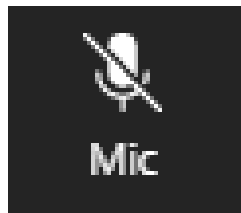
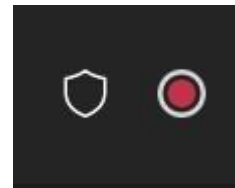


Housekeeping:

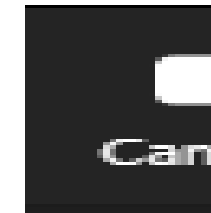
Mute please



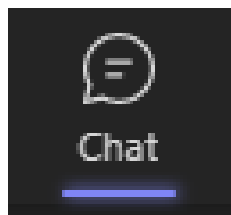
Recording



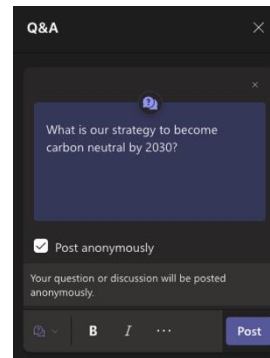
Cameras on!



Chat



Q&A



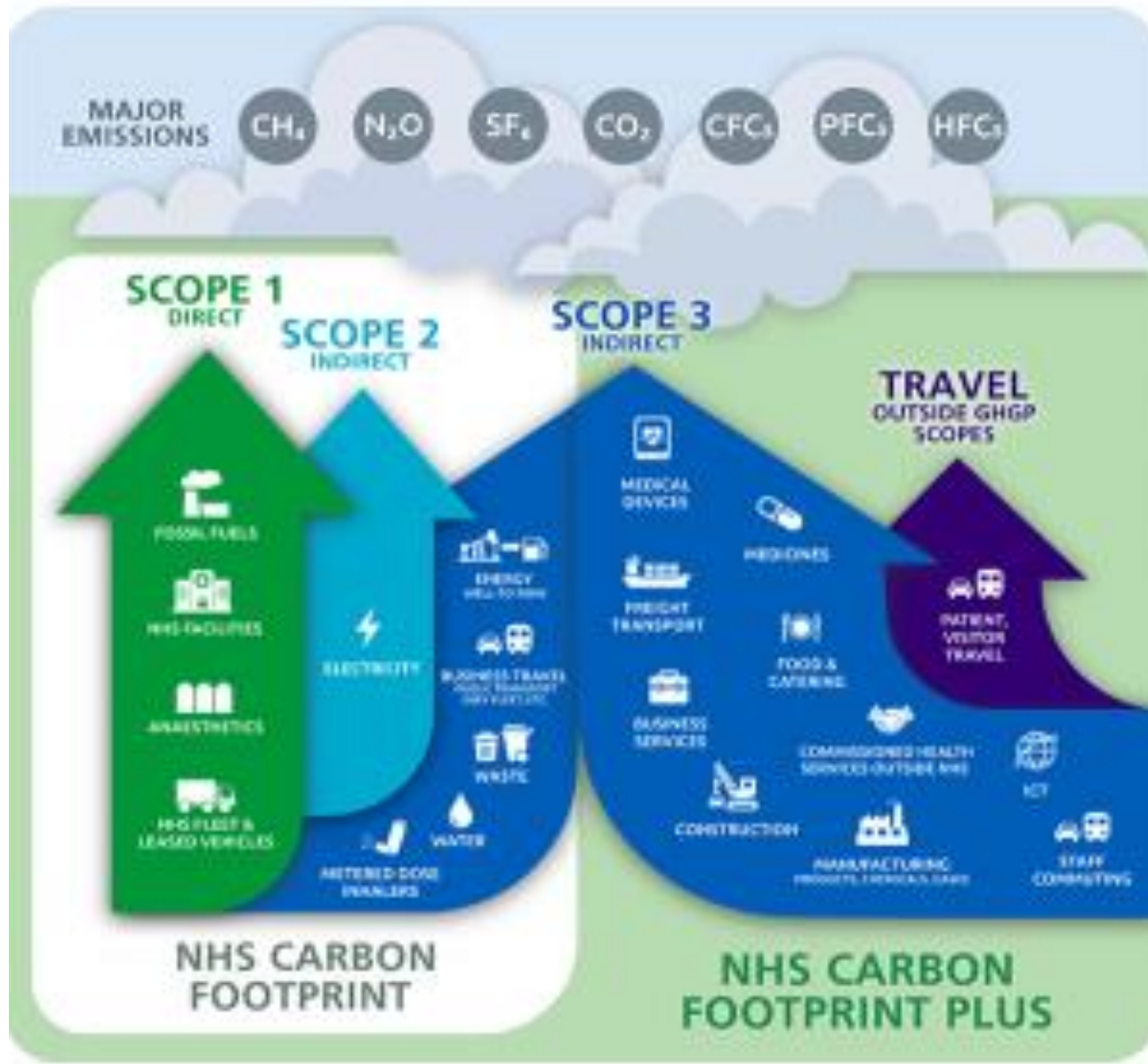
Use reactions



The Nitrous Project



Rebecca Pugsley, Consultant Anaesthetist
Musgrove Park Hospital



Anaesthetic gases are responsible for 2% of the NHS carbon foot print. 75% of this is due to nitrous.¹

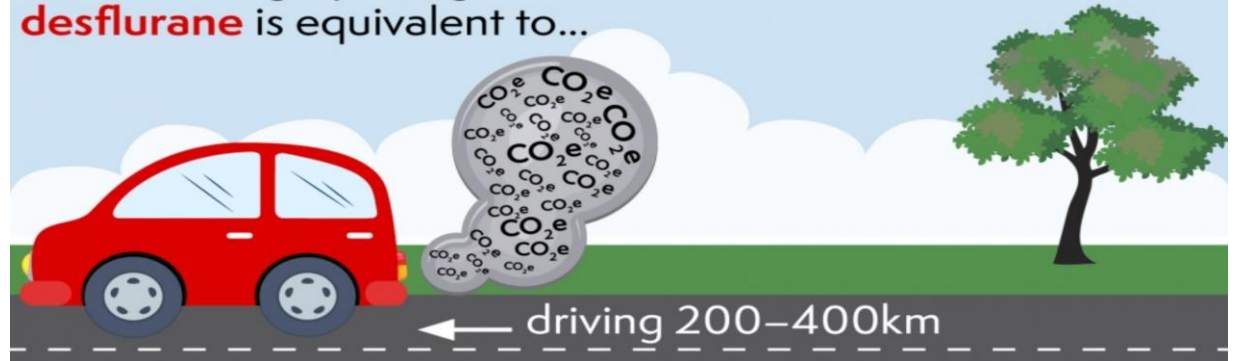
1 hour of surgery using
sevoflurane is equivalent to...



1 hour of surgery using
nitrous oxide is equivalent to...



1 hour of surgery using
desflurane is equivalent to...



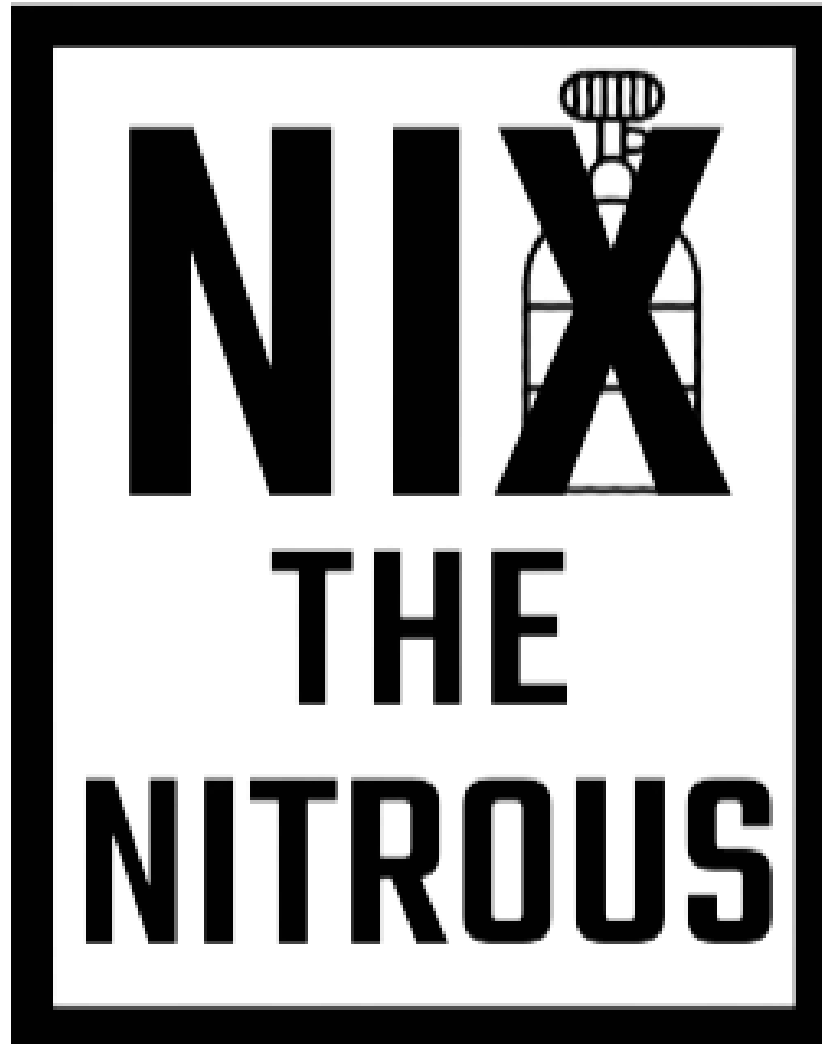
Why worry about nitrous oxide?

Potent greenhouse gas: $\text{GWP}_{100} = 298$

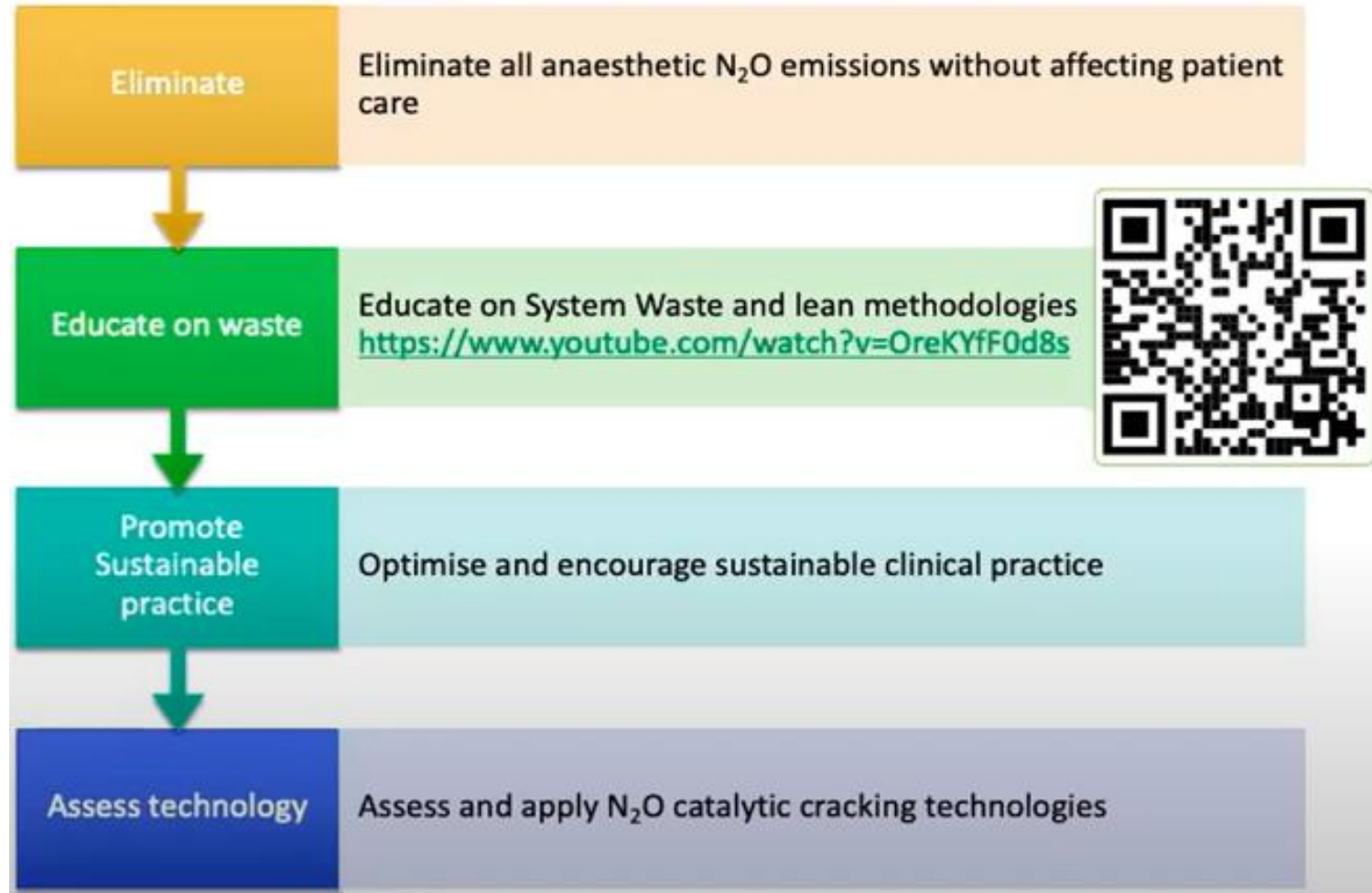
Deleterious ozone substance

Atmospheric life ~120 years

>320,000 tCO₂e per annum in UK



National project objectives



Reducing use or stopping use was having a **small impact** on the amount supplied and vented to the atmosphere.



Waste

13.7 million L waste per year
in 16 sites investigated.

Equivalent to **95% turnover**

Nitrous oxide wastage can come from:

- ineffective stock management
- system design
- poor security
- system leaks
- clinical wastage
- unawareness of the issue

Let's #nixthenitrous

To find out more about The Nitrous Oxide Project, please
contact: thenitrousoxideproject@gmail.com

Nitrous reduction at Musgrove

How it started:

Concerned individuals finding each other

Team learning:

- Not exclusive to theatre
- Requires infrastructure changes.

Anaesthetists (endoscopy, maternity, emergency department, dental).

Clinical services

Sustainability team

Medical gas committee

Pharmacy

Estates

Musgrove aims

- Reduction in use
- Reduction in waste
- Nitrous free surgical build
- Cracking device trials in endoscopy, maternity and the emergency department.

Usage reduction

Waste reduction

Nitrous free surgical build

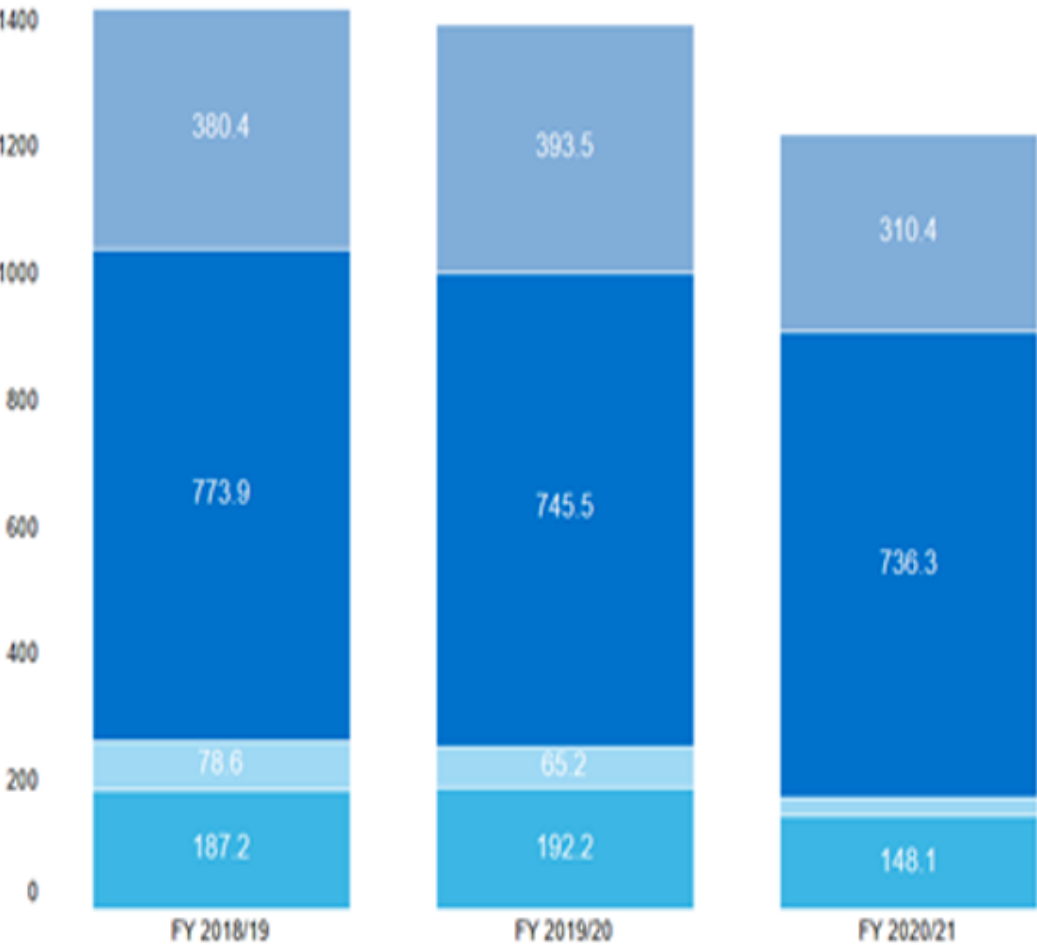
Cracking device trials in endoscopy, maternity and emergency department.

Measurements: Nitrous manifold

Local use – Local waste



Nitrous Oxide Carbon Equivalent Emissions (tCO₂e) by Cylinder Type



Financial and environmental savings

	Litres Nitrous oxide purchased:	Cost*	Waste in L if 3.5% used clinically	Waste in L if 1% used clinically	Financial loss if 3.5% used	Financial loss 1% used
2019	702,000	£2320.50	631,800	677,430	£2088.45	£2239.28
2020	540,000	£1785.00	486,000	521,100	£1606.50	£1722.52

COST OF A MANIFOLD
EST £10,000 PER ANNUM.

- Costs are based on the cost per cylinder and do not account for the cost of handling, maintenance of pipelines, maintenance of the manifold and time spent on checks.
- Costs based on cylinder costs and purchasing record for 2019 and 2020 at MPH.

CO2e of over 800 people switching a car commute to bike!

tCO2 e assessment:


Nitrous manifold consumption and waste converted into equivalent tCO2 and equivalent mileage in an average petrol car.

	2018/19	2019/20	2020/21
tCO2e	380	394	310
Milage	2,280,000	2,364,000	1,860,000
Wasted*tCO2 e	367	380	299
Wasted* milage	2,200,200	2,281,260	1,794,900


Change ideas

1. Encouraged low flows/TIVA and alternatives to nitrous.

2. Disconnected the nitrous pipeline at the back of the machines.



3. Switching to small cylinders with a regulator valve that can be attached using the existing pipeline to individual anaesthetic machines.



4. NOT installing a nitrous manifold into the new surgical build.

Next steps to zero emissions in 5 years

1. Small cylinders with a regulator valve that can be connected using existing pipe line.
 2. Reduce use.
 3. Use cracking (MEDCLAIR).
- Maternity
 - Endoscopy
 - Dental
 - Emergency department



Useful resources

[Nitrous Oxide Mitigation - How to Guide \(#NixtheNitrous\) - YouTube](#)

<https://youtu.be/YUWaUIC5YAw?t=1560>

<https://youtu.be/YUWaUIC5YAw>

References:

1. Alifia Chakera <https://sustainablehealthcare.org.uk/what-we-do/sustainable-specialties/anaesthetics/nitrous-oxide-project>

Chakera, A. (2020) Reducing the Impact of Nitrous Oxide Emissions within Theatres to Mitigate Dangerous Climate Change. Evidence-Based Policy Brief Dissertation.
University of Edinburgh

Evaluation form



Thank you!

<https://forms.office.com/r/ijuprzYQsb>

 **Quality**
Improvement
for our patients, people and planet



CENTRE for
SUSTAINABLE
HEALTHCARE
Inspire • empower • transform

