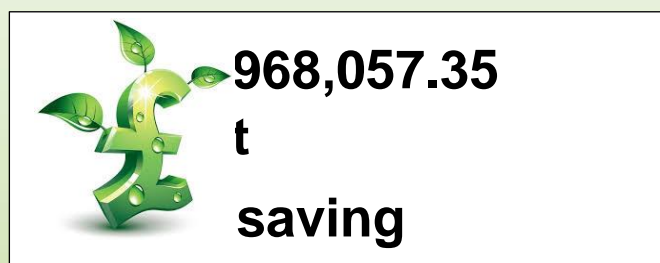
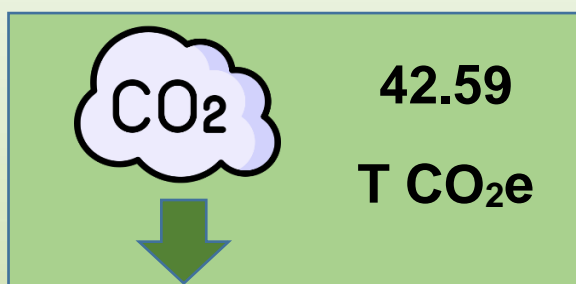


National Green Theatres Programme

Prògram Nàiseanta Lannsaireachd Uaine

Reducing Material Waste in Operating Theatres

Date: April 2025



1. Description of action

- 1.1 This action aims to reduce the amount of material waste generated within the operating theatre environment through the reduction in volume of surgical items and instruments opened in preparation for surgery but not then used.

2. Background

- 2.1 It is routine current practice across NHS Scotland operating theatres that surgical instruments and consumables are opened as part of pre-surgical preparation in anticipation of being required.
- 2.2 Whilst this process streamlines access to these items when they are needed, it has the unintended consequence of also generating unnecessary additional waste by opening a number of items which remain unused during the surgical procedure being undertaken, but which then have to be disposed of. This places both an unnecessary carbon and financial burden on boards.
- 2.3 Orthopaedic surgery is one of the most resource intensive specialties, due to the high volume of single use surgical instruments and consumables used. The Orthopaedic surgical team in NHS Grampian have undertaken a programme of work focussing on the reduction of unnecessary waste generated within orthopaedic theatres, with the work being underpinned by the completion of a number of 4 week waste audits.

Waste in this context is defined as 'surgical items or instruments which were opened from the packaging for a case but were not used in the case'¹.

- 2.4 During the audit period, on completion of each procedure a checklist was completed which recorded **all open but unused** items. The process by which the audits were undertaken is outlined in greater detail in the accompanying Standard Operating Procedure Undertaking Material Waste Audits Within Operating Theatres document. A copy of the SOP, which includes checklist templates, can be found in the Appendix.

¹ [Resource Management and Wastage in Elective Orthopaedic Theatres](#)

- 2.5 Data from the 2021 audit¹ and 2024 audit² has been used to inform this Opportunity for Change. Audits identified the products being opened but unused and sought to reduce incidence of this happening through increased awareness and education and subsequent behaviour change.
- 2.6 Analysis of findings highlighted that small, high volume items such as gloves and suture materials were those most frequently opened but unused. That said, a wide range of products were opened and not used, suggesting that a generalised behaviour change may have a greater impact than targeting only specific products.
- 2.7 Feedback documented in the 2021 audit and gathered anecdotally from discussion with Mr Kumar indicated that the audits were viewed positively as a means of supporting practice and behaviour change in relation to waste management when undertaking surgical procedures.
- 2.8 Reducing the volume of waste generated has both carbon and financial benefits. Using the NHS Grampian 2024 audit data, national annual carbon and cost savings can be calculated.
- 2.9 Given the breadth of products which may potentially be captured in the material waste audits, initial carbon calculations have been made using a spend-based emission factor. Using the Defra Factor (1) for Medical and Surgical Consumables figure of 0.044kg carbon per £1 spent, provided by National Procurement, an annual national carbon saving of **42.59** tCO₂e is identified.
- 2.10 Financial savings are shown in Table 1, and have been calculated based on the information listed beneath the table.

Table 1

Cost Saving for Audit Period	Cost Saving Per Procedure	Annual Cost Savings – 4 Theatres	Annual Cost Savings – Single Theatre	Annual Cost Savings – 378 Theatres
£761.80	£8.46	£9903.40	£2475.85	£968, 057. 35

² [Woodend Waste Audit 2024](#)

- Figures taken from 2024 audit
- 90 procedures undertaken
- 4 theatres included in the NHS Grampian data
- 391 total number of theatres nationally³
- Work undertaken in Woodend Hospital related specifically to elective orthopaedic theatres, there may be variance in waste generated, and in turn savings achieved, across other surgical specialties.
- Disposal costs are not included in the figures

2.11 Whilst the potential carbon saving is relatively small, the financial savings are not insubstantial. It is fundamental that this action not only raises awareness of the impact that making small changes can have, but that this in turn encourages additional changes to be considered. It also ensures that the resources necessary for the manufacture of these consumables are not wasted.

2.12 It is the recommendation of this Opportunity for Change that this Action be implemented across NHS Scotland Health Boards as part of the wider portfolio of actions supporting improved waste segregation and reduction in unnecessary waste.

3. Who needs to be involved in this change locally?

3.1 To allow successful implementation of this action it is recommended that the following stakeholder groups should be consulted and involved:

- Surgical / theatre teams
- Anaesthetists
- Waste Managers
- Procurement colleagues

4. Boundaries

4.1 The table below identifies the boundaries for this action:

³ <https://publichealthscotland.scot/publications/scottish-health-service-costs/scottish-health-service-costs-summary-for-financial-year-2023-to-2024/files-listing-for-2023-to-2024/>

In scope	Out of scope
<ul style="list-style-type: none">All theatre departments in NHS Scotland	<ul style="list-style-type: none">Determined at local level

5. What is the change and how will it be implemented?

- 5.1 The proposed change is to reduce the volume of unnecessary waste generated when surgical instruments and consumables are opened but not used during surgical procedures. This change will be implemented by following the steps outlined in the accompanying Standard Operating Procedure document.

6. What are the potential co-benefits of this change?

6.1

Outcome	Potential Benefits
Carbon savings	42.59 tCO ₂ e annually
Cost savings	£968,057. 35
Staff experience	Allows opportunity to positively contribute to carbon saving measures

7. Risks and Issues

- 7.1 As part of the development of this action the following risk has been identified below:

Description of risk or issue	Mitigation / Action Plan
Negative response when pre-emptive opening of instruments is challenged	<ul style="list-style-type: none">Surgical teams are briefed on the impact of waste reductionAgreement reached regarding what should be opened immediately v what should be available on standby.

8. Implementation Guidance

- 8.1 The opportunity for change highlights the importance of implementing this action. This change will help your site and NHS Scotland achieve net-zero emissions by 2040 as stated in NHS Scotland's Climate Emergency & Sustainability Strategy 2022-2026.
- 8.2 Below the National Green Theatres Programme has provided guidance on how you can implement this change within your area. If you require any further information or guidance, please contact the National Green Theatres programme team on: cfsdgreentheatres@gjnh.scot.nhs.uk

Local Sustainability or Green Theatre Group:	
1.	Review opportunity for change and validate what this means locally.
2.	Provides National Green Theatre Programme Team with validated information/local targets.
3.	Convene a discussion with the staff who need to implement it and those who are impacted by the action.
4.	Understand what the opportunity is for implementing the action locally: work already undertaken and challenges.
5.	Agree a local implementation plan.
6.	Implement local plan.
7.	Provide data as per measurement plan.
8.	Monitor implementation of action.

9. Measurement

Findings from each Health Board's initial audits will provide baseline data, against which progress will then be measured. In the first instance carbon savings will be calculated using the Defra Factor (1) for Medical and Surgical Consumables spend based emissions factor.

Appendix 1:

Standard Operating Procedure

Undertaking Material Waste Audits Within Operating Theatres

April 2025

Purpose and Scope

The purpose of this Standard Operating Procedure (SOP) is to outline the process for the collection, collation and sharing of resultant data gathered when undertaking material waste audits within the operating theatre environment.

This SOP outlines each step in the process to allow a consistent, standardised approach when implemented across NHS Scotland Health Boards, and is based on the work undertaken by Mr Kapil Kumar, Consultant Orthopaedic Surgeon, and his team in NHS Grampian. It should be read in conjunction with the NGTP Reducing Material Waste in Operating Theatres Opportunity for Change.

It is recognised that some variation at individual Health Board level may be required to facilitate local implementation.

Implementation Process

Considerations

- Availability of data collection tool – audit checklist templates can be found in the Appendix of this document and adapted to include surgical instruments and consumables applicable to the department undertaking the audit.
- Expectations, Education and Awareness – for the audit process and subsequent reduction in unnecessary waste to be successful the purpose and anticipated outcomes of the audit should be shared with all relevant staff members in advance of undertaking the initial audit.

Implementation

Pre-audit Phase

- Identify local champion who will take the lead in promoting and driving the project
- Identify staff member(s) who will have responsibility for completing the checklist

- identify staff member(s) who will have responsibility for collating and feeding back audit results
- Brief all relevant staff of upcoming audit, inclusive of any changes to current practice, to ensure buy in / compliance
- Highlight as part of the briefing component
 - The need to identify and differentiate between essential items (i.e. those which should be opened immediately) and those which can remain unopened, to be opened if required.
 - To support the previous point, nursing staff will question, if required, whether items do need to be opened pre-emptively
- Agree on start date to commence 4 week audit

Audit Phase

- As part of pre-surgery morning huddles clearly identify **necessary** instruments and consumables per case, to be opened as part of pre surgical prep.
- On completion of each case the identified staff member completes an audit checklist form, recording **all opened but unused** items.

Post Audit Phase

- Collate all completed checklists
- Findings presented to local forums as relevant
- Findings used to reinforce behaviour change
- Findings used to feed into NGTP Measurement and Validation process

Roles and Responsibilities

Role	Responsibilities
Champion	<ul style="list-style-type: none">• Prepare department for undertaking audit<ul style="list-style-type: none">• Awareness and education regarding carbon and financial impact• Maintain momentum throughout audit period
Scribe	<ul style="list-style-type: none">• Completion of checklist following each case• Filing of completed checklists in designated space
Collator	<ul style="list-style-type: none">• Collation of all data collected during audit period• Access procurement information to support calculation of financial savings accrued over audit period• Provide summary report of audit outcomes (format to be determined at local level)
All surgical team members	<ul style="list-style-type: none">• Give consideration to what items are and are not essential• Consolidate behaviour change beyond the audit period, to become business as usual.
NGTP	<ul style="list-style-type: none">• Support in implementing change if indicated• Record outcomes as part of measurement and validation process

Appendix 1: Populated Checklist

Material Waste in Theatre Checklist

(To be completed for every case during audit period)

Date of procedure: _____

Name of procedure: _____

Completed by: _____

Product	Opened but not used (please specify the type and number of items)
Gloves	
Swabs	
Dressing material	
Suture material	
Steri Strips	
Arthroscopic shaver blades	
Syringe/needle	
Surgical blade	
Image intensifier cover	
Surgical marker	
Fibre wire/fibre tape	
Instrument / supplementaries	
Wrong size plate / screw or Prosthesis (Implant)	
Cement / cement gun	
Surgical gowns	
Drapes	
Any other item not mentioned above	

[illegible]