



SUSQI PROJECT REPORT

Project Title: 'Enhancing Sustainability Value in Endoscopy at RUH Bath: Simple Switches and PPE Reduction'

Project commenced: October 2024

Date of Report: December 2024

Team Members:

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Background:

The impact on human health of climate change is obvious and healthcare needs to respond urgently to the issue. Given the size and reach of the NHS, it is not surprising that its activities are responsible for 6.3% of UK's total carbon emissions and 5% of total air pollution. NHS England (2020a). In healthcare, endoscopy is a major contributor to the environment footprint generating around 3.09kg of waste per bed per day (Maurice et al 2020)

It is suggested that in the UK alone 2.1 million procedures were performed in 2019, Siau et al (2021,) therefore as a specialty we need to actively review and undertake actions to assist endoscopy services to become more sustainable. This is now actively being reflected by the growing body of recommendations and appetite for more sustainable working from national agencies including the joint advisory group on Endoscopy (JAG), British society of gastroenterology (BSG) and the Centre for sustainable Healthcare.

If NHS England aims to be net zero for carbon emissions by 2040, with the ambition to reach 80% reduction between 2028 to 2036, NHS England (2020b) it means active commitment and actions need to be implemented to secure any chance of reaching these goals. It is therefore imperative that endoscopy services create more sustainable departments.

These figures however appear daunting, and it may seem that the only way to tackle the issue is to introduce big projects to make any form of gains. As a result, many individuals feel the



introduction of local projects or small alterations to current practices are too insignificant to be beneficial and as such will not be received with any enthusiasm.

This idea, however, needs to be re assessed. It is important to understand that small projects are initiatives that generally require limited resources, budgets and timeframes compared to larger projects. They should be viewed as projects that can introduce incremental changes that over time can lead to considerable improvements in processes or indeed systems.

“Great things are done by a series of small things” Vincent Van Gogh

As a clinical Endoscopist the change review began at source, reviewing the procedures that I performed to try and identify any ‘small wins’ that could be achieved which led to the idea of switching linen sheets to paper couch roll during trans nasal endoscopy (TNE) procedures. A snowball effect immediately began as the idea was quickly expanded to the removal of pillowcases and incontinent (Inco) pads which are used prophylactically to protect the linen.

But why stop there? The idea continued, why not implement the changes to all outpatient oesophagogastroduodenoscopy (OGD) procedures.

But why stop there? This in turn led to reviewing the use of unnecessary personal protective equipment (PPE) during these procedures and linking with our infection control colleagues to ensure that we could reduce our usage in line with the trusts guidelines and policies. Whilst this aspect was not implemented, the conversations and education in reducing the unnecessary usage of PPE is now underway.

Specific Aims:

To reduce environmental waste (CO₂e) and monetary costs by

- Removing the use of unnecessary linen that requires laundering off site
- Removing the unnecessary use of Inco pads that are then placed into hazardous waste disposable bins
- To introduce tissue paper as an alternative that can be recycled post procedure



Sustainability mind set

- To introduce the ideas of sustainability in the Endoscopy department.
- To commence engagement with staff surrounding sustainability practices within the trust, namely PPE usage

Methods:

Studying the system

1. What were the numbers?

Total linen use and PPE utilization for trans-nasal endoscopy was initially calculated over a 4-week observational period during October 2024 (of the authors lists). The amount used vs the amount needed was identified in conjunction with consultation of the Hospital guidelines located within the Hospitals intranet website (Standard infection control precautions, National hand hygiene and personal protective equipment, policy number 622. Infection prevention and control surveillance, policy number 621. Linen, policy number 603. Aseptic non touch technique (ANTT), policy number 764, Cleaning policy for public and clinical areas, policy number 829) and liaising with the hospital's infection control team and consulting the intensive care society gloves off in critical care documents.

TNE procedures performed by the author- 41 (total number performed over the same 4-week period 85).

Linen results:

41 Patients

X 39 TNE in bed

X 2 in wheelchair (no linen used)

Of the 39 TNE patients:

X34 utilized x1 sheet x1 pillowcase x1 Inco per procedure

X5 utilized x5 couch roll x5 pillowcases, X5 Inco pads

In total 34 sheets, 39 pillowcases and 39 prophylactic Inco pads were utilized

PPE Results

Endoscopist requirements for PPE

Gown- 0 Used 0

Gloves- 82 Used- 82

Endoscopy nurse PPE requirements

Gowns needed -0 Used 75

Gloves needed- 82 Used- 154

The annual number of procedures was subsequently calculated based on the number of procedures performed over the same 4-week period for all outpatient OGD and TNE procedures.

TNE 1,584

OGD 1,224

2. Involving Patients

Prior to the project introduction, the Trusts patient experience and engagement teams were approached to identify if there was any baseline information surrounding patient experience on procedures and any environmental factors (i.e. linen usage). This information could be gained through outcomes from the friends and family test (FFT) results specific to endoscopy.

On examination of results there was no data that could be pulled through that was specific to our project and it was felt that given the small-time frame that was available for the project implementation alterations to the entire FFT card would not be appropriate.

As a result, a random selection of 10 un-sedated patients who were having both TNE and OGD procedures were asked post procedure if they would have minded being led on couch roll as opposed to linen. This was felt to be important as subject to the responses the project aims may

have needed to be altered significantly. Fortunately, the responses were all positive and mainly consisted of “not being aware what I was on in the first place” or “Too nervous to care”

PPE usage was advertised on the introduction of a new green board that was placed in the patient waiting area. This was to demonstrate that healthcare professionals do not necessarily use PPE for patient contact and that we are part of the Trusts campaign to reduce plastic waste as such in line with the trusts policies and guidelines. This was to help allay any possible concerns that patients and families may have had surrounding reduced infection control practices.

3. Involving staff

Contact with our infection control teams was important to ensure that what we were proposing was within guidelines and policies. It also in turn allowed us to be aware of other departments ideas and practices and so the identification of a national gloves off campaign that will be introduced within the trust and so our PPE aims were introduced to align alongside this.

The implementation of a green endoscopy group had recently been introduced and as such it was known that the department already had those across all grades who were engaged with the idea of healthcare sustainability. For this reason, it was important to utilize members of this team as green champions to help with the implementation of the project and to help communicate its roll out.

By utilizing the green members, it would be clear that this was a bottom-up approach to implementing ideas and change rather than a top-down approach, so assisting with the idea that introducing the project was team orientated rather than a change for change’s sake.

As with all projects effective communication surrounding the projects rationale and outcomes were discussed and disseminated via meetings and continued reinforcement. Clear and concise messaging was introduced outlining the reason for the change and delivered via various team members.

Changes Implemented:

- Removing the use of unnecessary linen that requires laundering off site
- Removing the unnecessary use of Inco pads that are then placed into hazardous waste disposable bins
- To introduce tissue paper as an alternative that can be recycled post procedure

PPE

Changes in progress /planned

- Education package and training
- Surveys
- Nursing Induction Handbook redesign
- Regular reminders and audit to ensure changes continue to be adhered to
- Green Endoscopy Board to advise patients of our PPE commitment to sustainability vs continued guideline adherence

The next step will be to have regular sessions on the use of PPE, with the introduction of the Gloves off campaign and staff surveys to help identify staffs understanding of PPE requirements alongside teaching sessions with the green champions and infection control teams.

This will obviously require regular and continued enforcement to change current mind sets and behaviors surrounding PPE. A new Endoscopy nurse handbook and induction package is also underway and will include all aspects of green endoscopy but also our PPE guidance utilization and use of linen in endoscopy. This will also be disseminated to all the Endoscopists regarding PPE via the endoscopy lead to reduce the chance of returning to old habits.

Measurements

Patient outcomes:

The changes made are unlikely to impact patient outcomes, so not formally assessed.

The impact of patient experience was considered and as above, a random selection of patients were interviewed on their experience of comfort during procedure.

Post project patient outcomes were not formally assessed. However, following the projects implementation, we will monitor FFT outcomes and liaise with our patient liaison teams to ensure that no concerns have been raised by patients following its introduction.

Economic sustainability:

Financial data was obtained via the trust's procurement and estates team.

There were no investment costs.



Social sustainability:

Having just emerged from a global pandemic with all the levels of PPE usage that were actively encouraged and demanded of us, we are now quickly turning our attention to how can we reduce our demand, reliance and usage of these products. For this reason, it is important that the idea of reducing the amount of PPE and other physical barriers to reduce contact such as incopads and sheets are dealt with sensitively and according to guidelines.

Staff attitudes towards the project was therefore as a result at times a challenge. For this reason, ongoing communication and re-enforcement is vital for the sustained outcomes to be maintained.

Ongoing education surrounding the use of PPE and sustainability in health care will continue. This will be facilitated through the allocation of green champions and the introduction of green meetings. This will enable current practices and ideas to be discussed. The green champions will also continue to monitor compliance

The department is in the process of re-writing induction packages and as such our green endoscopy champions will be identified, the green endoscopy board advertised, and the encouragement of all employees to take active roles in sustainability alongside appropriate PPE usage will be documented

Contact with other departments will continue following the creation of a green team to disseminate yet also understand and communicate with the department ongoing sustainable projects

The use of green champions and the commencement of green projects will and has started a discussion within the department and acceptance of the need for improved sustainability and practices.

Environmental sustainability:

A process-based life cycle assessment was used to estimate the GHG emissions associated with the incopad, and the couch roll. The analysis included GHG emissions associated with raw material extraction, transport and disposal. Packaging of items was excluded due to data unavailability.



Material weights and transport distance were converted into GHG emissions using emission factors taken from the [2024 UK Government Greenhouse Gas Conversion Factors database](#).

GHG emissions associated with the use of a pillowcase, sheet and laundering of a pillowcase and sheet were taken from John et al, 2024. It was assumed that the energy consumption of the laundry site in the study would be similar to the laundry service used at the RUH. Transport emissions were adjusted to reflect the distance traveled to the RUH’s off-site laundry services. The 85 mile round trip was converted into GHG emissions using the emission factor the vehicle per ton factor for an average HGV vehicle (as used in the 2024 study) taken from the [2024 UK Government Greenhouse Gas Conversion Factors database](#).

Results

Table 1 details the carbon footprint of each item:

Current procedure		Proposed procedure	
Item	GHG emissions per procedure (kgCO ₂ e)	Item	GHG emissions per procedure
Incopad	0.24	Blue couch roll	0.0549
Use of pillowcase and laundering of pillow case	0.090		
Use of sheet and laundering of sheet	0.348		
Total	0.677	Total	0.0549

By removing the use of an incopad, pillowcase and sheet and introducing couch roll, it's estimated that we'll be saving 0.622 kgCO₂e per procedure. Based on introducing this change to 100% of our TNE and OGD procedures, it's estimated that we'll save **1,747.0 kgCO₂e per year**.

Table 2 details the number of procedures and emission savings

	Procedures per year at RUH	GHG emission savings per year (kgCO ₂ e)
Transnasal procedures	1,584	985.5
OGD procedures	1,224	761.5
<i>Total</i>		<i>1,747.0</i>



Table 3 indicated the monetary savings per procedure and per annum based on a 100% switch

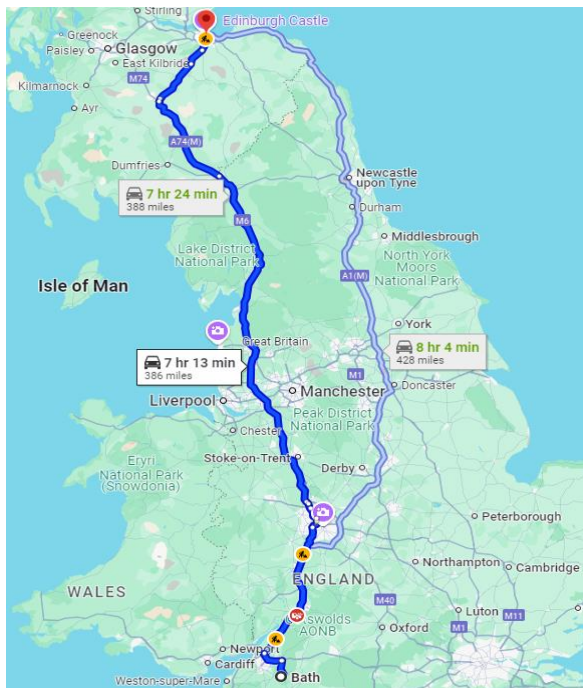
	GCG emission (kgCO2e)	Cost (£)
Savings per procedure	0.622	0.77
Savings per year for TNE (based on 100% switch)	985.47	1,218.85
Savings per OGD (Based on 100% switch)	761.50	941.84
Total savings per year (based on 100% switch)	1,747.0	2,160.68

To put the figures into context the emissions saved were translated into a visual format so that the outcomes could be better understood and communicated to staff, with a view to assist in engagement and realization of how small changes can make an impact

A saving of 1,747.0kgCO2e per year is equal to:

Driving 5,147 miles in an average care from Bath to Edinburgh 6.4 Times or

Flying London to Glasgow and back 4.7 times



Whilst this has not been implemented yet, there will be additional carbon and cost savings with the implementation of the PPE initiative.

Conclusions:

With the current demands that the NHS is facing it could be argued that the main threat to the concept of sustainability in health care is a financial one. However, we must be mindful that healthcare takes place within a social and environmental context. As a result, we must find ways that allow us to deliver optimum healthcare with minimum financial cost yet also with minimal harmful environmental impacts.

The intervention introduced within the project has started, albeit at a small-scale level, to assist in both aspects. Reducing CO2 emissions yet in conjunction with financial gains due to re assessing how we practice everyday tasks is a small step in altering people's mindset to the possibility of introducing change at any level. The results gained from this intervention could in turn be reproduced within different departments.

Whilst all the implementations have not been introduced or completed during the project timeframe, it has demonstrated the concept that small ideas can lead to others and in so doing create a movement of change by realizing that we can all play a part in sustainability, not just within health care but in all aspects of our life.

References and Resources

Maurice J.B, Siau K, Sebastian, S et al(2020). Green endoscopy: a call for sustainability in the midst of COVID 19. Lancet gastroenterology hepatology 5,(6) pg 6-8

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<https://www.engage.england.nhs.uk/survey/nhs-net-zero/> (accessed November 2024)

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Siau K, Hayee B, Gayam S. Endoscopy's current carbon footprint techniques and innovations. Gastrointestinal Endoscopy 2021: 23 pg. 344-352

This template is adapted from [SQUIRE 2.0 reporting guidelines](#).

Template References

- [SQUIRE | SQUIRE 2.0 Guidelines \(squire-statement.org\)](#)
- [Home | Sustainable Quality Improvement \(susqi.org\)](#)



