


#EA22: Reducing the Carbon Footprint of Anaesthetics

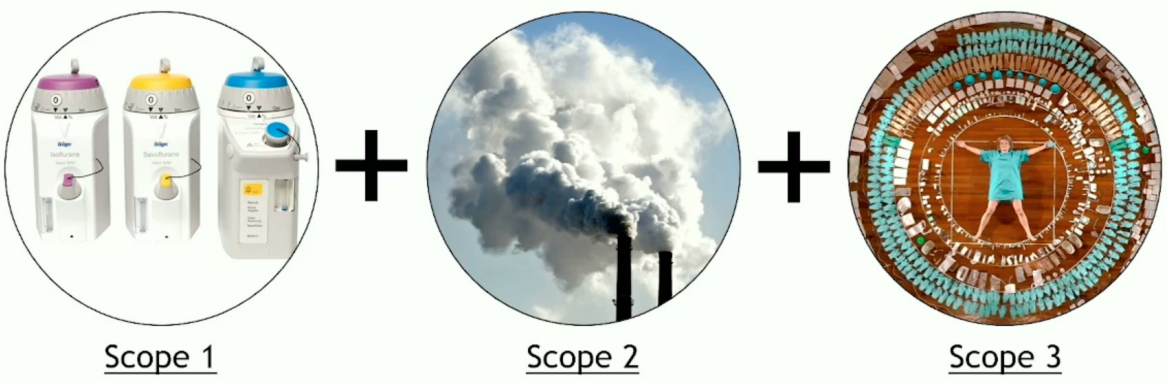


Dr Nicolaas Hendrik Sperna Weiland, anaesthesiologist, Amsterdam University Medical Center, The Netherlands, and founder of the centre's Sustainable Healthcare Team discussed the environmental impact of inhaled anaesthetic agents and the need to massively reduce their use at this year's Euroanaesthesia Congress.

Volatile anaesthetics are potent greenhouse gases with a global warming potential (GWP) from 440 to 6810 relative to CO<sub>2</sub>. For example, sevoflurane has a GWP of 440, isoflurane 1800, and desflurane 6810, which are extremely high. Methane has a GWP of 86, and nitrous oxide is 289. Nitrous oxide also has a long atmospheric lifetime of around 120 years.



## Surgery's footprint



Scope 1                      Scope 2                      Scope 3

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MacNeill et al. Lancet Planet Health (2017)

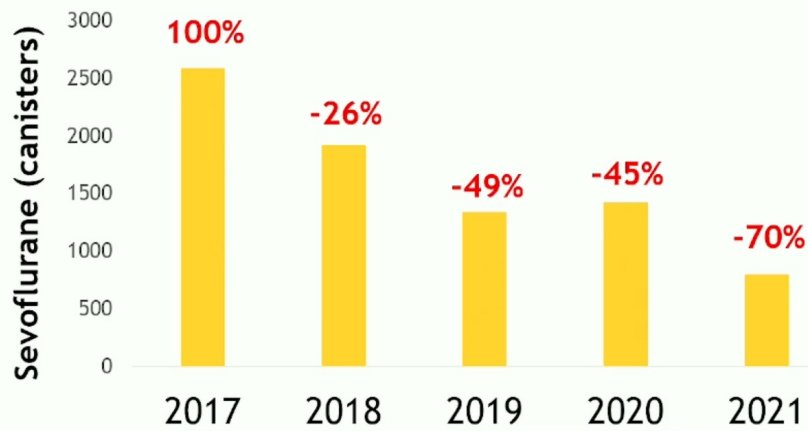
As Dr Weiland explains, it is important to reduce the emission of these gases to combat climate change. The use of nitrous oxide, desflurane and isoflurane should end immediately, and clinicians should switch to other modes of anaesthesia such as total intravenous anaesthesia (TIVA) and regional anaesthesia (spinal/epidural/nerve blocks), and also capturing volatile anaesthetics from the exhaust air piping. Dr Weiland talked about a proposed ban on desflurane that is already being prepared by the European Commission and which is likely to come into effect in January 2026.

Some indications for inhaled anaesthesia are likely to remain, but patients can be switched to TIVA or regional anaesthesia in most instances. There is no evidence that volatile anaesthesia results in more favourable patient outcomes. However, inhaled agents are still needed in certain indications, such as mask induction of anaesthesia for children.

Dr Weiland presented results from the sevoflurane reduction campaign of Amsterdam UMC. Annual canisters used have fallen by 70% from above 2500 per year to below 1000. Amsterdam UMC has also completely abolished the use of nitrous oxide, desflurane and isoflurane. This has been achieved without using the implementing capture and recycle technology by reducing the use of sevoflurane and switching to regional/TIVA. However, capturing and recycling will have to be used for the remaining 30%.



## Practice what you preach @Amsterdam UMC



### How?

1. Stop desflurane/N<sub>2</sub>O
2. Ultra low-flow sevo
3. Preferred use of TIVA and loco-regional options
4. (Capture and recycle)

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Dr Weiland also addressed the overall energy use in operating rooms and highlighted the fact that hospitals do not usually have a clear policy on this. Energy-saving technology is usually only introduced when operating theatres are refurbished or when new hospitals are built. However, he pointed out that energy can be saved by switching ORs off during evenings, nights and weekends. Amsterdam follows this practice and saves around 360,000 kWh per annum.

He discussed the 'reduce, reuse, recycle' paradigm for waste materials. Often, materials are unwrapped due to protocol but then disposed of without being used. It is important to review these protocols to minimise such waste. Amsterdam UMC has also developed a washable surgical headcover implemented this year. The goal is to go from 100,000 disposable headcovers to 500 per year. This is expected to save around 60% of the carbon footprint for headcover use. In addition, Amsterdam UMC has implemented a full recycling programme of plastic packaging materials in all its operating rooms recycling.

Dr Weiland emphasised the need to put climate change on top of the agenda and for all sectors to play their part in reducing the emission of harmful gases and reducing their energy use. This can be achieved with little effort by reducing the use of inhaled anaesthesia and adopting power-saving techniques. It is entirely possible, as has been demonstrated by Amsterdam UMC.

Source: [Euroanaesthesia Congress 2022](#)  
Image Credit: [Dr Weiland's presentation @EA22](#)

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