

Cumulative Savings from Green Nephrology Innovations

Green Nephrology case studies are prepared in collaboration with renal units to document local innovations with environmental benefits, together with information to support their replication elsewhere. The majority of case studies describe financial as well as environmental benefits. This study reviewed cumulative environmental and financial benefits from Green Nephrology innovations and estimated potential savings from their widespread replication.

Methods

Initiatives in the Green Nephrology online case library were categorised as “infrastructure innovations” (requiring capital investment), “process innovations” or “model-of-care innovations”. Greenhouse gas (GHG) emissions calculations were updated using the latest DEFRA conversion factors. Duplicate initiatives were classed as a single innovation, and their costs/benefits averaged. For each category, data were combined to give a cumulative figure for annual savings in GHG, water and financial cost.

Since almost all of the innovations related to the provision of haemodialysis, the potential savings from scaling up across the UK were estimated for each innovation by correcting for the number of haemodialysis patients in the original renal unit, relative to the total UK haemodialysis population. Uptake of innovations is influenced by pre-existing infrastructure and practice, and (in the case of infrastructure innovations) by availability of capital investment; we therefore assumed a maximum uptake of infrastructure innovations in 30% renal units and process innovations in 60% renal units:

$$\text{Potential savings from scaling up} = \text{savings} \times \frac{\text{total UK HD population}}{\text{no. HD patients in renal unit}} \times (0.3^* \text{ or } 0.6^{**})$$

* infrastructure innovation ** process innovation

Model-of-care innovations were excluded due to poor data quality; one process innovation was excluded as non-transferable.



Bulk acid storage tanks in Bradford St Luke's Renal Unit. The central delivery system is saving 16 tonnes CO₂e and £23,000 per year in reduced acid wastage and reduced plastic waste.

Results

Six infrastructure innovations included upgrade to water treatment plants, water recycling, installation of baling machines for plastic and cardboard recycling, central delivery of acid for haemodialysis, lighting upgrades and retrofit of heat exchangers to dialysis machines. Total capital investment amounted to £121,000, while annual savings generated thereafter were £57,000, 84 tonnes CO₂e and 12 million litres of water.

Eleven process innovations were identified, ranging from paperless laboratory reporting to waste reductions in food, linen and dialysis consumables to improved waste segregation. No investment costs were reported. Annual savings were £186,000 & 183 tonnes CO₂e.

Three model-of-care innovations demonstrated the improved use of tele-communications in patient management. Financial savings were difficult to quantify due to the uncertainty of commissioning arrangements. Total carbon savings for the three model-of-care innovations were 6 tonnes CO₂e.

Potential savings from widespread replication of Green Nephrology case studies in UK renal units were estimated at £7 million, 11,000 tonnes CO₂e and 470 million litres water per year.

Conclusions

Isolated sustainable innovations are already demonstrating cost and environmental savings in individual renal units. Although not every innovation will be applicable everywhere, this study suggests that the systematic implementation of Green Nephrology innovations across UK renal units offers significant financial and environmental rewards.

