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Anesthetic Gases Heat Climate as Much as One Million Cars Do, New Research Shows

When doctors want their patients asleep during surgery, they gently turn the gas tap. But anesthetic gasses have a global warming potential as high as a refrigerant that is on its way to be banned in the European Union. Yet there is no obligation to report anesthetic gasses along with other greenhouse gasses such as carbon dioxide, refrigerants and laughing gas.

One kilogram of anesthetic gas affects the climate as much as 1,620 kilos of CO₂. That has been shown by a recent study carried out by chemists from University of Copenhagen and NASA in collaboration with anesthesiologists from the University of Michigan Medical School. The amount of gas needed for a single surgical procedure is not high, but in the US alone surgery related anesthetics affected the climate as much as would one million cars.

Analyses of the anesthetics were carried out by Ole John Nielsen. He is a professor of atmospheric chemistry at the University of Copenhagen, and he's got an important message for doctors. "We studied three different gasses in regular use for anesthesia, and they're not equally harmful," explains Nielsen. All three are worse than CO₂, but where the mildest ones -- isoflurane and sevoflurane -- have global warming potentials of 210 and 510 respectively, desflurane the most harmful will cause 1,620 times as much global warming as an equal amount of CO₂, explains the Professor.

"This ought to make anesthesiologists sit up and take notice. If all three compounds have equal therapeutic worth, there is every reason to choose the one with the lowest global warming potential," says professor Ole John Nielsen.

The three anesthetic gasses -- isofluran, desflurane and sevoflurane -- were studied at the Ford atmospheric laboratories in Michigan. Research scientist Mads Andersen of NASA's Jet Propulsion Laboratory collaborated on the analyses with Nielsen, his Former PhD Supervisor. Andersen relates how he got the idea for the study while

his wife was giving birth.

"The anesthesiologist told me that the gas used is what we chemist know as a halogenated compound. That's the same family of compound as the freon that was famously eating the ozone layer back in the eighties," says Andersen.

Freon is a compound that Andersen knows well. It got his supervisor Nielsen on the scientific map. With a global warming potential of a whopping 11,000, the refrigerant freon has been banned all over the world since 1992. When the search was on for an alternative to the harmful substance, Nielsen analysed just how much heat was retained by new compounds, and how long they would stay in the atmosphere. His methods went to prove that the refrigerant HFC-134a had a global warming potential of 1,300 and left the atmosphere in just 14 years to freon's 50 to 100 years.

HFC-134a has spared the atmosphere a considerable climate effect. But it, too, is being prohibited all across the European Union. And unless therapeutic arguments speak for using all three, sevoflurane should be the only legal anesthetic gas as shown by the study done by NASA, Ford and the Department of Chemistry at the University of Copenhagen.

The study was published in the British Journal of Anaestesia.

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