nitrous will have a positive impact on the environment

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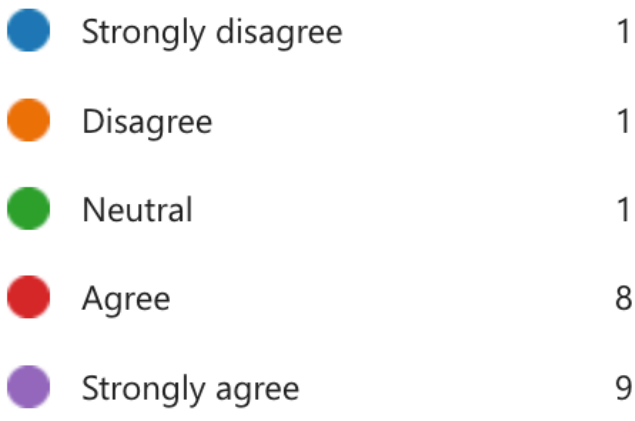


Figure 6: 8 week follow up questionnaire: Perceived impact on the environment

6. I would recommend this process to other hospitals keen to make this change

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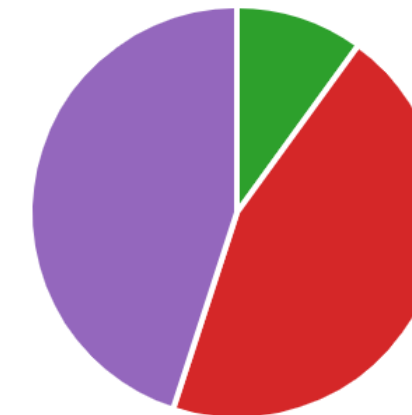
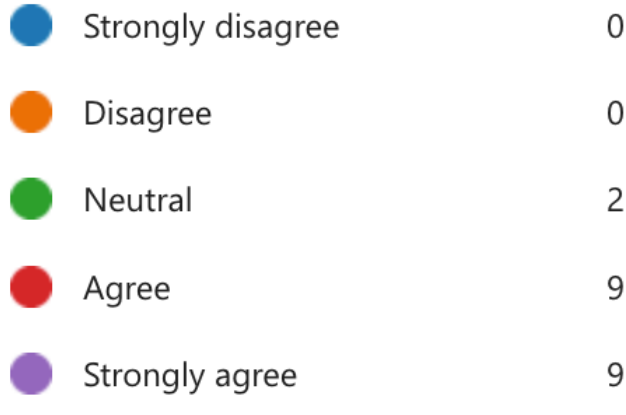


Figure 7: 8 week follow up questionnaire: Likelihood of recommendation

