Making the Paediatric Theatre Environment Greener

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GREENER ANAESTHESIA & SUSTAINABILITY PROJECT

Introduction

- Anaesthetic gases = 5% carbon footprint[1,2]
- Desflurane is most harmful and expensive
- N20 >75% of carbon impact[1,2]
- Paediatric theatres important area for change – less routine use TIVA[3] and high proportion inhalational inductions

SMART Aim

- Ensure desflurane and N20 use for maintenance of anaesthesia in < 5% cases
- Achieve low flow anaesthesia in 95% of cases

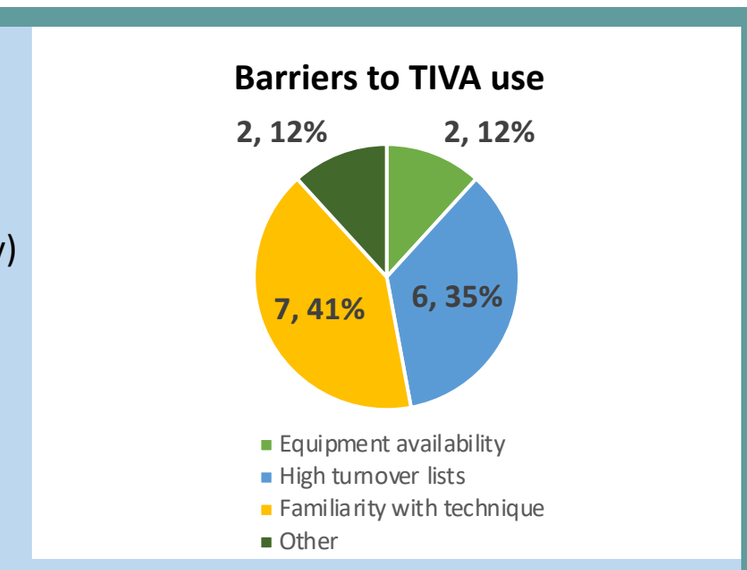
1st PDSA Cycle - pre intervention (pre covid)

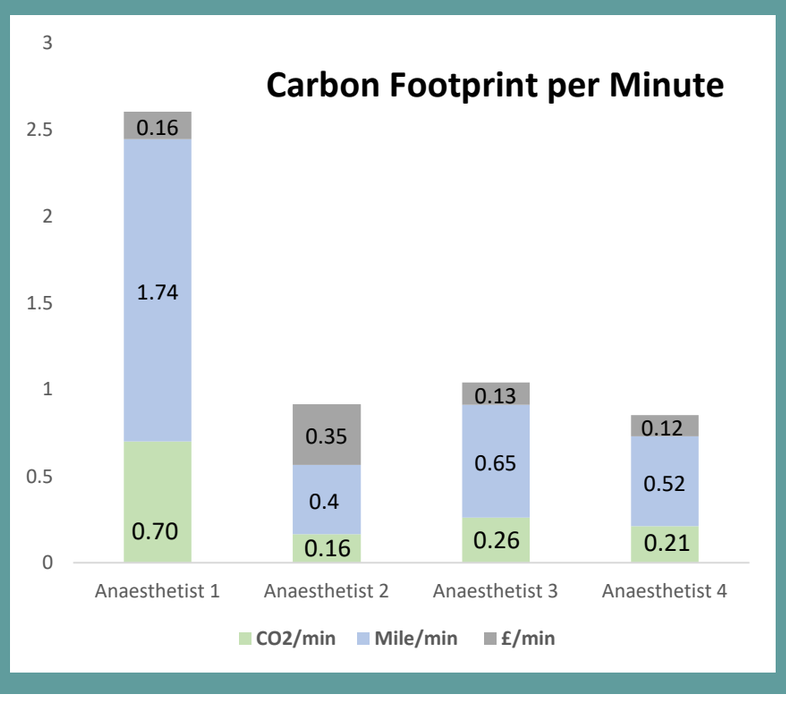
- Gassing greener app
- Individual carbon footprint per theatre

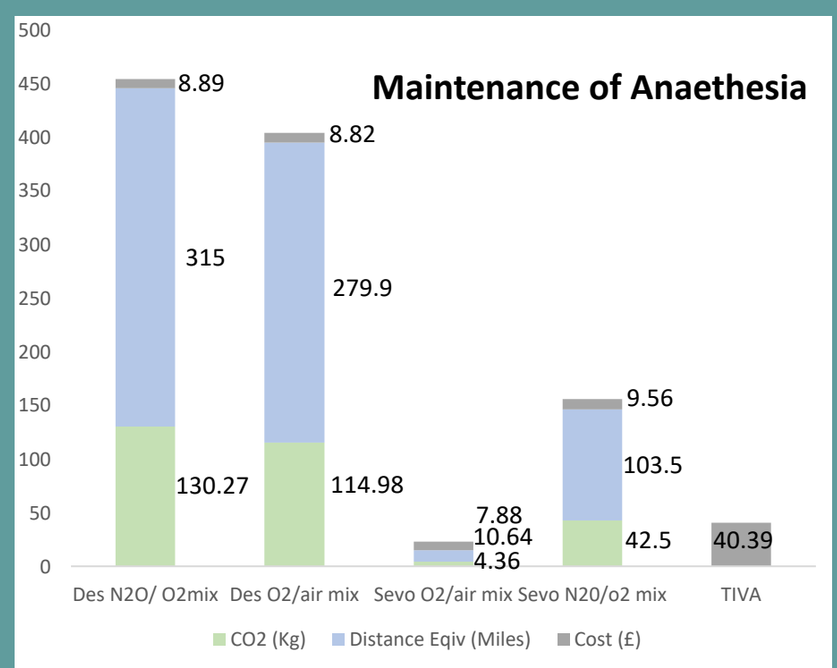
- 15 cases; 4 theatres
- Induction
  - 13% IV induction (n=2)
  - 87% gas induction (n=13)
- Maintenance
  - 93% volatile (n=14)
  - 20% desflurane (n=3); 33% N20 (n=5)
  - 7% TIVA; (n=1)

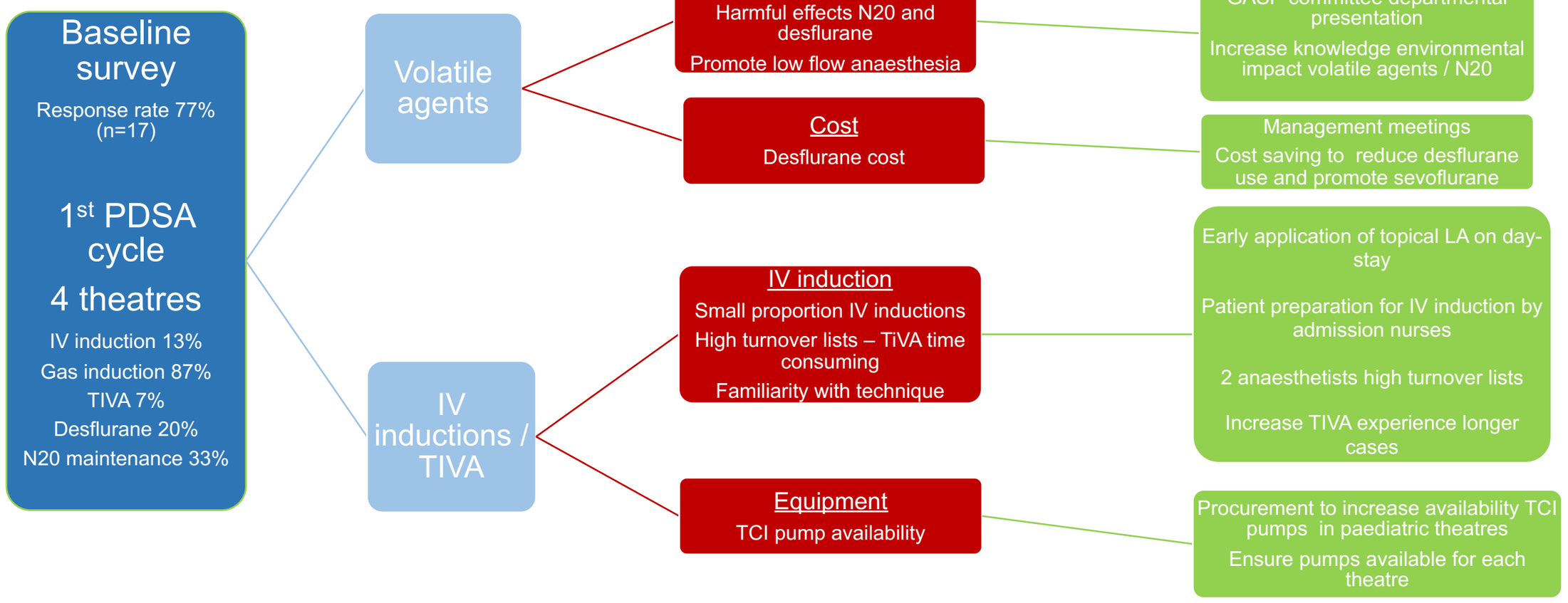
Method

- Tertiary paediatric anasthetic department
- Baseline survey anaesthetic practice.
- Response rate 77% (n=17)
  - 36% use desflurane for maintenance (18% daily)
    - List efficiency / faster wake-up
  - 42% use N20 for maintenance (24% weekly)
  - TIVA frequency
    - 47% weekly / 35% monthly
    - Main reason: previous PONV / myopathy
    - Barriers – lack of equipment driving lack of familiarity. Theatre managers driving list efficiency / turnover
- Baseline PDSA cycle /Identify drivers for change









2nd PDSA cycle – post intervention (pre covid)

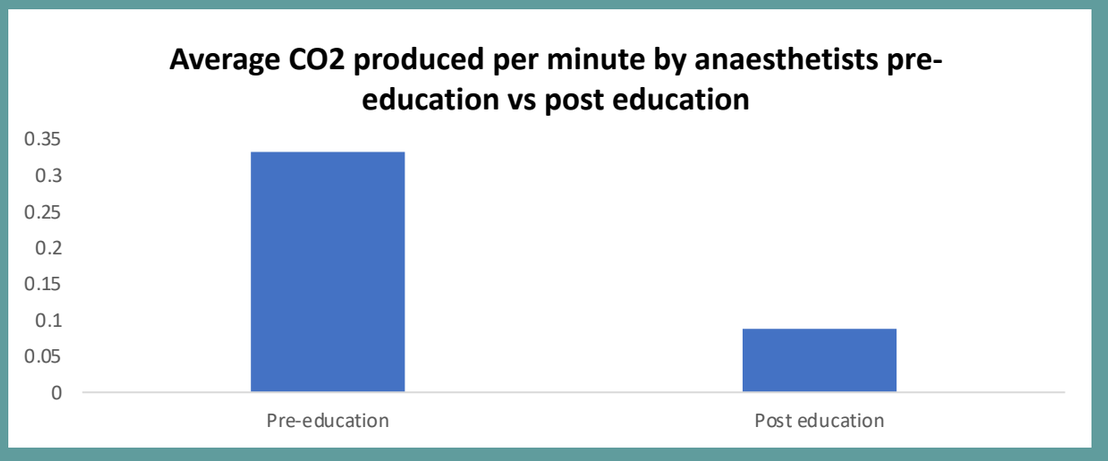
58 cases; 4 theatres

- Induction
  - 29% IV induction (n=17)
  - 71% Inhalational (n=41)
- Maintenance
  - 1.7% Desflurane (n=1)
  - 5.2% N20 maintenance (n=3)
  - 3.4% TIVA (n=2)
  - Remainder sevoflurane / air
- Flow <1 L/minute in 100% cases

3rd PDSA cycle - post intervention (post covid)

25 cases; 4 theatres

- Induction
  - 44% IV induction (n=11)
  - 56% inhalational (n=14)
- Maintenance
  - **0% Desflurane (n=0)**
  - 4% N20 maintenance (n=1)
  - 12% TIVA (n=2)
  - Remainder sevoflurane / air
- Flow < 1L/minute in 100% cases



Future Work

- Ensure changes sustained
  - Education sessions 3-months for rotating trainees
    Permanent staff involvement ODPs and consultant leads
- Co-existing project by ODPs – reduce plastic + increase recycling
- Assess impact of COVID-19
  - Reduce exposure to virus by promoting IV induction
  - Shorter patient lists to allow cleaning / PPE
  - Time to promote TIVA use / reduce desflurane
- Increase TIVA and IV inductions
- TCI pumps from clinical engineering to ensure 2 per theatre

References

1. The Royal College of Anaesthetists. Environment and Sustainability. https://www.rcoa.ac.uk/about-college/strategy-vision/environment-sustainability. Last accessed 27th January 2020.
2. Charlesworth M and Swinton F. Anaesthetic gases, climate change, and sustainable practice. The Lancet. 2017; 1 (6): 216 – 217.
3. Goh N, Bagshaw O, Courtman S. A Follow up Survey of Total Intravenous Anaesthesia Usage in Children in the UK and Ireland. 2018: 29 (4). 10.1111/pan.13556