European Society of Anaesthesiology and Intensive Care

THE GLASGOW DECLARATION ON SUSTAINABILITY IN ANAESTHESIOLOGY AND INTENSIVE CARE

03 June 2023

1 Introduction

The healthcare sector contributed 5.2% of global greenhouse gas emissions in 2019, up from 4.9% in 2018.[1,2] These emissions are from a variety of sources. Data from England suggest that inhaled anaesthetic agents contribute to 2% of the total emissions from the health system.[3] In addition, up to 4.2% of a nation's waste generation may be attributable to healthcare,[4] and operating rooms (ORs) produce approximately 20% of all waste in a hospital.[5] Thus the field of anaesthesiology and intensive care has an important role to play in helping countries decrease the carbon footprint of their health systems and protect the future environmental sustainability healthcare. The World Health Organization defines an environmentally sustainable health system as one which *'would improve, maintain or restore health, while minimising negative impacts on the environment.'*[6]

Recognising the importance of rapid action, the European Society of Anaesthesiology and Intensive Care (ESAIC) created a Declaration focused on achieving greater environmental sustainability across anaesthesiology and intensive care in Europe. This Declaration presents a shared European perspective of what is feasible and achievable within this field. It builds on the existing Helsinki Declaration for Patient Safety,[7] and is intended as a guide for countries across Europe to build into their own healthcare plans.

This Declaration is based on the European Union's strong commitment to tackle climate change. The European Green Deal aims to achieve climate neutrality by 2050 and reduce emissions by 55% by 2030 (compared to 1990).[8] In addition, the EU is also proposing regulation to decrease the use of fluorinated gases (F-gases), which are potent greenhouse gases that account for 2.5% of total EU greenhouse gas emissions.[9] This is relevant to ESAIC because inhaled anaesthetic agents may be comprised of hydrofluorocarbons, which are F-gases.[10,11]

To be both acceptable and feasible in practice, the transition towards environmental sustainability must consider the timelines for development and availability of environmentally-friendly alternatives – for medicines, devices and equipment.

It is also possible that there are conflicting interests between environmental and patient safety goals – for example in the use of heating, ventilation and cooling to ensure a high ventilating rate in the OR. Moreover, the clinical importance of certain drugs may be in conflict with their environmental burden. Therefore, multidisciplinary dialogue is essential to ensure any proposed changes in practice are feasible, safe and always serve the best interests of patients and society as a whole.

It is also important to keep in mind that hospitals being asked to become more environmentally sustainable are coping with other parallel pressures, including staff shortages, unreliable supply of materials due to complex global supply chains, and the cumulative effects of the COVID-19 pandemic (such as backlogs in elective care[12]). Any plans to transition to environmental sustainability must thus be adapted to each context and be accompanied by comprehensive training and communication with all relevant personnel.

1.1 Methodology

Experts and members of the ESAIC Sustainability Committee met to develop position statements aligned to each of the areas outlined in Figure 1 below, as well as staff well-being. Iterative drafts of these position papers were shared among subcommittee members for review and discussion, using a Delphi approach. This Declaration was drafted to serve as a companion piece to these position papers.

2 ESAIC's declaration for sustainability within anaesthesiology and intensive care

The Declaration is focused on key areas where the greatest gains may be made in terms of environmental sustainability: medication use, energy use, and circularity in processes and waste. (Figure 1)

Medication use	Energy use	Circularity in processes and waste
Medicine choice	HVAC optimisation	Circularity in processes Medical devices
Reducing medicine wastage	Lighting	Medicine waste management
Low-flow anaesthesia	Electrical equipment	Waste water management
Limiting the use of F-gases and nitrous oxide	Sustainable energy generation	Reusable items
	Preventing energy loss	Recycling

Figure 1. Priority areas to improve environmental sustainability within anaesthesiology and intensive care (Not all the priorities listed in Figure 1 are discussed in this Declaration)

2.1 Medication use

The global warming potential over 100 years (GWP_{100}) of volatile anaesthetics is much greater than that of carbon dioxide, the reference greenhouse gas.[13,14] Therefore, making conscious and sustainable decisions with regards to medication use is thus essential to minimise the carbon footprint of anaesthetic practice.

Recommendations

Discourage the use of nitrous oxide and desflurane and favour the use of anaesthetics with the lowest GWP where possible, including intravenous anaesthesia.

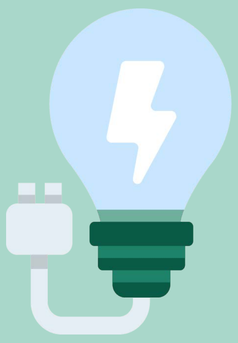
Use halogenated agents at the lowest possible fresh gas flow (FGF) during the induction and steady phase of anaesthesia (set FGF in a low-flow technique, aiming to achieve minimal-flow, <0.5 lpm whenever safe and technically feasible).

Consider the need for stockpiling emergency use medications, with careful monitoring of stockpiles to balance patient safety and efforts to reduce waste.

2.2 Energy use

Hospital heating, ventilation and air conditioning systems (HVAC) comprise between 90 and 99% of the overall energy use in ORs.[15] Energy conservation efforts must therefore focus on HVAC system management. Preventing energy waste generated with fossil fuels should also be considered, especially when designing new facilities. Proper insulation and introducing passive building concepts can also significantly reduce energy consumption and energy waste in clinical practice.[16] Efficient use of lighting is also important.

Recommendations



Make consistent efforts to reduce energy consumption from HVAC, including setting systems to 6 air changes per hour when ORs are not in use, and maintaining temperatures at 18°C – 23°C with a relative humidity of 30-60% (though the burn unit OR optimum temperature range is 24°C to 30°C).

Ensure hospitals have their own renewable energy production sources when feasible: photovoltaic, thermo-solar and geothermal are readily available depending on the geographical location.

Reduce energy use from lighting in hospitals through the use of LED bulbs and automatic sensors.

Encourage the use of hand water sensors to promote hand washing and save water, and use reclaimed water instead of drinking water when not intended for human use (cooling systems, warming circuits, or toilet flushing).

2.3 Circularity in processes and waste

Twenty percent of all hospital waste is produced in its ORs.[5] General waste accounts for almost half of total OR waste,[5] and up to 25% of the latter is generated by anaesthetists.[17] Waste production derives from multiple practices, such as opening and not using surgical packs, trays and instruments[18] and unused sterile towels, gloves or disposable gowns.[19] This is often referred to as 'overage'.[19] Data have shown that when OR staff actively monitor the rate of unused material that becomes non-valid for human use, overage rate and associated costs decrease.[20] Waste management of pharmaceuticals is also of concern, for example, intravenous propofol accounts for 45% of wasted anaesthetic medication, which is not biodegradable and has demonstrated toxicity to aquatic organisms.[21]

Recommendations

If applicable, consider purchasing reusable or reprocessed equipment instead of disposable ones. Avoid single-use items that do not provide a clear benefit in patient care.

Reduce the amount of waste generated, minimising the need for recycling, energy intensive treatment, or disposal in landfill.

Educate staff on waste management, encouraging waste segregation and recycling.

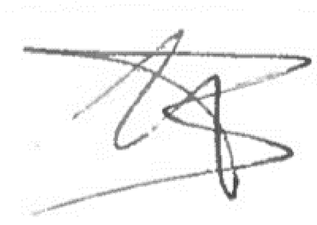
Consider the use of urine collective bags or waste water filters to reduce the amount of pharmaceutical pollution in sewage water.

3 The way forward

Climate change is a defining issue for our generation. We are facing an environmental crisis in which we have a small but significant part to play. It is our hope that this Declaration can be used by European anaesthesiologists and intensive care physicians to present to health authorities, politicians, policy-makers and hospital-level stakeholders to help persuade them to implement sustainability approaches both locally and nationally.

Our efforts to make our care more sustainable will, however, only bear fruit if we manage to engage with broader communities and work across different disciplines. We thus welcome other healthcare stakeholders and organisations to endorse this Declaration and to join ESAIC in our initiative to improve sustainability of anaesthesiology and intensive care in Europe. By working together, we can achieve this vision of enhanced sustainability for the benefits of our patients, our society and our planet.

Signed at Euroanaesthesia 2023



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