



Healthcare
Improvement
Scotland

SHTG
Advice on health
technologies

Volatile anaesthetic gas capture technology

SHTG Recommendation

Plain language summary | May 2024

What are volatile anaesthetic gases?

General anaesthesia is used for surgical procedures when it is safer or more comfortable for the patient to be unconscious. During a general anaesthetic, a patient is given medicines which send them to sleep and stop them from waking up during the procedure. The anaesthetic medicines are usually given as a gas, which the patient breathes in through a mask.

In NHSScotland, two gases that are used for general anaesthesia are sevoflurane and isoflurane. A third gas, called desflurane, is no longer used in NHSScotland. Sevoflurane, isoflurane and desflurane are known as 'volatile anaesthetic gases'.

What is volatile anaesthetic gas capture technology?

Patients who are having a general anaesthetic breathe in (inhale) the volatile anaesthetic gases, and then breathe them out (exhale). The exhaled volatile anaesthetic gases, along with other waste gases, travel down a tube and are gathered by the hospital's 'anaesthetic gas scavenging system'. All the waste gases are then released into the atmosphere.

Volatile anaesthetic gas capture technologies are known as 'VCTs'. VCTs capture the waste volatile anaesthetic gases, so that they are not released into the atmosphere with the other waste gases. The volatile gases are stored in canisters, which are then taken by the manufacturer who should safely remove and dispose of the gases.

Why is this important?

Experts are concerned that volatile anaesthetic gases contribute to pollution and climate change. VCTs might help reduce pollution. In addition, the manufacturers of VCTs are working on a process to recycle the volatile anaesthetic gases that are captured, so that they can be reused. This could also be better for the environment, as making volatile anaesthetic gases from scratch causes pollution. The Scottish Government asked us to assess VCTs to help them decide whether they should buy them for operating theatres in Scotland.

What we did

We assessed two VCT systems called CONTRAfluran™ and SID-Dock. We looked at studies on how well the VCTs work at capturing the volatile anaesthetic gases. We also looked at other studies, and spoke to experts, to help us understand how the purchase of the VCTs in NHSScotland would impact the environment, patients and clinical staff, and whether they were good value for money.

What we found

We found four small studies on how well VCTs work, and these suggest that they can capture up to 51% of the volatile gases that are used. We did not find enough information about whether using VCTs in Scotland would be better for the environment, and whether they are good value for money. Anaesthetists in Scotland have already taken steps to reduce the release of volatile anaesthetic gases to the atmosphere, and desflurane (which is considered the most polluting volatile anaesthetic gas) is no longer used. We also heard that several climate experts feel that the amount of volatile anaesthetic gases released into the atmosphere is too small to contribute to climate change, and that our attention should be focused on other more polluting gases (like carbon dioxide and nitrous oxide).

What is our conclusion?

Based on the information available, it is not clear whether the environmental benefits of VCTs would outweigh the environmental impact of installing and maintaining them in Scotland. It is also not clear whether they offer good value for money. Therefore, we feel that VCTs should not be bought for NHSScotland.

What next?

This SHTG Recommendation will be shared with colleagues in the Scottish Government who requested the work. The work will also be shared more widely, with colleagues within NHS England (Greener NHS Programme), Wales and Health and Social Care Northern Ireland.

More research is being done on VCTs, and VCT manufacturers are trying to establish a process for recycling volatile anaesthetic gases in the UK. For these reasons, we may need to assess VCTs again in the future.

This plain language summary has been produced based on SHTG Recommendation: [Volatile anaesthetic gas capture technology](#)