Centre for Sustainable Delivery

NHS SCOTLAND

National Green Theatres Programme Action for Adoption

Rationalising single use patient warming devices during the perioperative period

March 2024

About

This information raises awareness about this carbon-saving action. There is no formal requirement to report on this action through the National Green Theatres Programme, however Boards are encouraged to consider how they are adopting this action ensuring they are connected with any relevant initiatives or national work streams.

Background

This action for adoption highlights the current environmental impact of single use forced air warming devices (FAW). The document aims to:

- Support clinicians to consider alternative patient warming methods to reduce their burden on the environment.
- Compare and analyse the current reusable warming devices on the national framework (Section 4) to offer alternatives to FAW devices.
- Assist health boards to consider reducing their use of single use FAW devices by an initial 15% through adoption of local protocols and/or guidance.

Patients may be cool on arrival to the operating theatre. This can be down to a combination of several factors, for instance, wearing thin and exposing hospital gowns, fasting before surgery and exposing their arms for the insertion of cannulas and arterial lines. It is understood that preventing perioperative hypothermia is critical for patient outcomes. Hypothermia is a state defined by having a core body temperature below 36 degrees, patients with a core temperature below this are at higher risk of adverse outcomes, such as delayed recovery from anaesthesia, increased intraoperative blood loss and infections.

To ensure patients maintain normothermia in the perioperative period clinical teams commonly use forced air warming (FAW) devices. There is no doubt that these devices play a critical role within the operating theatre. However, there are other interventions that should be considered before opting for these devices.

Figures from national procurement identified that 153,913 FAW devices were ordered across NHS Scotland in the 2022-2023 generating over 70 tonnes of embodied carbon, per annum, and over 20 tonnes of plastic waste contributing to clinical waste streams.

The predicted demand of forced air warming devices against the actual number ordered has been calculated using the National Resource Allocation Formula (NRAC) and figures from national procurement.

This has been broken down by board level and provided to boards so they can interpret their current position and the potential scale of their opportunity.

If a 15% reduction in the use of FAW devices is assumed to be achievable, through adopting alternative solutions such as passive warming and investing in reusable warming devices. Then there is a potential to save just under 10 tonnes embodied carbon and reduce plastic waste annually by approximately 3 tonnes.

The potential costs and carbon savings for each health board, based on this 15% assumption and the current devices used, have been calculated and provided to boards.

Interventions to rationalise single use patient warming devices

Through best practice and the NICE guidelines teams can rationalise the use of FAW devices during the perioperative period.

The recommendations below are passive warming solutions and provide alternatives to active warming[1] prior to surgery.

Preoperative opportunities:

- Patients should be advised that staying warm before surgery will lower the risk of postoperative complications[2]. The patient should be advised to bring extra clothes such as slippers, dressing gown and other warm clothing[3].

- The patient's temperature should be taken in the hour before surgery, if this is above 36 degrees no intervention is required, current protocol should continue. If temperature is below 36 degrees patient warming options should be considered.

- Avoid prolonged fasting - adopt 'Sip till Send' protocol – see Appendix 1 for an example protocol from NHS Tayside.

- Additional blankets should be available to the patient to keep them warm prior to surgery.

- Patients who are fit and able should be encouraged to walk to theatre department to generate body heat as per NICE guideline 65[4].

[1] Definitions: Active warming – a process that transfers heat to the patient. Passive warming – interventions to promote heat retention. Recommendations | Hypothermia: prevention and management in adults having surgery | Guidance | NICE

[2] National Institute for Health and Clinical Excellence (2008) Inadvertent perioperative hypothermia: full guideline. Available at: http://www.nice.org.uk/nicemedia/pdf/CG65Guidance.pdf

[3] Keeping patients warm before, during and after an operation (nice.org.uk)

[4] National Institute for Health and Clinical Excellence (NICE) (2012) *CG65 Perioperative Hypothermia (Inadvertent): Understanding NICE guidance.* http://tinyurl.com/d5x7qf5 (accessed 30 January 2013) Google Scholar

Intraoperative opportunities:

Surgical teams should discuss and consider alternative methods of warming before defaulting to FAW devices.

- **Surgical site** - Consider the surgical site before opting for a FAW device. Body surface, peripheral limb or head and neck surgery is unlikely to lose heat to the same extent as intra-abdominal or thoracic procedures.

- **Type of procedure** - Laparoscopic surgery is less prone to heat loss than open surgery. Less physiologically challenging procedures may only need passive warming. Operations where there is anticipated major blood loss or fluid requirements will require active warming.

- **Length of operation** - Short surgery may be appropriate for passive measures and regular monitoring of temperature whereas active warming could be reserved for prolonged surgery if required.

- **Patient needs** - Frail, elderly, or low body weight patients may need help maintaining body temperature more so than muscular patients.

- **Passive warming alternatives** - Walking to theatre, retaining clothing as long as possible, warm blankets. Adequate patient hydration; employing ‘Sip till Send’ policies can reduce perioperative hypothermia.

- **Reusable patient warming alternatives** - A reusable electric patient mattress which is cleaned in the same way as a surgical table and do not require single use plastic sleeve also consume less electricity than FAW devices.

Postoperative opportunities:

- Patients should be transferred to recovery and monitored prior to being transferred to a ward. Ensure that the patient has adequate bed clothes to keep warm as per NICE guidelines[5].

- Where possible, have warmed blankets available for the patient if they are feeling cold.

[5] Recommendations | Hypothermia: prevention and management in adults having surgery | Guidance | NICE

Example of protocol to support local adoption

Having identified opportunities to reduce the use of FAW devices it is important that teams are able to understand and implement these opportunities locally. Appendix 2 includes an example of a protocol that clinical teams could draw on to develop their own protocol/checklist that is appropriate for their specialty or area. The green theatres programme would be grateful if teams could share local protocols, guidance or checklists that have been implemented to reduce unnecessary use of FAW devices.

Reusable patient warming

There are currently two suppliers of reusable patient warming devices on the national framework, QED Scientific (Medwarm & Safewarm systems) and Novus Med (HotDog system). It is important for health boards to consider the key information to help decide if investing in reusable devices is right for them.

With financial pressures health boards may not be in a position to purchase these warming devices due to the upfront costs. Both current suppliers have indicated that devices could be leased. Pricing would be agreed on a case-by-case basis through the local rep. If this is something that you would benefit from, please contact the national green theatres team (cfsdgreentheatres@gjnh.scot.nhs.uk) who can pass on the relevant contact details.

Figure 1 represents a comparison of single use forced air warming devices against reusable devices. We have focussed on the QED Scientific system as it has a lifespan of 6-7 years in comparison to the Novus Med System which has a lifespan of only 2 years.

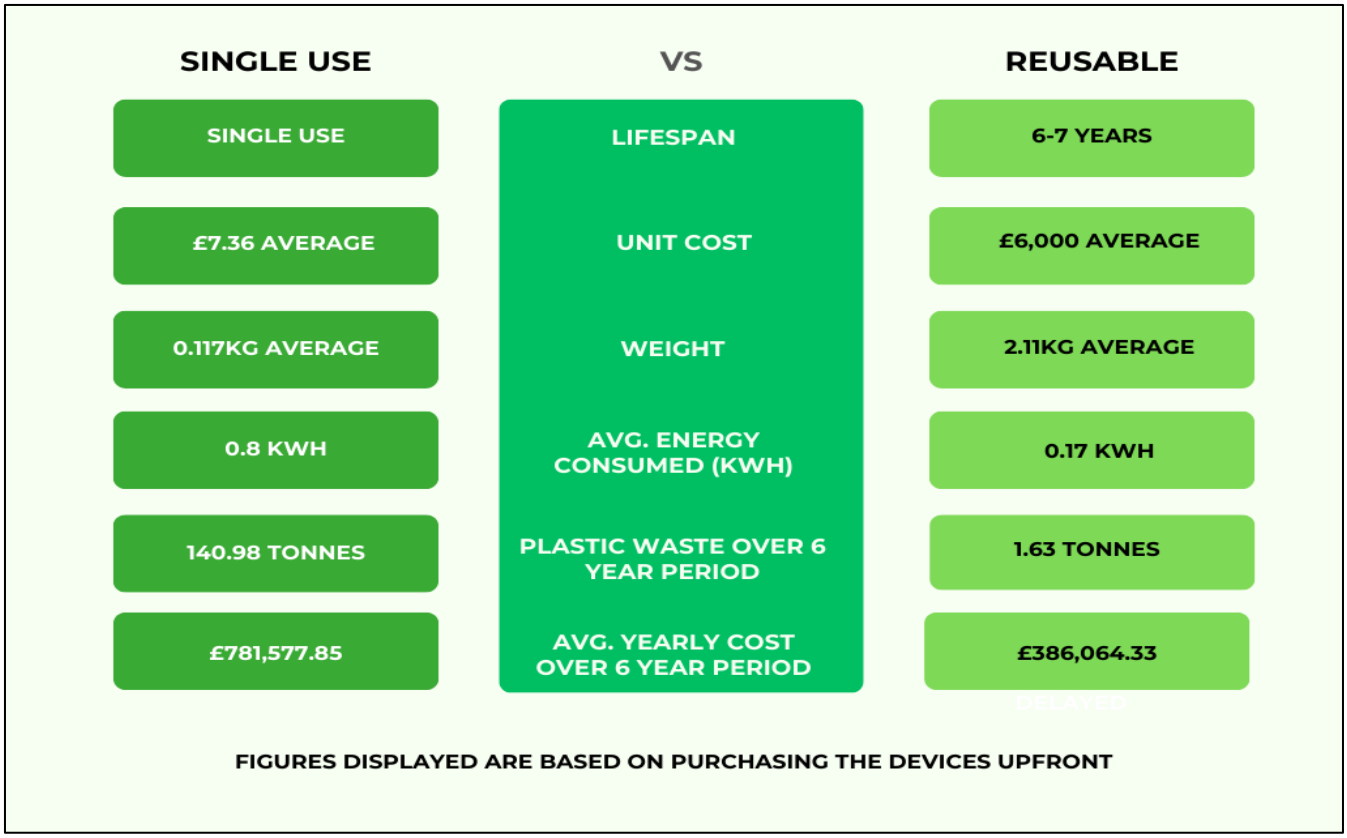

Figure 1

Key findings

- The reusable mattresses and blankets have a recommended lifespan of between of 6 to 7 years and the controllers 10 years, the devices use significantly less energy to run (0.17kWh vs 0.8kWh), operate at lower decibel levels and produce just 1% of the waste compared with FAW devices, over a 6 year period.

- The reusable devices have an average embodied carbon score of 17.9kg per device compared with 0.45kg per device for the FAW devices. Although there is a higher initial carbon output when purchasing the mattresses and blankets, after 40 uses they have a lower footprint than the single use FAW devices, comparatively. To put that into context each operating theatre in Scotland uses an estimated 400 FAW devices per annum.

- Decision makers should consult with clinicians and theatre staff on the feasibility of adding a reusable device to their repertoire. This will benefit each site by reducing their clinical waste, reducing energy use per procedure and reducing costs in the long term.

- For a full price list and contact information please reach out to a member of the green theatres team.

Single use forced air warming devices

There are currently two main suppliers of single use devices, 3M and Central Medical Supplies (CMS). They are comprised of similar materials, on average the CMS mistral air devices are slightly heavier than the 3M devices. There is however a difference in price across the two suppliers that procurement and finance teams may want to consider.

Next steps

Clinical teams, managers and senior leaders are encouraged to consider their local opportunity to address the overuse of forced air warming devices perioperatively. Clinical teams should consult both the NICE guidance and use their clinical judgement when deciding on appropriate use of forced air warming devices. The plan for maintaining normothermia should be discussed in morning briefing for surgical teams.

Contact us

If you have any questions about this action, please contact the National Green Theatres Programme by emailing gjnh.cfsdgreentheatres@gjnh.scot.nhs.uk.

Appendix 1 - Sip till send protocol

Pre-operative Fasting Guidelines for Scheduled Surgery and Procedures

NHS Tayside

Step 1

To keep you safe and able to have surgery you must not eat food for **6 hours** before your operation

You should continue to sip water or clear fluids*

If you are told to come into hospital before/at 7.30am, **your last food should be at 12 midnight (including sweets)**

or

If you are told to come into hospital **after** 11.00am **your last food should be at 7.00am (including sweets)**

Step 2

You can have a cup of tea or coffee on the morning of surgery with up to 3 teaspoons/15ml milk

*** Drinks that are allowed**

- Water
- Fruit juice – without pulp or bits
- Diluting juice/squash

If you have not followed the instructions about eating and drinking then your operation may be cancelled

Step 3

You should continue to drink* right up until your procedure

Do not chew gum or sweets

Once in hospital the ward staff will allow you to sip clear fluids until you are sent for your procedure

'Sip Til Send'

If you are Diabetic please make sure that you have discussed your medication with the Diabetes Specialist Nurse Team

Department of Anaesthesia – Revised: December 2021 Review Date: December 2023 LN0064

Appendix 2: Example protocol