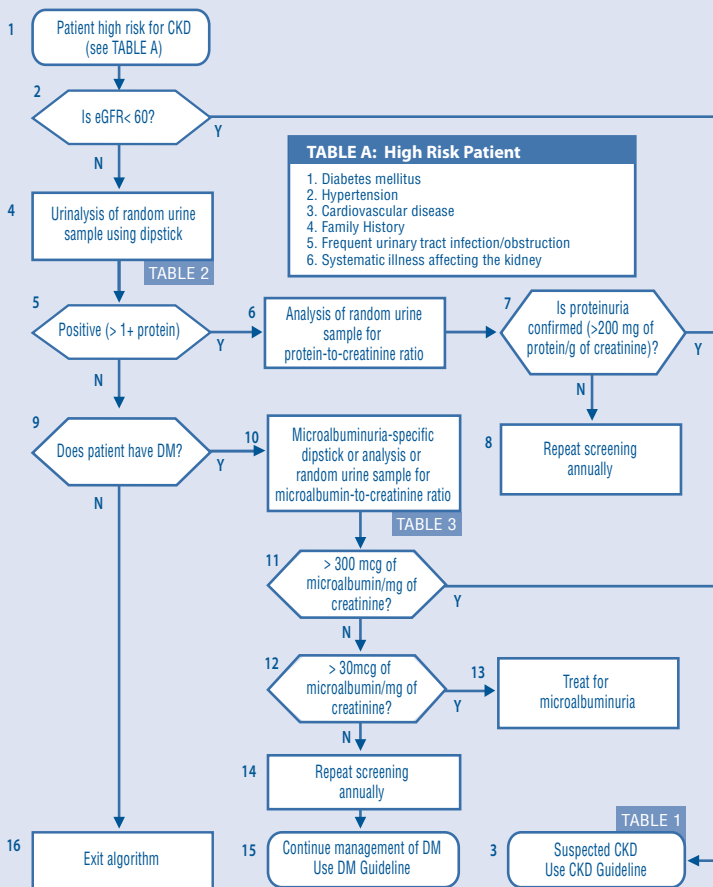


VA/DoD Clinical Practice Guideline Management of Chronic Kidney Disease

Screening Algorithm



VA access to full guideline: <http://www.healthquality.va.gov>
DoD access to full guideline: <https://www.QMO.amedd.army.mil>

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TABLE 1 | Definitions of Chronic Kidney Disease

- Persistent decreased eGFR < 60 ml/min/1.73m² on two tests at least three months apart
- or**
- Proteinuria (> 1+) on dipstick or urine protein-to-creatinine ratio > 0.2, confirmed on two tests at least three months apart
- or**
- Microalbuminuria defined as albumin-to-creatinine ratio > 30, confirmed on two out of three urine tests in patients with diabetes mellitus (DM)
- or**
- Known structural kidney disease defined by imaging or pathologic examination (e.g., polycystic kidney disease [PCKD])

Estimated glomerular filtration rate (eGFR) is the preferred method to assess kidney function.

TABLE 2 | Urine Dipstick: Interpretation

<i>Protein</i>	<i>Blood</i>	<i>Consider</i>
Negative	Negative	Rule-out false negative, microalbuminuria, multiple myeloma and other paraproteinuria, heart failure, volume depletion or obstruction, ischemic nephropathy
Positive	Negative	Rule-out false positive, benign, or orthostatic proteinuria, diabetes, HTN, tubulo-interstitial diseases, nephrotic syndrome. Quantitate proteinuria
Positive	Positive	UTI, pyelonephritis, RPGN, GN, HIV, vasculitis, pulmonary-kidney syndrome, HUS, TTP, malignant HTN, nephrotic syndrome, nephrolithiasis with obstruction, atypical DM, PCKD
Negative	Positive	Look for urologic cause of hematuria

Key: DM: Diabetes Mellitus; GN: Glomerulonephritis; HTN: Hypertension; HUS: Hemolytic Uremic Syndrome; PCKD: Polycystic Kidney Disease; RPGN: Rapidly Progressive Glomerulonephritis; TTP: Thrombotic Thrombocytopenic Purpura; UTI: Urinary Tract Infection

TABLE 3 | Definitions Of Abnormalities In Albumin Excretion

<i>Condition</i>	<i>Random Urine for ALB-to-Cr Ratio (mg/g creatinine)</i>
Normal	< 30
Microalbuminuria	30-300
Macroalbuminuria	> 300

TABLE 4 | Stages of Chronic Kidney Disease

Stage	eGFR (ml/min/1.73m ²)	Description	Action
1	≥90	Kidney damage with normal or increased eGFR	Diagnosis and treatment of comorbid conditions, slow progression, CVD risk reduction
2	60-89	Kidney damage with mildly decreased eGFR	Estimating progression
3	30-59	Moderately decreased eGFR	Evaluating and treating complications
4	15-29	Severely decreased eGFR	Preparation for kidney replacement therapy
5	<15 or dialysis	Kidney failure	Replacement (if uremia present)

TABLE 5 | Urgent/Emergent Conditions

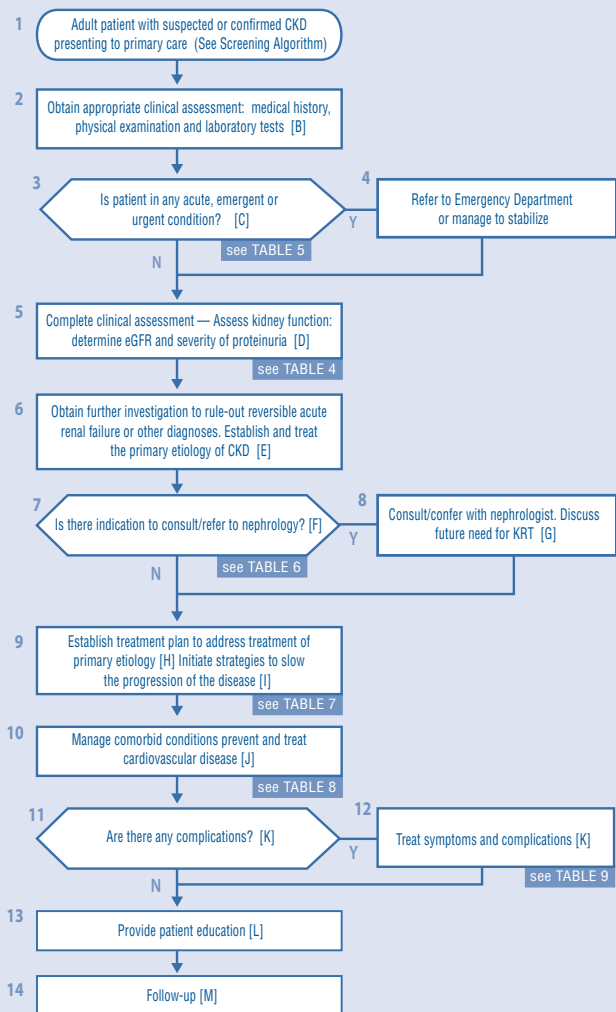
- a. Acute renal failure
- b. Fluid overload, especially pulmonary edema
- c. Hyperkalemia (potassium ≥ 6.0 mEq/L)
- d. Metabolic acidosis (bicarbonate ≤ 16 mEq/L)
- e. Pericarditis
- f. Encephalopathy
- g. Signs symptoms of uremia (nausea, vomiting, and anorexia)

TABLE 6 | Indications for Nephrology Referral/Consultation

1. eGFR < 30 ml/min/1.73m²
2. Rapid decline of eGFR
3. Severe complications of CKD (e.g., recalcitrant anemia, calcium or phosphorus abnormalities)
4. Nephrotic range proteinuria (> 3.5 grams/24 hours)
5. Underlying cause of CKD is unclear after basic work-up
6. Kidney biopsy is indicated
7. Patient's level of disease exceeds the level of comfort of the primary care provider

VA/DoD Clinical Practice Guideline Management of Chronic Kidney Disease

Treatment Algorithm



VA/DoD Clinical Practice Guideline Management of Chronic Kidney Disease

		Urine Results			
		Protein < 1 gr/day without hematuria	Protein 1-3 gr/day without hematuria	Protein > 1 gr/day with hematuria	Protein > 3 gr/day with or without hematuria
Blood Results	eGFR > 60	Reassess patient annually with eGFR and urine protein determination	Consider diabetic nephropathy. If confirmed: <ul style="list-style-type: none"> • Offer ACE inhibitor (or ARB if intolerant) unless contraindications • Treat HbA1c to target • Continue to monitor eGFR and urine protein excretion at least annually • If diabetic nephropathy is unlikely, consider referral to a renal specialist 	Refer to renal specialist	
	eGFR 30-59	Manage according to recommendations for non-diabetic renal disease according to stage of disease. Consider one time referral to a renal specialist			
	eGFR < 30	Refer to renal specialist			

TABLE 7 | Recommended Intake of Protein, Energy, and Minerals in CKD

<i>Chronic Kidney Disease</i>	<i>Protein g/kg/day</i>	<i>Energy kcal/kg/day</i>	<i>Phosphorus mg/day</i>	<i>Sodium gr/day</i>
Mild to Moderate (eGFR 25 – 60 ml/min/1.73m ²)	No restriction	No restriction	600 – 800	< 2 ^a
Advanced (eGFR < 25 ml/min/1.73m ²)	0.60–0.75 ^b	35 ^c	600–800 8 gr/kg ^d	< 2

^a If hypertensive edema or history of heart failure

^b With close supervision and frequent dietary counseling

^c 30 kcal/kg/day for individuals 60 years or older

^d Along with phosphate binders, as needed

* If serum phosphorus >5.5 mg/dL

TABLE 8 | Strategies to Slow Progression

1. Control of hypertension
2. Use of ACEI or ARB
3. Control of hyperglycemia in patients with diabetes
4. Avoidance of nephrotoxic drugs and adjusting medication dosage as indicated
5. Smoking cessation
6. Control of dyslipidemia

TABLE 9 | Prevent and Treat Complications

- | | |
|---|-----------------------------------|
| 1. Risk for Cardiovascular Disease | 6. Volume overload |
| 2. Disorders of potassium balance | 7. Disorders of nutrition |
| 3. Disorders of calcium and phosphate metabolism (bone mineral) | 8. Adjustment of medication doses |
| 4. Acid based abnormalities | 9. Immunization |
| 5. Hematologic abnormalities (anemia) | |

Dosing Recommendations for ACEIs and ARBs in Patients with CKD ^{a-c}

DRUG	USUAL DOSE RANGE
Angiotensin Converting Enzyme Inhibitors (ACEIs)	
Benazepril	10 – 40 mg divided once or twice daily
Captopril ^d	25 – 150 mg divided two to three times daily
Enalapril	5 – 40 mg divided once or twice daily
Fosinopril	10 – 40 mg once daily
Lisinopril	10 – 40 mg once daily
Moexipril ^d	7.5 – 30 mg divided once or twice daily
Perindopril	4 – 8 mg divided once or twice daily
Quinapril	10 – 80 mg divided once or twice daily
Ramipril	2.5 – 20 mg divided once or twice daily
Trandolapril	1 – 4 mg once daily
Angiotensin II Receptor Antagonists (ARBs)	
Candesartan	8 – 32 mg once daily
Eprosartan	400 – 800 mg divided once or twice daily
Irbesartan	150 – 300 mg once daily
Losartan	50 – 100 mg divided once or twice daily
Olmesartan	20 – 40 mg once daily
Telmisartan	40 – 80 mg once daily
Valsartan	80 – 320 mg once daily

a Adapted from KDOQI Clinical Practice Guideline

b Adapted from McEvoy GK, ed. American Hospital Formulary Service Drug Information , Bethesda, MD: American Society of Health-System Pharmacists, Inc., 2006.

c Adapted from Hebel SK ed. Drug Facts and Comparisons, St. Louis, Missouri : Facts and Comparisons Inc., May 2006.

d One hour before meals, on an empty stomach

COMMENTS/CAUTIONS

Angiotensin Converting Enzyme Inhibitors (ACEIs)

- Start with lower or less frequent doses in patients with renal insufficiency (except fosinopril as partial compensation by hepatobiliary elimination) or in patients currently being treated with a diuretic.
- Use with caution in patients with renal artery stenosis.
- Monitor potassium and renal function after initiation.
- Concomitant therapy with potassium-sparing diuretics and/or potassium supplements may result in hyperkalemia.
- Due to the potential risk for fetal morbidity and mortality in patients taking ACEIs during pregnancy, it is recommended that therapy be discontinued as soon as a woman becomes pregnant; alternate therapy should be considered. ACEIs should only be prescribed in pregnant women when the benefit clearly outweighs the potential risk for fetal abnormalities.
- Contraindicated in patients with a history of angioedema on an ACEI

Angiotensin II Receptor Antagonists (ARBs)

- Alternative to ACEIs in patients unable to tolerate an ACEI.
- Consider lower doses in patients with intravascular volume depletion (e.g., patients currently being treated with a diuretic).
- Use with caution in patients with renal artery stenosis.
- Monitor potassium and renal function after initiation.
- Concomitant therapy with potassium-sparing diuretics and/or potassium supplements may result in hyperkalemia.
- Contraindicated in 2nd and 3rd trimesters of pregnancy due to potential neonatal/fetal morbidity and death.
- Use with caution in patients with a history of angioedema on an ACEI.