

Executive Summary

The Green Surgery report provides initiatives and recommendations to reduce the adverse impact of surgical care on the environment, based upon evidence synthesis and case studies. It also considers barriers and facilitators to implementation. Key contributors of emissions in the operating theatre include products (in particular single-use items), energy consumption, and anaesthetic gases (many of which are powerful greenhouse gases).

Circular economy principles may be used to mitigate the carbon footprint of products used for surgery, including reduction (e.g. streamlining single-use pre-prepared sets through removing unused items, and appropriate use of personal protective equipment) and switching from single-use to reusable equipment where appropriate. Where “reduce and reuse” are not possible, the lifespan of items can be extended through repair and remanufacture, and the recycling of waste.

In terms of energy use, staff in the operating theatre can switch off unused equipment, or turn equipment down where appropriate. In the design of operating theatres there are opportunities to install motion sensors for lighting, alongside use of shutdown checklists, using energy efficient lighting and appliances, and opting for clinically appropriate ventilation systems with lower energy consumption and appropriate set back modes; all with potential for retrofit. Hospitals can use (and ideally generate) renewable energy.

Anaesthetic gases are an important source of greenhouse gas emissions (in particular desflurane, which is being phased out across the NHS). Volatile anaesthetic emissions can be mitigated by switching to more environmentally preferable options, including using local, regional, and intravenous anaesthesia. Emissions associated with nitrous oxide can be reduced through decommissioning of centrally piped nitrous oxide and substitution with portable cylinders.

Outside of the operating theatre, we can optimise end-to-end surgical care pathways. Improving the quality of patient care goes hand in hand with sustainability, ensuring optimal use of resources and maximal patient benefit. This includes minimising unwarranted variation (over-use or under-use of surgical care) and using shared decision-making to ensure surgery is the right option for the individual patient. We can work with patients to optimise their health and wellbeing ahead of surgery, reducing risk of complications (also associated with emissions), with co-benefits to human and planetary health. There are opportunities to streamline patient pathways, including rationalising peri-operative investigations, and use of remote consultation supported by digital technologies. There are opportunities to increase the proportion of operations undertaken in ambulatory day-case settings, or outpatient clinics. More broadly, shifting resources towards public health to prevent individuals becoming surgical patients in the first place will reduce surgical emissions.

To implement these changes we call upon leaders (including national representative bodies, and at organisational and departmental level), educators, policy makers, and academics. Change will require engagement from all those in the surgical ecosystem, including senior and trainee surgeons, anaesthetists and anaesthetic trainees, nursing staff, operating department practitioners, and other allied health professionals, alongside colleagues in infection prevention and control, primary care, and public health practitioners. We must also work with our procurement teams, industry partners throughout the medical supply chain, and supporting services (including facilities and estates, instrument and linen reprocessing, and waste facilities), to optimise emissions associated with use of surgical products.