Royal Cornwall Hospitals
NHS Trust

Non-Acute Haemodialysis Prescribing Clinical Guidelines

V1.0

November 2026

Summary

This clinical guideline has been written to support the safe prescribing of dialysis and also optimisation of dialysis treatment. Standard prescriptions are suggested for the different elements of dialysis throughout the guideline; this does not replace clinical judgement which should lead the decision making for prescribing dialysis.

The commencement of dialysis should be gradual to help prevent disequilibrium. Below is a suggested starting regime for chronic kidney disease (CKD) commencing on long term dialysis. Again, this should be used alongside and not replace clinical judgement.

Table 1: Suggested gradual dialysis start

Session number	Time on dialysis (min)	Dialyser size	Fluid removal (ml)
1	120	FX 5 (HD)	Nil
2	150	FX 5 (HD)	Nil
3	180	FX 5 (HD)	Max 500
4	210	FX 60 (HDF)	Max 500
5	210	FX 60 (HDF)	Max 1000
6	210	FX 60 (HDF)	Max 1000
7	210	FX 60 (HDF)	Max 1500
8	210	FX 60/80 (HDF)	Max 2000

In some instances, the lead reason for commencing dialysis may be fluid overload – the Nephrology Consultant will therefore request fluid removal during the first dialysis session and set the volume to be removed.

Following the gradual start of dialysis the patient's prescription should be set according to these guidelines and clinical judgement.

1. Aim/Purpose of this Guideline

1.1. This guideline applies to clinical nurse specialists (CNS) in nephrology and delegated medics (SHO and above) who are undertaking prescribing of in-center haemodialysis. The aim is to ensure safe consistent haemodialysis treatment optimizing adequacy of dialysis.

1.2. This version supersedes any previous versions of this document.

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2. The Guidance

The dialysis prescription will be reviewed monthly as part of the multi-disciplinary team (MDT) quality assurance meeting as well as when clinical circumstance dictate. The patients named Nephrology Consultant will also review and update the dialysis prescription and undertake face to face review with their patients at least every 6 months. The Nephrology consultant is responsible for the dialysis prescription for patients and can delegate the task of prescribing to resident doctors in renal and renal replacement specialist nurse.

Transonic readings are taken for patients with fistulas and grafts every three to four months to detect any change in blood flow or recirculation.

Bloods are taken monthly to monitor dialysis adequacy, anaemia and other biological markers relevant to dialysis patients. Every 3 months PTH levels, HbA1c and viral screens are undertaken.

2.1. Dialysis Schedule

This will be decided initially by the patient's Nephrology Consultant on commencement of dialysis. The consultant will decide dialysis frequency based on the residual function of the patient and their co-morbidities. Changes to a schedule may be made as patient condition and residual function changes.

2.1.1. **Incremental schedule**:(twice a week) may commence for patients who have an adequate residual function. For decision making regarding ongoing/commencing dialysis incrementally please refer to the RCHT Incremental Start Dialysis Clinical Guidelines. Once patients no longer meet the criteria for incremental dialysis or on consultant decisions, they will be increased to thrice weekly schedule.

2.1.2. **Thrice weekly schedule:** most patients will receive the **standard three times a week** dialysis schedule.

2.1.3. **Augmented schedule:** Occasionally patients may require an augmented dialysis regime if they are unable to achieve adequacy targets or fluid control on a standard schedule. Other medical indications (such as calciphylaxis) may require an augmented schedule. There are some relative contraindications to increased frequency or length of dialysis, such as residual function and problematic fistulas. An augmented schedule could also impact on the patient's quality of life. These factors should be considered when deciding to start or continue an augmented schedule for dialysis.

2.2. **Dialyser**

The dialyser facilitates the molecule clearance and removal of excess fluid during dialysis via a semi-permeable membrane, blood flowing in one direction and the dialysate in the opposite side of this membrane. Dialysers can influence the clearance by their size (measured in square meters) and the membrane pore size.

2.2.1. **Dialyser flux:** All patients should be treated with high-flux dialyser unless clinically not tolerated. High-flux dialysers allow for removal of middle molecules such as β2-microglobulin whilst preserving important components like red blood cells and proteins.

2.2.2. **Dialyser size:** Below is a table suggesting dialyser size for patients weight. If the suggested dialyser size is not achieving adequate clearance (measured to be a URR of >70) and factors such as access blood flow and dialysate speed have been optimized then size of dialyser may be increased to support better clearance. Please note this is guidance and selection of dialyser size should be made with clinical judgement considering other influencing factors which can affect clearance such as access type, pump speed, dialysate flow speed and dialysis time.

Table 2: Suggested dialyser size according to patient weight

Dialyser surface area (Fresenius size)	1.4(m2) (FX60)	1.7(m2) (FX80)	2.2(m2) (FX100)	2.5(m2) (FX120)
Patient weight	<60kg	60 to 80kg	80 to 100kg	>100kg

2.3. **Anticoagulation**

Anticoagulation is used to help prevent dialysis circuit clotting during dialysis. A clotted circuit leads to blood loss for the patient and treatment interruption. Clotting of the circuit can be influenced by the length of time the blood is exposed to the circuit, dialyser size, patients Hb level and other clinical factors such as sepsis induced coagulopathy.

Contraindications for patients receiving anticoagulation with low molecular weight heparin on dialysis include:

- Warfarin therapy with a therapeutic INR.
- History of Heparin Induced thrombocytopenia (HIT).
- Active bleeding or suspicion of recent surgery or due surgery/invasive procedure.
- Known clotting issues.

2.3.1. Patients receiving 3 hours or more of dialysis should have a bolus dose of LMWH (20mg enoxaparin) prescribed. This is administered into the dialysis circuit on commencement of dialysis.

2.3.2. If clotting occurs or the transmembrane pressure (TMP) is rising during dialysis the bolus dose of LMWH should be increased to 40mg enoxaparin.

2.3.3. Patients who receive over four hours of dialysis treatment and have issues with clotting or raised TMP ***or*** patients who clot towards the end of treatment despite receiving 40mg enoxaparin may be prescribed a split dose of Low Molecular Weight Heparin (LMWH) to prevent clotting. Typically starting with 40mg on commencement of dialysis and a further 20mg enoxaparin at the midpoint. If clotting continues then the Nephrology Consultant should review the anticoagulation schedule with consideration of a continuous unfractionated heparin infusion regime.

2.3.4. Patients for whom anticoagulation is contraindicated may require regular flushes of the circuit to prevent clotting. These flushes should be considered when calculating the fluid removal on dialysis. For patients who are fluid overloaded the decision to administer regular flushes should be discussed with Consultant Nephrologist or Clinical Nurse Specialist.

2.3.5. Patients who have a history of HIT should be considered for anticoagulation with warfarin.

2.3.6. For patients who continue to struggle with clotting and/or increased TMP/DIP after the above treatment options have been implemented pre-dilutional HDF may be commenced. Pre-dilutional dialysis affects the concentration gradient of the dialyser potentially decreasing clearance therefore, pre-dilutional HDF should not be standard and only undertaken if clinically indicated.

2.4. Dialysate Temperature

Dialysate temperature can influence vasodilation and vasoconstriction whilst the patient is receiving dialysis. For this reason, the dialysate temperature should be reviewed if patients are haemodynamically unstable whilst on dialysis.

2.4.1. Dialysate temperature should be 36.5°C as standard.

2.4.2. Patients who have significant hypotension on dialysis may require the dialysate temperature to be reduced to 36°C or if hypotension continues 35.5°C. Dialysate temperature should not be set any lower than 35.5°C.

2.5. Blood flow

Blood flow should be maximized for patients on dialysis as this is directly proportional to dialysis clearance and HDF substitution, both associated with patient outcomes. Factors which can affect maximum blood flow:

- Access type and needle size.
- Issues with access.
- Heart function.
- Blood pressure.

Suggested minimum needle gauge for prescribed blood flow.

Table 3: Needle Gauge and Blood Flow Rates

Prescribed blood flow ml/min	Minimum needle gauge
>450	14
350 to 450	15
300 to 349	16
<300	17

2.5.1. The standard rate of blood flow for patients with an arteriovenous fistula (AVF) or arteriovenous graft (AVG) (once established on dialysis) should be 350ml/min. Rising to 400ml/min if clearance or HDF substitution is not adequate.

2.5.2. If there are issues with reaching 350ml/min to 400ml/min blood flow in patients with AVF or AVG (due to either hypotension or fistula issues) the pump speed should be reduced to a rate tolerated (aiming to keep above 250ml/min) and renal consultant or clinical nurse specialist to review.

2.5.3. Some patients dialysing via a AVF/AVG may be considered for higher pump speed if their clearance is not adequate following increasing dialyser and time on dialysis. 450ml/min pump speed may be used in these patients if there is no concern regarding heart function or blood pressure.

2.5.4. The standard rate of blood flow for a patient with a tunnelled line for dialysis is 300ml/min.

2.6. Dialysate Flow

An optimal dialysate flow rate maximizes the concentration gradient for adequate clearance. A low dialysate flow can lead to poor clearance of waste products. For this reason, dialysate flow should be at least 1.5 x the blood flow or a minimum of 500ml/min. Maximum dialysate speed of 800ml/min.

2.7. HD/HDF

All patients should be prescribed haemodiafiltration (HDF) once established on treatment rather than haemodialysis (HD). Research shows a reduction in all-cause mortality and cardiovascular mortality on HDF. HDF is often better tolerated than HD amongst heart failure and frailer patients. If patients are having longer side effects post dialysis or intolerable side effects on dialysis a trial of HD may be undertaken to assess if the symptoms resolve.

2.8. Time on dialysis

Standard treatment time on dialysis is 3.5 hours. If clearance is not adequate (URR<70) or HDF substitution is sub-optimal treatment time should be increased in 15-minute increments to improve clearance. This should be done alongside review of dialyser size and blood flow to ensure optimisation of dialysis is achieved.

2.9. Dialysate Composition

Dialysate composition should be individualized for a specific patient depending upon their biochemical, physiological and fluid status. Monthly bloods and QA are important for reviewing the dialysate composition and making changes as clinically indicated.

2.9.1. **The standard potassium prescription is 2mmol**. Patients whose pre dialysis potassium is consistently 4.0 mmol/L or less should be increased to a 3mmol dialysate concentration to prevent hypokalaemia post dialysis. For patients with hyperkalaemia (>5.5mmol/L) it is not routine to commence on 1mmol/L dialysate due to the associated dangers of electrolyte shift. Patients with hyperkalaemia should have dietary support, assessment of dialysis clearance (including access), medication review and acid base status assessment (acidosis causes an efflux of potassium from cells).

If a patient attends dialysis with a known significant hyperkalaemia (7.0mmol/L or above) they may be prescribed 1.0mmol potassium concentration for the first two hours of dialysis and then 2.0mmol for the remainder of their dialysis. An extra dialysis session should be offered the following day for this patient alongside the interventions mentioned above.

This guidance is summerised in the table below:

Table 4: Potassium dialysate levels according to pre- dialysis bloods

K+ level pre dialysis	Dialysis K+ concentration
<4.0mmol/L	3.0mmol/L
>4.0mmol/L	2.0mmol/L
Significant hyperkalaemia (>6.5mmol/L)	1mmol/L first two hours of treatment. 2mmol/L remainder of dialysis time. Next day dialysis (extra session).

2.9.2. **Sodium Standard prescription is 138mmol**. Higher levels can lead to sodium loading; lower levels may lead to haemodynamic instability. Patients who gain significant amounts of fluid between sessions or have intradialytic hypotension or considerable post dialysis recovery times should be reviewed by the renal consultant or clinical nurse specialist if adjustment to sodium concentration is being considered. 'Sodium profiling' (also known as sodium modeling) should be avoided as this is associated with sodium loading.

2.9.3. **Bicarbonate Standard prescription is 35**. If patients have a pre-dialysis bicarbonate of 22 or more the bicarbonate prescription should be changed to 30. Due to the consequence of serum pH on potassium movement it is important to consider the bicarb prescription alongside the patient potassium levels.

2.9.4. **Calcium** Standard calcium prescription is 1.5mmol/L. A concentration of 1.25mmol/L may be considered if: serum calcium persistently raised despite stopping calcium increasing or calcium containing medications. Other causes of raised calcium should be considered.

2.10. Target Weight (dry weight)

Is the weight that should be achieved at the end of dialysis as part of fluid management. The patients target weight is set according to fluid overload so therefore clinical assessment of central and peripheral oedema as well as blood pressure should be undertaken to help inform the dry weight target. Intradialytic weight gains will vary between patients depending on their residual function and their concordance with fluid and sodium restriction. Weights are taken pre and post dialysis – this should continue where possible when the patient is being dialysed as an inpatient.

Renal unit staff will set the fluid removal target at each dialysis session with consideration of the target weight and weight gain since the previous dialysis session. Blood volume monitoring (BVM) and blood pressure monitoring during dialysis may be undertaken to inform if the volume being removed needs to be adjusted. Ideally no more than 2L should be gained between sessions as removal of higher amounts of fluid puts extra strain on the cardiovascular system. On HDF/HD no more than 1L/hour should be removed.

Some patients may be significantly overloaded and require higher volumes of fluid to be removed. For these patients a stand-alone ultrafiltration (UF) session may be offered on a non-dialysis day. Alternatively, 30 minutes of UF could be undertaken at the start or end of a regular HDF session to aid fluid removal (1L in 30 minutes) however this should not be undertaken too regularly as this will reduce their dialysis clearance.

The target weight should be reviewed every three months or sooner if clinically indicated. Education from dieticians regarding fluid restrictions and sodium intake should be provided at their regular review. Any concerns regarding flesh weight loss should also be referred to the dietician as well as Nephrology Consultant. If patients are having intradialytic hypotensive episodes or cramping on dialysis, their target weight should be reviewed and adjusted as required.

If a patient struggle (i.e intra-dialysis hypotension) with fluid removal which is clinically present profiling the fluid removal to help support intravascular refill should be considered. Most modern machines show the vascular refill rate – this may be used to help guide profiling fluid removal.

3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	Dialysis adequacy. Hyper/hypokalaemia.
Lead	Dr Stratton – clinical lead for dialysis.
Tool	Vital Data, URR.
Frequency	At monthly quality assurance meetings.
Reporting arrangements	Renal Multi-Disciplinary Tea, (MDT).
Acting on recommendations and Lead(s)	Consultant clinical lead for haemodialysis. Renal Replacement Clinical Nurse Specialist (CNS).
Change in practice and lessons to be shared	Renal Business and Governance meeting.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the Equality Diversity and Inclusion Policy or the Equality and Diversity website.

4.2. Quality and Equality Impact Assessment (QEIA)

The QEIA process allows RCHT to monitor the impact of changes to its policies and services, ensuring that nobody is unduly disadvantaged. The Quality and Equality Impact Assessment (QEIA) Form is available via the link in Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Non-Acute Haemodialysis Prescribing Clinical Guideline V1.0
This document replaces (exact title of previous version):	New Document
Date Issued/Approved:	November 2026
Date Valid From:	November 2026
Date Valid To:	November 2029
Directorate/Department responsible (author/owner):	Jon Stratton – Renal Consultant Dialysis Lead. Rachel Whyte – Advanced Clinical Practitioner.
Contact details:	01872 252887.
Brief summary of contents:	Guidance for prescribing non acute haemodialysis.
Suggested Keywords:	Haemodialysis prescription.
Target Audience:	**RCHT:** Yes **CFT:** No **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer.
Approval route for consultation and ratification:	Renal Governance and Nephrology Consultants.
Manager confirming approval processes:	Roz Davies.
Name of Governance Lead confirming consultation and ratification:	Natasha Andrews.
Links to key external standards:	None required.
Related Documents:	None required.
Training Need Identified?	None required.
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet.

Information Category	Detailed Information
Document Library Folder/Sub Folder:	Clinical/Renal.

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
January 2026.	V1.0.	Initial issue.	Jon Stratton, Renal Consultant Dialysis Lead. Rachel Whyte, Advanced Clinical Practitioner.

All or part of this document can be released under the Freedom of Information Act 2000.

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Controlled Document.

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Appendix 2. Quality and Equality Impact Assessment (QEIA) Form

The QEIA process allows RCHT to monitor the impact of changes to its policies and services, ensuring that nobody is unduly disadvantaged.

Please ensure you have completed a Quality and Equality Impact Assessment (QEIA) using this link to complete the form:

E11 QEIA Policy

For guidance, please see the QEIA Essentials – Quick Reference Guide or contact as required below:

Equality, Diversity and Inclusion guidance, please contact: rcht.inclusion@nhs.net

Quality Governance guidance, please contact Jillian Tozer: jillian.tozer3@nhs.net