

James Whitehouse, Salih Elhag, Ollie Turner, Mr Robert Jennings, Mr Alexander Aarvold

Introduction

- Climate change is one of the biggest threats of our generation
- The NHS generates 500,000 tonnes of waste each year and 25 megatons of CO2
- The NHS makes up 4 to 5% of the UK’s total greenhouse emissions (1)
- 70,000 people are affected each year by neck of femur fractures
- An aging population means this number will climb and areas to reduce emissions should be targeted

Methods

- The study was conducted at University Hospital Southampton between September 2024 and January 2025
- 29 #NOF surgeries were observed and the waste collected
- The waste was separated into recyclable, non-contaminated waste, PPE and contaminated waste and weighed to the nearest gram
- Validated methods by Rizan et al were used to calculate the CO2 emissions (2)
- The mean results were used to extrapolate to our major trauma centre
- The national hip fracture database was used to extrapolate nationally

Average mass of waste produced (kg)

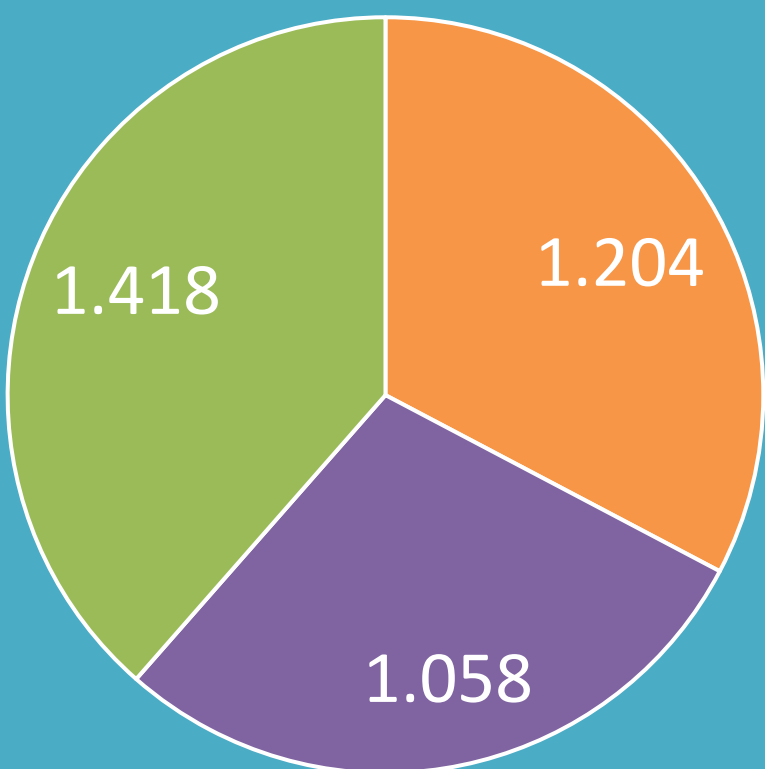


Figure 1: pie chart showing the proportion of each waste category

Results

- Carbon footprint of high temperature incineration in the UK: 1,074kg of CO2e per tonne of waste (2)
- Estimated annual CO2e from incinerated waste at UHS from #NOF: 2.2T
- Calculated CO2e from recycling hospital waste: 21-65kg of CO2e per tonne of waste
- Estimated annual CO2e from recyclable waste at UHS from #NOF: 21-65kg
- CO2 per #NOF surgery: 2.99 - 3.04 kg
- Total estimated CO2e from #NOF at UHS per annum: 2.5T
- NHFD reports 69,375 #NOF cases in 2022 (3)
- Estimated annual carbon footprint from #NOF surgeries nationally: 207,000 – 211,000 kg of CO2e
- This equates to roughly 1,206 car journeys from London to Glasgow

Total CO2 (Tonnes)

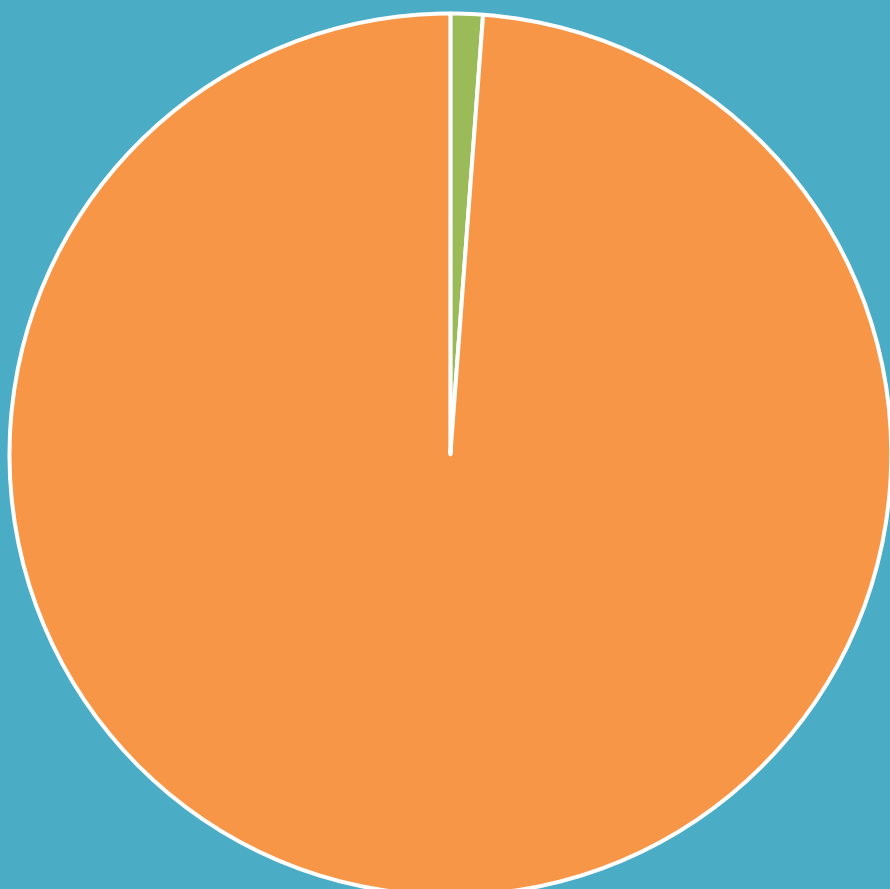


Figure 2: UHS #NOF CO2 emissions compared to the estimated national CO2 emissions

Type of waste	Total waste across 29 surgeries (kg)	Average waste per surgery (kg)
Recyclables	34.917	1.204
PPE	30.686	1.058
Single-use	41.113	1.418

Table 1: Table shows the amount of waste collected in each category

Discussion

#NOF surgery results in a significant amount of CO2e. Although a small amount of total emissions produced by the NHS, it is an area where excess waste can be reduced. The areas identified to reduce waste are as follows:

- Switching to mains powered pulsed lavage machines and transitioning away from battery powered machines, thus reducing the carbon footprint of this surgery by as much as 50% (4)
- Cement systems used in hemiarthroplasties come with individual paper instruction booklets that are thrown away, unused. Working with manufacturers to have a single copy in theatres would reduce paper waste
- Transitioning to reusable PPE will significantly reduce the waste sent for high temperature incineration and lower total carbon emissions.

Through small changes, the environmental impact of #NOF can be reduced and the NHS can reach its goal of net zero by 2040.

References

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2. Rizan C BMF, Reed M, Lillywhite R. The carbon footprint of waste streams in a UK hospital. Journal of Cleaner Production. 2021;286.
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