Missed Haemodialysis Sessions – Medical Management Guideline

1. Purpose

This guideline is to provide WA Country Health Service (WACHS) medical officers (MO) and non-haemodialysis (HD) clinicians with information regarding the medical management of end stage kidney disease (ESKD) patients who have missed HD session(s) and require stabilisation prior to commencing HD treatment.

The WACHS Missed Haemodialysis Sessions - Haemodialysis Treatment Guideline provides WACHS HD clinicians at WACHS Satellite Dialysis Units (SDUs) with information regarding the management of HD treatments for ESKD patients who have missed HD session(s) and require HD treatment.

2. Guideline

2.1 Implications of missed haemodialysis sessions

Regular planned HD treatment for ESKD patients is required for best clinical outcomes. The minimal usual standard for HD is three sessions per week of four to five hours in duration. Non-attendance to dialysis sessions is detrimental to the patient's health. Even one missed HD session per month is associated with an increased risk of hospitalisation, emergency department (ED) attendance and increased mortality. Missed HD results in various clinical consequences including sodium and / or fluid retention (i.e., oedema), electrolyte disturbances, chronic hypertension and cardiac dysfunction resulting in sub-acute to acute pulmonary oedema (APO).

Fluid retention may range from minimal to extreme, depending on pre-existing cardiac status, residual urine output and underlying pulmonary complications. Presentation with severe APO may be the most catastrophic and require intubation if not immediately stabilised in the ED.

Electrolyte disturbances include hyperkalaemia, hyponatraemia, hyperphosphataemia and hypocalcaemia. Hyperkalaemia poses an immediate threat and requires immediate attention to stabilise the situation pending resumption of HD.

ED attendance following missed HD is usually for symptoms e.g., shortness of breath (SOB), nausea and fatigue, and / or complications e.g., APO, hyperkalaemia, non-ST-elevation myocardial infarction (NSTEMI) and chest infections. These acute symptoms generally need to be managed and the patient stabilised prior to attending HD treatment.

Caution is required when ordering and interpreting additional tests that might delay HD. Fluid overload may be associated with evidence of cardiac dysfunction including elevated B-type natriuretic peptide (BNP) and troponins and these tests are not routinely required for decision making unless prompted by clinical concerns of myocardial ischaemia e.g. chest pain.

To avoid diagnostic confusion or inappropriate interventions, careful clinical assessment should guide the utility of these tests or the activation of chest pain pathways as fluid overload, hepatic congestion and / or pleuro-pericarditis might mimic ischaemia.

2.2 Missed haemodialysis treatment pathways and clinical decision making

In the absence of absolute indications for transfer, acute symptoms need to be managed by Medical Officers (MO) and non-HD clinicians, and the patient stabilised (e.g., APO and hyperkalaemia treatment initiation and monitoring) prior to being able to attend HD in a SDU.

Point-of-Care and Evidence Based Practice Tools can provide MOs guidance for acute assessment and management along with additional medical support available from the Command Centre Emergency Telehealth Service (ETS).

Appendix A is a clinical decision-making flowchart for missed HD patients and appropriate management and treatment pathways.

Guidance and support for appropriate patient management should be sought early via consultation with the Nephrologist / On-call Renal Specialist providing medical governance and support to each WACHS region. See WACHS Renal Services Intranet Page.

Note: interventions for patients who have missed HD sessions are given not to replace HD but to stabilise until the earliest HD session can be arranged, and medical review (by phone or in person) should not unnecessarily delay dialysis but facilitate it.

The WACHS Missed Haemodialysis Sessions - Haemodialysis Treatment Guideline provides HD clinicians with the information on how to manage and provide HD treatments at SDUs for renal patients that have missed HD treatments. HD clinicians may seek medical guidance, support and clinical patient reviews during HD for patients displaying symptoms as a result of missed HD or may be deteriorating as a result of missing HD.

ATTENTION

Absolute indications for transfer would include:

- APO requiring intubation
- no functioning vascular access
- severe sepsis requiring inotropic support
- acute coronary/stroke syndrome where intervention is indicated and cannot wait regional dialysis.

If transfer is deemed necessary as per the above and confirmed with appropriate Nephrologist / On-call Renal Specialist, contact Acute Patient Transport Coordination (APTC) via the Command Centre to initiate process for transfer.

Missed HD clinical consequences, symptoms and acute and definitive management are summarised in Table 1**.** The definitive management for the majority of consequences is resuming HD as soon as possible.

Table 1: Summary of missed dialysis clinical consequences, symptoms and acute and definitive management

Consequences	Symptoms	Acute management	Definitive management
Fluid Retention	Shortness of breath / APO	Oxygen, NIV, glyceryl trinitrate, high dose diuretics *See 2.3 Acute medication management and dosing recommendations	Haemodialysis
	Hypertension	Oral (PO) / intravenous (IV) vasodilators, glyceryl trinitrate, diuretics	Haemodialysis
	Ascites/oedema	Ascitic drainage	Haemodialysis
	Atrial fibrillation	Rate control / rhythm when required	Variable-beta blockers and amiodarone, anticoagulation consideration (individualised dosing in ESKD)
Electrolyte Disturbances	Hyperkalaemia	Nebulised salbutamol Insulin with glucose infusion and subsequent glucose infusion to mitigate delayed hypoglycaemia. IV calcium gluconate for ECG changes Patiromer or calcium resonium *See 2.3 Acute medication management and dosing recommendations	Haemodialysis
	Hyponatraemia	Water restriction	Haemodialysis
	Hyperphosphatemia	Nil	Haemodialysis and oral phosphate binders
	Hypocalcaemia	Oral calcium and calcitriol IV calcium gluconate **only** for management of hyperkalaemia or	Haemodialysis and oral replacement

Consequences	Symptoms	Acute management	Definitive management
		symptomatic hypocalcaemia (rare)	
	Metabolic acidosis	IV sodium bicarbonate is generally avoided due to risk of fluid overload and oral is ineffective in acute situations	Haemodialysis
Uraemia	Nausea and vomiting, drowsiness, itch, myoclonus, altered conscious state, fatigue, myalgia	Anti-emetics (limited use)	Haemodialysis
Anaemia	SOB, fatigue, tachycardia	Transfusion when indicated is best given on Haemodialysis to avoid precipitating APO. Do not transfuse off dialysis unless active bleeding or Hb ≤60 g/L or Hb ≤70 g/L and symptomatic (e.g., angina)	Haemodialysis facilitated transfusion
Platelet dysfunction	Bleeding / oozing	Desmopressin (DDAVP)	Haemodialysis with reduced anticoagulation
Hypercoagulable	Fistula Thrombosis	Anticoagulation usually not indicated	Tertiary transfer for intervention
Infection **Chest / skin / urine etc**	Fever	Antibiotics as appropriate	Antibiotics managed in the context of haemodialysis

2.3 Acute Medication Management and Dosing Recommendations

Medications and their prescription and administration summarised in Table 2 are imperative to the acute management of missed haemodialysis to stabilise the patient in preparation for haemodialysis treatment.

The WACHS Hyperkalaemia Guideline can also provide further information of precautions and considerations regarding the medications detailed in Table 2.

Table 2: Missed dialysis acute medication management and dosing recommendations

Medication	Prescription & Administration

Furosemide (high dose)	• **Only** if patient has urine output > approximately 300 mL/day give:
	  ○ 500 mg tablet PO 8 hourly or;
	  ○ 250 mg ampoule IV 8 hourly given over at least 70 minutes (maximum rate 4 mg/min). Administer undiluted via central line (250 mg/25 mL) or dilute in 100 mL sodium chloride 0.9% if administering peripherally (in a large vein).
	• **Do NOT catheterise dialysis patients (other than the rare occasion where they maintain a high urine output and are too ill to void naturally).**

Salbutamol (high dose) nebulised	• 10 mg nebulised over 10 minutes. • Repeat every 4 hours as required.
Insulin with glucose infusion	• ACTRAPID® 10 units in 50 mL of glucose 50% IV over 15 min. • Emergencies: may give ACTRAPID® 10 units in 50mL of glucose 50% over 3-5 minutes for faster onset then: ○ Sustained / continuous infusion 10% glucose at 40 mL/hr for 4-8 hours or until patient stable / eating / dialysed to prevent hypoglycaemia. • **Due to prolonged action of insulin in ESKD 50% of patients develop hypoglycaemia unless supplemented with continuing dextrose.**
Calcium gluconate	• Calcium gluconate 10% 10 mL (2.2 mmol calcium) undiluted IV over 5 minutes into a large vein. • Repeat after 5 minutes if ECG changes persist or to maintain response. • Administer under continuous ECG monitoring to monitor response.

Patiromer or Calcium resonium	• Where patient capable and haemodialysis delayed > 6 hours administer:
	  ○ patiromer 8.4g every 12 hours or 16.8g single dose sachet.
	• If patiromer unavailable give:
	  ○ calcium resonium 30g BD (60g maximum total daily dose) orally (PO) - **not** rectally.

Guidelines are designed to provide staff with evidence-based recommendations to support appropriate actions in specific settings and circumstances. As such, this guideline should be followed in the first instance where practical. In the clinical context, where a patient's management should vary from this guideline, this variation and the clinical opinion as to reasons for variation should be documented in accordance with Clinical Practice Standards.

3. Roles and Responsibilities

WACHS staff are required to work within their identified scope of practice, level of experience and work role.

Nephrologist / On-Call Renal Specialist is responsible for:
- providing medical oversight and support to MOs and HD clinicians providing care to patients who have missed HD sessions
- approving emergency evacuation/transfer to tertiary hospital as required.

Medical Officers are responsible for:
- providing medical care and oversight to patients who have missed HD sessions and present to WACHS facilities
- consulting with Nephrologist / On-Call Renal Specialist to determine HD treatment plans or transfer to tertiary hospital
- consulting with SDU Clinical Nurse Manager (CNM) / Shift Coordinator to discuss patient need for HD treatment and schedule HD sessions.
- supporting HD clinicians in WACHS SDUs providing HD treatment to patients who have missed HD sessions.

SDU Clinical Nurse Manger / Shift Coordinator are responsible for:
- scheduling HD treatment for patients who have missed HD sessions in collaboration with MOs
- providing oversight and clinical support to HD clinicians providing treatments to patients who have missed HD sessions.

Non-HD Clinicians are responsible for:
- collaborating with MOs to provide clinical care to manage acute symptoms of missed HD to stabilise patients prior to transfer to SDU for HD
- provide patient handover to HD clinician upon transfer to SDU for HD treatment.

HD Clinicians are responsible for:
- providing clinical care and support to patients in the WACHS operated SDU who have missed HD sessions
- escalating concerns and deterioration in patients to MO and senior HD nursing staff (e.g., SDU CNM / Shift Coordinator) as required.

All staff are required to work within policies and guidelines to make sure that WACHS is a safe, equitable and positive place to be.

4. Monitoring and Evaluation

Monitoring of compliance to this guideline is to be undertaken bi-monthly by the WACHS Renal Services Team and WACHS Renal Governance Group through:
- review of outcome indicators of patient transfer data associated with missed dialysis
- review of patient safety and quality data including clinical incidents and consumer feedback related to missed haemodialysis.

This guideline is to be reviewed as required to determine effectiveness, relevance and currency. At a minimum it is to be reviewed every three years by the WACHS Renal Services Team and the WACHS Renal Governance Group.

5. References

Al Salmi I, Larkina M, Wang M, Subramanian L, Morgenstern H, Jacobson SH, Hakim R, Tentori F, Saran R, Akiba T, Tomilina NA, Port FK, Robinson BM, Pisoni RL. Missed hemodialysis treatments: international variation, predictors, and outcomes in the Dialysis Outcomes and Practice Patterns Study (DOPPS). American Journal of Kidney Diseases [Internet]. 2018 [cited 2023 Oct 10];72(5)

Alfonzo A, Harrison A, Baines R, Chu A, Mann S, MacRury M. Clinical practice guidelines: treatment of acute hyperkalaemia in adults [Internet]. UK Renal Association; 2023 [cited 2023 Oct 10]

Fotheringham J, Smith MT, Froissart M, Kronenberg F, Stenvinkel P, Floege J, Eckardt K, Wheeler DC. Hospitalization and mortality following non-attendance for hemodialysis according to dialysis day of the week: a European cohort study. BMC Nephrology [Internet]. 2020 [cited 2023 Oct 10];21

6. Definitions

Term	Definition
Clinician	A Clinician is a qualified healthcare professional who provides direct patient care.
End Stage Kidney Disease	End Stage Kidney Disease (ESKD) is the stage of kidney disease when a person's kidney function cannot sustain their wellbeing, requiring some form of treatment to maintain life. Also known as end stage renal failure (ESRF).
Haemodialysis	Haemodialysis (HD) is treatment for ESKD via machine and artificial kidney using access to the bloodstream. Treatment can be nurse assisted or performed by patient self-caring.
Haemodialysis Clinician	A Haemodialysis Clinician is a qualified healthcare professional who provides direct patient care in haemodialysis e.g., registered nurse, enrolled nurse etc.
Nephrologist	A Nephrologist is a senior physician specialised in renal medicine providing diagnosis and management of kidney disease.
Non-Haemodialysis Clinician	A Non-Haemodialysis Clinician is a qualified healthcare professional who provides direct patient care e.g., registered nurse, enrolled nurse in a non-HD setting e.g., Emergency Department.
On-call Renal Specialist	An On-Call Renal Specialist is a senior medical officer (registrar or advanced trainee) specialised in renal medicine providing out-of-hours medical oversight and governance of renal patients.
Medical Officer	A Medical Officer is a qualified healthcare professional who provides direct patient care, e.g., senior medical officer, resident medical officer, general practitioner (for district sites).
Satellite Dialysis Unit	A Satellite Dialysis Unit (SDU) provides haemodialysis away from a tertiary hospital site. This option is suitable

	for medically stable, relatively independent patients for whom home therapies is not appropriate.

7. Document Summary

Coverage	WACHS wide
Audience	Registered nurses, medical officers and pharmacists providing patient care to ESKD patients presenting to WACHS health facilities after missing HD treatment.
Records Management	Clinical: Health Record Management Policy
Related Legislation	*Health Services Act 2016* (WA)
Related Mandatory Policies / Frameworks	• Clinical Governance, Safety and Quality Policy Framework
Related WACHS Policy Documents	• Missed Haemodialysis Sessions - Haemodialysis Treatment Guideline • Hyperkalaemia Guideline
Other Related Documents	Nil
Related Forms	Nil
Related Training Packages	Nil
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 3303
National Safety and Quality Health Service (NSQHS) Standards	1.07;1.27; 4.04; 4.13; 4.15
Aged Care Quality Standards	Nil
Chief Psychiatrist's Standards for Clinical Care	Nil

8. Document Control

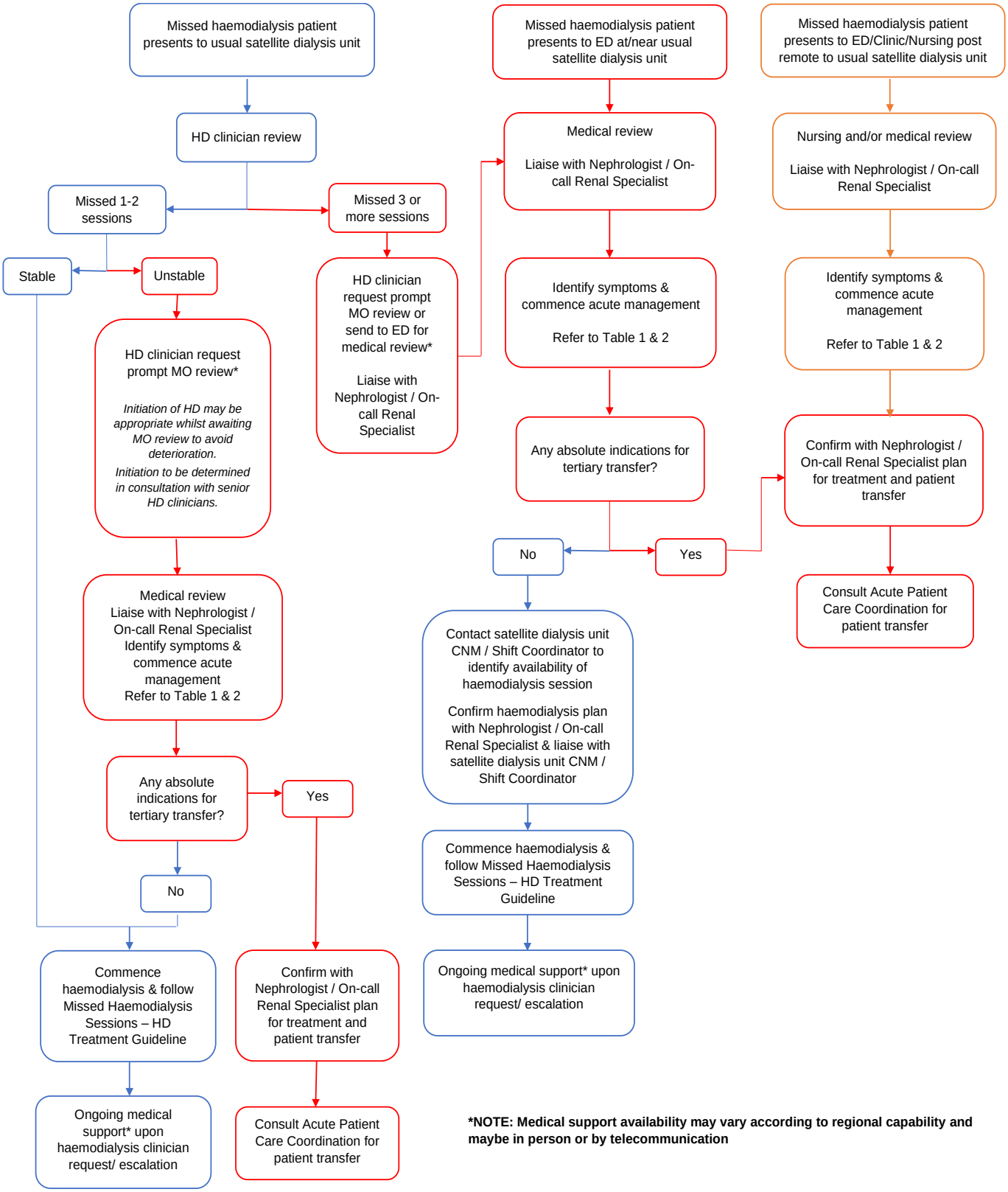
Version	Published date	Current from	Summary of changes
1.00	24 October 2024	24 October 2024	• new guideline

9. Approval

Policy Owner	Executive Director of Clinical Excellence
Co-approver	Executive Director Nursing and Midwifery Services
Contact	Program Manager - Renal
Business Unit	Population Health
EDRMS #	ED-CO-24-181731

This document can be made available in alternative formats on request.

Appendix A: Missed Haemodialysis Treatment Pathways and Clinical Decision-Making Flowchart



***NOTE: Medical support availability may vary according to regional capability and maybe in person or by telecommunication**