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## ARE PAEDIATRIC ANAESTHETISTS COSTING THE EARTH?

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Introduction and aims

Anaesthetic gases have a substantial impact on climate change through global warming(1). Paediatric anaesthesia frequently uses volatile agents for induction of anaesthesia. We aimed to quantify the environmental impact of anaesthetic room choices.

Methods

We conducted a prospective audit of anaesthetic room volatile use in paediatric theatre suite in a large teaching hospital. Volatile use was measured by subtracting the weight of the vapouriser after induction from the weight prior to induction using specific scales measuring in 1g increments (HanmirR). This was conducted over a 5 day period and recruited 78 patients. 8 patients were excluded as they were anaesthetised in theatre. Anaesthetists conducting inductions were not made aware of the audit. We also collected simple data on type of induction/maintenance, demographics and difficulties/delays in the anaesthetic room. Estimations of kgCO2e are based on published GWP data(2).

Results

Gas induction followed by gas maintenance used the most volatile with a median of 34g (IQR 40.75-25 = 15.75g). IV induction followed by gas maintenance resulted in median use of 12g (IQR 17-10 = 7g). Gas induction to IV maintenance used a median of 17g (IQR 22.5-16.75 = 5.75g). TIVA used 0g of volatile.

Discussion and Conclusion

In our audit sevoflurane was the only volatile used. The average gas induction and maintenance with sevoflurane used 34g, equivalent to 11.9kg of CO2 production (roughly the same as driving 73.2 miles in a car with average emissions of 100gCO2/km). The impact of N20 was not calculated in this study but assuming 4L/min for 10min this would add an additional 21.8kgCO2e (in total 33.7kgCO2e – equivalent to 208 car miles). IV induction to volatile produced a median of 4.2KgCO2e (25.9 car miles).

Our data suggests IV induction reduces volatile use and environmental impact, compared to inhalation induction. Changing to IV anaesthesia, even following inhalational induction, reduces kgCO2e emissions in the anaesthetic room.

It is not feasible to expect paediatric anaesthetists to completely avoid gas inductions or the use of N20. The wide ranges of volatile mass consumed for all induction types (except TIVA) suggests considerable practice variations and appeared largely unrelated to case complexities. The next stage must be to ensure adequate education and training to ensure optimal individual efficiency. Simple measures such as reducing flows early, using a circle system or switching to a circle at an early stage can make a huge difference. Turning off N20 once the patient is asleep alone can reduce CO2 emissions by 18.5kgCO2e (6L vs 40L use, equivalent to 114 car miles).

Adoption of efficient techniques can significantly reduce the environmental impact of paediatric anaesthesia. We, as paediatric anaesthetists, must recognise the enormous responsibility we have to reduce our environmental impact.