

ESTABLISHING ENTONOX CRACKING IN MATERNITY CARE, A QUALITY IMPROVEMENT PROJECT

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Introduction

Nitrous oxide (N_2O) scavenging and cracking is being trialled by our Maternity Unit to mitigate the environmental impact of Entonox use, in keeping with government sustainability targets¹. Our centre has four Medclair Mobile Destruction Units (MDUs) that crack exhaled Entonox using heat into its atmospheric elements. They have been shown to be effective devices². Using quality improvement methodology, this project aimed to introduce and increase use of MDUs, leading to sustained changes in practice.



Method

Weekly snapshots of all births over the preceding 24 hours were collected. Consent from participants gained. Elective caesarean sections were excluded. Entonox usage and MDU usage were recorded. Stakeholder analysis and patient and midwife feedback was gathered prior to introduction of the MDUs. Multiple Plan Do Study Act (PDSA) cycles including the following intervention bundles were trialled:

1. Instructional video produced and quick setup guide fixed to each machine
2. Entonox wall outlet MDU reminder signs and handover board signage for machine location
3. Relaunch event: social media promotion and recruitment of midwifery champions
4. Grab bags: single use components grouped into bags attached to MDUs
5. Patient information poster aiming to increase patient awareness and demand for MDUs
6. Designated cracking rooms for optimisation of machine positioning, room ergonomics and certainty of machine locations

Results

- Over 12 weeks 135 deliveries were recorded
- A further 17 women were unavailable or declined to participate
- Excluding 24 elective caesarean sections, 111 deliveries had the opportunity to use Entonox in an area served by an MDU
- Of those, 94 (85%) used Entonox
- Eight of those 94 used an MDU

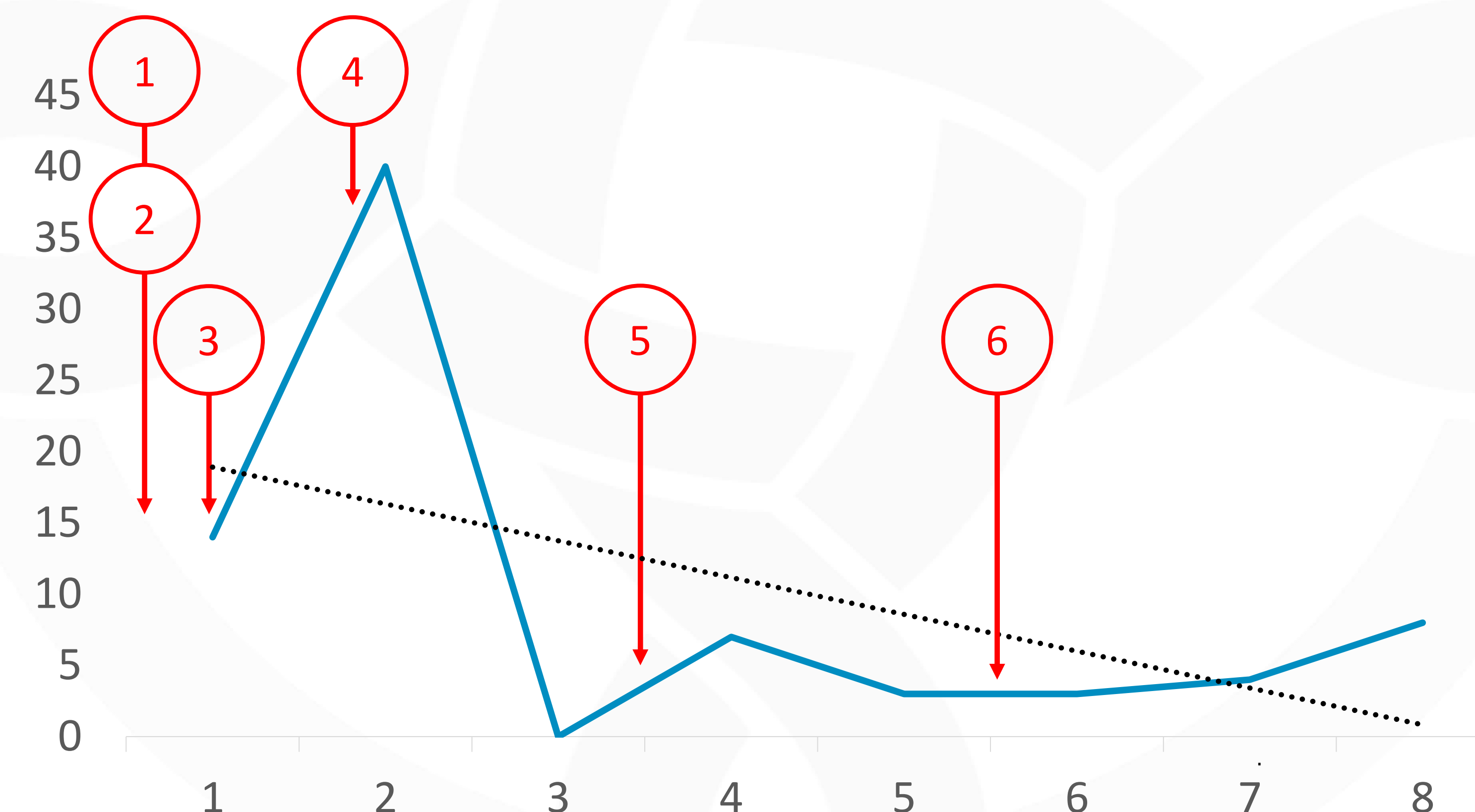


Figure 1 . A graph showing sequential MDU uses against preceding Entonox uses without an MDU. PDSA cycles are in red, corresponding with numbering in method.

Discussion

- The run chart demonstrates the impact of each PDSA cycle on MDU use and overall shows a sustained increase in use.
- The most effective PDSA cycle, number four, was the introduction of grab bags that streamlined the process of setting up the machines. This was preceded by number three, the social media relaunch and appointment of midwifery cracking champions.
- Process mapping showed MDU setup and use contained a greater number of steps compared with using Entonox without an MDU.
- The use of social media effectively engaged midwifery colleagues and having cracking champions created ownership of the project within the midwifery group.
- The devices have become accepted by a cohort of the midwifery staff and further work is ongoing to maximize machine use to realise their full potential in reducing our N_2O emissions.
- Maintaining the positive change seen in this project is another priority. Given the rotational nature of staffing in over department, creating a self-sustaining system of stocking, education and training for the MDUs will be crucial.

Conclusion

Establishing Entonox cracking as accepted practise in our department required significant quality improvement work.

A multifaceted approach improving staff awareness and engagement, as well as streamlining the process of machine use were the most influential interventions we implemented.

References

1. Powlesland D., Joyce C. NHS Wales Decarbonisation Strategic Delivery Plan. 2021. www.gov.wales/sites/default/files/publications/2021-03/nhs-wales-decarbonisation-strategic-delivery-plan.pdf
2. Fang, Li, Amanda Fieldhouse, James Fletcher, Matthew Gaines, Jennifer Khan-Perez, Richard Lowe, Teresa MacCarrick, et al. 2022. "Quantifying Changes in Ambient Nitrous Oxide Levels with Catalytic Cracking in the Labour Ward." BJA Open 4 (100086): 100086.