



SUSQI PROJECT REPORT

Improving Sustainability in the Heart Centre: Implementing Disposable Gowns and Hats and Introducing a Bespoke Electrophysiology Procedure Pack.

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Team Members:

- Kemi Adegboyega, Matron
Kemi.Adegboyega@hhft.nhs.uk
- Cheryl Gadsby, Sister
Cheryl.Gadsby@hhft.nhs.uk



Background

The Heart Centre Catheterisation Laboratories (Cath Labs) are a resource-intensive clinical environment with a high consumption of single-use gowns, hats, and procedure packs. In addition, a significant number of electrophysiology (EP) procedures are undertaken each year using angiography procedure packs, which are not specifically designed for EP procedures. This results in unnecessary waste due to the inclusion of items that are not required, while additional equipment must be sourced separately. By optimising the supply chain, collaborating with industry partners, and building on the success of similar sustainability initiatives implemented within operating theatres, there is an opportunity to reduce the environmental impact of Cath Lab procedures. This project focuses on three key areas: replacing single-use gowns with reusable alternatives, replacing single-use hats with reusable alternatives, and introducing a dedicated EP procedure pack. Together, these interventions support the principles of a circular economy by reducing waste, preserving raw materials, and improving resource efficiency (Ellen MacArthur Foundation, n.d.). The proposed changes also align closely with the Trust's **Green Plan 2025–2028**, which prioritises reducing environmental impact through the increased use of reusable products, minimising reliance on single-use items, and reviewing product selection to reduce waste associated with products and packaging. Furthermore, the project supports the Green Plan's objective of optimising resource utilisation by improving the efficient use of equipment, staff time, clinical space, financial resources, and workforce capacity. Collectively, these initiatives contribute to the Trust's wider commitment to delivering high-quality, sustainable healthcare while progressing towards its environmental sustainability goals. These interventions were selected because suitable, well-established alternatives are available, and their implementation is considered achievable within the scope and timeframe of this project.

1. Surgical Gowns.

Surgical gowns exist to protect patients from being exposed to microorganisms and to serve as personal protection equipment (PPE) for surgical staff (Vozzola, Overcash & Griffing., 2020). They are vital part of surgical care, helping to maintain sterile field, with several gowns used for every surgical procedure (Atay et al., 2021). There are a range of surgical gowns on the market with varying levels of protection, with options for reusable and disposable. A surgical gown must be fluid resistant, suitable for sterilisation, fire resistant, comfortable, and non-toxic (Atay et al., 2021). Further considerations on gown selection should include cost, any contractual agreements in place, usability and sustainability (Vozzola et al., 2020).

At the Heart Centre at Hampshire Hospitals NHS Foundation Trust (HHFT), a high volume of surgical gowns are used annually, with multiple gowns used for every single case. Due to this, there is great potential for significant carbon and financial savings whilst also enabling staff to practice in line with their sustainability values. Main theatres at HHFT have already made the transition to the use of reusable gowns and the heart centre has undergone a trial of these reusable gowns prior to commencement of this project. We aimed to make further progress towards full implementation of reusable gowns into our department during the project. We hoped that in combination with the reusable hats, HHFT will be one step closer to a 'green sustainable hospital'.

2. Surgical hats.

Surgical hats are an important component of operating theatre attire because they help contain hair and skin particles, reducing contamination of the sterile field and supporting infection prevention practices. Although current evidence does not show that specific hat types significantly reduce surgical site infections, wearing clean head coverings remain recommended as good practice to maintain theatre discipline, professionalism and environmental cleanliness (Speth, 2024). Recent evidence also indicates that reusable surgical hats provide similar patient safety to disposable hats while reducing environmental impact (Gumera et al., 2024).

Reusable surgical caps with names and roles are designed to improve communication, safety, and sustainability in surgical environments. Traditional ID badges and lanyard are often obscured by sterile gowns and lead aprons, contributing to delays, miscommunication, and hierarchical barriers- factors linked to 70% of adverse events (WHO Joint Commission, 2015). By clearly displaying names and roles, these hats enhance patient-centred care, particularly during emergencies and handovers.

3. Electrophysiology EP Packs.

EP procedure packs are pre-assembled, sterile kits containing single-use drapes, covers, and basic consumables designed to streamline setup for cardiac EP studies and catheter ablations. The key benefits include providing efficiency of procedures thus minimising prep time in the cardiac EP lab and maintaining sterility during procedures hence maintaining a standardised sterile barrier compliant with medical regulations (Mölnlycke, 2026).

The Heart Centre introduced regular electrophysiology (EP) procedures in October 2022. Since then, the angiography pack has been used because it included a drape of the appropriate size for these procedures. However, the pack also contains a manifold that is specific to angiography and is not required for EP procedures, resulting in unnecessary waste of a high-cost item. In addition, the pack did not include several items that are required for EP procedures, necessitating the addition of

supplementary equipment. This has resulted in both avoidable waste and increased procedural preparation.

Specific Aims

- To reduce the amount of waste in the heart centre and become more sustainable.
- To reduce the number of disposable gowns used in the department by 50% by August 2026 by introducing reusable hats.
- To reduce the number of disposable hats used in the department by 50% by August 2026 by introducing reusable hats.
- To introduce EP packs for ablation and EP procedures (apart from cryo procedures) to be used instead of angiogram packs with an aim that this will reduce wastage. This will be an aim of 90% of EP procedures. To be achieved by August 2026.

Methods

1. Surgical Gowns

Time Frame

Organisation and coordination of the project started in December 2025. The initial product trial took place in February 2026; this was unsuccessful with poor compliance from the Cath lab team. The main reason for the trial being unsuccessful was the busy schedule of the trial day, leading to lack of compliance from the team undertaking a change project whilst juggling clinical demands of the day. A retrial exercise was then planned for May 2026, with better communication and planning. Data collection took place through May and July 2026.

Engagement

Prior to implementing any changes, key stakeholders were identified to ensure adequate engagement and support. These individuals/departments were procurement, clinicians, scrub practitioners, clinical governance and IPC team. The most important factor was to gather research and contact others that had implemented similar projects. Their experience was invaluable to us in getting the project off the ground and helping resolve issues. In addition, regular meetings and engagement with the SUSQI project team facilitated the smooth implementation of the project. The company rep from 'elis' was also involved in this process, where procurement was planned from. When organising the implementation for the gowns into practice the logistics of storing the gowns and delivery/collection was required and has involved engagement from procurement, porters and the linen room. Once all information needed was collated and shared, with necessary questions fully answered, the trial could begin.

Clinical implementation and analysis

Due to ongoing price negotiations between Kimal, Mölnlycke, and the Trust's Procurement team regarding the removal of disposable gowns from the existing angiography packs, and the development of a new EP-specific pack without disposable gowns, it was not possible to implement reusable gowns within the project timeframe.

These negotiations are now in the final stages, and implementation is expected to commence shortly. Consequently, the measurements and results presented in this report are based on data collected during previous product trials, together with projected outcomes derived from those trials.

1. Surgical hats

Time Frame

The implementation of reusable surgical hats was identified as an opportunity during the rollout of reusable surgical gowns, as both changes could be incorporated into the same implementation process. A similar initiative had previously been successfully introduced within the Trust's main operating theatres, providing an established implementation framework and valuable learning to inform this project.

Consequently, it was agreed in June 2026 to proceed with the introduction of reusable surgical hats across all cardiology catheterisation laboratory teams. Implementation is currently nearing completion, with full adoption expected shortly.

Engagement

Prior to implementation, key stakeholders were identified and engaged to ensure appropriate support for the project. These included clinical leads, SUSQI project leads, the finance department, cath lab clinicians, and representatives from Medicus Group.

Early stakeholder engagement focused on understanding the perceived value of introducing reusable hats in place of disposable alternatives and gathering feedback from staff who would be directly affected by the change. Learning from the successful implementation of reusable hats within the Trust's main operating theatres was also an important aspect of the planning process, providing practical insights into implementation, staff engagement, and operational considerations. Representatives from Medicus Group played a key role throughout the planning and implementation phases, providing product expertise and supporting the trial process.

Once the required information had been gathered, stakeholder support secured, and the implementation plan agreed, the project progressed to the trial phase.

Clinical implementation and analysis

Due to the late commencement of this project, it was not possible to fully implement the use of reusable surgical hats within the project timeframe. In July 2026, Medicus supplied sample reusable hats for evaluation within the department. Initial feedback from staff has been positive, demonstrating good acceptance of the proposed change.

The project is currently progressing through the funding approval process, with implementation expected to commence soon. Consequently, the measurements and outcomes presented in this report are based on data collected during the product trial, together with projected benefits derived from the trial findings.

2. EP Packs

Time Frame

Initial stakeholder consultations regarding the introduction of a bespoke electrophysiology (EP) procedure pack commenced in May 2026. Discussions involved clinical teams, procurement, and finance to ensure the proposed pack met both clinical requirements and financial objectives. Financial negotiations and finalisation of the pack specification are ongoing, with implementation planned once these processes have been completed.

Engagement

Prior to implementation, key stakeholders were identified and engaged to ensure appropriate support for the project. These included clinical leads, SUSQI project leads, the finance department, Cath lab clinicians, and representatives from Mölnlycke.

Early stakeholder engagement focused on understanding the perceived value of introducing bespoke EP packs to the EP lab, in place of using the current angiography packs.

Clinical implementation and analysis

Current procedure packs used for EP contain unused items leading to waste and cost.

Electrophysiology procedures (EP) currently use equipment in premade packs. The team currently use the Basingstoke Procedure Pack which is also used for angiograms. However, these 'Angio packs' contain some equipment not needed for EP procedures and some additional items need opening as they are not present. For example, the 'angio pack' includes a manifold set infrequently used (most expensive component, used for contrast/arterial line) and 2 gowns that wouldn't be used. Individually wrapped items which are not included include 2-3 syringes and long lines and are added separately. There will be a premade pack for EP procedures, which fulfils the equipment needs for the procedures. The packs are supplied by Mölnlycke.

The proposed EP pack moves away from using the Basingstoke Procedure Pack. Nothing will need adding or taking away. This will become the standard premade EP pack.

Table 1: Contents of angiography pack and proposed EP pack.

Current Angiography pack contents	Proposed EP pack contents
Solution guidewire bowl	Gauze swab
Cover Fluro medium blue	Label sheet
Label set new colours	Jug
Paper towels	Syringe 20mls
Namic cardiac catheterisation lines	Probe cover ultrasound
18g needles	Bowl 2500mls
10ml syringe	Reinforced table cover
Gauze swabs	Kidney bowl
Cover trolley	Needles 23g
Gown large	Needles 21g
Gown XL	Sharps holder
Drape radial	Banded bag
Chloraprep PIL	Needle blunt 18g filter
Kidney dish	Needle blunt 18g red
Cover fluoro large green	Syringe 10ml x 3
Jug	Sharp container 500ml aspein basin

23g needle	Arterial needle 18g
Scalpel	Pressure monitoring line
Syringe 20ml	Scalpel 11
21g needle	Syringe 20ml
Needle containment device	Syringe 2ml
Kimla fluid collection device	Angio drape trans panel.

Due to delays in engagement with the Procurement team, it was not possible to fully implement the bespoke electrophysiology (EP) procedure packs within the project timeframe. However, by July 2026, the proposed pack specification had been developed and reviewed with the clinical team. Initial feedback from nursing and medical staff has been positive, indicating strong support for the proposed changes.

The project is currently progressing through the final stages of procurement and funding approval, with implementation expected to commence shortly. As a result, the measurements and outcomes presented in this report are based on findings from product evaluation and projected benefits, rather than data from full implementation.

Measurement

Clinical/Patient Outcomes

It was beyond the scope of the project to directly measure this for gowns and hats however, we monitored for adverse events via monitoring system, and none occurred. We will refer to the literature in the results regarding maintaining current IPC standards throughout.

Social sustainability:

1. Surgical gowns

A feedback form was provided to us by Elis and completed by the cath lab team after each use (Appendix 1). Social outcomes were measured via responses to feedback forms collated during the trial period.

2. Surgical hats

Cath lab nursing, physiology, radiography and clinician teams were consulted, with trial hats supplied to the team.

3. EP procedure packs

The proposed introduction of a dedicated procedure pack was discussed with key stakeholders, including the Clinical governance team, nursing team, clinical lead for cardiology, and the procurement team. Their engagement ensured that the proposed changes aligned with clinical requirements, governance standards, and procurement processes.

Representatives from Mölnlycke attended the department to present the proposed EP procedure packs and facilitate discussions with the clinical team. Through ongoing collaboration, the contents of the pack were reviewed and refined to ensure they met the specific clinical requirements of the department while eliminating unnecessary items and improving procedural efficiency.

The suitability of the surgical gowns, surgical hats, and EP packs was assessed through feedback collected during the trial period, including completed evaluation forms, sample reviews provided by Medicus, team morale, and clinician responses to the bespoke procedure pack supplied by Mölnlycke.

Environmental sustainability:

1. Surgical gowns

To calculate the carbon footprint of a disposable versus reusable gown, we collated the weights and materials used for the gowns and packaging in both the disposable and reusable options. We used a standard large sized gown for these measurements. Transportation distances and modes were also considered for both options from manufacturer to distributor and then to our trust, using the heart centre, Basingstoke as the end site. The carbon footprint was calculated by collating this data and projecting carbon and financial savings annually based on usage numbers gathered from procurement. Based on manufacturer guidelines it was assumed that each gown could be reused 75 times before disposal.

2. EP Packs

Methodology

A cradle-to-grave hybrid approach carbon footprint analysis was used to estimate the items greenhouse gas (GHG) emissions. The inventory provided for equipment in the current Basingstoke procedure pack (and additional add on items), proposed EP packs were carbon footprinted using a process- based carbon footprint analysis. Items were weighed by the team and materials identified.

Data was obtained from previous studies by the Centre for Sustainable Healthcare and other references including 2024 green team competition results. Where data was not available, calculations were made based on the weight and material of the product. Material weights were converted into GHG emissions using emission conversion factors taken from the Department of Energy Security and Net Zero (DESNZ)'s Greenhouse Gas Reporting Conversion Factors 2026 database, ICE V4.0 database, and Climatiq and primary research papers and LCAs. The analysis included GHG emissions associated with primary materials production, transport, and disposal.

Materials

Material emissions are calculated by the weight of the material, emission factor of the material and number of items.

*Total emissions = weight of material * material emission factor*

Transport

Transport emissions per journey are calculated by weight of product, distance travelled and emissions per tonne.km travelled.

*Total emissions = Weight in tonnes per delivery*distance in km*emission factor*

The emission factor for average laden, non-refrigerated HGV is 0.127 kgCO₂e per tonne.km.

Waste

Waste emissions are calculated by amount of waste (tonnes) and the UK emission factor of average emissions by waste stream

*Total emissions = volume of waste * waste stream emission factor*

The emission factor for clinical waste is 1074 kgCO₂e, infectious waste is 569 kgCO₂e, dry mixed recycling is 172 kgCO₂e and domestic waste is 172 kgCO₂e.

Activity data

Number of procedures conducted in 2025 was 238, but 222 EP cases will be used for modelling carbon emissions as 10% of cases are expected to continue to use current angio packs.

Financial sustainability

1. Surgical hats.

Data on the team's use of disposable hats was obtained from the Trust Procurement Team to determine annual usage and associated procurement costs. These figures were then used to compare the cost of introducing reusable hats supplied by Medicus. The analysis was further used to estimate the annual financial savings and reduction in carbon footprint that could be achieved by switching from disposable to reusable hats. Laundry costs have not been included in the analysis, as reusable hats will be washed by individual staff members off site.

Results

Patient/Clinician outcomes:

There are no negative patient outcomes predicted from any of the changes made.

Patient outcomes were considered in the context of surgical site infections (SSIs), and no adverse patient outcomes are anticipated following the introduction of reusable surgical gowns, reusable surgical hats, or streamlined EP procedure packs. The World Health Organisation (WHO, 2016) recommends either disposable non-woven gowns or reusable woven gowns during surgical procedures for the prevention of surgical site infections, recognising both as clinically appropriate options.

Evidence suggests that reusable personal protective equipment (PPE) is at least as effective as disposable alternatives and may offer enhanced performance characteristics. McQuerry et al. (2021) found that reusable gowns demonstrated greater water resistance, strength, and durability than disposable gowns while maintaining their protective properties throughout repeated laundering.

Further research has shown that the introduction of reusable gowns does not increase postoperative infection rates, and professional surgical bodies have concluded that there is no evidence that disposable gowns are superior to reusable gowns in preventing surgical site infections. Therefore, the adoption of reusable surgical gowns and hats, alongside streamlined EP packs, is not expected to negatively impact patient safety or clinical outcomes while delivering environmental and financial benefits

Environmental sustainability:

1. EP Packs

The inventory for each piece of kit and equipment used in the current Basingstoke Procedure Pack is shown in Table 1 including the emission factors for each material or piece of equipment and for waste disposal. The carbon footprint for each item was calculated; the carbon footprints of each item were

aggregated to estimate the total emissions of the pack. It is assumed all equipment is disposed of via the clinical waste route.

Current EP packs

The total weight of current Angio pack is 2,420g and total emissions (raw materials, waste disposal) are 12.83 kgCO₂e.

Table 2. Inventory for equipment, weights, emissions factors and the carbon footprints of the Basingstoke Procedure Pack.

Basingstoke procedure pack	Weight (g)	Carbon emission factor per item (kgCO₂e /item use)	Total carbon emissions per item (kgCO₂e)	Carbon emissions for waste disposal of item (kgCO₂e)	Total carbon footprint (kgCO₂e)
Solution guidewire bowl	200	0.515	0.515	0.2148	0.7299
Cover fluoro medium blue	60	0.195	0.195	0.0644	0.2593
Label set new colours	2	0.000	0.000	0.0021	0.0021
Paper towels 57*33	31	0.005	0.010	0.0666	0.0766
Namic cardiac catheterisation lines	200	0.108	0.100	0.2148	0.3148
18g needle	3	0.003	0.007	0.0032	0.0105
10ml syringe	7	0.024	0.033	0.0075	0.0407
Gauze swabs	62	0.185	0.185	0.0666	0.2515
Cover trolley 140*210	200	0.846	3.723	0.2148	3.9380
Gown large	200	0.933	0.933	0.2148	1.1478
Drape radial 240*330cm	800	0.195	2.280	0.8592	3.1387
Choroaprep PIL	3	0.052	0.004	0.0269	0.0073
Kidney dish 800ml	53	0.058	0.058	0.0569	0.1150
Cover fluoro large green	79	0.195	0.195	0.0848	0.2797
Jug 1000ml	76	0.500	0.500	0.0816	0.5816
23g needle	2	0.003	0.013	0.0021	0.0155
Scalpel	13	0.002	0.003	0.0140	0.0165
Syringe 20ml	16.6	0.056	0.049	0.0354	0.0664
21g needle	2	0.003	0.017	0.0021	0.0188
Needle containment device	38	0.151	0.151	0.0408	0.1917
Gown SNS XL	200	0.933	0.933	0.2148	1.1478

Chloraprep 3ml applicator (for wrists)	16	0.026	0.026	0.0172	0.0429
Kimal fluid collection device	120	0.309	0.309	0.1289	0.4379

Added items

The items in Table 3 are added to the Basingstoke Procedure Pack for EP procedures.

Table 3. Inventory for equipment, weights, emissions factors and the carbon footprints of the additional items.

"Additional equipment"	Weight (g)	Carbon emission factor item (kgCO ₂ e /item use)	Total carbon emissions per item (kgCO ₂ e)	Carbon emissions for waste disposal of item (kgCO ₂ e)	Total carbon footprint (kgCO ₂ e)
Manometer line 1500mm (Kimal K39/41)	20.0 (*)	0.801	0.801	0.0215	0.8228
BD Emerald 10ml Luer tip syringes (Ref 307736) x3	21.3	0.024	0.071	0.0686	0.1395
Transducer cover (Ref 610-1270 made by Civco)	35.0 (*)	0.010	0.010	0.0376	0.0476
Blunt fill needle (Medicina ref BN01)	1.0	0.003	0.003	0.0011	0.0040
Blunt fill filter needle (Prosum Ref BNH18112)	1.0	0.003	0.003	0.0011	0.0040

(* estimates based on data from <https://raydan-company.com/wp-content/uploads/catalogs/Vascular-Access-Products.pdf>).

The total emissions from the additional items are 1.017 kgCO₂e and the total weight of the additional items is 78g.

The total weight of the equipment used is 2,420g + 78g = 2498g (2.5kg). The total carbon footprint of raw materials, production and waste is 12.83 kgCO₂e + 1.017 kgCO₂e = 13.85 kgCO₂e.

Transport

A 2.5 kg pack transported from Kimal in Worcester to Basingstoke Hospital (102 miles/163 km) by an average laden non-refrigerated HGV generates approximately 0.051 kgCO₂e (51 gCO₂e) in transport emissions.

Summary for Basingstoke Procedure Pack

Total emissions are 13.85 kgCO₂e for raw materials, production and 0.05 kgCO₂e for transport resulting in **13.90 kgCO₂e per Basingstoke Procedure Pack**.

Proposed EP pack

The proposed EP pack moves away from using the Basingstoke Procedure Pack. Nothing will need adding or taking away and this will become the standard premade EP pack.

The inventory for each piece of kit and equipment used in the proposed Basingstoke EP Pack is shown in Table 3 including the emission factors for each material or piece of equipment and for waste disposal. The carbon footprint for each item was calculated, then combined for the total emissions. It is assumed all equipment is disposed of via the clinical waste route. The proposed Basingstoke EP pack weight is 930g and has a carbon footprint of 6.85 kgCO₂e.

Table 4. Inventory for equipment, weights, emissions factors and the carbon footprints of the proposed Basingstoke EP pack.

Current EP pack	Weight (g)	Carbon emission factor per item kgCO₂e /item use)	Total carbon emissions per item (kgCO₂e)	Carbon emissions for waste disposal of item (kgCO₂e)	Total carbon footprint (kgCO₂e)
Angiography drape 240*370cm	59.5	0.195	2.533	0.8307	3.3635
Label sheet	5.0	(*)	0.000	0.0107	0.0107
Paper bag 18*38*9	(*)	0.021	0.021	0.0000	0.0208
Kidney bowl 800ml transparent	34.6	0.058	0.058	0.0372	0.0953
Sharps container 500ml	88.0	0.227	0.227	0.0945	0.3211
Jug 1000ml	76.0	0.193	0.193	0.0816	0.2748
Bowl 2500 pp blue guidewire eco	200.0	0.515	0.515	0.2148	0.7299
Pressure monitoring line 3.22mm 150cm	29.0	0.085	0.085	0.0311	0.1165
18g blunt needle	1.0	0.003	0.003	0.0011	0.0040
Syringe 10ml	7.1	0.024	0.024	0.0076	0.0313
Syringe 10ml 3parts	7.1	0.024	0.024	0.0076	0.0313
Crepe paper 60*60	27	0.002	0.002	0.0000	0.0017
21g needle	1.0	0.003	0.003	0.0011	0.0040
23g needle	1.0	0.003	0.003	0.0011	0.0040

Arterial 18g needle	1.0	0.003	0.003	0.0011	0.0040
Scalpel blade protection	0.6	0.002	0.002	0.0006	0.0024
18g blunt needle purple filter	1.0	0.003	0.003	0.0011	0.0040
Lubricating jelly	2.4	0.005	0.005	0.0026	0.0076
Syringe 2ml	3.2	0.024	0.024	0.0034	0.0274
Syringe 20ml	16.6	0.056	0.056	0.0178	0.0734
Sharp shortstop	45.0	0.151	0.151	0.0483	0.1992
Bns camera drape 14*250cm	52.8	0.156	0.156	0.0567	0.2130
Banded bag 40*30*84	150.0	0.445	0.445	0.1611	0.6056
Banded bag 140cm dome 70cm depth	120.0	0.356	0.356	0.1289	0.4845
Gauze swab 10810 13th 12p xrd	32.3	0.185	0.185	0.0347	0.2196

(* not known)

All materials are discarded in the clinical waste stream or medically contaminated sharps waste stream. Some of the weights are approximate.

Transport

A 0.93 kg amended pack transported from Kimal in Worcester to Basingstoke Hospital (163 km) by an average laden non-refrigerated HGV generates approximately 0.019 kgCO₂e (19 gCO₂e) in transport emissions.

Summary for Basingstoke EP pack

Emissions for the proposed Basingstoke EP pack is 6.85 kgCO₂e for raw materials, manufacture and waste disposal and 0.019g for transport. The **total carbon footprint is 6.87 kgCO₂e**.

Summary

The current Basingstoke Procedure Pack, including additional items, generates 13.90 kgCO₂e per procedure, compared with 6.87 kgCO₂e for the proposed Basingstoke EP Pack. This represents a **saving of 7.03 kgCO₂e per procedure**. Based on **222 procedures per year**, the proposed pack is expected to **reduce annual emissions by 1,560.7 kgCO₂e**.

2. Surgical Gowns

The number of single use surgical gowns ordered annually in the heart centre, Cath labs in the year 2025-26 is 638, mainly large and XL sizes. The Kimal procedure packs come with 2 gowns (L, XL) per pack and the total used in 2025-26 totals 4,194. This equates to a total of 4,832 single use gowns in the last year. This figure was provided to us by the procurement team and has been used to obtain quotations for the reusable gowns.

We have used this to project carbon savings for both the reusable and disposable gowns annually, as displayed in Table 5. The disposable gowns cost £9,730.20 annually, with a total annual KgCO₂e of 5315.2. The reusable gown will cost £8,567.46 annually, with a total annual KgCO₂e of 1750.9. This offers an annual savings of £1,162.74 and a total KgCO₂e of 3564.3. In addition to this, there will be an associated waste reduction savings of £706.55.

Table 5. Financial costs of disposable and reusable gowns from purchasing and waste costs and carbon footprint

HHC Reusable Gowns								Waste Reduction Saving		
	Number ordered		Financial costs			Carbon footprint		Weight of waste		
	Size L Quantity	Size XL Quantity	Size L £	Size XL £	Total Annual £	Per Gown KgCO2e	Total Annual KgCo2e	Weight Per Gown Kg	Quantity Gowns Used	Total Weight Kg
Kimal Pack Disposable Gown	2097	2097	£2.03	£2.14	£8,744.49	1.1	4613.4	0.148	4832	715.14
Single Packaged Disposable Gown	319	319	£1.46	£1.63	£985.71	1.1	701.8			
				Total	£9,730.20	Total	5315.2	Weight of each Packaging Kg	Quantity gowns used	Total weight kg
Elis Reusable Gown	2670	2668	£1.59	£1.62	£8,567.46	0.328	1750.9	0.039	4832	188.45
				Total Savings	£1,162.74	Total Savings	3564.3		Waste Reduction Savings £	£706.55
Elis Reusable with VAT Reduction	2670	2668	£1.27	£1.30	£6,853.97					
				Total Savings	£2,876.23					

Table 6. The weight and carbon footprint of waste generated,

Waste Reduction Saving			
Weight Per Gown Kg	Quantity Gowns Used	Total Weight Kg	Waste Reduction Savings £
0.148	4832	715.14	£706.55
Extra Individual Packaging Amount	Weight of each Packaging Kg	KgCo2e of each Packaging	Total KgCo2e for increase in Packaging
4832	0.039	0.0761	367.72

Whilst the raw materials used for the reusable gown are far more carbon intensive, after considering the number of uses per gown in addition to the reduced transportation associated emissions, significant savings are predicted for making this change.

3.Surgical hats:

Annual Usage of disposable hats 2025-2026

Procurement data from May 2025 to April 2026 identified that the Heart Centre used **4,980 disposable surgical hats annually** across three different product types. This included 2,880 Kosack surgical caps, 1,400 elasticated back caps, and 700 woven tie-back caps shown in Table 7.

Table 7. Number of boxes of disposable surgical hats ordered from 1/5/25 to 30/4/26.

Introducing reusable surgical hats would eliminate the requirement for these single-use products, preventing approximately **4,980 disposable hats from entering the waste stream each year**. This represents a significant opportunity to reduce clinical waste generation, and the environmental impact associated with the manufacture, packaging, transportation, and disposal of single-use surgical

Order number	Item Description	Total number of boxes	Hats per box	Total hats used
BWC85000	Surgical Cap Kosack One size Elastic Violet	3	960	2,880
BWF030	Cap theatre non woven elasticated back disposable Blue	14	100	1400
BWF035	Cap theatre non woven tie back disposable Blue	7	100	700
Grand Total		24		4,980 hats/year

headwear.

The associated carbon reduction will depend on the life-cycle carbon footprint of the disposable hats and the environmental impact of laundering reusable alternatives. However, eliminating the manufacture, packaging, transportation, and disposal of nearly 5,000 single use hats each year represents a significant opportunity to reduce the environmental impact of surgical practice and support the Trust's sustainability objectives. Due to introducing this into the project late, we have not been able to obtain the actual carbon footprint savings data.

Economic sustainability:

1. EP packs

Based on an annual procurement volume of **1,695 Kimal packs**, the current annual expenditure is **£81,563.40**. This is worked out based on the cost of each Kimal pack of £48.12. Following implementation of the revised pack configuration, the annual cost would reduce to **£75,597.00**, resulting in an estimated annual saving of **£5,966.40**.

As part of the proposed change, reusable gowns will be removed from the Kimal packs, reducing the unit cost of each pack from **£48.12** to **£44.60**, representing a saving of **£3.52 per pack**.

2. Surgical Gowns

Procurement data indicates that the current annual expenditure on disposable gowns, including both the gowns contained within the Kimal packs and individually packaged disposable gowns, is £9,730.20. This figure includes the large and extra-large disposable gowns supplied within the pre-packed Kimal packs, as well as those purchased individually. Elis reusable gown will cost £8,567.46 annually, this offers an annual savings of £1,162.74. In addition to this, there will be an associated waste reduction savings of £706.55, making yearly savings of £1,869.29.

3. Hats

Within the Heart Centre, three types of surgical hats are currently procured: Kosak surgical caps, elasticated back caps, and woven tie caps. The unit cost ranges from £0.09 to £0.22 per cap, with the elasticated back cap representing the highest-cost option.

During the financial year 2025–2026 (May 2025 to April 2026), a total of 24 boxes of surgical hats across all three types were purchased.

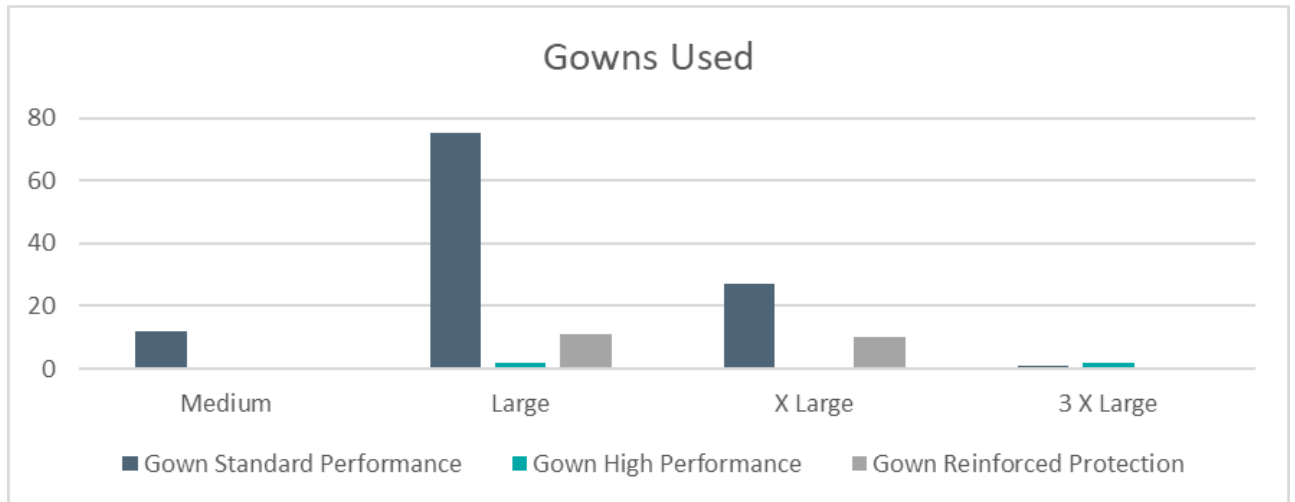
Based on procurement data, the total annual expenditure for surgical hats within the Heart Centre was £630.20. This baseline cost provides an opportunity to explore potential financial and environmental benefits associated with transitioning towards reusable alternatives.

Social sustainability

1. Gowns

During the initial trial period, the feedback was not favourable. With better staff engagement and education, retriability was largely positive. Survey form sent to the team also indicated an awareness of the environmental benefits and comfort as advantages over the current disposable gowns. There were negative/neutral comments from users regarding the length and warmth, including donning and doffing. Overall, 100% of users found them to be clinically acceptable.

Table 8. Retrial survey result



Clinical acceptability

Total Number of forms completed 10

Answered 'Yes' 10 (100%)

BREAKDOWN OF FEEDBACK

- No issues with the gowns.
- Felt slightly longer.
- It is folded differently that we are use too but easily learnt.
- We need to get used to removing the gloves, without touching the inside.
- A bit warmer than the single use but not uncomfortable.
- Had 2-4 inches opening of the gap, for other nurses despite closing properly.
- A little warmer than the existing gowns.
- Slightly warmer than the disposable ones.
- It's not breathable even under the low a fan in the lab.
- Back not completely covering.

Feedback and recommendations

Evaluation in Cath- Lab Theatres was well received and the staff welcoming. Thank you to everyone involved for their hospitality and support. The trial covered Basingstoke sites in x 2 theatres and Cath-Lab specialities. 10 Evaluation forms in total were completed.

The aim of the project is to reduce clinical waste in the theatre environment converting to reusable Gowns. Currently using single use.

Recommendations from comments made of feedback forms.

Based on comments received, the following recommendations were proposed and will be implemented as part of the creation of the standard operating policy (SOP) for reusable gowns for the department:

1. Elis to be fully aware of the comments and implement changes such as the design of the poppers and the gaps at the back of the gowns.
2. Hospital policy for donning and doffing a surgical gown and gloves to be reviewed and shared with the team
3. Staff try alternative sizes if required – all sizes are now available.

Reusable surgical hats

This project has sparked lots of interest and conversation around sustainability and the changes that we can implement in the department in future. This has had a positive impact on staff morale and will hopefully be a driver for change in the department going forward.

Discussion

This project has demonstrated the potential for significant environmental and financial benefits through the transition from disposable to reusable surgical hats and gowns, alongside the introduction of bespoke EP procedure packs.

Although HHFT is a relatively small NHS trust, scaling these changes across the NHS could result in substantial reductions in waste, carbon emissions, and procurement costs, given the high volume of surgical gowns and hats used nationally. The findings of this project highlight the considerable opportunity for sustainable improvement through wider adoption of reusable surgical products.

The implementation of these reusable practices represents a meaningful step towards establishing a greener, more sustainable Heart Centre and supports the Trust's wider environmental sustainability objectives.

Introducing new products into a surgical department can be challenging due to the number of multidisciplinary stakeholders involved in delivering and managing patient care. Early stakeholder identification and engagement were therefore essential to ensure that concerns could be discussed and potential barriers to implementation identified at an early stage.

Initial questions regarding the safety and suitability of reusable products were addressed through a review of the available literature and through consultation with representatives from Kimal, Medicus, and Mölnlycke. This collaborative approach helped to provide assurance that the proposed changes would not compromise patient safety or clinical practice.

Despite strong support for the project, implementation has been delayed by ongoing commercial and procurement negotiations. Discussions between the Trust's procurement team and Kimal regarding the introduction of reusable gowns and hats, together with financial negotiations with Mölnlycke relating to the bespoke EP packs, have extended the implementation timeline. Although these processes have delayed the transition into clinical practice, they are necessary to ensure that contractual, financial, and logistical arrangements are fully established before the changes are introduced.

These challenges have highlighted that implementing sustainable change within healthcare is often a complex and time-consuming process, requiring collaboration between clinical teams, procurement services, and external suppliers. The experience gained through this project has demonstrated the

importance of effective stakeholder engagement, clear communication, and organisational support in successfully delivering practice change. Once procurement negotiations have been finalised, the proposed reusable gowns, hats and bespoke EP packs will be introduced into practice, enabling the anticipated environmental, financial, and operational benefits to be realised.

Conclusions

This project demonstrates that redesigning the EP procedure pack and transitioning from disposable to reusable theatre products offers significant environmental, financial, and operational benefits. The proposed bespoke Basingstoke EP Pack removes the need to add or remove items before each procedure, creating a standardised pack specifically designed for electrophysiology procedures. This not only simplifies preparation and reduces unnecessary waste but also improves efficiency within the clinical workflow. When combined with the introduction of reusable surgical hats and gowns and the removal of unnecessary disposable gowns from the Kimal packs, the cumulative reduction in waste and carbon emissions becomes even more significant.

Although we have not been able to implement any aspect of the proposed changes into practice, we are optimistic that with ongoing discussions, the changes will come to fruition, making the heart centre a 'greener centre'. In future projects, we would take more time, consideration and planning of how to best engage and build relationships with key stakeholders to drive projects forward faster.

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Appendix 1. Feedback Form for gown trial.



Sterile Gown Trial	
Site	
Name	
Grade/Surgeon/Nurse etc	
Speciality or Theatre No	
Procedure	
Date	

	YES	NO	COMMENTS
Was the gown clinically acceptable, with adequate protection for the procedure			

Gown Feedback

	YES	NO	COMMENTS
Did the gown fit you correctly?			
Was the correct size available to trial			
Was the gown easy to put on (Don)			
Was the gown easy to take off (Doff)			
Did the gown allow adequate movement?			
Was the gown comfortable to wear?			

Gown(s) used during the procedure (please circle)					
Standard Protection	SP	Medium	Large	Extra Large	3XL
Re-inforced	RF	Medium	Large	Extra Large	3XL
High Protection	HP	Medium	Large	Extra Large	3XL

Thank you for taking time to complete this form.
Please return it to the theatre office for collation.

Critical success factors

Please select **one or two** of the below factors that you believe were most essential to ensure the success of your project changes.

People	Process	Resources	Context
☐ Patient involvement and/or appropriate information for patients - to raise awareness and understanding of intervention ☐ Staff engagement ☐ MDT / Cross-department communication ☐ Skills and capability of staff ☐ Team/service agreement that there is a problem and changes are suitable to trial (Knowledge and understanding of the issue) ☐ Support from senior organisational or system leaders	☐ clear guidance / evidence / policy to support the intervention. ☐ Incentivisation of the strategy – e.g., QOF in general practice ☐ systematic and coordinated approach ☐ clear, measurable targets ☐ long-term strategy for sustaining and embedding change developed in planning phase ☐ integrating the intervention into the natural workflow, team functions, technology systems, and incentive structures of the team/service/organisation	☐ Dedicated time ☐ QI training / information resources and organisation process / support ☐ Infrastructure capable of providing teams with information, data and equipment needed ☐ Research / evidence of change successfully implemented elsewhere ☐ Financial investment	☐ aims aligned with wider service, organisational or system goals. ☐ Links to patient benefits / clinical outcomes ☐ Links to staff benefits ☐ 'Permission' given through the organisational context, capacity and positive change culture.