

National Green Theatres Programme

Prògram Nàiseanta Lannsaireachd Uaine

Installation and implementation of alternative surgical fluid collection and disposal system – Opportunity for Change

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An opportunity to save across NHS Scotland:



75
Tonnes of
CO₂e



£235,000

1. Description of action

- 1.1 This action relates to a change in equipment used within theatres for surgical suction resulting in a decrease in the use and disposal of single use suction containers.
- 1.2 The installation and implementation of an alternative surgical fluid collection and disposal system will eliminate the need for single use suction containers and their disposal within the clinical waste stream commonly used across Health Boards in Scotland.
- 1.3 The introduction of new equipment will instead allow surgical fluid be collected, filtered and discharged through the waste water system, a process which greatly reduces the environmental impact of managing clinical waste.
- 1.4 This will reduce the transportation and specialist disposal currently required under the NHS Scotland healthcare waste contract.

2. Background

- 2.1 During normal theatre operation a significant quantity of liquid (mainly irrigation fluids, and some body fluids) is created. This liquid is collected in plastic suction containers with or without addition of gel and disposed as clinical waste (orange bags) at a cost of around £500 per tonne or in some cases placed in sealed rigid plastic bins and transported to specialist incinerators elsewhere in the UK for high temperature incineration at a cost of around £890 per tonne.
- 2.2 The current process is very time consuming for staff and generates a significant amount of clinical waste. There is a high environmental impact to this, in addition to the costs associated with the disposal.
- 2.3 Several systems are now available that offer an alternative fluid management solution for the operating theatre environment. Such systems allow this waste to be collected, filtered and discharged through the sewage system. Water UK¹ and Scottish Water² have both provided written confirmation of having no objections to these systems being utilised, subject to review should changes to the volume or composition of waste water being discharged from these systems, or changes to the function of the systems occur.

¹ [UK Water Letter](#)

² [Scottish Water Letter](#)

- 2.4 It should be noted that radioactive waste should never be suctioned and discharged via these systems and should be streamed as appropriate following SHTN guidance and advice from Health Board Waste Management Officers.
- 2.5 These systems reduce staff direct contact with and exposure to surgical fluid collected, time taken to package waste in theatre, and the amount of clinical waste required for disposal by removing this stream of waste from the existing system.
- 2.6 Such systems also remove the need for individual containers stored at floor level and thus significantly reduces risk associated with manual handling.
- 2.7 Currently there is limited data available outlining the comparative costs and carbon savings which might be achieved from switching to an alternative surgical fluid collection and disposal system, however a pilot of one of the available systems conducted by NHS Highland highlighted the carbon savings achieved by such a system.
- 2.8 The NHS Highland pilot was conducted for a period of 8 months within **one** operating theatre. The figures were then used to calculate the anticipated **annual** volume of waste fluid and associated disposal costs within one theatre and then extrapolated for all other territorial Health Boards using the Resource Allocation Formula (NRAC). NRAC does not include NHS Golden Jubilee, figures for this Health Board have been calculated based on NHS Golden Jubilee having 4% of the total number of operating theatres across NHS Scotland. A full breakdown of these figures can be found in Tables 1 – 3 in the Appendix.

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

- 3.1 In order to implement this action it is recommended that the following groups should be consulted and involved:
 - Surgeons
 - Theatre Managers/Staff
 - Estates and Facilities
 - Waste Management Officers
 - Infection protection control
 - Procurement Staff

4. Boundaries

- 4.1 The table below identifies the boundaries for this action:

In scope	Out of scope
<p>Surgical specialities with high volumes of waste fluid:</p> <ul style="list-style-type: none"> • Urology • Orthopaedics • Gastrointestinal <p>All other surgical procedures should also be considered against availability of the suction system and cost effectiveness of utilising it for these procedures.</p>	<p>Surgical procedures with minimal amounts of waste fluid where carbon/cost savings are not indicated.</p>

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

- 5.1 Health Boards have the opportunity to change from disposing of waste fluid via single use suction containers, to an automated collection and disposal system that utilises the hospital waste water system and eliminates the need for clinical waste to be disposed of/processed off site.
- 5.2 It is anticipated that a national service contract will be established which will allow Health Boards to access the waste fluid suction system which best suits their needs. The national procurement contract will also include equipment needed for fluid suction systems.

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

- 6.1 Based on the pilot at NHS Highland the estimated national benefits through the implementation of this action are detailed in the below:

Outcome	Potential Benefits
Carbon reduction	75 tonnes of carbon saved annually based on calculations extrapolated from NHS Highland pilot study.
Cost savings	£235, 679 saved annually based on calculations extrapolated from NHS Highland pilot study.
Patient outcomes	No change to patient outcomes.
Staff experience	Reduction in manual handling and potential exposure to contamination.

- 6.2 Contained within Appendix 2, is an outline of the potential carbon and cost savings for NHS Scotland. Board specific calculations have been provided to local health boards. It should be noted that these are estimated figures and should be validated locally as part of the proposed measurement plan.

7. Risks and Issues

7.1 As part of the development of this action a number of risk and issues have been identified below:

Description of risk or issue	Mitigation / Action Plan
Reduction in clinical activity if system fails	<ul style="list-style-type: none"> • Regular servicing of system • Two units purchased • Staff training in new system • Utilise traditional methods of waste disposal until system fixed
Financial cost of new system exceeds current process	Offset by reduced level of staff absence, increased clinical activity
Risk of elective activity being reduced to support unscheduled care on site, and the system not therefore being utilised enough to warrant on-going servicing fees / capital costs.	To continue with service reconfiguration and redesign with a view to protecting elective activity as much as possible in current climate.
Loss of revenue for waste management contractors – less waste to transport	Inclusion of waste management contractors in discussions to ensure awareness/ renegotiation of contracts

8. Implementation Guidance

- 8.1 The opportunity for change highlights the importance of implementing this action. This modification 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: cfsgreentheatres@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.

Appendix 1 – Measurement plan

Name of Measure (,carbon, cost, staff experience and patient outcome)	Type of measure (Outcome, Process, Balancing)	Concept being measured?	Where is the data available from?	Who is collecting the data?	Frequency of collection
Carbon	Outcome	Decrease in tCO2e resulting from the reduction in amount of clinical waste collection and disposal	Health Boards/NHS Assure	Theatre Managers	Initial survey per Board with follow up at quarterly intervals if traditional suction system still in use.
Cost	Outcome	Financial savings resulting from less clinical waste	Health Boards/NHS Assure	NHS Boards	Quarterly

Appendix 2 – Potential Savings

The following figures are based on the NHS Highland pilot which was conducted for a period of 8 months within **one** operating theatre. The figures were then used to calculate the anticipated **annual** volume of waste fluid and associated disposal costs within one theatre and then extrapolated for all other territorial Health Boards using the Resource Allocation Formula (NRAC).

Table 1: Costings – Consumables and Waste Disposal					
Cost of Consumables		Cost of Waste Disposal		NHS Highland Neptune Pilot	
Item	Cost per Unit (£)	Method of Disposal	Cost/tonne (£)	Volume of Waste Fluid (L) per Year	No of Suction Liners required
1L Suction Liner	1.14	Orange Bag	503.94	3360	4480 *
Gel	0.17	Incineration	886.07		
Wiva Bin	6.11	Mean	695.00		

* Assumption made – not all suction liners will be completely filled, calculations based on overall average of 0.75L waste fluid per liner.

Table 2: NHS Highland Cost and Carbon Saving						
NHS Highland	1L Suction Liner (£) (4480 x 1.14)	Gel (£) 4480 x 0.17	Wiva Bin (£) 1120 x 6.11	Waste Disposal (£) 695 x 3.36	Total Costs (£)	Reduction in Carbon Emissions (KG)
	5107.20	761.60	6843.20	2335.22	15,047.22	4804.5

Table 3: Anticipated carbon saving for NHS Scotland

	Annual cost of Consumables (£)	Annual Cost of Waste Disposal (£695/tonne) *	Annual Cost Consumables + Disposal (£)	Reduction in Carbon Emissions (tonnes)
Total for NHS Scotland	19,104	36,576	23,5679	75.25

*Given some waste disposed of via clinical waste bags and some via HTI calculations are based on the average of these 2 figures

Please note a breakdown of these costs and potential saving at local level have provided to health boards.