



ELHT Green Newsletter

December 2024



Further Success

Welcome to the 8th edition of ELHT Green Newsletter.

- ❖ Trust-wide rollout of Pharmacy Returns Units
- ❖ Registration on to waiting list for the Green ED initiative
- ❖ 'Foodprint' – increased awareness and working to reduce our food carbon footprint
- ❖ Continue to follow the 7 principles of procurement for ALL new procurements at ELHT
 - Energy consumption
 - Greenhouse gas emissions
 - Reduction of waste
 - Use of recycled products
 - Reduction in hazardous substances
 - Packaging
 - End-of-life recycling
- ❖ More success with the roll out of Coolsticks to Central Birth Suite and Critical Care
- ❖ Push for Oral instead of IV Paracetamol for all elective surgery pre- and post-operatively!

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Reduce

Intravenous to Oral Paracetamol in the ED: A Regional Sustainability QI Project

Goves J, Reap S, Willicombe H, Chang V & Dasari A 2023

There is a regional move towards reducing IV paracetamol use within the theatre environment and we are happy to see this being looked into within the emergency department. Given paracetamol's oral bioavailability of 90%, conversion from IV to oral should not affect clinical efficacy in patients with a functioning GI tract. This project again highlights the reduction in physical waste by converting from IV to the oral route along with the significant cost savings associated.

Background:
Paracetamol is an essential analgesic in the Emergency Department (ED). Evidence suggests oral paracetamol is as effective as intravenous (IV) 1-5. IV paracetamol is more expensive and has a greater environmental impact due to increased clinical waste. This abstract outlines an in-progress sustainability quality improvement project encouraging ED staff to prescribe and administer paracetamol orally where clinically possible to reduce cost and clinical waste.

Methods
Dispensed quantities and costs of paracetamol formulations were requested from the ED inpatient pharmacies of three hospitals in the North West. Waste per dose was calculated using empty bottles, giving sets, flushes, and packaging versus the empty packaging of 32 tablet boxes. Costs used were the per 1g dose costs charged to the Royal Blackburn Hospital pharmacy for the dose, excluding paraphernalia. Educational materials are to be implemented within the ED to optimize prescribing and administration practices.
Data will be re-requested at the end of the audit cycle to assess impact in terms of waste and financial savings.

Annualised Number of doses dispensed

Hospital	Oral	Intravenous
Royal Blackburn Hospitals	~10,000	~10,000
Leighton Hospital	~28,000	~12,000
Royal Preston Hospital	~15,000	~10,000

Waste associated with Oral vs IV

Route	Waste per 1000 1g doses (kg)
Oral	0.75
Intravenous	163

Interim Results
In the Emergency Department of the Royal Blackburn Hospital Between 14/10/21 and 14/10/22, 10,744 doses of IV paracetamol were dispensed at a cost of £5479 and 1,755kg clinical waste (£0.50 and 163g/1g dose). 11,400 doses of oral paracetamol were dispensed at a cost of £166.72 and 8.55kg household waste (£0.015 and 0.75g/1g dose).

Cost of Oral vs IV

Route	Cost per 1000 1g doses (£)
Oral	15
Intravenous	500

Key Messages
Intravenous preparations are associated with substantial differences in waste and cost. These estimates are likely to be conservative: IV preparations are disposed of as sharps and clinical waste as opposed to regular waste and have much greater disposal costs and environmental impact. Furthermore, the carbon footprint associated with production and distribution of IV preparations is not examined here and likely to be much greater than tablets. Secondary benefits include patient benefits such as reduced risk of fluid overloading and iatrogenic infection from IV medication administration, and staff benefits such as reduction in time spent preparing, administering and monitoring IV medication.
A 30% reduction in IV prescribing would save ED departments an average of £1,566 and reduce waste by 523Kg Annually for minimal investment.

References:

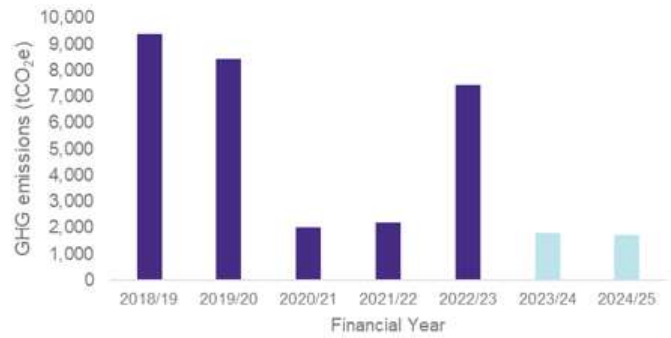
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East Lancs Green Plan - Key Emissions Changes

Electricity

– From April 2021 to 2022, the Trust procured 100% renewable electricity, resulting in a 76% reduction in emissions arising from procured electricity. In April 2022 ELHT reverted to a renewable/non-renewable mix, but ELHT will be returning to a 100% REGO contract from April 2023 onwards.

1 Electricity



Business travel

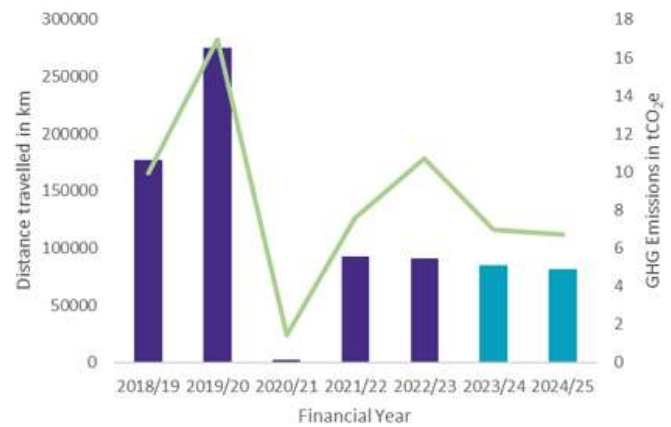
– In the past, km travelled per transport type has been available. Distance-based emissions calculations are much more accurate than spend-based emissions estimates. In 2022/23, distance data was unavailable, but spend data was available. Therefore, a spend-based methodology was employed, leading to a less accurate calculation and a rise in emissions as a result.

– A spend-based methodology also had to be employed to calculate the distance travelled, as distance data was unavailable. Therefore, there is no direct correlation between the emissions data calculation and distance data

calculation this year as both have been estimated based on spend, accounting for the discrepancy in the km to emissions ratio compared to the previous year.

– The emissions discrepancy is largely negligible compared to the Trust total, with Business Travel emissions accounting for only 10.71 tCO₂e in 2022/23.

2 Business Travel



Green ED Initiative



ELHT has been registered on to the waiting list for the Green ED initiative run by the Royal College of Emergency Medicine. The framework outlines evidence-based actions, divided into bronze, silver and gold levels, with the guidelines and resources required to help achieve them. Addressing these actions not only improves the environmental sustainability of an ED, but contributes to national net zero targets and creates financial savings for EDs while maintaining or improving patient care. Successful completion of all the actions at a given level leads to formal accreditation by RCEM, recognising the department's commitment to environmentally sustainable EM practices.

For more information including some helpful infographics of the various frameworks please visit their website <https://greened.rcem.ac.uk/>

IV Paracetamol - How we're doing?

Further to the excellent project above here is how we are currently doing as a trust simply on IV paracetamol cost and procurement.


The cost of IV paracetamol has increased from £6.70 per box of 10 vials to £13 per box recently, which means from 1/12/2023 to 21/10/2024, **ELHT has spent £66,311.91 on IV paracetamol alone! About £3,500 was spent on Critical Care.**

As you can see if this can be reduced even marginally it would lead to a significant cost and environmental saving so a gentle reminder to swap a patient to oral paracetamol wherever possible! Remember, patients who are nil by mouth for surgery and have a functioning GI tract CAN have a sip of water for tablet medications so do not need to be swapped to IV paracetamol.


****Beware that there is a potential shortage in the coming months, so please try to swap as much IV paracetamol to oral paracetamol in your practice! ***

This is recommended by NICE and there is no significant difference between oral and IV post-operative pain scores or patient satisfaction.

Oral Paracetamol Pre-Medication for All Elective Surgical Patients




East Lancashire Hospitals
NHS Trust
A University Teaching Trust




GREENER HEALTHCARE & SUSTAINABILITY PROJECT


Think oral pre-operative paracetamol



Price
60x lower for oral paracetamol vs. intravenous
Potential annual trust savings of £9440 across all day case surgeries



Planet
110x lower CO₂ emissions for oral tablets vs. intravenous
Reduce annual CO₂ emissions by 3,300kg, equivalent to driving 8,200 miles in a car



People
Recommended by NICE
No significant difference between oral and IV post-operative pain scores or patient satisfaction


Identify day case patients suitable for oral paracetamol

↓

Administer two tablets of paracetamol with a small volume of water


↓

Rapid gastric absorption with peak therapeutic levels at 45 minutes



Exclusions

- Long procedures
- RSI
- Gut motility issues



An SOP is being finalised in the coming weeks, which would allow all nurses to prescribe and administer oral paracetamol for all elective surgical patients.

All anaesthetists are reminded to check the patient's drug chart before anaesthetic induction.

Pre-medication with oral paracetamol: Reducing the Carbon footprint for day-case surgery at East Lancashire Hospitals NHS Trust (ELHT) - Presented at Research for Greener Surgery 2024

Parashar S, ffrench-Constant N, Lie J, Sengupta, Sharma S & Mehboob J 2024

Congratulations to our team who presented at the Research for Greener Surgery 2024 in Birmingham demonstrating the carbon footprint reduction with the use of oral paracetamol pre-medication for day-case surgery at ELHT.

Pre-medication with oral paracetamol: Reducing the Carbon footprint for day-case surgery at East Lancashire Hospitals NHS Trust (ELHT)

Co-authors: Dr. Siddhant Parashar & Dr. Natasha ffrench-Constant
Dr Jason Lie, Dr Soma Sengupta, Dr Sanjiv Sharma & Dr Jack Mehboob

Abstract

Oral paracetamol is considered equally efficacious when compared to intravenous paracetamol. NICE Guidelines have recommended pre-operative oral paracetamol administration since 2008. At ELHT, we implemented a multi-cycle quality improvement project to increase the use of oral paracetamol for all day-case patients.

Oral administration is more environmentally sustainable and also more cost-effective. If all 17,645 day-case surgeries utilised oral pre-medication with paracetamol in place of IV administration, we would reduce CO₂ emissions from 3405kg or CO₂ to only 52kg, equivalent of saving 8200 miles driven in a car. We would also create an associated cost saving of £9440.07.

Introduction

Switching to oral paracetamol from IV paracetamol is important for the following reasons:

- Clinically:** Perioperative NICE guidelines (2020) recommend oral paracetamol before and after surgery, do not offer IV paracetamol unless the person cannot take oral medication (1).
- Environmentally:** IV medications have a higher carbon footprint due to the need for sterilisation, increased packaging and transport. CO₂ emissions from IV paracetamol is 3405 kgCO₂e compared to oral paracetamol which is 52kgCO₂e. Plastic waste is also thought to be reduced by 384kg for a single hospital site (2).
- Economics:** at ELHT 1g oral tablet is £ 0.015 compared to 1g IV paracetamol £ 0.55. Annually if all day case surgeries at ELHT received oral paracetamol this equates to a cost of £ 264.68 versus a cost of £ 9704.75 if all patients received IV paracetamol. Annual savings would be £ 9440.07.

Methodology

Audit cycle one: January 1st - February 29th 2024

- Purpose:** establish current paracetamol usage and to establish physician beliefs around the use of oral vs IV paracetamol.
- Data Collection:** paracetamol usage, route of administration, patient demographics, surgical speciality. An initial clinician survey.
- Findings:**
 - Low use of oral paracetamol
 - Higher use of oral pre-medication in pediatrics
 - Barriers identified: challenges in prescribing oral paracetamol for day-case nursing staff and strong belief that IV paracetamol was more efficacious as compared to oral paracetamol
- Intervention:** educational campaign to promote oral paracetamol by presenting at local governance meeting as well as the dissemination of an informational leaflet.

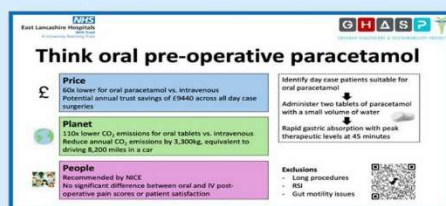


Figure 1. Poster displayed in clinic campaign.

Audit cycle two: June 1st - July 31st 2024

- Purpose:** review changes in practice post-educational campaign
- Data collection:** on original parameters
- Findings:**
 - Lack of awareness not the primary barrier
 - Burden of prescribing on medical staff and communication to nursing staff were significant barriers
- Intervention:**
 - Modified trust standard operating protocol (SOP)
 - Nurse-led paracetamol pre-medication as part of patient check-in process
 - Pharmacy team support for implementation

Results

Demographic data from audit cycle 1 and 2 represented in Figure 2. Oral pre-medication was more commonplace in the paediatric population 72% in cycle 1 and 73.6% in cycle 2 versus the adult population 44% to 33.8%. Site specific analysis (Figure 3.) identified that Royal Blackburn Hospital main theatres remains a site for improvement with the lowest oral pre-medication rates (at 37%, reduced to 18%) when expressed as a proportion of those who received Paracetamol. Specialty analysis (Figure 4.) identified improved compliance in Urology and Dental, with lowest pre-medication rates in vascular and gastroenterology.

Demographics	Audit cycle 1	Audit cycle 2
Number of cases (n)	935	1099
Average age (years, range)	41 (1-96)	41 (1-91)
Adult (n)	702	863
Paediatric (n)	233	256

Figure 2. Demographic of patients receiving oral paracetamol.

	Elective centre	Gynaecology Burnley	Royal Blackburn Main theatres	Wilson Hey
Audit cycle 1: % received oral paracetamol, where paracetamol was given.	48%	58%	37%	74%
Audit cycle 2: % received oral paracetamol, where paracetamol was given.	49%	36%	18%	78%

Figure 3. Site specific analysis of oral paracetamol use in cycle 1 and 2 when paracetamol was given. (No. in percentage with total no. in brackets).

	Vasc	Gastr	Urology	T&O	Dental	Gynae	Max	Gen	ENT	Breast
Audit cycle 1: % received oral paracetamol, where paracetamol was given.	0%	0%	35%	39%	65%	60%	52%	55%	50%	28%
Audit cycle 2: % received oral paracetamol, where paracetamol was given.	0%	0%	72%	41%	87%	37%	14%	44%	48%	8%

Figure 4. Specialty analysis of oral paracetamol use in cycle 1 and 2 when paracetamol was given. (No. in percentage with total no. in brackets).

Discussion & Conclusion

Limitations in the audit included: lack of data regarding the use of regional or neuroaxial anaesthesia, which could explain the lower use of paracetamol but would not account for the disparity in formulation choice. Furthermore, being a prospective audit, there was no blinding for those collecting data which may have influenced their use of oral paracetamol use.

By making the administration of oral paracetamol the default for our day-case patients at ELHT, the trust will reduce our carbon footprint by over 17000kg of CO₂ (equivalent of 41000 miles of driving). Furthermore, this would result in a cost saving of £47,200 for the NHS.

Acknowledgements & References

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Saving smart and spending less on energy costs

We are all aware that the Trust is facing huge financial pressures to reduce costs while continuing to provide safe, personal and effective patient care and meeting CO₂ emission targets – saving energy can help on both counts.

As we approach the winter season, we are asking everyone to take some really simple steps. The goal of this campaign is to reduce energy consumption throughout Trust buildings, resulting in cost savings and improved sustainability. Here's some tips on how to manage energy usage – tiny changes to your behaviour will go a long way towards saving the Trust money.

Understand your energy costs:

Before you can start to make savings, you need to understand the Trust's energy usage and cost.

- The Trust uses about 240,361 kilowatt-hours of energy every day delivering patient care, which costs £24,825 and results in the emission of 63,621 kilos of carbon dioxide (CO₂e)
- One kilo of CO₂e is the equivalent of a volume of gas in the size of a ball about 1.07 meters in diameter
- Every small effort can reduce this, so your support is essential.
- Check your lighting – lighting makes up more than 35% of a hospital's electricity bill
- Maximise natural light - open blinds and curtains during the day to reduce the need for artificial lighting
- Turn off lights: make it a habit to switch off lights in unoccupied rooms and at the end of your shift
- Reporting: if any lights or bulbs are faulty, report them immediately for replacement.

By adopting these practices, we can collectively reduce our energy consumption and contribute to a more sustainable ELHT!

Foodprint

Mandy Davies

There are many ways you can embrace sustainability, and considering food choice is one.

Food is responsible for around one quarter of the UK's carbon footprint, and it's estimated that food and catering services in the NHS accounts for approximately 6% the NHS' Carbon Footprint. It's huge!

Reducing food waste and promoting healthy and low carbon diets, will help bring health benefits as well as carbon emissions reduction.

Introducing FoodPrint by Nutritics – a powerful step toward making us and the food industry more sustainable. By calculating the carbon footprint of menu items and displaying this data, Foodprint empowers our patients, visitors and staff to make more eco-conscious choices.

The badge (right) shows the carbon rating for our veggie chilli and rice served in the Grane Restaurant at ELHT. It's good on all accounts!



Foodprint not only calculates the carbon emissions associated with dishes but also helps identify opportunities to reduce them. By tweaking recipes, sourcing sustainable ingredients, or highlighting greener options, we can cut costs and emissions simultaneously.

At ELHT we are currently carbon labelling our recipes and will be launching 'hero dishes' using Foodprint in the new year. Look out for them in the Grane restaurant and do your bit to 'ease emissions'.

For our consumers, carbon labelling brings much-needed transparency to food's environmental impact. It will help patients, visitors and staff understand how their choices contribute to climate change, promoting a shift toward low-carbon, sustainable meals. Informed customers are increasingly demanding such data, and offering it builds trust and loyalty.

Remember, eating dishes with a lower carbon footprint is good for everyone!

Gloves Off ICU

Shaw C & Lawes N

Single use non-sterile gloves make up a significant amount of the plastic waste produced in an intensive care unit with a review in 2023 finding that >100 gloves are used in the care of a single patient over 24hrs. The goal of this project is to reduce this number without compromising patient safety and infection control and to that end the scheme has been reviewed and endorsed by the Intensive Care Society, Infection Prevention Society and the British Association of Critical Care Nurses.

GLOVES OFF

in critical care



The project highlights 3 areas where use of gloves can be reduced

1. Drawing up of drugs
 - Gloves are not required for the drawing up of drugs with the exception of cytotoxic medications and monoclonal antibodies
2. Using the bedside computer
3. Routine patient examination
 - Where there is no risk of exposure to blood, body fluids, mucus membranes, broken skin

Needless to say, meticulous hand hygiene is essential and when caring for patients with specific transmissible diseases/immunocompromised PPE should be worn in accordance with local policy.

<https://ics.ac.uk/membership/sustainability/gloves-off-in-critical-care.html>

Reuse

Coolsticks

Coolsticks have now been made available at both Central Birth Suite and Critical Care as well as all theatres since June 2024. SOP for its use can be found on sharedpoint.

Currently the cost of each ethyl chloride spray cost £19.80.

****Last year we spent £15,369 on 853 ethyl chloride sprays,
equivalent to 759,170kgCO_e
= driving >2 million miles in an average petrol car
OR >1 million air miles by plane.****

A reminder to use the

COOLSTICKS



WHAT are they?
A reusable, sustainable, better value option to assess your local anaesthetic block

SAVINGS so far
50% reduction in Ethyl Chloride use (2021/22 vs 2022/23)
= **393 tonnesCO₂** equivalence

WHERE are they?
In all RBH/BGH theatre FRIDGES



ENVIRONMENTAL impact **REDUCED** by equivalence of **1,004,911** miles in a petrol car



ELHT JAN 2024

Help us reduce our Ethyl Chloride use further,
USE A COOLSTICK INSTEAD
Feedback and comments always welcome, please use QR code

Implementation of Coolsticks to Assess Regional Anaesthetic Block - Presented at GHASP Conference 2024

Gray-Renfrew A, Durdin S, Thorell S & Lie J 2024

Congratulations to our team who presented at the Greener Healthcare and Sustainability Project (GHASP) Conference 2024 in Leeds demonstrating our rollout of the Coolsticks at ELHT.

Implementation of CoolSticks® to Assess Regional Anaesthetic Block

¹Alexandra Gray-Renfrew ²Sally Durdin ³Sofia Thorell ⁴Jason Lie
^{1, 2, 3} Health Education North West ⁴East Lancashire Hospitals NHS Trust (ELHT), UK

INTRODUCTION

Traditionally, vapo-coolant sprays have been used to assess regional anaesthetic block. However, these sprays are costly and have a significant carbon footprint from manufacture, transportation and disposal (1). The CoolStick® has been developed as a reusable alternative to apply cold sensation to the skin (2). The device has a metal body, should be kept in the fridge between 2-8°C and can hold its temperature for around 15 minutes (3). Following assessment, the device can be cleaned with a non-alcohol wipe and put back in the fridge for further use.

The overall aim of this project was to reduce the use and purchasing of ethyl chloride (EC) vapo-coolant spray within the Trust.

METHODS

Work on the project began in April 2022 and is ongoing. Pre-implementation data on the number of EC sprays ordered by ELHT was collected and annual cost estimates calculated. Clinical areas using EC were identified using pharmacy order history. A trial period in general theatres involved the roll out of Coolsticks® to six anaesthetic rooms with further data on EC orders collected following this period. Various staff surveys were conducted prior to their introduction to each clinical area. To increase awareness of the project information posters were created and mass email notification sent to staff. A standard operating procedure was developed to standardise their use and address good infection control practice. Various updates were delivered at departmental meetings to encourage Coolstick® use as first line to assess regional anaesthesia.

RESULTS

Pre-Trial	1st April 2022 - 30th June 2022 • Order numbers of EC were obtained from hospital pharmacy over a 3-month period • 330 sprays were ordered (110/month)
Trial	7th July 2022 - 6th October 2022 • Coolsticks® introduced to 6 out of 25 theatres • 254 orders made (down by 76) = 23% reduction compared to pre-trial data
Run	1st February 2023 - 31st May 2023 • Each theatre supplied with 1 Coolstick® 374 sprays ordered (93.5/month) = 15% reduction compared to pre-trial • Potential annual saving of £2234+VAT and estimated reduction of 176220 kgCO2e
Review	1st May 2023 - 1st May 2024 • Over one year 836 sprays ordered (69.66/month) • 36% reduction based on pre-trial averages

SURVEY RESPONSES

Initial survey of anaesthetic trainees yielded 7 responses with 4 having previously used CoolSticks® to check regional block. Feedback included concerns with difficulty in differentiating between change in cold sensation compared to EC and a preference for use of EC spray in emergency obstetric cases. 21 responses were gained from a survey prior to implementation on maternity. At the time of conducting the survey 95% used vapo-coolant spray to monitor epidural height and 19% used light touch. 85.7% were willing to trial Coolsticks® and 14.3% were unsure. Reservations from staff included knowledge about the device and being able to access a fridge to store the device.

Figure 1. CoolStick®

DISCUSSION

Implementation of CoolSticks® as first line for assessing regional block is ongoing at ELHT with already marked reduction in EC spray orders and further plans to expand their use in other clinical areas such as Critical Care. Of note, the cost of each EC spray has recently increased to £19.80 which is significant.

Going forward, training for staff will be arranged to alleviate concerns identified from survey data and improve uptake. Ultimately, buy in from staff and healthcare leaders is key to the implementation of sustainable changes.

In line with the Triple Bottom Line, this sustainability initiative has been shown to reduce costs and has the potential to benefit people as well as the environment (4). Simple, safe, reusable medical devices as demonstrated by this project can bring about significant savings for anaesthetic departments as well as the wider hospital Trust.

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Reusable Theatre Hats!

NW School of Anaesthesia and Obstetrics managed to acquire sustainability funding to offer all trainees in the region with personalised, reusable theatre hats. We're now rolling it out twice a year for the February and August starters.

If you've seen trainees wearing navy blue theatre hats with their name on, then that's the project.



ELHT has now ordered theatre hats for 25-30 staff at both sites. They will be available very soon!

Reusable Gowns

Ongoing discussions are taking place with the surgical division with an aim to remove all disposable surgical gowns.

Recycle

Waste Recycling - A reminder on the ELHT Green Plan Refresh

Source: ELHT Green Plan Refresh 2023

Waste reduction (negation) needs to be our aim. In line with the NHS' net zero plan, we should reduce our waste by **359 tonnes** by 2024/25 from our 2020/21 baseline (equating to 87 tCO₂e emission reduction). The waste hierarchy of Reduce, Reuse, Recycle, Recovery (energy from waste) before disposal (landfill) must be embedded in all decision making around waste management as a trust.

We collect four main waste types: general, clinical/offensive, dry mixed recycling, and waste electrical and electronic equipment (WEEE)

2,386 tonnes of waste were produced, emitting 576 tCO₂e in 2020/21. 170 tonnes of offensive waste were sent to landfill in 2020/21, emitting 78 tCO₂e (14% of all emissions from waste).

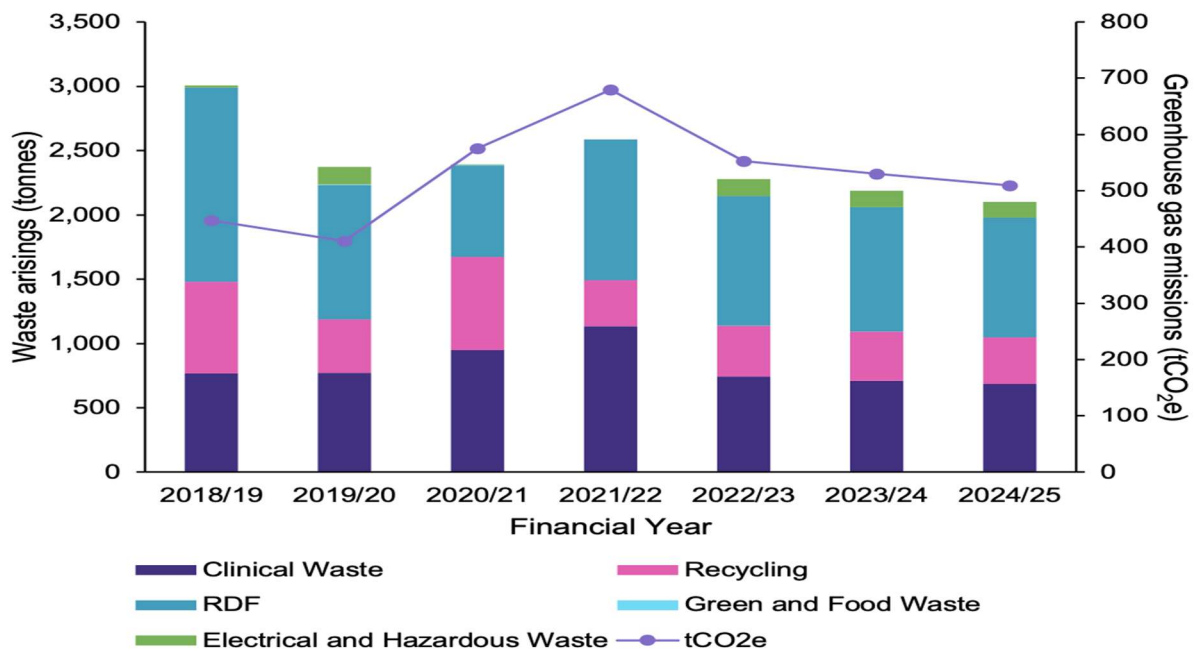


Figure 26 Stacked bar chart to show total waste arisings and emissions reduction trajectory to 2024/25

Waste Management Update Dec 2024:

The costs for domestic waste disposal from the trust per tonne are as follows:

Clinical Incineration - £950	Domestic Incineration - £130.42
Clinical after local treatment - £495	Domestic Recycling - £6.70
Clinical Offensive - £375	Domestic Food Waste - £7.80

Confidential Waste - £6.90 (per console)

SageTech Anaesthetic Gas Recapture Technology – UPDATE

Froud & Lie 2023

The SAGETech Trial on Volatile Capture in Theatre 6 was trialled in March to April 2023. Unfortunately due to financial restraint, we are still in the process of acquiring 3-4 Sagetech machines for RBH in the coming months.

Roll Out of Pharmacy Returns Units

Lead: Clare Mackie

Following a successful 3-week trail in Critical Care a trust wide rollout is coming with a goal of reducing unnecessary pharmacy waste. In all clinical areas there are medications that are no longer in use that could be returned to pharmacy and re-used. Currently there is no formalised process to return otherwise unused drugs to pharmacy and often these drugs need to be redirected to the waste stream due to concerns over safety and security of the drugs in transit. These bins are fully secured and will be collected by the pharmacist on their rounds.

During the 3-week test in critical care £2,310.10 of drugs were returned to the pharmacy in a re-usable state. Rolling this out to the 26 clinical areas this could equate to a £30,000 saving over 3 weeks or £500,000 per annum (based on ward medicine expenses being about half of critical care).



There will be an ongoing audit process following the rollout to establish drug savings, cost savings and annual overheads in terms of staffing and maintenance.


ELHT will be the first trust nationally to have a universal implementation of these bins, leading the way and hopefully providing an evidence base for other trusts to follow suit.

<https://uk.glasdon.com/litter-bins/pharmacy-bins/pharmacy-returns-unit-30>

Recycling QI Project - UPDATE

(Nickson M, Lewis C, Gayle K, Joseph T, Magill E & Lie J)


We have completed all the data collection in theatres and will be publishing the result of the Recycling QI Project in the coming months. Congratulations to our team for presenting this poster at Research for Greener Surgery 2024 in Birmingham.



University of Central Lancashire
UCLan

Improving sustainability and reducing waste in operating theatres: A snapshot quality improvement project on waste disposal adherence in operating theatres.

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East Lancashire Hospitals
NHS Trust

Introduction

Proper disposal of clinical waste is critical for ensuring safety, reducing environmental impact and lowering incineration costs.

From 2018-2021 it is estimated that East Lancashire Hospitals NHS Trust (ELHT) spent ~£100-150,000 on incineration of clinical waste, with incineration costing £535 per tonne⁽¹⁾.

Despite the availability of six specialised waste streams in operating theatres, there are concerns of incorrect waste disposal.

Contamination of recyclable streams leads to unnecessary incineration, further increasing CO2 emissions, at significant extra cost.

Contamination poses a safety issue to the recycling company who may remove their services, threatening the trust's disposal costs and recycling capabilities

Bins	Correctly disposed (%/correctly disposed/total bin)	Incorrectly disposed (%/correctly disposed/total bin)
Cytotoxic Waste	20.45% (9/44)	79.54% (35/44)
Clinical Waste	53.73% (36/67)	46.27% (31/67)
Recyclable Waste	61.70% (29/47)	38.30% (18/47)
Sharps	9.86% (7/71)	90.14% (64/71)
Pharmaceutical Waste	53.85% (14/26)	46.15% (12/26)
Re-useable Laundry Waste	100.00% (7/7)	0.00% (0/7)

Table 1: Percentage of correctly/incorrectly disposed waste per bin type.

Results:

- After applying the exclusion criteria our sample size went from an initial 407 to 262 images.
- A full bag of clinical waste was found left outside the designated bin, unattended within the operating theatre (Figure 2).
- An empty ketamine ampule with a giving set needle protruding from the top was found placed on the lid of the sharps bin, instead of being disposed of inside it (Figure 1).

Discussion

- Highest correct disposal: Reusable laundry (100%): Likely due to clear signage.
- Highest contamination: Sharps (90.14%): Likely due to lack of signage or staff finding it time-consuming to remove needles and dispose of syringes in the medicinal waste bin.
- Missed recycling opportunities: 46.51% of non-recycling bins contained recyclable material.
- Highest recyclable contamination: Cytotoxic waste (68.18%) - Many syringe and medication wrappers were found in these bins, suggesting improper disposal potentially due to time pressure.
- Propofol was incorrectly disposed of in 18 out of 218 of instances 8.26%. This incorrect disposal may contribute to environmental hazards such as accumulation of the drug in aquatic life⁽²⁾.

Limitations

No direct observation of disposal behaviours, limiting insight into root causes of errors. For example, errors could result from a lack of training, unclear signage, or haste during busy times.

The limitation of only taking photographs also meant we were unable to determine the specific use of certain items. Meaning we weren't sure if these items had been disposed of correctly, leading to exclusion.

This project likely involved a significant amount of human error. We had to review each picture individually to assess whether items were correctly disposed of which left room for potential oversight

Future Work

- Future work may include conducting staff surveys to understand their decision-making process and challenges during waste disposal as well as using machine learning algorithms to analyse the photographs automatically to reduce human error and increase the consistency of analysis.
- Future work could focus on calculating a specific CO2 reduction estimate by converting percentage contamination rates and missed recycling opportunities into real-world CO2 savings.
- Based on the findings of this study, we plan to create and deliver training sessions on proper waste disposal then repeat the audit.

Conclusion

These results highlight significant missed opportunities to recycle and significant instances of waste having to be unnecessarily incinerated. Correct disposal of these items would result in a tangible reduction in CO2 emissions.

Methods

11 operating theatres photographed over 4-week period.

Photos were compared to ELHT standard operating procedures to identify disposal errors

Exclusion criteria applied:

- Duplicate images
- Blurry images
- Images not of bin content
- Items with unclear contamination status (e.g., used stylets).

Figure 1: An empty ketamine ampule with a giving set needle protruding from the top was found placed on the lid of the sharps bin, instead of being disposed of inside it (Figure 1).

Figure 2: A full bag of clinical waste was found left outside the designated bin, unattended within the operating theatre (Figure 2).

Breakdown of incorrectly disposed waste	Should be in cytotoxic waste	Should be in clinical waste	Should be in recyclable waste	Should be in sharps bin	Should be in Medicinal waste	Should be in reusable laundry waste
Cytotoxic waste	6	30	10	16	0	
Clinical Waste	0	29	0	6	0	
Recyclable Waste	0	15	0	1	0	
Sharps Bin	15	24	36	27	0	
Medicinal Waste	3	6	5	1	0	
Reusable Laundry Waste	0	0	0	0	0	

Table 2: Breakdown of incorrectly disposed waste

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A Gentle Reminder

ORANGE BAGS

For infectious or potentially infectious soft clinical waste contaminated with blood/bodily fluids:

- Dressings
- Swabs
- Wipes
- Gloves
- Gowns
- Masks
- Aprons
- Blood bags



CLINICAL BAG

East Lancashire Hospitals NHS Trust
A University Teaching Trust



YES Infectious / Potentially Infectious Waste	NO Sharps / Drugs
© 'ENERGY FROM WASTE' / LOW TEMP INCINERATION © £385/TONNE 200KG CO2/TONNE	

YELLOW LID SHARP BINS

Sharps that have been used in the administration of, or are contaminated by, medicines other than those that are cytotoxic and cytostatic.
NO propofol!!



CLEAR BAGS

Domestic waste – all will be recycled

- Paper
- Food
- Syringe wrappers

NO GLOVES!
NO MASKS!

CLEAR BAG



YES Packaging & Wrappers Cardboard & Paper	NO Clinical Waste / Gloves Sharps / Medicines
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♻️ RECYCLED ♻️
£150/TONNE
50KG CO2/TONNE

PURPLE LID SHARP BINS

Waste & sharps that are contaminated with cytostatic and cytotoxic medicinal products.

(e.g. **Propofol** and **chemotherapy** drugs) (>1000C incineration)

- Propofol syringes/vials & TIVA lines
- Oxytocin
- Non-sharp waste contaminated with cytotoxic and cytostatic medicines
- Hazardous drugs in their original packaging, blister packs or denatured



YELLOW & BLACK BAGS (TIGER)

For soft healthcare waste from patients not known to be/suspected infectious.

No fluid.
For deep landfill.

BLUE LID BINS

For waste medicinal products that are not cytotoxic or cytostatic, contains non-hazardous medicinal drugs that are expired, unused, contaminated, damaged, denatured or not long needed.

- IV fluids
- Used syringes (**NO propofol**)
- **NO sharps**

BEWARE: IT IS ILLEGAL TO DISPOSE DRUGS DOWN THE DRAIN !!!

Safi, Lie 2024

Green Champions

We now have a network of 89 "Green Champions" – ideally one or two in each department (clinical and non-clinical) to act as a role model, point of contact and a local expert who can feed back more ideas on how we can save money and help the environment.

Email Dr Lie at jason.lie@elht.nhs.uk to find out or be the Green Champion of your working area – your support will be very gratefully received!

Feel free to approach the Green Champions in your working area to get involved!



Editors: Jason Lie and Angus Isham