



# Reducing the impact of anesthetic gases

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

51-63% of OR emissions

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

## DESFLURANE and NITROUS OXIDE are the biggest contributors

Despite no recognised 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 anesthetic 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 CO<sub>2</sub>e by 50% in 12 months

### Increase awareness

with regular face-to-face education

### Real-time monitoring & reporting

Provide updates on success

## 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

Example initiatives:

