NHS
The Leeds Teaching Hospitals
NHS Trust

CENTRE for SUSTAINABLE HEALTHCARE
inspire • empower • transform

GREEN WARD COMPETITION

CENTRE FOR SUSTAINABLE HEALTHCARE

2022 IMPACT REPORT
LEEDS TEACHING HOSPITALS NHS TRUST

GREEN WARD COMPETITION

POTENTIAL YEARLY SAVINGS FROM GREEN WARD COMPETITION PROJECTS

£8,945.95

8,594.8 kgCO2e

CENTRE FOR SUSTAINABLE HEALTHCARE

CARBON SAVINGS EQUIVALENT TO

The same amount as 343.8 mature trees absorb on average per year

24,661.5 miles in an average car
(63 return trips between St James Hospital, Leeds and Trafalgar Square, London)

CENTRE FOR SUSTAINABLE HEALTHCARE

TABLE OF CONTENTS

INTRODUCTION

Climate change is having far reaching consequences for planetary health, including within the United Kingdom, and is accepted as one of the greatest threats to the health of global populations[1]. In addition to climate change, the integrity of our environment, on which we depend, is threatened by pollution (air, plastic and chemical pollution), water scarcity, soil degradation, deforestation, and loss of biodiversity.

Whilst healthcare systems have a key part to play in maintaining health in the face of the threat of climate change, the delivery of healthcare is also undermining the health of our populations, by contributing to the problem. If healthcare were a country, it would be the 5th largest carbon emitter in the world[2].

However, climate change can also be viewed as 'the greatest global health opportunity'[3]. The NHS was the first health service globally to commit to net zero carbon and was cited by the Intergovernmental Panel on Climate Change (IPCC) as a global leader[4]. In the delivering a net zero NHS report[5], strategies to achieve this target are laid out. While National and international government action will be required, e.g., to decarbonise electricity, transport and supply chains, net zero will not be possible without front line NHS staff.

Clinicians have intimate knowledge of a vast range of medications, resources and equipment used for their daily practice to provide best, evidence-based care for their patients. Non-clinical teams are too essential to ensure that resources and patient care pathways are effective. The combined knowledge and understanding across of all aspects of care is vital when making the carefully nuanced decisions on how to maintain or improve clinical care whilst reducing environmental, social and financial cost.

The Green Ward Competition is a clinical leadership and engagement programme for NHS Trusts wishing to improve their sustainability practice. Rachel McLean, Green Ward Programme Manager with the Centre for Sustainable Healthcare (CSH), has worked directly with 5 teams across Leeds Teaching Hospitals NHS Trust (LTHT) to develop, run and measure projects that add sustainable value within their service, by considering the 'triple bottom line' of reduced environmental harm, reduced financial waste, and adding social value.

Running the competition in a Trust also builds a community of clinical staff who are empowered, enthused, and equipped to further improve their services for the future, guided by the concepts of the triple bottom line and sustainable healthcare.

References

1. The Lancet and University College London Institute for Global Health Commission (2009). Managing the health effects of climate change, *The Lancet Commissions*, 373(6976), 1693-1733, DOI: https://doi.org/10.1016/S0140-6736(09)60935-1
2. Health Care Without Harm and ARUP (2019). *Health Care's Climate Footprint: How the health sector contributes to the global climate crisis and opportunities for action*. Available from: https://noharm-uscanada.org/content/global/health-care-climate-footprint-report
3. Watts, N., et al. (2015). Health and climate change: policy responses to protect public health. *Lancet (London, England)*, *386*(10006), 1861–1914. https://doi.org/10.1016/S0140-6736(15)60854-6
4. IPCC (2022): *Climate Change 2022: Impacts, Adaptation, and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the IPCC. Cambridge University Press. In Press.
5. Greener NHS, 2021: Delivering a 'Net Zero' National Health Service. Available from: http://www.england.nhs.uk/greenernhs/a-net-zero-nhs/

1. A GREENER 'HUB' - A MORE SUSTAINABLE VISION FOR MEDICAL EDUCATION WITHIN THE UNDERGRADUATE HUB.

TEAM MEMBERS: Cleone Pardoe – Clinical Teaching Fellow, Post-IMT2 Doctor, Alexander Strother – Clinical Teaching Fellow, Post-FY2 Doctor, Linh Mao – Undergraduate Medical Education Clerical Officer & Receptionist, Amanda (Mandy) Shotton – Undergraduate Medical Education Service Manager

Project Aims:

1. Reduce the impact of our self-directed practice (SDP) rooms across the triple bottom line, by streamlining equipment packs for our 5 most popular skills: NGT, ABG, cannulation, venepuncture and catheter skills.
2. Empower students to be conscious of the financial and environmental cost of items they use in the SDP and clinical environments.
3. Save the Undergraduate department money, that can be better invested into improving the student experience and promoting sustainable healthcare.

Background:

Based at St James's Hospital, the 'Hub' represents the heart of Undergraduate Medical Education at LTHT. We consist of a diverse education and administration team and are committed to being a place of teaching excellence to the roughly 200 MBChB and Physicians Associate students rotating through our department every month. Further, not only do we facilitate teaching sessions on countless topics, we deliver simulation training, run mock examinations and have two dedicated 'self-directed practice' (SDP) rooms, equipped with everything students need to hone their clinical skills independently.

As a Medical Education team, we believe we are uniquely placed to promote 'greener' healthcare systems by preparing future clinicians to deliver first-class care to an ever-more complex patient population. As individual clinicians, we will likely care for thousands of patients throughout our career. But as educators, we play a role in training hundreds of students every year, who will in turn care for hundreds of thousands of patients. We believe that by educating future clinicians at this early stage in their training on the importance of sustainable healthcare, we can support delivery of truly holistic care that both protects and promotes the health of current and future generations.

Approach:

Studying the system: A review of the booking system identified which skills were most popular in the past 12 months as well as then process students would go through to use the room. This process involved an online booking system where students detailed when and what skill/s they wished to practice. Upon arrival at the hub students were given equipment they needed in the form of a specific 'pack', according to a list that had been in use for many years.

A baseline audit of storeroom inventory and SDP room use audit identified items that were

- Not required (unnecessary to the student experience nor reflective of real-life clinical practice)
- Required and potentially reusable

- Required and single use (needs to be replaced and purchased each time)
- Damaging to expensive equipment (e.g., alcohol-based cleaning solutions damaging to material of training arms, reducing their life span)
- Missing from the packs, which would be beneficial for student experience (e.g., gauze).

Engagement: Students were engaged to ensure a balance between sustainable changes and keeping an authentic and realistic experience for the students to practice their skills. A brief electronic questionnaire accessible via QR codes provided insight into why current students were using the SDP rooms, what an 'ideal' SDP was for students, and their thoughts on sustainable practice. This also supported us in developing our change ideas.

Changes implemented

We created new, sustainable 'packs', that could be collected by students when they arrived for their session. Metal trolleys were added to each SDP room, stacked with repurposed, labelled containers for students to put their unused and potentially reusable equipment in when finished (see image). Each label included the price of the relevant item, demonstrating how much money their simple actions could save, empowering students to take their learning into the clinical environment.

The sustainable packs are remade at the end of each week with the reusable items students have placed in the trolley, with single use items (e.g., canula) added as needed. Each skill pack has a clear, illustrated document of what needs to be included to facilitate this process.

A running total of CO2e savings with equivalent to miles driven in a car is shared on each room whiteboard and will be updated at the end of each month highlighting the environmental savings from their actions.

Measurement:

Financial: Price per unit was obtained from a comprehensive costing list from the Trust Supplies and Procurement team. We calculated savings by reviewing what we had saved through: a) removing unnecessary items; and b) reusing items that were previously thrown away. We added an additional cost to purchase cannulas, which were previously included as part of a larger pack (given free to the hub) that had contained several unnecessary items.

Environmental: CO2e were calculated for every piece of equipment based on the item cost or weight with the relevant emissions factor from the Carbon factors Greener NHS Team 2020-21. We used our audit to compare how many items were required pre and post introduction of our new sustainable packs.

Social: A questionnaire (Appendix 1) to collect both qualitative and quantitative data from our students ensured their voices were heard and at the heart of our initiative. This questionnaire sought to determine a number of important variables, including the students' wider views on the importance of sustainable healthcare as discussed above. It could be completed quickly and easily by scanning one of QR codes found in each SDP room, which would direct students to our Google form. These QR codes will remain available to the students beyond the Green Ward; we are always open to ideas on how we can improve these spaces for their learning and the planet. Informal, qualitative data from the wider education team on how they have been inspired by the project and how they might change their practice as a result.

Results:

The balance for each 'pack' was calculated and used to predicted savings over 12 months, based upon the previous 12 months' usage of the SDP room.

Environmental benefit: The total predicted savings amounted to **538.16 kgCO2e.** This is the equivalent to 1,544.12 miles driven in an average car.

Financial benefit: The new packs will save our department **£623.39 per year**.

Clinical and health outcomes: The potential clinical impact is vast due to the huge number of students who come through our SDP rooms and already work in clinical environments on their placements. Our student feedback questionnaire identified 42.9% students had never previously considered the environmental impact of their clinical skills.

When asked whether students had changed their practice to reduce waste, their responses were again encouraging:

> *"Yes - not using what is not necessary to practice examination"*
>
> *"After this, I will be more mindful of how much equipment I take out of their packets on the ward"*

Social sustainability: We were pleasantly surprised by how engaged students were in this process; the trolleys were overflowing with unused and potentially reusable equipment, and everything was in its correct tray. In response to asking if there was anything more we could do in addition to our current, thoughtful changes, the students responded positively:

> *"Not based on the environmentally friendly packs given today. They were sufficient for practicing the technique"*

Without the engagement of our students in this culture change, the remaking of the kits at the end of each week would be time consuming to our staff. Fortunately, we found that both staff and students have very willingly engaged, and there have been no issues in terms of compliance for students to return equipment as requested, and no complaints from staff into the time taken to remake packs at the end of the week.

Our project has also sparked enthusiasm and conversation for sustainable medical education not only within our own team, but across the student cohort, management and Postgraduate teams. Amanda, Undergraduate Medical Education Service Manager, attended regular meetings and updated key stakeholders throughout the project which was vital to this engagement. Please see below some reflections from the Undergraduate team:

> Ellie (CTF): *"This project has changed my clinical practice - I now ensure I only take the equipment I need for each clinical skill"*
>
> Jordan (Medical Education Administrative Coordinator): *"The whole project has been eye-opening. It has been great to see how much the students have got on board with the initiative"*

Barriers encountered:

A proportion of equipment required to assemble our clinical skills 'packs' was derived from pre-prepared, sealed packets, supplied to the department free of charge. These packs often contained one essential item with several unnecessary items. We ultimately made the decision to stop using the packs and purchase the individual items, such as Tegaderm IV cannula dressings and cannulas. Despite the additional cost, we overall have made financial savings.

When making our changes, we were left with unused equipment in our storeroom which was no longer needed in the sustainable packs. While in-date equipment was returned to clinical environment for patient care, this was not possible for out-of-date equipment. We are currently in discussion with other teams to find them an alternative home.

Steps taken to ensure lasting change and conclusion:

We believe the ongoing success of this project is possible due to the positive engagement and dedication of staff and students alike. Through our discussions with staff, clinicians and students, one thing is clear: people genuinely *care* about sustainability, especially students. We believe we have empowered students to be more mindful of the financial and environmental impact of their clinical practice. Both 'mindful' and 'conscious' were words used by our students in their questionnaire responses. This will ensure not only that our SDP room changes continue, but that students will move on to clinical work with both competence in their skills and awareness of environmental impact of their care.

We have further ideas to further enhance our sustainable teaching including going paperless via use of QR codes to share information, a digital educator platform, and use of iPads which have recently been funded (saving 26,280 sheets of paper and additional 113.72KgC02e per year). We are also working on delivering an interactive workshop on sustainable healthcare to newly graduated junior doctors, on the principles of sustainable care and how we can integrate these with practice.

Our project has sparked enthusiasm and conversation for sustainable medical education across the student cohort, management and Postgraduate teams. We are motivated to ultimately extend this platform to those involved in medical education across the region and are equally inspired by our interactions with students from the Leeds Healthcare Students for Climate Action (HESCA) and Planetary Health Report Card; two student-led initiatives which seek to inspire medical institutions to adopt and promote sustainable healthcare practices in the UK and worldwide.

2. THE PATIENT ENVIRONMENT ACTION TEAM (PEAT) SUPPORT CLINICAL AREAS TO BE MORE SUSTAINABLE

TEAM MEMBERS: Jemma Robinson - Facilities Operational Manager, Carl Hyatt - PEAT Technician, Matthew Robinson - PEAT Technician, Claire Flanagan - Facilities Operational Manager, Project Support - Matthew Quinton - Waste Compliance and Sustainability Manager

Project Aims:

1. Successfully implement active dry mix recycling (DMR) and Battery Recycling through staff engagement and behaviour change, reducing Trust carbon emissions.
2. Engage and increase staff awareness on sustainable actions, via a bespoke' Sustainability' leaflet
3. Identify ways the PEAT team can show continuous commitment to sustainability across the Trust in support of the Trust Green Plan and net zero ambition.

Background: The Patient Environment Action Team (PEAT) undertake a range of tasks including complex cleaning, minor routine maintenance works and repair of defected equipment. Visiting over 60 clinical areas annually, we felt we could play an active role in sustainable practice via meaningful engagement with clinical teams.

Strategic choice of project: Recycling is highlighted as a key area of focus in the Trusts Green Plan[1] and is one of the most common requests the sustainability team are asked about. Not only is domestic and clinical waste more costly to the Trust than recycling, but incorrect disposal of hazardous waste such as batteries, could result in additional cost in the form of fines issued to the trust due to non-compliance of appropriate waste disposal. Batteries are a hazardous waste and have potentially toxic metals which can leak into landfills and pollute drinking water if managed inappropriately.

Approach:

- An audit established that only 4/56 areas were actively using dry mix recycling (DMR). 0/56 areas had access to battery bins. For most areas, batteries were being placed in a Sharp Smart Waste container.
- We engaged with clinical staff during our audit, and pleasingly, found they were appreciative of the PEAT work and reported access to DMR and battery recycling would be valuable to them.
- We also engaged Matthew Quinton, Waste Compliance and Sustainability Manager, who confirmed that the incorrect disposal methods currently used were costly to the Trust. Access to appropriate battery recycling had also recently been identified as an action for the Trust following an external Waste management audit.

Changes implemented:

- Suitable areas for trial of DMR bins and Battery recycling were identified as those already on the PEAT schedule, as this would ensure sustainability of the project long-term.
- DMR bins were placed in non-patient facing, clinical staff break rooms for trial.
- Unused containers already available to the trust were labelled and repurposed to promote recycling.
- For the duration of the project, to minimise cross-contamination risks, full battery bins were collected by the PEAT team following contact from the ward clerk. However, a longer-term collection plan of adding this to the trust porter system is being considered. Batteries are collected via the Battery Back Scheme operated by WasteCare[2].
- A sustainability leaflet was shared with clinical areas, including useful contact numbers, information on the Leeds GRASP rewards, Carbon Literacy training, and PEAT 'let us help you' section. (Appendix 1).
- Contact details for the Trust Sustainability team were also left in a sustainability leaflet, should clinical teams wish to request implementation of DMR in clinical areas.

Measurement:

We successfully initiated and installed DMR and battery recycling for trial across 7 clinical areas. Data was collected between the 7/2/2022 and 18/2/2022.

Environmental: We collected data on how many DMR bags were filled on average per week, extrapolating an average weight per bag. The average weight of DMR and batteries in tonnes was used to calculate carbon savings. Clinical waste incineration emissions factor from Rizan et al (2021)[1] was used.

Financial: Matthew Quinton, Waste Compliance and Sustainability Manager, provided Trust costs of various wastes streams. Prior to implementation of DMR, all waste was disposed of via domestic waste at £97.00 per Tonne. As batteries were being disposed of via sharps bins, an assumption was made that batteries were previously disposed of in clinical waste, and therefore incinerated at £925.00 per Tonne. Use of DMR would reduce the cost to £89.00 per Tonne for recycling. Battery collection by WasteCare is free to the Trust.

Social: Informal feedback was gained by engagement with clinical staff.

Results:

Environmental benefit:

DMR: Waste disposal emissions were reduced by 9.47 kgCO2e for the 7 areas per week (492.89 kgCO2e per year). If applied to the remaining 79 areas (excluding 4 that already had DMR), the projected annual saving **is 5562.62 kgCO2e**.

Battery bins: Emissions reduced by 1.25 kgCO2e on average per week, per trial area. Due to the nature of clinical work, there will be significant variation in how quickly areas fill Battery Bins, making it challenging to accurately project data. We have therefore projected the annual potential savings as a percentage of our actual data. Projected at 70%, the potential annual saving across the 7 trial areas is 318.5 kgCO2e. As a conservative estimate, projected across the remaining 76 areas in the trust with 30% applicability, an additional **1,482 kg CO2e** could be saved across the Trust.

Financial benefit:

DMR in the 7 trial areas saved the Trust approximately 50p per week, with an annual saving of **£26.11**. If applied to the other 79.00 areas with no DMR this would be a projected annual saving of **£294.71.**

Battery recycling saved £1.15 on average per area per week. Projected at 70%, there is a potential annual saving of **£291.20**. Projected at a conservative 30% across remaining 76 areas **£1,358** could be saved annually across the Trust.

Social sustainability:

Engagement with clinical teams showed that staff care about becoming more sustainable. The sustainability leaflet has supported awareness and so far, the sustainability team have received three emails requesting DMR recycling in clinical areas. Matron, Honey from Ward J04 said

> *"The implementation of DMR and Battery recycling has been very beneficial to the area as it is cost effective and good for the environment" and "The PEAT team are an asset to the Trust, very helpful and always willing to go above and beyond in their works, improving the Patient Environment".*

Barriers encountered:

DMR in clinical areas was not possible due to a) concern raised by Infection and Prevention Committee, b) it required training delivered by Trust Waste Trainer, and c) it required additional waste segregation be arranged on site, which was not feasible for the scale of this project. This continues to be a longer-term trust wide project.

Steps taken to ensure lasting change and conclusion:

Meaningful engagement between PEAT Technicians and clinical staff has been key to successful implementation of this project. Whilst continued long-term implementation of DMR and Battery bin recycling will transition to the Trust's Sustainability team, we feel our project has shown that all staff have a role to play in achieving net zero ambitions.

We will continue to embed sustainable improvements into our work. A sustainability assurance section has been added to the PEAT 'works carried out sign off sheet' including staff engagement actions to promote the aims of this project. Two successful stock room reviews have been carried out jointly with ward clerks with issues including out of date stock, stock no longer required in the area, and ample stock with ongoing continuous orders risking additional out of date items noted. We are continuing to 'study the system' and identify change ideas jointly with clinical teams to support streamlining stock ordering and storage management.

References

1. Feeds Teaching Hospitals NHS Trust Green Plan 2020-2022. Available at: LTHT-Green-Plan-FINAL-compressed-v2.pdf (leedsth.nhs.uk)
2. Batteries - WasteCare Compliance
3. Rizan C, Bhutta M, Reed M, Lillywhite R. The carbon footprint of waste streams in a UK hospital. Journal of Cleaner Production 286 (2021) 125446. Available at https://www.sciencedirect.com/science/article/abs/pii/S0959652620354925

Think before you print!

A simple way to have a huge impact on the environment is through reducing paper consumption, by turning paper documents into electronic ones and eliminating paper.

A tree can only produce, on average, 17 reams of paper, and takes about 100 years to grow. By reducing paper usage, we can have a direct impact on reducing our carbon footprint.

Additionally, trees are also 'carbon sinks' and every tree that is not cut down for paper usage is able to absorb C02 gasses. The average tree can absorb around a ton- 2,000 lbs- of C02 in its lifetime.

Additionally as reviewed as part of the annual NHS Patient Led Assessment of the Care Environment (PLACE) inspections, Clinical areas should create a sense of tidiness for our Patients, and reducing non essential notices from notice boards, not only create a tidy environment but would also reduce the use of paper.

PLACE guidelines state that:

- Reception areas and nursing stations should look neat and tidy.
- Noticeboards should display only essential information and up-to-date notices.
- There should be separate noticeboards for patient and staff information.

Useful Information:

Key Contact Details:
Waste Compliance Team - leedsth-tr.eafwastecompliance@nhs.net

leedsth-tr.sustainability @nhs.net

Useful Links:
https://www.england.nhs.uk/greenernhs/

http://lthweb/sites/sustainability

LTHT– Green Plan : http://lthweb.leedsth.nhs.uk/sites/sustainability/ltht-green-plan-final/view

GRASP the Challenge!

Be sustainable, get rewarded with GRASP Rewards!

We're making it easy (and rewarding!) for all Leeds Hospitals staff to take positive environmental actions. We have launched GRASP Rewards to show that you can make a difference. The online platform and mobile app will show you a range of simple actions you can take that will have a big impact. In return, you will be awarded Green Points!

Each month those who earn the most Green Points will win a £20 voucher, or you could be our lucky monthly raffle winner simply for taking part. Choose from activities like energy quizzes and reporting your recycling or try eating local food and growing your own plants!

That's not all: you'll compete as part of your CSU team, and every six months the teams that have earned the most Green Points per person will win a share of £200 to donate to their favourite Leeds Hospitals Charity funding area.

How can I join?

Homepage (greenrewards.co.uk)

What do I need to do?

1. Turn it off
2. Turn off the light when outside is bright
3. Save Water
4. Dry Mixed Recycling
5. Segregate Waste
6. Leave your Car at home
7. Measure your Carbon Footprint at: *https://footprint.wwf.org.uk/#/*

For help contact the Sustainability Team:

leedsth-tr.sustainability @nhs.net

GRASPRewards

NHS The Leeds Teaching Hospitals NHS Trust

How can you and your area contribute to a Greener NHS?

"Be Green, Recycle, be Aware, be Sustainable for our Patients "

Climate change poses a major threat to our health as well as our planet.

The environment is changing, that change is accelerating, and this has direct and immediate consequences for our patients, the public and the NHS.

This is why the NHS has launched the 'For a greener NHS' programme, to build on the great work being done by trusts across the country, sharing ideas on how to reduce the impact on public health and the environment, save money and – eventually – go net carbon zero.

At Leeds Teaching Hospitals we are already doing lots of great work to reduce carbon, waste and air pollution across our hospital sites.

National ambition

To deliver the world's first net zero health service and respond to climate change, improving health now and for future generations.

This leaflet, sets out how you personally and your area can become more sustainable, working together to reduce carbon emissions at Leeds Teaching Hospitals Trust (LTHT).

Estates and Facilities

LTHT– Green Plan

Our Green Plan

We have the aspiration to become one of the greenest NHS Trusts in the UK. Our Green Plan is the central document for the Trust's sustainability agenda including our objectives and how they will be met.

This Green Plan establishes the Trust's sustainable vision, our targets and the actions by which to achieve this vision. The Trust considers sustainability to be a key issue facing the future, for the Trust, the City of Leeds, the UK and beyond.

The Green Plan is designed to enable us to:

- Reduce our total carbon emissions (through consumption of fuels, energy, and materials consumption)
- Reduce our contribution to air pollution
- Reduce our use of plastic and improve recycling

During 2021, The Trust was proud to announce that they were recognised as the first NHS Trust to become Carbon Literate!

PEAT Team– Let us help you!

The Patient Environment Action Team (PEAT) are a dedicated team from Estates &Facilities (E&F), who attend Clinical areas annually to carry out minor routine Estate and Maintenance works, along carrying out Vent, Light and Radiator cleans.

The PEAT team want to help you and your team become more sustainable!

Commencing February 2022, as part of their scheduled visit, the team will help you become more sustainable by:

- Supporting the installation of Dry, Mixed Recycling in Staff rooms.
- Supporting the installation of battery Recycling stations.
- Offer you a review of your store rooms, with the aim to de clutter aligned with Lean 4 Leaders 5S key principles.
- Leave you with a 'How can you and your area contribute to a Greener NHS' information leaflet.

Waste Segregation

Did you know that It is a legal requirement to segregate your waste correctly?

Correct segregation saves the Trust both £££'s and CO2.

- General and Offensive waste - all goes waste to energy.
- In 2021 462.13kg of CO2 Saved = 2000 planted trees.
- LTHT have introduced reusable sharp containers and some of our clinical waste is repurposed.
- Confidential Waste - green bags or hessian sacks—100% of the waste is shredded and recycled.
- Only dispose of clinical waste into the correct clinical waste receptacles or bags .

The Trust's Waste Compliance team are happy to support with any queries or training you or your team may require:

leedsth-tr.eafwastecompliance@nhs.net

Dry Mixed Recycling (DMR)

What CAN be put in a dry mixed recycling bin ?

- Cardboard
- Plastic Bottles (clear and coloured plastic bottles)
- Tin and cans (clean and empty food and drinks cans)
- Paper (Not confidential)

What can NOT be put in a dry mixed recycling bin?

- Coffee Cups
- Contaminated Food Packaging
- Tissues
- Confidential waste

Carbon Literacy Training

Carbon Literacy is externally accredited training designed to educate colleagues about climate change.

If you would like more information on the above or would like to arrange training for your team, please email :

leedsth-tr.sustainability @nhs.net

Energy

Electricity

The Trust encourages staff to save energy by remembering to turn off lights and electrical equipment such as computers when they are not required.

Natural lighting should be utilised by opening blind and curtains and turning lights off when appropriate, this also helps patients and staff by promoting health, wellbeing, alertness, mood and good sleep patterns.

At night, where suitable, lights should be turned off to reduce light pollution and help patients sleep properly.

Side room lights should be turned off if not needed and all lights in non-clinical areas should be turned off when leaving work. The Trust are trialling the installation of occupancy sensors on lights in priority areas.

Did you know?

1 computer left on overnight creates enough CO2 to fill a double decker bus!

Heating

Regulating room temperatures for patients is a priority, this should be done without using electric heaters which could overload the electricity supply and put patients at risk. To keep rooms warm and protect patient safety and privacy close doors and windows. Blinds and curtains should also be closed at night to retain heat. Please contact the sustainability team if your workplace is too cold.

Water

The Trust spends >£1 million on water a year, and uses enough water to fill 26,500 baths a day!

You can help reduce the amount of water used by the Trust by not leaving taps running and reporting any dripping taps or leaks to Estates using the K2 Portal on the Intranet.

3. REVIEW OF THE HAEMODIALYSIS PROCESSES IN A SINGLE SATELLITE DIALYSIS UNIT WITH THE AIM TO REDUCE CARBON AND WASTE.

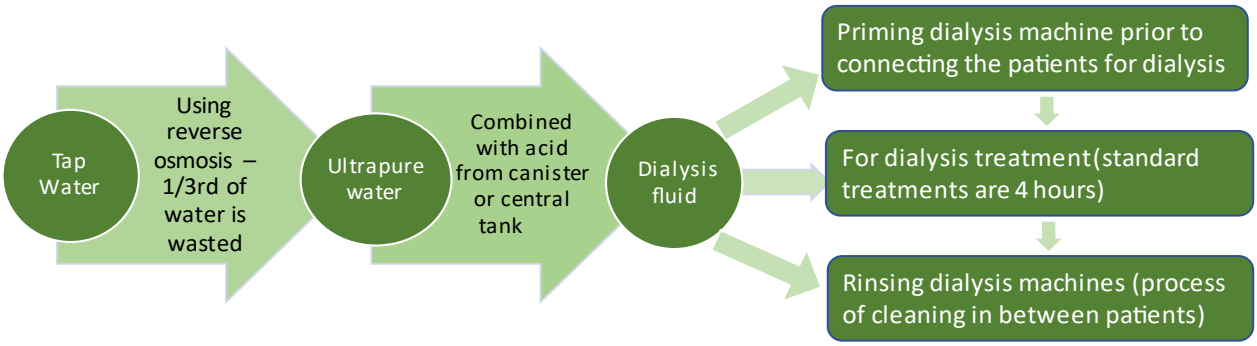
TEAM MEMBERS: Alison Hardy – Satellite Dialysis Unit Sister, Peter Jones – Renal Technical Services Manager, Terence Simpson – Renal Technologist, Dr V R Latha Gullapudi - Consultant Nephrologist, Dr Mark Wright- Consultant Nephrologist and Haemodialysis Lead

Project Aims:

1. Reducing the number of disinfections of the dialysis machines to once in 24 hrs in staggered manner and replacing the others with rinsing process
2. Once the initial priming process of the dialysis machines is complete, placing them standby mode whilst waiting to connect patients to the machine
3. Reducing the number of pharmacy deliveries from weekly to biweekly to the satellite dialysis unit
4. Reviewing the processes to enable usage of wastewater generated during the process of water purification for dialysis
5. Identifying potential ways of reduction in wastage of canister acid
6. Recycling of the empty acid canisters

Background: Haemodialysis is lifesaving therapy for patients with kidney failure. However, it comes with huge environmental costs, including usage of vast amount of medical consumables, water, and electricity. It is estimated that 3.8 tonnes of carbon-dioxide equivalent emissions are produced by one patient's dialysis treatment per year[1].

Studying the system: We started by creating a process map of the steps from the production of dialysis fluid to use of dialysis machine, with major steps outlined below.



Of approximately 350-400 litres of water utilised during each dialysis session, a significant part (1/3rd to 2/3rd depending on the system) is wasted during the process of purification. In the satellite unit under review (1 of 8 in LTHT), we provide services to our patients in two different shifts per day. This means that a single dialysis machine is routinely used for provision of two dialysis treatments in a 24 hour period. As per the standard practice of the unit, the dialysis machine gets three heat disinfections (the beginning of the day, in between patients and at the end of the day). As a part of the routine, dialysis machines are primed and turned on at the beginning of the day, and dialysis fluid runs continuously whilst waiting for the patients to be connected. The process of dialysis requires several consumables like lines, dressing kits, pharmaceutical products which are currently delivered from the central hospital services weekly.

Changes implemented:

The proposed plans for aims 1 and 2 were discussed with the staff on the unit during daily handovers to seek their views and encourage staff engagement. Staff were enthusiastic to try the suggested changes. The whole unit (and all dialysis machines) are visible at the same time, which helped us to successfully remind the team of the changes in the initial stages of implementation.

A similar approach was adopted with aim 3 with seeking staff opinions regarding the sustainability of fortnightly deliveries by exploring the availability of the storage space, rearranging few storage cupboards to improve the utilisation of the available space, and relabelling of the cupboards as per the new agreed storage arrangements.

Measurement:

Aim 1: We measured the electricity and water usage with each episode of disinfection and rinse during 24 hour periods for one dialysis machine. We then projected the electricity and water use over one year.

Table 1: *Comparison of the differences in the power and water consumption in the Satellite dialysis unit with Standard vs Changed practice*

Table 1	Standard practice		Changed practice	
Number of actions/ day	3 disinfections	0 Rinse	1 disinfection	2 Rinses
Number of stations in dialysis unit	10	0	10	10
Working days/ week in dialysis unit	6	0	6	6
Number of action/ week in dialysis unit	180		60	120
Number of action/ year in dialysis unit	9360	0	3120	6240
Power Consumption/action (Kwh)	0.75	0	0.75	0.1
Power Consumption/year (Kwh)	7020	0	2340	624
Total Power per year (Kwh)	7020		2964	
Water Consumption/action (L)	14.6	0	14.6	4.4
Water consumption/year (L)	136656	0	45552	27456
Total water per year (L)	136656		73008	

**Action refers to disinfection or a rinse process; Kwh- kilo watt per hour; L- litres.*

Aim 2: We collected data regarding the waiting times between the dialysis machined being primed and turned on, to when a patient was connected, over a period of one week. This data was utilised to calculate the average time per dialysis station per day. We then measured the consumption of electricity, water and central acid usage during this waiting time per minute and projected it over a one year period. There is a scope for further savings from this change by reduced number of central acid deliveries, however it is not possible to precisely calculate at this stage.

Table 2: *Summary of the power, water and acid consumption during the standard practice of allowing continuous flow of dialysis fluid whilst waiting for patients*

Table 2	Standard Practice (Continuous flow of dialysis fluid whilst waiting)
Average waiting time/machine/day (minutes)	135
Number of stations in dialysis unit	10
Working days/week in dialysis unit	6
Total average waiting time/week (minutes)	8100
Total waiting time/year (minutes)	421200
Power consumption kwh/minute	0.004
Total power consumption/year (kwh)	1684.8
Water consumption/minute	0.12
Total water consumption/year (L)	50544
Acid consumption/min (ml)	8.33
Acid consumption/year (L)	3508.596

**Kwh- kilo watt per hour; L- litres; ml- millilitres*

Aim 3: Reducing pharmacy deliveries from weekly to biweekly will lead to an average saving of 104 miles in transportation per year. We are liaising with the teams at the other satellite units within the Trust to investigate if the same change is feasible in their setting. This would yield higher milage savings.

Aim 4: We measured the water wastage from the purification system at the satellite unit and it comes to 1,337,000 litres/ year. We are liaising with appropriate teams to enable redirection of this water to grey water systems of our healthcare setting. Significant progress has been made in one of our other satellite dialysis units and we are looking forward to continuing this work to maximise the benefit of water preservation.

Aim 5: As demonstrated in flow chart 1, we use acid supplied in 6 litre plastic canisters and our standard practice is to use one canister for each patient/ treatment. The leftover acid goes down the drain systems. On measurement of the wastage of the acid, the cumulative wastage of acid comes down to 18.75 Litres over 10 dialysis treatments. We are currently exploring the feasibility of avoiding this wastage, by liaising with the infection control team regarding potential safety issues if we were to use a cannister for multiple patients.

Aim 6: Currently we do not recycle the plastic acid canisters. We are in discussion with the hospital wastage management team regarding recycling potential of these canisters by using existing steri-melt facilities.

Results:

Our data enabled to calculate the impact of changes made for aims 1, 2 and 3. For travel, water and energy conversion factors from the UK government BEIS 2021 database were used. Pharmaceutical carbon factors were taken from the Greener NHS Team 2020-21. In total, changes implemented from our aims 1, 2 and 3 will save **1,914.4 kgCO2e** and **£2,837.05.** The rest of the projects have been excluded from analysis at this stage as they are still work in progress.

Table 3: *Summary of the environmental and financial impact from Aims 1, 2 and 3 from proposed changed practice in the satellite dialysis unit*

Table 3	Savings per year	Environmental impact		Financial Impact	
		kgCO2e/ unit	Total kgCO2e	Pence/ unit	Total (£)
Electricity (Kwh)	5740.8	0.2913	**1672.29504**	22.4	**1285.9392**
Water (m3)	114.192	0.3666	**41.8627872**	232	**264.92544**
Travel (miles)	104	0.09489	**9.86856**	56	**58.24**
Acid savings (L)	3508.596	0.155	**190.341333**	35	**1228.0086**

**Kwh- kilo watt per hour; m^3- cubic meters; L- litres and kgCO2e -Carbon Dioxide Equivalent in kg*

This satellite unit is a part of Leeds Haemodialysis services which currently provides care provision for 550 incentre dialysis patients in 8 different dialysis units. After taking into consideration of the shift patterns in each unit, if we implement the above changes across our haemodialysis services, the estimated annual savings will be much higher.

Table 4: *Estimated impact from proposed changed practice on implementation across the Leeds Haemodialysis services*

Savings per year	Changing to 1 heat disinfection + 2 rinses per day	Dialysis fluid flow off during the standby for patient
Total reduction in power consumption (Kwh)	41353.2	38
Total reduction in water consumption (m3)	509.3868	3236
Power kgCO2e	12046.19	11
Water kgCO2e	186.7412	1186
Acid kgCO2e	NA	2398.284
Total reduction in kgCO2e	**12232.93**	**3595.284**
Power (£)	9263.296	8.512
Water (£)	1183.2	7507.52
Acid (£)	NA	15472.8
Total cost savings(£)	**10446.5**	**22988.83**

**Kwh- kilo watt per hour; m^3- cubic meters; L- litres, £- pounds and kgCO2e -Carbon Dioxide Equivalent in kg*

Based on the above calculations, a reduction of 0.1845 kgCO2e/patient/dialysis session can be achieved with the implementation of the above proposed changes. If the same small changes were possible for all 24,365 people receiving dialysis in the UK[2] and energy consumption of all dialysis equipment was similar across the 70 renal centres in the UK, the national reduction in CO2 emissions could be in the region of 4,495kg per treatment session. If everyone was having dialysis thrice per week, that would reduce CO2 emissions by approximately 700 tonnes per year.

Based on the above calculations, a reduction of 0.1845 kgCO2e/patient/dialysis session can be achieved with the implementation of the above proposed changes. If the same small changes were possible for all 24,365 people receiving dialysis in the UK[2] and energy consumption of all dialysis equipment was similar across the 70 renal centres in the UK, the national reduction in CO2 emissions could be in the region of 4,495kg per treatment session. If everyone was having dialysis thrice per week, that would reduce CO2 emissions by approximately 700 tonnes per year.

Social sustainability and clinical outcomes: The proposed changes may not directly impact individual patient experience but may contribute to an improvement in the turnaround of the patients in the dialysis unit, for example from saving time by replacement of disinfection (40 minutes) with rinse (9 minutes) of the machine in between patients. The unit is planning to move from a 2 shift to 3 shift cycle. Our new system will support in reduce staff workload.

Barriers encountered:

Measuring energy and water consumption on site was difficult as the relevant meters aren't in place, so this was dealt with in a test setting in the main workshop. Reuse of water, maximising the benefits of reduced acid consumption and improving recycling has been more difficult to achieve as we need input from other departments and discussions about various policies. These discussions are ongoing.

Steps taken to ensure lasting change and conclusion:

We learnt a lot from this project and were pleasantly surprised by how much we could reduce our central acid consumption, as well as save water and electricity with relatively simple changes. We are proud to work with an enthusiastic team who were all willing to take part to support changes to everyday practice. Meeting with colleagues regularly and tackling a different sort of problem to usual was really uplifting and motivating, especially when we realised how much potential benefit there would be when we roll out across the service. Our next steps are to spread this enthusiasm by sharing our project aims and finding at an upcoming departmental meeting, and to explore if the other satellite units would consider a reduction in their pharmacy deliveries.

We are continuing to explore options for projects 3-6 as we could have even further savings

- Aim 4: Water wastage from the purification process was measured as 1,337,000 litres/ year. Across the service equates to approximately 16,848,000L of water wasted per year, equivalent to 6 Olympic sized swimming pools. We are liaising with appropriate teams to enable redirection of this water to grey water systems of our healthcare setting. Significant progress has been made in one of our other satellite dialysis units and we are looking forward to continuing this work to maximise the benefit of water preservation.
- Aim 5: We use acid supplied in 6L plastic canisters and our standard practice is to use one canister for each patient/ treatment. The leftover acid goes down the drain systems. On measurement of the wastage of the acid, the cumulative wastage of acid comes down to 18.75L over 10 dialysis treatments. We are currently exploring the feasibility of avoiding this wastage, by liaising with the infection control team.
- Aim 6: Currently we do not recycle the plastic acid canisters. We are in discussion with the hospital wastage management team regarding recycling potential of these canisters by using existing steri-melt facilities.

References:

1. Connor A, Lillywhite R, Cooke MW. The carbon footprints of home and in-center maintenance hemodialysis in the United Kingdom. Hemodial Int. 2011 Jan;15(1):39-51. doi: 10.1111/j.1542-4758.2010.00523.x. Epub 2011 Jan 14. PMID: 21231998.
2. UK Renal Registry (2021) 23rd Annual Report- data to 31/12/2019, Bristol, UK. Available from renal.org/audit-research/annual-report.

4. THE GLOVES ARE OFF ON THE PAEDIATRIC INTENSIVE CARE UNIT (PICU)

TEAM MEMBERS: Grace Crossland - PICU Staff Nurse, Dr Jonathan Ince - Simulation Fellow, LTHT, Dr Alex Olney - ST3, Paediatrics

Project Aims: To stop the use of non-indicated nonsterile gloves during the preparation and administration of oral and enteral medicines within PICU, via a staff re-education and behavior change initiative.

Background: Before the Covid-19 pandemic the use of personal protective equipment (PPE) had gradually escalated to an unprecedented level, bringing with it a significant financial and environmental burden. During the pandemic this burden has only worsened,[1] with gloves and plastic aprons now a regular part of almost every aspect of clinical care, without strong evidence of an improvement in patient or staff safety. Non-sterile gloves are used to protect healthcare professionals, for example from bodily fluid exposure or when preparing certain medications. However, there is reasonable evidence to suggest that frequent, untargeted glove use worsens hand hygiene[2] and increases transmission of preventable infection in our hospital environment[3].

On the Leeds' PICU alone glove procurement, usage and disposal costs £11, 906.06 and generates of 16,7627kgCO2 per annum (from 2019-2020 data). Our team are nurses and doctors who work clinically and are part of the sustainable healthcare drive within LTHT. The wider PICU team have also recently declared their wish to actively work towards sustainability, so we therefore felt well placed to collaborate with the PICU work group to promote and implement sustainable changes. We believed glove usage could be brought down substantially without any detriment to patient care, or staff safety, inspired by similar changes achieved by Great Ormond Street Hospital (GOSH) through their gloves off campaign[4]. GOSH have publicly shared challenges they faced, resources they used, and data on the impact of their campaign, which helped to guide our project. By taking this opportunity to re-educate our workforce and reduce glove usage, we hope to make an impact across the triple bottom line of sustainable value.

Approach and Method:

We completed a 2-week audit where each nurse kept a tally of the number of pairs of gloves they used per shift. With this data we averaged the number of pairs of gloves used per patient per 24-hour period.

A 7-day audit of the number of oral and enteral medications and number of administrations to each patient to obtain an average number of gloves used per patient for medications per 24-hour period. We noted that many medications require a second nurse to check the medication before it is administered. We therefore also audited the rates of 'double check 'medicines and applied a glove use factor of 1.5 to these episodes (as multiple pairs of gloves are commonly worn during a 'double check' episode). From this data, we extrapolated what percentage of total glove use was attributable to enteral medicine administration and what we could reasonably expect to reduce.

Change implemented

Our audit identified non-sterile gloves during preparing and administering of oral and enteral medications as an area to target reduction. We focused on nursing usage during medication administration as this accounts for the majority of glove use on PICU and we felt focusing on several areas of reduction at once may reduce engagement. This was then reviewed by one of the senior PICU nurses and infection prevention. We started by conducting short non structured qualitative interviews with nursing staff to understand themes of either concern or support for glove use reduction so we could tailor our education materials to PICU staff.

We implemented an awareness and education campaign aiming to change practice in line with current research.

We placed posters next to glove dispensers and on an education board on the ward and gave a presentation to nursing staff either 1 to 1 or in small groups, led by Grace and the rest of her professional development group.

Measurement:

We are currently continuing our trial phase, however plan to measure our impact in the following ways;

Environmental: We will re-audit glove usage using the same proforma filled out by each nurse per shift and calculate a carbon footprint using the emissions factor for a single glove taken from Rizan et al (2021)[5]

Social: We will undertake further short non-structured interviews to further understand the impacts of our campaign and how this has been perceived by staff. This may highlight unforeseen barriers or difficulties people have found, as well as potential new supported avenues to further reduce glove usage. Research shows that inappropriate use of non-sterile gloves decreases hand hygiene compliance due to staff not removing or changing gloves at key moments and therefore missing hand washing opportunities. We therefore expect to see an improvement in hand hygiene and with this, a reduction in hospital acquired infections, reduced length of stay and reduced PICU bed days. This is data we can retrospectively collect once we have implemented the change onto PICU.

Financial: Due to changes in how PPE has been supplied in the pandemic we cannot obtain PICU specific data on gloves purchased from the last 2 years or current practice. We therefore obtained figures for 2019-2020 through hospital procurement. We will calculate savings based upon reduction in numbers of gloves on our audit form, and when available based on reduction in amounts of gloves compared to orders from the 2019-2020 data.

Results:

Our audit found that over a two-week period an average of 93.6 gloves were used per patient in a 24-hour period. During these two weeks PICU had an average of 11 patients on the unit, equaling 1029.6 gloves in a 24-hour period. At full bed space capacity (18 patients) 1684.8 gloves would be used in a 24-hour period. Our drug chart audit found 9 episodes of drug administration per patient on average in a 24-hour period. 85.3% of the time, a 'double check' was required. We can assume a reduction of glove use in these instances as the nurse no longer needs to wear gloves for preparation, only for administration.

As we are still in our trial phase, we have made assumptions based on our audit data to estimate potential savings from reduction in glove use. We did not use procurement data as this would cover glove use for all medical professions for a range of reasons. We also considered the GOSH gloves off campaign result of a 38% reduction, however our project does not address all areas of glove use addressed in the GOSH campaign, for example, GOSH also removed the requirement for non-sterile gloves to be used when preparing and administrating intravenous medications. While we cannot expect a reduction as great as 38%, with a successful behavior change campaign, we hope to achieve a reduction of glove use by 25%.

Environmental benefit: A 25% reduction would save between **2242.73 kgCO2e - 3997.19 kgCO2e** per year. These estimates include the production, transport, and incineration of the gloves. Reduction in glove use will also save a significant amount of plastic e.g. GOSH saved 21 tonnes of plastic in the first year of their campaign).

Financial benefit: Cost of gloves was obtained through hospital procurement data from 2019-2020 (pre-covid data). A reduction in use by 25% will save **£1965.81 - £3216.79** per year. These estimates include the purchase and disposal (via incineration) of the gloves. There is an expected increase in the price of PPE following the rise in oil price and so the implementation of this project is also crucial from a cost avoidance perspective.

These estimates include the production, transport and incineration of the gloves. It is also important to consider that there is an expected increase in the price of PPE following the rise in oil price and so the implementation of this project is also crucial from a cost avoidance perspective.

Clinical and health outcomes:

Use of non-sterile gloves is known to increase the rate of workplace related contact dermatitis[6], and therefore reduced glove use may be of benefit to some staff. We plan to retrospectively audit rates of contact dermatitis (through occupational health), as well as if reduced glove use has improved hand hygiene and reduced hospital acquired infections, length of stay and PICU bed days.

Social sustainability:

When delivering the teaching to staff nurses on the unit we found there were many positive attitudes to welcome the change in terms of environmental impact and improved hand hygiene, as seen in the responses below;

> *"Great idea, I think it would be really good to improve our hand hygiene, I feel I often see people not following the correct hand washing policy"*
>
> *"It would be really good to improve our hand hygiene"*
>
> *"Really good idea, really good that there is such an environmental saving"*

With positive attitudes towards the project, we can assume better engagement and hopefully improved staff morale when knowing that we are making a positive change for our patients, the environment and the trust.

Barriers encountered:

Data collection was challenging at times, due to the dependency on staff to complete audit forms on top of clinical demands. Grace went into PICU every day to hand out the audit sheets and prompted staff to fill them in. It was unachievable to collect data from service users as most of our patients are either intubated and sedated and/or too young to engage. We did consider collecting data from parents, but PICU is an incredibly stressful place for parents and carers and therefore it felt inappropriate to involve them at this time. The poster board display is in a location where both staff and parents/caregivers can view.

The team were required to implement education whilst also on clinical PICU shifts where 1:1 nursing care is required. To overcome this Grace gave presentations during her breaks, while she had cover for her patient, to get the information out to the rest of the team. A display board was also set up to display the information for all healthcare professionals to see and it was emailed to the wider team. As well as having much positive feedback from staff members, there was another key theme identified from the short interviews with staff which was perceived hygiene with some nurses feeling that they would be seen to be unclean if not wearing gloves. We are hoping that with time and chance for the cultural around this project to change with a wider awareness of it.

Steps taken to ensure lasting change and conclusion:

Our project demonstrates when empowering staff to use of PPE responsibly, we can reduce environmental harm, while enhancing hand hygiene and maintaining patient safety. Our main factor for success was staff engagement, which would not have been possible without the enthusiasm of nursing staff on PICU. Listening to their concerns throughout any next steps is vital to ensuring suggested changes are taken on by staff and that lasting change is achieved.

Our next steps are to continue to widen education and resource distribution and re-audit to obtain true outcomes. We recognise that cultural changes take time so plan to re-audit at 6 weeks and 6 months with changes or additions to our resource package and scope of change depending on uptake and success. We are also going to investigate the possibility of removing non-sterile gloves when preparing and administering IV medications. This will need further input from the infection prevention team and the education team as it will affect the education program for newly qualified nurses. We would also like to consider embedding education of non-sterile glove indication in the initial education of new staff members to help maintain the change in practice we wish to achieve. We are also considering ways to include parental and patient views in a sensitive and ethical manner.

Positively, the project has gained the support of business management, pharmacy, and the infection control and prevention team, and we have already had other clinical areas get in touch to state their interest in participating in our gloves aware re-education. We can also expect to informally reach medical and allied healthcare professionals at this stage, potentially reducing their glove usage during some patient contacts. It will be important to involve each workforce in any new area covered as needs are likely to be somewhat different depending on clinical environments.

Overall, we are very pleased with the potential this project has to offer and look forward to sharing it more widely in the children's hospital and across LTHT, as it is applicable to the majority, if not all, clinical areas. With time and widening of our education program to include all front-line health care workers, we aim to achieve a similar reduction as GOSH.

References

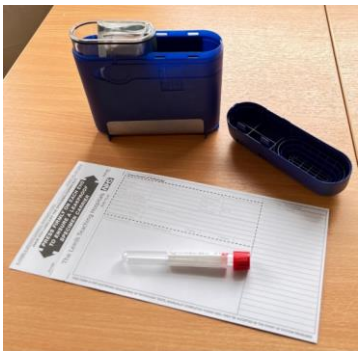
1. Unicef. 2021. https://www.unicef.org/supply/stories/three-reasons-why-personal-protective-equipment-ppe-supply-remains-critical
2. H.P.Loveday, S.Lynam, J.Singleton, J.Wilson, 2013, 'Clinical glove use: healthcare workers' actions and perceptions 'Journal of Hospital Infection, Vol 86, No. 2, Pg. 110-116
3. Ashley Flores, Martha Wrigley, Peter Askew, 2020, 'Use of non-sterile gloves in the ward environment: an evaluation of healthcare workers 'perception of risk and decision making 'Journal of Infection Prevention, Vol. 21, No. 3, Pg. 108-114
4. Gloves aware campaign GOSH
5. Rizan C, Bhutta M, Reed M, Lillywhite R. The carbon footprint of waste streams in a UK hospital. Journal of Cleaner Production 286 (2021) 125446. Available at https://www.sciencedirect.com/science/article/abs/pii/S0959652620354925
6. Upton. 2021. https://www.rcn.org.uk/news-and-events/blogs/dermatitis-and-glove-use-make-one-change

5. CHANGING THE 3 MONTHLY BLOOD TEST POSTAGE KITS FOR PATIENTS ON THE RENAL TRANSPLANT REGISTER

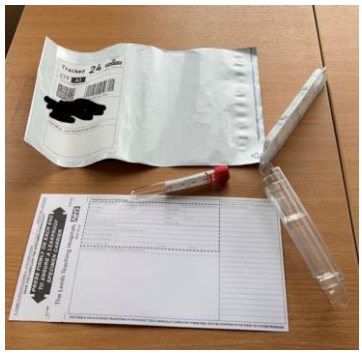
TEAM MEMBERS: Natalie Bird - Clinical Nurse Specialist, Renal Transplant, Laura Kirk - Clinical Nurse Specialist, Renal Transplant, Jo Wales - Clinical Nurse Specialist, Live Renal Donation, Jo Hitchings - Senior Clinical Support Worker

Project aims: To measure the environmental, social and financial benefits of a new postal system compared with an old postal system.

Background: Patients active on the transplant register and those listed for simultaneous kidney and pancreas transplant must have regular blood tests (every 1-3 months) to re-examine their antibodies. With patients all over the region, transporting these samples to the laboratory can be logistically challenging and expensive.



a) Old Kit: Blood tube, blood card, blue 'safebox' provided by RoyalMail.



b) New Kit: Blood tube, blood card, plastic case for blood tube, plastic envelope

Strategic choice of project: As a team, the renal transplant department is already very proactive in seeking out sustainable changes. Prior to the Green Ward Competition, we implemented changed in the way blood tests are sent to patients. Previously, patients would be sent a blood tube in a "Safe lock" box (image a), which had to be sent back to the hospital from a post office, at an inconvenience to the patient. The boxes themselves were expensive and single use, creating a large amount of plastic waste. Use of a lightweight, recyclable plastic pouch with pre-paid postage labels (image b) has been implemented, eliminating the trip to the post office (in favour of the closest post box) to the convenience of patients. As clinical nurse specialists we felt uniquely placed to be able to measure the impact across the triple bottom line of sustainable value and promote implementation of this change on a wider scale.

Methods / Approach:

We audited the number of patients suitable for the change to the new blood test kits. The number of the patients in our clinics changes regularly due to starting dialysis or having a transplant. We estimated on average there will be 11 patients under assessment or active on the simultaneous kidney and pancreas register, requiring monthly blood tests, totalling 132 tests annually. On average there will be 30 low clearance (pre-dialysis) clinic patients active on the transplant register who require 3 monthly blood tests, totalling 90 tests annually. This gave as an average annual total of 222 blood tests completed a year.

Environmental: A process-based carbon foot-printing analysis was used to estimate the carbon footprint of both kits (blood tests were the same in both kits and therefore excluded from analysis). Data on the type of material was taken from product specification sheets, and each material weighed. It was assumed both kits were disposed of in domestic waste as despite part of the new kit being recyclable, we cannot rely on staff consistently separating and recycling this section. Carbon emission factors for waste disposal were taken from a recent study from Rizan (2021) looking at the carbon footprint of waste streams in a UK hospital. Financial data was used to estimate the carbon emissions associated with postage. For this analysis we looked only at the emissions associated with sending the kits from the hospital to the patient only.

Social: We conducted semi-structured telephone interviews with previous patients who have used both kits. We also liaised with the Manchester renal transplant coordinators, as their service continues to use Safe Lock boxes, to inspire larger-scale change.

Financial: Our team had postal costings for both the old kit and the new kit. The old kit we sent out cost £13.20 for each lock box and 1st class packaging. The new kits used are smaller and more compact with a cost of £4.41 with a total saving of £8.79 per kit sent out.

Results:

Environmental benefit: The total emissions per test (kit + postage) were reduced by 5.495 kgCO2e, extrapolated across a year with 222 tests sent, this is a saving of **1219.9 kgCO2e.**

Financial benefit: The old kits cost including postage cost £13.20, whereas the new kits cost £4.41 (3.83 + 58p per plastic container for blood tube). With a saving of £8.79 per kit, we will save **£1951.38** per year. With the old kits, we were charged for every kit ordered. With the new kits, we are only charged for blood samples returned, and the envelopes are free, so we won't be charged for tests that are not completed for patient care.

Social sustainability: Our telephone interviews with patients showed that the new postage kits are easier to use and more convenient to return. Some patients stated they had to pay for the blue lock boxes to be sent a couple of times out of their own money and described them as 'expensive and seemed unnecessary'. While some patients had no preference for either kit, no negative feedback was received for the new kits.

> *"I used to use the old lock boxes to send bloods to Manchester. I have to say I really didn't trust them, they were very bulky but also felt like they wouldn't close properly so was worried the samples might fall out easily. They weren't very easy to close."*
>
> *"From my house it was 2 miles there 2 miles back so 4 miles in total to post the lock boxes. I also found it quite annoying as I work full time and struggled getting to the post office in time to post them before they closed."*
>
> *"I am partially sighted so find it quite fiddly / tricky putting the bloods in here and getting myself to and from the post office."*
>
> *"I used to travel about ½ a mile to post office so wasn't far but inconvenient with the opening times."*

For staff, the old lock boxes were described as "fiddly and bulky" so organising and sending out the new tests via internal post has been easier and faster for staff in the renal transplant office. Dialysis staff stated they preferred the new smaller postage boxes as the blue boxes were 'difficult to close properly.

Clinical and health outcomes:

The patient health outcomes have not differed or been negatively impacted by using the new postal kits. Some patients have stated rather than driving in a car or using public transport to get their lock boxes to the post office they now walk to their nearest post box instead which potentially may have some indirect benefit of increased physical activity. There is a potential positive impact of the added convenience to patients leading to faster posting and analysis of blood testing, in turn leading to faster results and treatment as required.

Barriers encountered:

Specific patient data was difficult to obtain due to a rapidly changing patient group, we therefore have needed to rely on estimations as there is no fixed number of patients for whom this change can be implemented.

We continued to manage full clinical duties during the competition which was challenging considering low staffing levels within the department and sickness within the team. We were grateful for support and expertise of other staff such as the waste reduction department and have made contacts which will be useful for widening the scope of this project or implementing any future changes.

Steps taken to ensure lasting change and conclusion:

We have demonstrated positive impacts across the triple bottom line of sustainable value. Our financial savings have been recognised and celebrated by Paul Jackson, the Abdominal Medicine and Surgery Clinical Service Unit (AMS) project manager for sustainability and transformation and the wider AMS management team. The project took place within the renal recipient team, however we will look at implementing the change in blood kits to aspects of live donor service delivery to expand the effect of the change.

The team in Manchester with whom we liaise for the patients listed for simultaneous pancreas kidney transplants have already expressed an interest in this new postage system. We are continuing to collaborate with the Manchester renal transplant coordinators. We have shared our data and new postal kit products to support the team in rolling out

the same service for their patients. Manchester sends an average of 20 SafeLock blood tests per month. If these 240 tests annually were changed, an additional 1,318.80 kgCO2e and £2,109.60 would be saved.

We have regular meetings with other hospitals in the region including Bradford, Hull and York, and plan to present findings here to encourage change to other regional teams. There may be opportunities to share our outcomes further at national network meetings associated with NHS Blood and Transplant or the British Transplant Society to potentially scale our changes to many of the additional 21 transplant centres in the UK.

This project also has the potential to be applied to other outpatient departments requiring regular monitoring of patient bloods. This may be other outpatient departments within LTHT, or perhaps other renal transplant departments nationally.

References

1. https://www.alphalabs.co.uk/laboratory-products/consumables/sample-handling/sample-transport/specisafe174-un3373-compliant-mailing-packs/specisafe-for-vacuum-blood-tubes/sh0500ss
2. https://www.royalmail.com/sites/royalmail.com/files/2021-07/Royal-Mail-Safebox-Terms-Conditions-March-2021.pdf
3. Link to ICE database: Embodied Carbon Footprint Database - Circular Ecology
4. C Rizan, M Bhutta, M Reed, R Lillywhite. The carbon footprint of waste streams in a UK hospital. 2021

AWARDS

WINNERS: Haemodialysis Team

HIGHLY COMMENDED: Renal Transplant Team

Congratulations to the WINNING team, the Haemodialysis team, led by Dr Mark Wright and Dr Latha Gullapudi. It was a project that tackled massive waste hotspots in their service and is a great example of sustainable quality improvement in practice. We at CSH are looking forward to hearing updates from the team in regards to their ambitious longer term aims, including reduction and redirection of water and acid waste.

NEXT STEPS

Having run these pilot projects, we encourage the teams to build on this initial phase and continue to meet their longer term aims, and for the Trust to spread suitable projects to other areas (CSH can be commissioned to facilitate this) and for teams to continue to look at their work through a 'Sustainability Lens'

ACKNOWLEDGEMENTS

CSH would like to thank the teams for all their enthusiasm, dedicated work & creativity in devising and completing their projects.

Thank you to Libby Sutherland, Sustainability Manager, for partnering with us for a second Green Ward Competition at LTHT.

Thank you to our judges, Daniel Barrett - Head of Sustainability and Net zero North and East Yorkshire at Greener NHS, Sophie Williams - Operational improvement Specialist at LTHT, and Catherine Floyd – Clinical Specialties Lead at the Centre for Sustainable Healthcare, for your time and keen interest in the projects.

Thank you to Ingeborg Steinbach - Carbon Consultant, and Rosie Hillson - Carbon Modelling Assistant, both with The Centre for Sustainable Healthcare for their careful and highly skilled work in carbon footprinting. Inge and Rosie supported the teams in carrying out their own carbon footprinting and equipped teams with the knowledge and tools to carry out future calculations for projects in the future. Carbon calculations are essential to 'triple bottom line' integrated project reporting and make plain the true cost and impacts of services to allow better, safer and more responsible decisions to be made in healthcare organisations.

> *"The support from CSH was really valuable. Keeping us on track with our QI approach helped us to see the projects through. They gave us good tips and advice and access to some very useful resources. Meeting with colleagues regularly and tackling a different sort of problem to usual was really uplifting and motivating, especially when we realised how much potential benefit there would be when we roll out across the service."*
>
> Haemodialysis Team

Potential annual savings

The following table provides detail on the **annual** savings available to the Trust from the 2022 Green Ward Competition projects when projects are fully implemented and embedded. **These carbon and cost savings will increase if the projects are scaled up across clinical areas throughout the Trust.**

Project	Financial Outcomes	Environmental (CO2e) Outcomes	Social Outcomes	Clinical Outcomes
Gloves off in Paediatric Intensive Care	£1,965.80 - £3,216.80	2242.73 - 3997.19 kgCO2e	Potential for reduced rates of workplace related contact dermatitis for staff. Positive attitudes from staff promote better engagement with behaviour change and improved staff morale.	Potential for improvement in hand hygiene and with this, a reduction in hospital acquired infections, reduced length of stay and reduced PICU bed days.
A **Greener 'Hub' Education Team**	£623.40 (excluding iPads)	651.9kgCO2e (including iPads)	Maintained 'authenticity' for students learning. Engaged medical students in sustainable action and sparked enthusiasm for sustainable medical education across the student cohort, management, and Postgraduate teams. Has led to further projects including action to embed sustainability into	Potential for wide impacts due to number of students utilising SDP rooms. When asked whether students had changed their practice as a result, responses were encouraging, e.g. *"After this, I will be more mindful of how much equipment I take out of their packets on the ward"*
New blood test postage kits Renal Transplant Team	£1,951.40	1,219.9kgCO2e	New postage blood test kits easier to use and more convenient to return. organising and sending out the new tests via internal post has been easier and faster for staff in the renal transplant office.	No change to or negative impacts on patient care
DMR and Battery Recycling - Patient Environment Action Team	£317.30 (£1652.70 if scaled to remaining suitable areas)	811.4kgCO2e (7000kgCO2e if scaled to remaining suitable areas)	Engagement with clinical teams showed that staff care about being more sustainable. Matron from Ward J04 said *"The implementation of DMR and Battery recycling has been very beneficial to the area as it is cost effective and good for the environment"*	No change to or negative impacts on patient care
Review of dialysis practice, Haemodialysis team	£2,837.05 (£33,435.30 if scaled to all Leeds dialysis units)	1,914.4kgCO2e (15,919.2kgCO2e if scaled to all Leeds dialysis units)	Changes support in reducing staff workload. Enthusiasm and interest from wider team will support ongoing work towards longer term aims, and in scaling changes to other dialysis units.	May contribute to improvement in patient turnaround, for example from saving time by replacement of disinfection (40 minutes) with rinse (9 minutes) of the machine in between patients.
Total Savings	**£8,945.95**	**8,594.8 kgCO2e**		