

## WATER AND WASTE REDUCTION ON A RENAL UNIT

Royal Devon & Exeter NHS Foundation Trust, Green Ward Competition 2018

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**\*HIGHLY COMMENDED\***



In the region, dialysis is offered at five nurse-led units, Heavitree, Taunton, North Devon, South Devon and East Devon. Heavitree and South Devon are the largest units. In addition, the unit at the Wonford site offers acute care and medical staff are on site as part of this multidisciplinary team. Home haemodialysis is also offered in the region. A total of 109 patients receive dialysis in the service as a whole.

**Goal:** The renal team ran six different projects, aiming to improve sustainable working at the Heavitree site.

### **Project 1: Gambro machine settings**

**Background:** 24 Gambro dialysis machines are used on the unit. Each day 3 patients use each dialysis machine. After each patient use the machine goes through a heat disinfection cycle to ready it for the next patient (i.e. 3 times/day). In addition, a 'Hot C-CART' cycle was run at the end of the day to remove calcium, with a further disinfection cycle overnight.

**Approach:** The third heat disinfect cycle has been eliminated and the Hot C-CART cycle started following the third patient. This saves 24 heat disinfection cycles saved each day and reduces water and energy use.

**Results:** Are given for the savings made at Heavitree. Additional savings would be made if changes were spread to all sites (note that the size of different units varies so the potential for savings would be different at each site).

**Cost:**

£1790/year in Heavitree unit.

**Environmental:**

4,406 kgCO<sub>2</sub>e/year at the Heavitree unit.

52,416 litres of water/year in Heavitree unit.

**Social:**

None identified for this project.

**Project 2: Disposal of bicarbonate canisters**

**Background:** used bicarbonate canisters (Bi-CART) weighing 100g/canister were being put into clinical waste for disposal, which was thought to be an unnecessary expense as disposing of clinical waste is much more costly than disposing of general waste.

**Approach:** The canisters are now being put in general waste.

**Results & discussion:**

**Cost:**

£498/year in Heavitree unit.

**Environmental:**

The carbon cost of sending the plastic cannisters to landfill **increased** by 280 kgCO<sub>2</sub>e/year in the Heavitree unit.

Some bicarbonate cannisters (e.g. manufactured by Baxter) can be recycled. Whilst recycling (at a cost of £233.23/tonne) is a more expensive way of processing waste than general waste (at £128.23/tonne), it is cheaper than clinical waste processing (at £350.00/tonne) and is better from an environmental perspective.

**Social:**

None identified for this project.

**Project 3: Introducing patients own blankets**

**Background:** when patients attended for dialysis they were provided with a blanket to make sure that they kept warm whilst sitting for several hours during treatment. After use each blanket was laundered by the hospital. The laundry generated by 109 patients attending for dialysis multiple times per week is costly to process financially and is resource intensive (water and electricity use).

**Approach:** A letter has been given to all the patients at the Heavitree dialysis unit asking them to bring in their own blanket for use on the dialysis unit. The blankets will be stored in named bags on

the unit for repeated use and patients will be responsible for laundering their own blankets, as needed.

**Results:**

**Cost:** Potential savings on in-house laundry costs are £4,591 for Heavitree unit.

**Environmental:** 2,250 kgCO<sub>2</sub>e/year were saved in the Heavitree unit.

**Social:** Staff thought that patients may prefer their own blanket (no survey was carried out to verify this).

There have been some challenges implementing this project at other sites so currently the project is simply limited to the Heavitree site.

**Project 4: Home haemodialysis**

**Goal:** to assess the value of home haemodialysis compared to in-centre haemodialysis in financial, environmental and social terms. The service currently supports 18 patients to undergo home haemodialysis.

**Background:** the renal service has been aiming to increase the number of patients receiving haemodialysis at home to improve the financial and environmental impact of haemodialysis as well as to improve the patients' experience of care.

Home haemodialysis uses less water - 152 litres/week/patient on average compared with 360 litres/week/patient in conventional in-centre treatment. Consumables such as plastic and cardboard packaging can be recycled by the local council in the domestic recycling. Utility costs involved in the haemodialysis service are borne by the Trust and reimbursed to the patient. Renal nurses visit the patients at home to oversee care.

The process of home haemodialysis is less demanding from a cardiovascular perspective (i.e. less stressful on the heart) as haemodialysis occurs over a longer time. There is evidence that patients undergoing haemodialysis at home: experience an improved symptom profile (improved energy, appetite and sleep), live longer and take fewer medications.

**Results:** The calculations assume savings as if all these patients were new to the service and would have been on in-centre dialysis. Note that results are based on water use as water use was the largest difference between in-centre and home haemodialysis. Travel (of patients travelling to the units and renal nurses visiting the patients at home) and electricity could also be considered in calculations. A reduction in medication also has a positive impact on the environment, but as there was no data available it has not been included in the calculations.

**Cost:** savings due to reduced water use amounted to £1,577 per year for the 18 patients.

**Environmental:** savings of water use per year were 194,688 litres, with a carbon footprint reduction of 177 kgCO<sub>2</sub>e.

**Social/health:** there is evidence from the literature of patients undergoing home having a better experience of haemodialysis, however no assessment of the social impact/patient experience was carried out as part of this project.

### **Project 5: introducing NIPRO machines**

**Background:** water use is one of the greatest costs and sources of environmental impact for haemodialysis. The unit continue to choose machines that reduce the unit's water use when purchasing new machines.

**Approach:** 12 new NIPRO machines came into use in October 2018 (for haemodialysis and haemodiafiltration, HDF). These machines use 0.5l/min less water when starting up. Each machine starts up around 3 times a day and the start-up phase lasts 2 minutes.

**Results:**

**Cost:** £53 saved each year.

**Environmental:** 11,230 litres of water will be saved each year, saving 10 kgCO<sub>2</sub>e each year. In addition, the new machines do not use water when on 'standby', unlike the Fresenius machines, but data was not gathered on the length of average 'standby' so this was not included in our calculations.

**Social:** None identified for this project.

### **Project 6: No Meat Mondays**

**Background:** meat, amongst all food, has a high carbon footprint and is more costly than other foods. The renal unit dietician wished to raise awareness amongst staff of the particularly high carbon footprint of meat.

**Approach:** Kidney Unit staff were invited to sign the 'Meat-free Monday' campaign pledge.

**Results:**

30 staff signed up to the pledge.

**Environmental:** if staff were not eating a portion of meat once a week this would amount to 598 kgCO<sub>2</sub>e per year. Eating vegetables instead has approximately 77% of the carbon footprint of meat so the savings would be approximately 460 kgCO<sub>2</sub>e per year (Carbon factor is 2.5 for meat and 1.73 for vegetarian meals).

**Cost:** savings to the Trust would depend upon whether the staff were buying food from the hospital or providing their own meals. Vegetarian meals tend to be cheaper than meat-based meals and so there would be a potential saving for the Trust if this measure was adopted at scale in the canteens.

**Social:** there are potential benefits to staff in joining a movement and in raising awareness of the environmental impacts of our daily choices and habits.