

Green Healthcare Scotland National Green Renal Programme

Opportunity for Change: Returning Disinfection Cycle Schedule to Manufacturers' Guidance

September 2026



36
tCO₂e



£56,000
Cost
Reduction



1. Description of action

1.1 This action aims to raise awareness of the carbon-saving opportunity to not exceed the manufacturers' recommended disinfection cycle frequency for the dialysis machines that are being used by renal services across Scotland.

2. Background

2.1 Dialysis machines historically are disinfected after each session, with spare machines kept on stand-by in case of technical faults are disinfected daily. Disinfection cycles for haemodialysis (HD) machines require heat, water, and chemical cleaning products, contrary to rinses. The practices for the disinfection of HD machines are often set at the time of installation according to manufacturer instructions. The instructions may vary per manufacturer but generally it is advised after a HD treatment and within a maximum 72 hours before commencing the next treatment.

2.2 However, there is variation across Scotland with some clinics' disinfection protocols in excess of this advice with a morning disinfection cycle, in addition to those performed after each dialysis session the day before. Heat disinfections are energy intense and affect the time the next patient starts their treatment.

2.3 HD machine energy use accounts for around 24% of the overall carbon footprint of HD, which is around 3.7tCO₂e per patient per year. According to the Scottish Renal Registry Annual Report 2025, 1,964 patients across Scotland receive some form of HD. Data from a project run by the Royal Devon and Exeter NHS Trust (2017), indicated that one heat disinfection per day per machine has an annual cost of £74.58, 183.58 kgCO₂e, and 2,184 litres of water. Approximately half of the estimated 750 dialysis machines across Scotland run a disinfection cycle every weekday morning.

This would mean an annual impact of:

- 375 machines x £74.58 = £27,967.50
- 375 machines x 183.58 kgCO₂e = 68,842.50 kgCO₂e
- 375 machines x 2,184 litres of water = 819,000 litres of water

2.4 In addition to returning to the manufacturers' recommended schedule, there is evidence that the frequency of disinfection can be reduced without creating clinical risk, a fact also acknowledged by the UK Kidney Association (2026). Renal clinics in England, including Doncaster (no date) and Leeds (no date), as well as in Malaysia (2020) and the province of British Columbia (BC Renal) in Canada (2019), have reduced heat disinfection to once a day, and instead use 11-minute rinses between patient sessions. This approach has been supported by good safety evidence and no actual (as opposed to theoretical) clinical risk.

2.5 However, there are strict exclusions to these practices:

- a) Heat disinfection after every HD treatment will continue where patients have known Hepatitis B, Hepatitis C, or HIV virus, with unconfirmed blood borne virus serology, or treated on quarantined machines following possible blood borne virus exposure.
- b) Patients receiving acute HD/inpatient wards.
- c) If blood has entered the hydraulic circuit, either through the rinse or infusion portals of the dialyser connector lines, the machine will still be disinfected before next patient use.

3. Who needs to be involved in this change locally?

3.1 Below is a list of colleagues, including but not limited to, who should be involved in implementing this change:

- Technical colleagues
- Clinical colleagues (consultants and nursing staff)
- Service managers

4. Boundaries

4.1 The table below identifies the boundaries for this action:

In scope	Out of scope
• Carbon cost of energy use • Financial cost of energy use	• Device manufacture, maintenance, and disposal • Consumables • Staffing costs • Infrastructure costs, e.g. lighting, heating, etc.

5. What is the change and how will it be implemented?

5.1 The proposed change is to align disinfection protocols with the manufacturer's guidance and avoid exceeding the recommended frequency of disinfection cycles. This will involve no longer running unnecessary disinfection cycles on machines that have been used for treatments less than 72 hours prior, as per manufacturers' instructions for use - typically, this relates to the early morning disinfection cycles. As most units operate 6 days a week, this would prevent up to 6 disinfection cycles being run per week. When required, the morning disinfection cycle could be replaced with a rinse cycle to warm up the machine.

5.2 The change would be implemented by Renal Technical Managers relaying the change to protocol to clinical and technical staff. Renal Technicians would be responsible for updating the machines' programming to remove the unnecessary disinfection cycle. Local teams should

consider the practical implications of their local machines, including how best to schedule back-up machines as and when they rotate in and out of use.

5.3 Usual protocol for monitoring of microbial and endotoxin levels remains unchanged.

6. What are the potential co-benefits of this change?

6.1

Outcome	Potential benefits
Carbon reductions	0.311 kgCO ₂ e per prevented cycle (Bradford)
Financial savings	£0.48 per prevented cycle (Bradford)
Patient experience	Neutral
Staff experience	Neutral

6.2 Indicative calculations of carbon and financial reductions

Area	Calculation
Carbon reduction	0.311 kgCO ₂ e per prevented cycle (Bradford) 375 machines x 5 mornings = 2,250 cycles per week 1,500 x 52 weeks = 117,000 cycles per year 117,000 x 0.311 kgCO ₂ e = 36,387 kgCO ₂ e (36.387 tCO ₂ e)
Financial reduction	£0.48 per prevented cycle (Bradford) 375 machines x 5 mornings = 2,250 cycles per week 2,250 x 52 weeks = 117,000 cycles per year 117,000 x 0.48 = £56,160 per year
Total	~ 36.3 tCO₂e and ~ £56,160 per year

7. Risks and issues

7.1 Adhering to the manufacturers' guidance, instead of exceeding it, does not create additional risk.

8. Implementation guidance

8.1 This opportunity for change highlights the importance of implementing this initiative. By embracing this change, your site will contribute to NHS Scotland's commitment to achieving net-zero emissions by 2040, as outlined in the NHS Scotland Climate Emergency and Sustainability Strategy 2022–2026.

8.2 Below, Green Healthcare Scotland provides guidance on practical steps you can take to implement this change within your area. If you require any further information or guidance, please contact the Green Healthcare Scotland programme team at: cfsgdghs@nhs.scot.

Local sustainability group:	
1.	Review the opportunity for change and assess what it means for your local context.
2.	Provide Green Healthcare Scotland programme team with initial validated information/local targets.
3.	Facilitate a discussion with the staff responsible for implementing the change and those directly impacted by it, ensuring collaboration and shared understanding.
4.	Agree a local implementation plan.
5.	Implement local plan.
6.	Provide quarterly data to Green Healthcare Scotland programme team.
7.	Monitor implementation of action.

9. Measurement

9.1 This action would be measured through self-reporting by the services.

10. Acknowledgements

Name	Role	Contribution
Gerry Boyle	Section Manager Renal Services, NHS Dumfries & Galloway	Provided technical expertise for Situation Background Assessment Recommendation (SBAR) document
John Ramsay	Regional / Home Sector Manager (Renal), NHS Lothian	Reviewed draft OfC and provided technical expertise for OfC
Mark Prentice	Technical Manager (Regional), NHS Greater Glasgow & Clyde	Assisted with disseminating survey to renal technicians

12. References

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13. Version Control

Version Control	Date YYYY MM DD	Editor	Changes
0.1	2026 08 18	DZ	First draft
0.2	2026 08 21	EM	Review
0.3	2026 09 02	DZ	Updated calculations based on feedback at SDG
1.0	2026 09 04	DZ	Document ready for Programme Board
1.1	2026 09 23	DZ	Amendment based on feedback from Programme Board

Peer Review	Name	Title	Date YYYY MM DD
Author	DZ	Project Manager	2026 08 18
Reviewer	JR	Regional / Home Sector Manager (Renal), NHS Lothian	2026 08 19
Reviewer	LB	Project Manager, GHS, NGEP	2026 08 20
Reviewer	RM	Project Manager, GHS, LTI	2026 08 20
Approver	EM	Clinical Lead, NGRP	2026 09 24