Reducing the impact of anesthetic gases

Anesthetic gases comprise over half of the carbon footprint of the operating room in North America*

For a complex with 20 ORs these emissions are equivalent to those produced by a coal-fired power plan for half a year

DESFLURANE and NITROUS OXIDE are the biggest contributors

Despite no recognise outcome benefit, use of Desflurane for an hour using a modern anaesthetic machine is equivalent to driving 230 miles in a car compared to just 30 miles with use of Sevoflurane

1. CONSIDER ALTERNATIVE

ALTERNATIVE TECHNIQUE
Total Intravenous Anesthesia (TIVA) or use of regional anaesthetic techniques to avoid the need for general anesthesia

ALTERNATIVE VOLATILE
If TIVA or regional is not possible, consider alternative choice of volatile anaesthetic e.g. Sevoflurane

2. REDUCE USE

LOW FGF
Use the lowest possible fresh gas flows. The ASA calculator can be utilised for this.

PAUSE FGF...
(do not turn off the vaporizer) during airway management or system disconnections

3. IMPROVE EFFICIENCY

UTILISE ET CONTROL
End tidal control will significantly reduce excess, unnecessary use of volatile gases

4. REDUCE WASTE

CHECK FOR LEAKS
Regular anesthesia machine checks to detect and fix leaks will reduce waste and occupational exposure for the OR team

BARRIERS TO IMPLEMENTATION

Two main barriers
- Behavioural
- System-based

SYSTEM-BASED SOLUTIONS

Remove desflurane vaporizers
First from the OR, then from the formulary

Upgrade anesthetic equipment
TIVA/infusion pumps & anesthesia machines

Configure anaesthetic machines
Recirculate sampled gas & default to lower FGF
Decommission nitrous oxide piping
Substitute with portable tanks

Utilize Decision Support Tools
Alarms which sound when FGF exceeds a certain threshold (e.g. > 1-2L/m for > 5mins)
Check medical gas vacuum for leaks

Install vacuum or scavenging valves to reduce energy consumption
Install gas sequestration systems
Consider new WAG technologies

BEHAVIOURAL SOLUTIONS

Identify a champion
Ideally a senior member of the team as well as key stakeholders

Establish baseline emissions
Calculators are available § ¶
Set a goal
e.g. reduce CO2e by 50% in 12 months

Increase awareness
with regular face-to-face education
Real-time monitoring & reporting
Provide updates on success

Example initiatives:

BENEFITS

These measures are shown to reduce anesthetic gas emissions by almost 90%
Benefits can be tracked using Yale tool, practice greenhealth tool or any equivalent tool used at baseline assessment

COST SAVINGS

These measures have been shown to save up to $300,000 annually with a 90% reduction in Desflurane usage cost and > 50% overall anesthetic gas cost reduction