

Reducing unnecessary carbon in haemodialysis by recycling acid concentrate canisters

Abstract Title

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Theme

Sustainability

Abstract Body

In collaboration with the UK Kidney Association (UKKA) Kidney Quality Improvement Partnership (KQIP) and the regional sustainability initiative Trying to Reduce UnNecessary Carbon in Haemodialysis (TRUNC-HD), our centre has actively worked to minimise the carbon footprint of haemodialysis. A key focus has been on improving the waste management of dialysis acid concentrate canisters, a significant source of plastic waste in dialysis. During a KQIP regional meeting, we learned that other dialysis units recycled these canisters contrary to our practice.

The team carried out an information-gathering phase to quantify canister usage, evaluate their weight and environmental impact, and identify barriers to recycling. Stakeholders, including waste management teams and product manufacturers, were engaged. A liaison from the product manufacturer confirmed that canisters used in their industry-run haemodialysis units were sent for recycling. Subsequently, the waste manager conducted a review to determine whether recycling of the canisters was possible in our organisation. The carbon footprint of recycling was calculated using the 2024 UK government conversion factors for greenhouse gas (GHG) and other waste streams using *Rizan et al. (2021)* paper on “The carbon footprint of waste streams in a UK hospital”. The emission factor for recycling only include emissions attributed to the transportation of waste to the recycling facility as the emissions from the recycling process is attributed to the user of the recycled materials and not the producer of the waste.

Through advocacy and systematic changes, our canister waste transitioned from being disposed in the infectious waste stream, to domestic waste and finally, to recycling. The recycling plant processes the plastic into new plastic products such as garden furniture and pipes. Now, six of our eight dialysis units recycle plastic canisters which amounts to 19,344 canisters annually. The remaining two units, located at a different hospital trust sites, are working towards implementing a recycling program following discussions with their sustainability teams.

Each individual 4.7L and 6L canisters weighs 259g and 292g, respectively. 19,344 canisters amounts to 5-5.6 tonnes of plastic waste annually. The change from infectious to recycling waste stream is estimated to save 2.8-3.1 tonnes of carbon dioxide equivalent (CO₂e) emissions annually, with financial saving of between £1800-2000. The impact of the environmental and financial implications of the different waste streams are summarised in Table 1. To prepare canisters for recycling, they are drained of residual acid and rinsed with water. Rinsing requires an estimated 0.5L of water per canister, amounting to approximately

9672L annually. Despite this, the environmental impact of rinsing is minimal, contributing only 3.28kgCO₂e annually.

This initiative underscores the critical need to reevaluate waste classification and disposal practices in healthcare. Collaboration with external stakeholders and learning from other units were instrumental in driving this change. Further efforts are underway to review whether other consumables used in our units can be recycled, advancing our commitment to sustainability.

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Table 1: Impact of different waste management of dialysate concentrate plastic canisters in six haemodialysis units

Waste stream	Waste process	Carbon footprint (kgCO ₂ e/tonne of waste)	Annual carbon footprint of this waste stream (kgCO ₂ e)*	Cost (£/tonne of waste)	Annual cost of waste disposal*
Recycling	Recycling	6.41	32-36	£89.00	£445.90-502.71
Domestic waste	Low temperature incineration with EfW	172	861-971	£109.42	£548.29-618.05
Non-infectious offensive waste	Low temperature incineration with EfW	249	1248-1407	£206.86	£1036.39-1168.44
Infectious waste	Autoclave decontamination Low temperature incineration with EfW	569	2850-3212	£450.00	£2254,54-2541.80

CO₂e = carbon dioxide equivalents, kg = kilograms, EfW = Energy from waste

*The annual carbon emissions and financial results are provided as a range as our organisation is in the process of switching from 1:34 to 1:44 acid concentrate, in which there is a weight difference between the two different canisters.

[For more information](#)

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