

# Recycle anaesthetics to reduce carbon emission of healthcare, study concludes

February 24 2021

---



Credit: CC0 Public Domain

New research has highlighted the value of recycling general anesthetic used in routine operations.

In the UK, healthcare accounts for more than five per cent of national greenhouse gas emissions, and as much as 10 per cent in the US. Inhaled [general anesthetics](#) are particularly potent greenhouse gases and as little is metabolized almost all that is administered is breathed out to end up in the atmosphere. The commonly used [anesthetic agents](#) have been considered to vary considerably from as little as 1.5 for sevoflurane to more than 60 kg carbon dioxide equivalence for an hour's [anesthetic](#) with desflurane. However, research led by a team from the University of Exeter have discovered that the original assumptions failed to consider the manufacture of the anesthetics, questioning the validity of the initial assumptions and the subsequent conclusions.

Led by the University of Exeter and funded by Innovate UK, the study published in Resources, Conservation and Recycling set out to model different anesthetic scenarios including the application of new vapor capture [recycling](#) technology allowing for waste anesthetic to be captured, extracted and purified and remarketed.

The new research built on the last analysis of the [carbon footprint](#) of inhalational [anesthesia](#) by Jodi Shearman and colleagues in 2012 and analyzed the synthetic process of the commonly used anesthetics, sevoflurane, isoflurane and desflurane, the use of [nitrous oxide](#), as well as the injectable anesthetic, propofol in a carefully conducted life cycle analysis.

Modelling the gas combinations typically used for anesthesia in the UK, they found that the carbon footprint of sevoflurane is as low as that of propofol, where an oxygen and air mix is used at the lowest flow rate so long as anesthetic recycling is in place. However, the team found that when the current manufacturing method is taken into account, the carbon footprint of sevoflurane anesthesia is similar to that for desflurane anesthesia.

The team were also able to conclude that nitrous oxide adds disproportionately to the carbon footprint of anesthesia and supports the current move by the NHS to reduce the use of this particular greenhouse gas. Furthermore, the carrier gas used to administer the anesthetic is important—with an air and oxygen mix reducing emissions compared to nitrous oxide.

The value of the research is twofold. First it provides evidence that unless [manufacturing processes](#) are considered, traditional values of the carbon footprint of anesthesia may be serious underestimate and secondly it supports the use of waste anesthetic capture technology to help reduce the carbon footprint of modern [anesthesia](#).

Lead author Dr. Xiaocheng Hu, of the University of Exeter Medical School, said: "our results are an important step in supporting healthcare providers to reduce their [carbon](#) footprint. To reduce the [carbon](#) footprint of inhalational anesthetics, this study encourages the continued reduction in the use of [nitrous oxide](#) and recommends a wider adoption of [anesthetic recycling](#) technology."

The paper is entitled "The [carbon footprint](#) of [general anesthetics](#): A case study in the UK," published in *Resources, Conservation and Recycling*.

Provided by University of Exeter

Citation: Recycle anaesthetics to reduce carbon emission of healthcare, study concludes (2021, February 24) retrieved 9 April 2024 from <https://phys.org/news/2021-02-recycle-anaesthetics-carbon-emission-healthcare.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--