Anaesthetics, theatres and the environment

A toolkit collating useful sources of information and quality improvement projects that can be undertaken to improve environmental impact within theatres and anaesthetics.

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Disclaimer: Examples from existing trusts included within this toolkit- please follow appropriate local governance procedures prior to implementation.

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Table of Contents

Background

Page 3: Key Anaesthetics and the environment publications
Page 4: West Midlands Sustainability survey

Training and resources

Page 5: General Sustainability training courses and resources
Page 6: Theatres and Anaesthetics specific sustainability training
Page 7: Further resources and special interest groups
Page 8: Sustainable operating theatre checklist
Page 9: Green Surgery report

Anaesthetic gases

Page 10: Volatile Anaesthetics and the environment
Page 11: Nitrous oxide and the environment
Page 12: Total Intravenous anaesthesia

Medicines in theatres QI projects

Page 13: Ethylchloride alternatives
Page 14: Prefilled "just incase" medications
Page 15: IV to oral switch

Additional sustainability projects

Page 16: Introducing reusable items
Page 17: Remanufactured devices
Page 18: Waste management in theatres
Page 19: Patient education and involvement

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Background and key environmental sustainability documents

- Theatres are considered to be carbon hotspots of hospitals, with anaesthetic gas use responsible for 2% or NHS carbon footprint. The NHS Long Term plan commits to lowering this by 40% by “transforming anaesthetic practices”

- The Delivering a ‘Net Zero’ National Health Service report outlines the NHS national ambition to deliver the world’s first net zero health service and respond to climate change, improving health now and for future generations
- With key targets

*For the emissions we control directly (the NHS Carbon Footprint), we will reach net zero by 2040, with an ambition to reach an 80% reduction by 2028 to 2032;

*For the emissions we can influence (our NHS Carbon Footprint Plus), we will reach net zero by 2045, with an ambition to reach an 80% reduction by 2036 to 2039.

Other environmental implications::

- The majority of work around improving environmental impact of anaesthetics reports in terms of carbon savings, however, there are a number of other environmental considerations that can be impacted on by theatres and anaesthetics. More information on this can be found in Sustainability in anaesthesia and critical care: beyond carbon - BJA Education

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Sustainability, theatres and anaesthetics

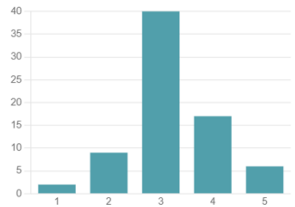
Why this toolkit?

West Midlands Sustainable theatres and anaesthetics survey

In November 2022, the West Midlands Academic Health Science Network (Health Innovation West Midlands from October 2023) undertook a survey of theatres and anaesthetics staff.

Although the majority of people surveyed believed they had reasonable sustainability knowledge- see graph to right. The results demonstrated a desire for further knowledge in the environmental impact of theatres and anaesthetics. Key findings can be seen below and link here to West Midlands Theatres and Anaesthetics Environmental Sustainability Survey.

West Midlands Theatres and anaesthetic staff Current environmental sustainability knowledge assessment (1 limited/5 extensive)



74 respondents

77% were Consultant or anaesthetic registrar level

All 16 West Midlands Hospitals represented

86% of respondents had no sustainability training

73% of those would like sustainability training

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General environmental sustainability training.

Introduction to sustainable healthcare

Two free short (Approximately 30 minutes each) e-learning modules providing a general introduction to environmental sustainability in healthcare

Available through e-learning for health and often through Trust learning platforms

- Introduction to sustainable healthcare
- Sustainable Quality Improvement

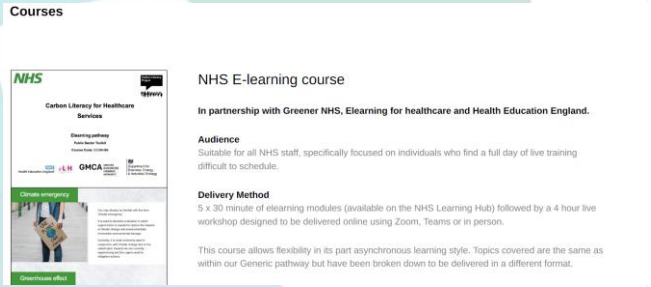
https://www.e-lfh.org.uk/programmes/environmentally-sustainable-healthcare/

Carbon literacy

Carbon Literacy Project and Greener NHS offer three areas of Carbon literacy training

1. NHS eLearning Pathway
2. Generic Staff Pathway
3. NHS Leadership Pathway

Healthcare - The Carbon Literacy Project



Theatres and Anaesthetics specific training

Click on the buttons below to access key training and resources to support sustainable theatres and anaesthetics practice

eLearning for Health Environmentally Sustainable Anaesthetics Practice. Comprehensive eLearning module

The Royal College of Surgeons Edinburgh- reading list and webinar links

Greener NHS Knowledge Hub- regional priorities, case studies and resources (Requires login using NHS email address

Centre for Sustainable Healthcare – Sustainable Anaesthetics courses and projects

Centre for Sustainable Healthcare – Resource library

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Further information and special interest groups

GREENER HEALTHCARE & SUSTAINABILITY PROJECT

GHASP- Greener Healthcare and Sustainability project.

- A free to join group with networking, QI projects and membership benefits

Home | GHASP

Association of Anaesthetists
Guide to green anaesthesia

Association of Anaesthetists Guide to Green Anaesthesia

- Guide to green anaesthesia | Association of Anaesthetists

Green Anaesthesia & Intensive Care Network – West Midlands
GAIN - WM

GAIN-WM is a growing team of clinicians working to educate, empower and inspire people on how healthcare professionals can help during this climate crisis. We meet regularly to discuss projects and innovations to improve sustainability in healthcare. We organise educational events and we are always ready to hear your ideas. GAIN-WM Membership Form (google.com)

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Resources to implement sustainable improvements: Royal College of Surgeons, Sustainability in the Operating Theatre. A Guide to Good Practice

The Royal College of Surgeons have a comprehensive guide to sustainability in the operating theatre.
Click on the buttons to the left to see the comprehensive guides to environmental sustainability within theatre settings

- Covers a range of topics including:
  - Reducing solid waste
  - Reusing products and instruments
  - Correct waste segregation
  - Recycling clean plastic, paper and other materials
  - Environmentally preferable purchasing
  - Water conservation
  - Care pathways and travel
  - Virtual consultations and staff travel
  - Service configuration
  - Leadership and cultural change

12 Quick Steps That Can Improve Your Environmental Impact

Intercollegiate Green Theatre Checklist **Compendium of Evidence**

Green theatre checklist

Theatre posters

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Resources to implement sustainable improvements: UK Health Alliance on Climate Change: Green Surgery report

Detailed report of how to reduce environmental impact of surgery with recommendations and case studies throughout the surgical pathway

Click on the button to the left to see the comprehensive report to environmental sustainability within theatre settings

- Recommendations
- Case studies
- Reducing the need for surgery
- Care pathway interventions

Green Surgery report

https://ukhealthalliance.org/sustainable-healthcare/green-surgery-report/

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Volatile anaesthetics

The biggest contributor to environmental harm from the anaesthetic department is the use of volatile gases.

- All volatile anaesthetic gases have a high global warming potential but particularly high is desflurane and as such it's use will be decommissioned for use in the UK by 2024
- The first step volatile anaesthetic use, in to take in tackling volatile anaesthetics use, particular desflurane, is by raising awareness of the problem
- Consider creating a presentation to educate your colleagues and your division leads to the harms of desflurane usage.
- Example case studies available at: Reducing emissions from anaesthetic gases - Greener NHS Knowledge Hub - FutureNHS Collaboration Platform
- A useful tool for determining the environmental impact of anaesthetic gases is the Anaesthetic Gas Calculator https://anaesthetists.org/Home/Resources-publications/Environment/Guide-to-green-anaesthesia/Anaesthetic-gases-calculator
- NHS England is currently producing guidance on destruction of Anaesthetic gases

Steps to reduce usage of desflurane

- Removing cartridges from the anaesthetic room and storing them in an area only accessible by ODPs- This means that the anaesthetist must specifically ask for it if they want to use it for their procedure.
- Create a form that anaesthetists must fill in to document the need to use this agent.
- Ultimately, creating barriers to accessibility will naturally reduce usage.
- Once your anaesthetic department is aware of the harms of desflurane you will eventually be able to liaise with your pharmacy department to stop ordering any more desflurane

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Nitrous oxide

Nitrous oxide is a potent greenhouse gas and accounts for the largest carbon footprint of the anaesthetic gases within the acute sector, around 80% of the total anaesthetic gas footprint in 2019/20. The UK is responsible for around 1/3 of European nitrous oxide use. Wastage within piped nitrous oxide systems can be significant.

- For background on Nitrous oxide and reductions: https://anaesthetists.org/Home/Resources-publications/Environment/Nitrous-oxide-project

All trusts within England should have undertaken a Nitrous oxide review. Further information can be found in the **NHS England comprehensive guide** to reducing nitrous oxide emissions including Reducing waste emissions from piped nitrous oxide products: A toolkit for acute NHS hospitals

Additional resources to support Nitrous oxide reductions can be found:

- Nitrous oxide methodology https://anaesthetists.org/Portals/0/PDFs/Environment/Nitrous%20waste%20methodology.pdf?ver=2021-04-26-115439-240
- A poster to support teams with unplugging mouthpieces and demand valves and reporting leaks Nitrous oxide waste poster 2 - Midlands Pharmacy Leadership Team - FutureNHS Collaboration Platform (Requires NHS email to login)

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Total Intravenous Anaesthesia (TIVA)

Evidence is still emerging as to the environmental impact of using TIVA, however it can pose an alternative to volatile gas emissions. A comparison between inhalational and TIVA can be found here Comparing the environmental impact of inhalational anaesthesia and propofol-based intravenous anaesthesia (wiley.com)

Suggestions that may help reduce barriers of using TIVA implementation and streamlining use:
•Preprepared syringes in CD cupboards
•Ensuring supply of pumps are available

Further reading and information can be found here:
•'TIVA from a bottle' – a method for reducing plastic waste during total intravenous anaesthesia | Association of Anaesthetists
- Example of decrease of GA
- An eye on sustainability | News from Whipps Cross Hospital - Barts Health NHS Trust

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Ethylchloride alternatives

Why undertake this project?

Ethylchloride spray is used to provide a cold sensation in order to check spinal and epidural anaesthetic blocks. Replacing the spray with a reusable alternative can provide both carbon and wider environmental benefits alongside cost savings.

- The spray is available in a single use aerosol can
- This product can be replaced with a reusable stainless-steel stick known as a CoolStick
- The sticks can be kept in the fridge and pressed against the skin to provide the cold sensation

Financial savings

- One CoolStick costs roughly the same a 4 cans of Ethyl Chloride but will have multiple uses over many years
- Essential to determine different departmental use pathways- pharmacy issue data can help determine potential target departments within a trust
- Liaise with pharmacy to ensure supply reduced

Social benefit

- Ethylchloride is on the COSHH register so reductions in staff exposure by replacing
- Link to case study: SusQI Case Study - Who needs spray anyway? University Hospitals Dorset 2020 Green Ward Competition | Sustainable Healthcare Networks Hub

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Prefilled syringes of “Just in-case” medications

Why undertake this project?

Identifying medication that can be bought prefilled allows for recirculation if not used rather than destruction of just drawn up medication, reducing unnecessary waste.

Who needs to be involved in the project ?

- Anaesthetic teams
- Pharmacy- surgery/theatres pharmacists and pharmacy procurement

Pre-Project Auditing

Pre project audit is imperative to understand:

- Wastage improvement numbers
- Costs of pre-filled ready to use versus vials or ampoules drawn up each time.

Potential Obstacles

Costs of prefilled syringes can be prohibitive to adopting this initiative, close discussion with medication budget holders is essential.

Examples of medications where this has been implemented include;

- metaraminol,
- ephedrine
- glycopyrrolate
- atropine

An Audit tool that can be used to determine wastage of medication can be downloaded alongside this toolkit

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Intravenous to oral switch (IVOST)

Why undertake this project?

Switching patients promptly from Intravenous (IV) to oral medication for appropriate medications generally has a lower carbon footprint due to reduced packaging and ancillary items just as cannulas, fluid bags for reconstitution and lines.

- Additional advantages of oral over IV medication include;

  Reduced nurse administration time

  Reduced risk of line infections

  Increased possibility of patient to return home

IV to oral switch is well established in Antimicrobials, however other medications are also candidates for oral switch. For Antimicrobials local Trust guidelines should be adhered to

- Examples of paracetamol IV to oral switch comms and posters are available Greener Medicine Posters - Midlands Pharmacy Leadership Team - FutureNHS Collaboration Platform
- **Therapeutic substitution policy** Once approved by appropriate governance procedure allows pharmacists to switch appropriate patients to oral forms of medication. An Example therapeutic switch document can be downloaded alongside this toolkit

Pharmacy Standard Operating Procedure	Insert organisation Title		
Site	Version	Date Ratified	Review Date
Document number	Therapeutic Substitution by Clinical Pharmacists		

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Reusable items

Example: Reusable theatre hats

Top tip: Use existing finance streams to fund. Disposable hats are already covered under budgets, replace with reusable hats rather than prepare a new business case

Why undertake this project?

- Using single use hats used in theatres mean thousands of hats were disposed of every year
- The hats were made of cellulose and needed to be incinerated after use
- The introduction of reusable hats reduces waste as well as providing a cost benefit

Steps to undertake

- Identify a supplier of reusable theatre hats
- Identify permanent members of staff who require hats
- Measure head sizes
- Take names for inscription inside the hat

Key details

- Different colours were used for different team members e.g. anaesthetist, surgeon, nurse, ODP
- 4 hats were ordered per person
- Each person is responsible for laundering their hats
- The male hats are one size Bandana hats but are allowed to choose from better fit elastic hats.

Remanufactured devices

DEVICE REMANUFACTURE 'HOW TO' GUIDE

MEDICAL DEVICES

Why undertake the project? The potential financial and carbon savings are substantial.

In general

- remanufactured surgical devices cost half as much as new devices and have half the carbon cost compared to new devices.
- In addition, they have the same guarantees and CE assurance marks as the equivalent new device and are available via NHS Supply Chain.

Link here to NHS England toolkit on remanufactured devices

- the 'sweet spot' in terms of savings and to ensure a continued supply of remanufactured devices is to aim for a 50:50 split of new: remanufactured devices.

Who needs to be involved in the project ?

- Procurement – this is essential for costing up potential savings and checking existing contractual requirements with current suppliers
- Surgical teams – although the devices in question are essentially the same as new devices, surgical buy in to the project is essential if it is to succeed
- Green Plan Working Group – this is important to ensure that the potential financial and carbon benefits are tracked and the timescale for the project is kept

Key Benefits

- Substantial reduction in both overall spend and associated carbon cost
- Improved collaborative working between procurement and clinical departments

Potential Obstacles

- For the majority of trusts, existing contracts for the supply of new surgical energy devices are likely to be in place. The exact nature of any such contracts will dictate both the quantity and type of remanufactured devices that can be considered, and the speed at which the project can be undertaken to completion.
- In addition, contracts for the devices themselves may have a knock-on effect on contracts for associated equipment (such as the generators in the case of surgical energy devices – most contracts with existing suppliers will stipulate a minimum number of new devices to be purchased per year, per generator, for instance)

Potential Timeframe

Heavily dependent on existing contractual arrangements, as outlined above. Likely to be around 12 months from initial data gathering to ordering of remanufactured devices for use

Post-Project Auditing

Yearly auditing via procurement on the continued financial savings of using 50% remanufactured devices compared to wholly new devices.

Waste management in theatres

Example from a West Midlands trust

Why undertake this project?

- The theatres sustainability team at RWT noticed that all waste in the department was going into yellow and orange clinical waste bags and there were no domestic waste or recycling facilities in the department.
- As a result they wanted to embark on a project to introduce recycling bin and re-educate staff to cut down the amount of clinical wate produced.

Who should be involved?

- Continuous Quality Improvement team and conducted key stakeholder analysis

Initial research undertaken

- waste management survey to determine staff knowledge on waste management, recycling and individuals personal views on the environment and recycling
- Waste audit- The departments waste from a one month period was weighed and the weight of the clinical waste was found to be significantly higher than domestic waste

What was discovered?

- The majority of staff were interested in environmental sustainability
- a lot of variability of practice when it came to disposing of items such as unused medicines, empty fluid bags and clinical waste

Actions undertaken

- Appropriate **waste bins sourced** for the department (i.e. clear domestic waste bins, blue medicines bins etc) and **created posters** to outline the appropriate use of each bag/bin
- **Created a video** to: outline correct waste process and journey from department to onsite incinerator and support new starter induction and shown during the departmental governance day

Post project audit and next steps

- Re-weigh the waste to determine if there has been a reduction in inappropriate use of clinical waste bins
- The team will also be re-running of the survey to determine if the interventions have improved staff awareness of appropriate waste management

Patient education and involvement

Information for patients

- Royal College of Anaesthetists has produced information for patients to help explain the environmental impact of anaesthetics Your anaesthetic and the environment | The Royal College of Anaesthetists (rcoa.ac.uk)

Patients own belongings

- Instead of putting patients own belongings into large plastic bags that are single use, patients can be encouraged to bring in their own bags to put their belongings in or replace existing plastic bags with paper bags that can be recycled

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