Clinical Reference for CKD

Medication Management and Dosing

Objective:
This resource offers concise, practical guidance on Chronic Kidney Disease (CKD) management and medication dosing for patients with CKD. The content is derived from Appendix H of the 2025 VA/DoD CKD Clinical Practice Guideline and is intended to supplement the primary recommendations.

General Guidance:

- Many medications require renal dosing adjustments due to reduced clearance in CKD.
- Toxicity risk increases for renally cleared drugs as eGFR declines.
- Dose adjustments should consider both eGFR trends and clinical context (e.g., acute kidney injury, fluid status).
- Therapeutic drug monitoring should be used when available (e.g., for aminoglycosides or digoxin).

Clinical Pearls:

- Avoid nephrotoxic medications when safer alternatives exist.
- Be cautious with over-the-counter NSAIDs in CKD stages 3–5.
- Review medications regularly for patients with progressive CKD.

Key Practice Reminders:

- Use eGFR and clinical judgment together—consider changes during acute illness.
- Assess drug-drug interactions, especially with polypharmacy in older adults.
- Incorporate pharmacist consultation for complex regimens.

Medication Reconciliation:

- Conduct thorough med review at each visit.
- Pay special attention to drugs started by specialists or prescribed outside VA/DoD system.

Patient Counseling Points:

- Encourage patients to report OTC use (especially NSAIDs and supplements).
- Reinforce importance of lab follow-up to monitor medication safety and efficacy.

Medication Adjustment by eGFR Category
Dosing Considerations by eGFR (mL/min/1.73m^2)

Stages of CKD	
Stage	Description (eGFR)
G1	Kidney damage with normal or increased eGFR (eGFR ≥90*)
G2	Kidney damage with mildly decreased eGFR (eGFR 60-89*)
G3a	Mildly to moderately decreased eGFR (eGFR 45-59*)
G3b	Moderately to severely decreased eGFR (eGFR 30-44*)
G4	Severely decreased eGFR (eGFR 15-29*)
G5	Kidney failure <15 or dialysis*
*eGFR (mL/min/ 1.73m2)	

eGFR Range	Key Clinical Notes
≥ 60	No renal dosing needed for most drugs.
30-59 (Stage 3)	Some medications may need adjustment; monitor kidney function regularly.
15-29 (Stage 4)	Adjust most renally cleard medications. Avoid nephrotoxins.
< 15 or dialysis	Major dose reductions or discontinuation may be necessary; individualized care.

Antibiotics: Monitor levels (e.g. aminoglycosides, vancomycin).

Anticoagulants: Direct oral anticoagulants (DOACs) may require dose adjustment.

Pain Medications:

- NSAIDs: Avoid long-term use, if possible. Short-term use after careful consideration of risks and benefits and use lowest dose for shortest period with monitoring of kidney function.
- Opioids: Buprenorphine is favored when opioids are needed.

Management of CKD Table

Concerns:	Interventions:
Medications	• Adjust medication dose based on eGFR or CrCl if indicated • Eliminate/avoid nephrotoxic agents (see Appendix K) • Assess medication adherence • Assess for medication side effects since drug clearance may be reduced in patients with kidney dysfunction and side effects may contribute to non-adherence

Diabetes	• Optimize glycemic control
	  • Target HbA1c 7-8.5% in most patients with diabetes and CKD
	  • HbA1c <7% is appropriate for patients with life expectancy greater than 10-15 years and mild microvascular complications, if it can be safely done
	  • Target HbA1c 8-9% for patients with type 2 diabetes with life expectancy <5 years, significant comorbid conditions, advanced complications of diabetes, or difficulties in self-management attributable to e.g., mental status, disability or other factors such as food insecurity and insufficient social support
	  • Metformin can be used if eGFR >30 mL/min/1.73m^2
	• Recommend participation in a Diabetes Self-Management Education and Support Program (see VA/DOD Diabetes CPG).
	• Recommend use of ACEI or ARB at maximally tolerated dose if UCR >30 mg/g – continue ACEI or ARB unless drug intolerance or other adverse events (see Recommendation 14)
	• Recommend use of SGLT2i or GLP-1 RA (see Recommendations 15 and 16, Module D and VA/DOD Diabetes CPG) ***(a)*** to slow progression of kidney disease
	• Recommend finerenone if UACR >30 mg/g despite maximal ACEI or ARB and potassium <4.8 mmol/L (see Recommendation 18)
	• Recommend avoiding sulfonylureas
	• Suggest more frequent blood sugar monitoring and/or use of continuous glucose monitor for patients at risk for hypoglycemia (e.g., those on insulin)

Hypertension	• Optimize blood pressure control (see Recommendations 11-13, Module D, and VA/DOD Hypertension CPG) ***(b)*** • Recommend use of ACEI or ARB as first-line especially in patients with albuminuria - continue ACEI or ARB unless drug intolerance or other adverse events (see Recommendation 12 and 14) • Recommend adding thiazide diuretics and/or calcium channel blockers, if blood pressure not controlled on ACEI or ARB (Recommendation 13) • Restrict dietary sodium to 2,300 mg/day (see VA/DOD Hypertension CPG) • Optimize volume status • Consider nephrology referral for resistant hypertension, defined as BP >140/90 mmHg despite optimal dose of 3 anti-hypertensives that include a diuretic
Albuminuria (urine albumin/ creatinine >200mg/g in individuals without diabestes)	• Recommend use of ACEI or ARB at maximally tolerated dose – continue ACEI or ARB unless drug intolerance or other adverse events (see Recommendation 14) • Decrease other antihypertensives to maximize use of ACEI or ARB • Recommend adding SGLT2i for persistent albuminuria despite maximally tolerated dose of ACEI or ARB (see Recommendation 15 and Module D)

Management of CKD Table

Concerns:	Interventions:
Vaccination	• Assess Hepatitis B status and vaccinate, if non-immune • Update pneumococcal vaccines • Update influenza and COVID vaccination annually • Provide age-appropriate vaccination (e.g., MMR, VZV, Tdap/Td, RSV) • Do not administer live vaccines (e.g., MMR, Zostavax) to kidney transplant recipients.
CV health	• Recommend placing a referral to an RD and/or a comprehensive lifestyle intervention program for weight management to achieve/maintain ideal body weight/BMI (e.g., VHA's MOVE! Weight Management). See the VA/DOD CPG for Management of Overweight and Obesity for further guidance on weight management. • Assess and treat dyslipidemia (see VA/DOD Dyslipidemia CPG) ***(c)*** • Recommend use of a statin (see Recommendation 19) • Assess risks/benefits of aspirin therapy • Recommend tobacco cessation • Encourage physical activity, considering the guidance of 150 min/week of moderate aerobic activity as appropriate
Pain	• Avoid NSAID use, including OTC and prescription (oral/topical), if possible • Use of Buprenorphine is preferred over other opiates for chronic pain (see Appendix N and VA/DOD Opioid Therapy for Chronic Pain CPG) ***(d)***
Education/behavior change support	• Review dietary habits and refer patient to an RD for individualized nutrition counseling on sodium, potassium, phosphorus, and fluid intake as indicated. • Offer education on diagnosis and prognosis of CKD, as well as measures to prevent progression to kidney failure • Develop sick day planning specifically addressing temporary cessation of sulfonylureas, ACEI, diuretics/direct renin inhibitors, metformin, ARBs, NSAIDs, and SGLT2i's (i.e., SADMANS) • Educate on KRT options to include dialysis, vascular access, and transplant when eGFR <20 mL/min/1.73 m^2 • Screen for depression or health-related mental illness
Anemia	• Evaluate for underlying cause of anemia • Assess for nutritional deficiency and replete iron, vitamin B12, and folate stores if levels low • Refer to nephrology if patient has CKD stage G3b or higher and persistent hemoglobin <10 for consideration of ESA • Refer for IV iron, if patient has persistent iron deficiency (transferrin saturation <20%, ferritin <100 mg/dl) despite trial of oral iron (after age-appropriate evaluation for etiology or if patient unable to tolerate oral iron)
Electrolytes	• Dietary management for hyperphosphatemia or hyperkalemia – consider referral to medical nutrition therapy • Manage persistent hyperkalemia with bicarbonate, adjustment of diuretics and potassium binders as indicated (see Appendix M). • Treat metabolic acidosis with bicarbonate

Management of CKD Table

Concerns:	Interventions:
Mineral Bone Disease	• Modify diet for hyperphosphatemia (e.g., plant-based diet, avoidance of phosphorus additives/preservatives) • Consider vitamin D and active vitamin D
Iodinated contrast agents	• Use isotonic IV fluid to prevent CA-AKI, if indicated and time allows (see Recommendations 22-23 and Algorithm Module E)
Gadolinium	• Do not use group 1 gadolinium agents if eGFR <30 mL/min/1.73 m2 or current AKI (see Appendix Q)
Nuclear medicine contrast	• No concerns for kidney toxicity so may use as clinically indicated
Kidney Stones	• Recommend low-sodium diet and sufficient fluid intake to produce urine output >2.2 L/day • Dietary calcium restriction is not recommended even for calcium stones • Send stones for analysis when available • Manage symptomatic stones with analgesics, hydration, and alpha-blockers initially and refer to urology for persistent symptoms or obstructive nephrolithiasis • Refer to nephrology for metabolic evaluation/management of recurrent nephrolithiasis

Abbreviations: ACEI: angiotensin-converting enzyme inhibitor; AKI: acute kidney injury; ARB: angiotensin II receptor blockers; BMI: body mass index; BP: blood pressure; CA-AKI: contrast-associated acute kidney injury; CPG: clinical practice guideline; CrCl: creatinine clearance; CV: cardiovascular; DM: diabetes mellitus; DOD: Department of Defense; eGFR: estimated glomerular filtration rate; ESA: erythropoiesis-stimulating agent; GLP-1 RA: glucagon-like peptide-1 receptor agonist; IV: intravenous; KRT: kidney replacement therapy; L: liter; MMR: measles, mumps, and rubella; NSAID: non-steroidal anti-inflammatory drug; OTC: over-the-counter; RD: registered dietician; RSV: respiratory syncytial virus; SADMANS: sulfonylureas, other secretagogues, gliclazide, glimepiride, glyburide, repaglinide; SGLT2i: sodium-glucose cotransporter-2 inhibitor; Td: tetanus and diphtheria; Tdap: tetanus, diphtheria, and pertussis; VA: Department of Veteran Affairs; VZV: varicella zoster virus

(a) See the VA/DOD Clinical Practice Guideline for the Management of Diabetes Mellitus in Primary Care. Available at:

(b) See the VA/DOD Clinical Practice Guideline for the Management of Hypertension in Primary Care. Available at:

(c) See the VA/DOD Clinical Practice Guideline for the Management of Dyslipidemia in Primary Care. Available at:

(d) See the VA/DOD Clinical Practice Guideline for the Management of Opioid Therapy for Chronic Pain. Available at:

(e) Practice Point 4.3.2 -- Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int. 2024 Apr;105(4S):S117-S314. doi: 10.1016/j.kint.2023.10.018. PMID: 38490803.

Topic	Sub-topic	#	Recommendation
Pharmacologic Management of CKD and Associated Conditions	*Hypertension Medications*	11.	We suggest intensive blood pressure management to reduce mortality and major adverse cardiovascular events in patients with estimated glomerular filtration rate below 60 mL/minute/1.73 m^2.
		12.	In patients with hypertension and albuminuria (i.e., urine albumin-to-creatinine ratio [UACR] >30 mg/g), we recommend the use of either an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker to slow the progression of chronic kidney disease.
		13.	We suggest the addition of a thiazide diuretic or calcium channel blocker to reduce blood pressure in patients with chronic kidney disease and hypertension not controlled on an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker.
	Other Medications to Decrease Cardiovascular Disease and Kidney Outcomes	14.	In patients with advanced chronic kidney disease (estimated glomerular filtration rate [eGFR] <30 mL/min/1.73 m^2) currently on an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker, we suggest continuing therapy, unless there is drug intolerance or other adverse event.
		15.	We recommend the addition of sodium-glucose co-transporter 2 inhibitors to maximally tolerated angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers, in patients with chronic kidney disease who have one or more of the following: • Type 2 diabetes • Albuminuria (UACR >200 mg/g) • Heart failure to reduce the risk of major adverse cardiovascular events, heart failure, progression of kidney disease, and mortality, and continuing sodium-glucose co-transporter 2 inhibitors until start of dialysis.
		16.	We recommend adding a glucagon-like peptide-1 receptor agonist to an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker in patients with type 2 diabetes and albuminuric chronic kidney disease to reduce the progression of chronic kidney disease, major adverse cardiovascular events, and all-cause mortality.
		18.	We suggest the addition of a non-steroidal mineralocorticoid receptor antagonist (e.g., finerenone) in individuals on maximally tolerated angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker who meet **all** the following criteria: • Type 2 diabetes • Albuminuria >30 mg/g • eGFR ≥25 mL/min/1.73 m^2 • Potassium <4.8 mEq/L for the purpose of decreasing major adverse cardiovascular events and slowing progression of chronic kidney disease.
		19.	In patients with chronic kidney disease not on dialysis, we recommend the initiation of statins to reduce major adverse cardiovascular events and mortality.
Contrast-Associated Kidney Injury	*Other Kidney Disease Related Complications*	22.	For patients with chronic kidney disease undergoing imaging utilizing iodinated contrast media who are at increased risk for iodinated contrast-associated acute kidney injury, we recommend intravenous volume expansion with isotonic crystalloid (see Algorithm Module E and Appendix Q for additional information).
		23.	We recommend against the administration of N-acetylcysteine for prevention of iodinated contrast-associated acute kidney injury.