Project Title

Rational Use of Anaesthesia Breathing Circuits

Project Lead and Members

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Organisation(s) Involved

National University Hospital

Healthcare Family Group(s) Involved in this Project

Medical

Applicable Specialty or Discipline

Anaesthesia

Aims

- Align local practices with international guidelines
- Sustainable practice without compromising patient safety
- Financial and environmental savings

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Project Category

Care & Process Redesign

Build Environment, Green Building

Keywords

Sustainable Practices, Environmental Savings

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INTRODUCTION

Considerable international variation exists regarding the use of anaesthesia breathing circuits.

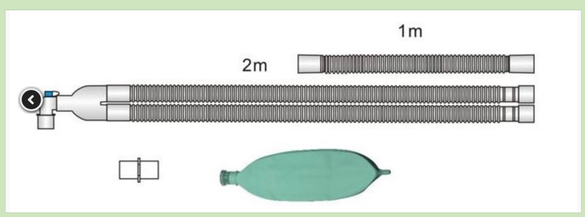
Australia & NZ: Unclarified duration

USA : Single patient use

Germany: Weekly use

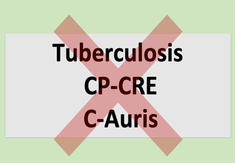
United Kingdom: Weekly use

Since 2002, an agreement was reached between The Association of Anaesthetists of Great Britain and Ireland (AAGBI) and health authorities that breathing circuits can be used for 7 days provided a new single-use breathing circuit bacterial/viral filter is placed between the patient and the circuit Y-piece.



+  = weekly circuit change

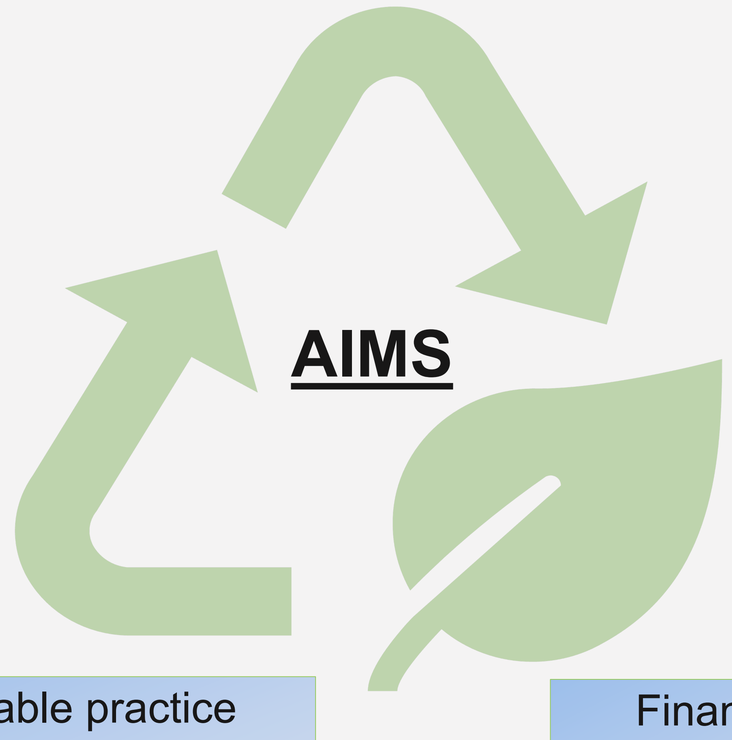
This practice is endorsed by multiple international consensus guidelines including ANZCA, the Association of Anaesthetists and the ASA.



Exceptions: *Visibly soiled circuit* *Infectious patient*

A survey of 7 Singaporean public healthcare institutions (TTSH , SGH, CGH, NUH, NTFGH, KKH, KTPH) revealed that all change their circuits daily, deviating from international recommendations.

Align local practices with international guidelines



Sustainable practice without compromising patient safety

Financial and environmental savings

RESULTS

5800 circuits

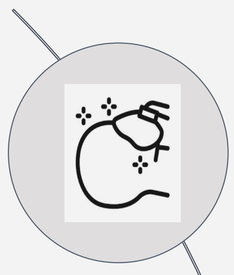
$46400

*Savings from one institution (NUH). There are 18 institutions locally.

Figures are based on estimated consumption of 7250 circuits/year
Actual consumption was similar: 7108 circuits/ year

11600 kgCO2e

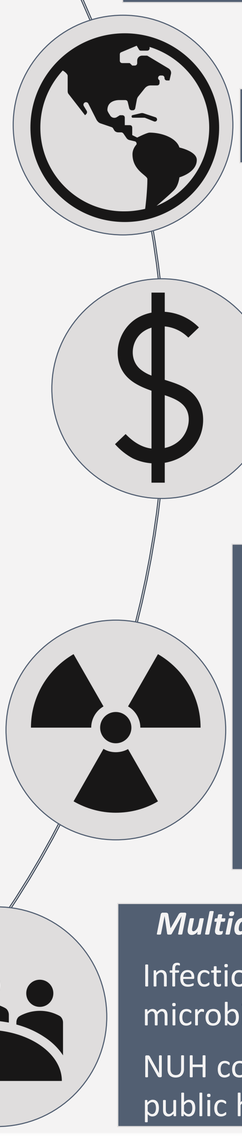
METHODOLOGY



Annual consumption of circuits = daily caseload x working days = 29^{1} x 250^{2} = ***7250***

**1=29 Operating theatres . 2= 250 working days [5 days / week x 52weeks/ year minus 10 public holidays]

Expected savings = 80% (decrease from 5 circuits to 1 circuit per week)



Carbon footprint : 1 circuit =2 kg CO2e/kg

Financial cost : 1 circuit = 8 SGD

Addressing Concerns

Infection transmission : Single patient use for cases of Tuberculosis, CP-CRE, C-Auris

Condensation: Drain water condensation from tubing before capping

External contamination: Clean external surface of tubing with Microzid wipes

Multidisciplinary & Inter-institutional collaboration:

Infectious Disease colleagues in NUH endorsed the microbiological safety of weekly circuit change

NUH conducted a sustainability session with other public hospitals to share our experience

Breathing Circuits Carbon Footprint

Component	Material	Weight (kg)	Carbon Emissions Factor (kgCO2e/kg)				Carbon Footprint (kgCO2e)
			Manufacture	Moulding	Extrusion	Disposal	
Fitting	Polyethylene	0.055	2.75	1.8	0.47	1.1	0.3366
Corrugate Tubing	Polyethylene	0.115	2.75	1.8	0.47	1.1	0.7038
	Ethylene vinyl acetate	0.115	2.1	1.15	0.45	1.1	0.552
Breathing Bag	Latex (Natural rubber)	0.045	2.1	1.3	0	1.1	0.2025
Filter	Polypropylene	0.03	3.05	1.6	0.47	1.1	0.1866
Clear Bag	LDPE (Film)	0.01	2.6	-	-	1.1	0.037
Total		0.37					**2.0185**