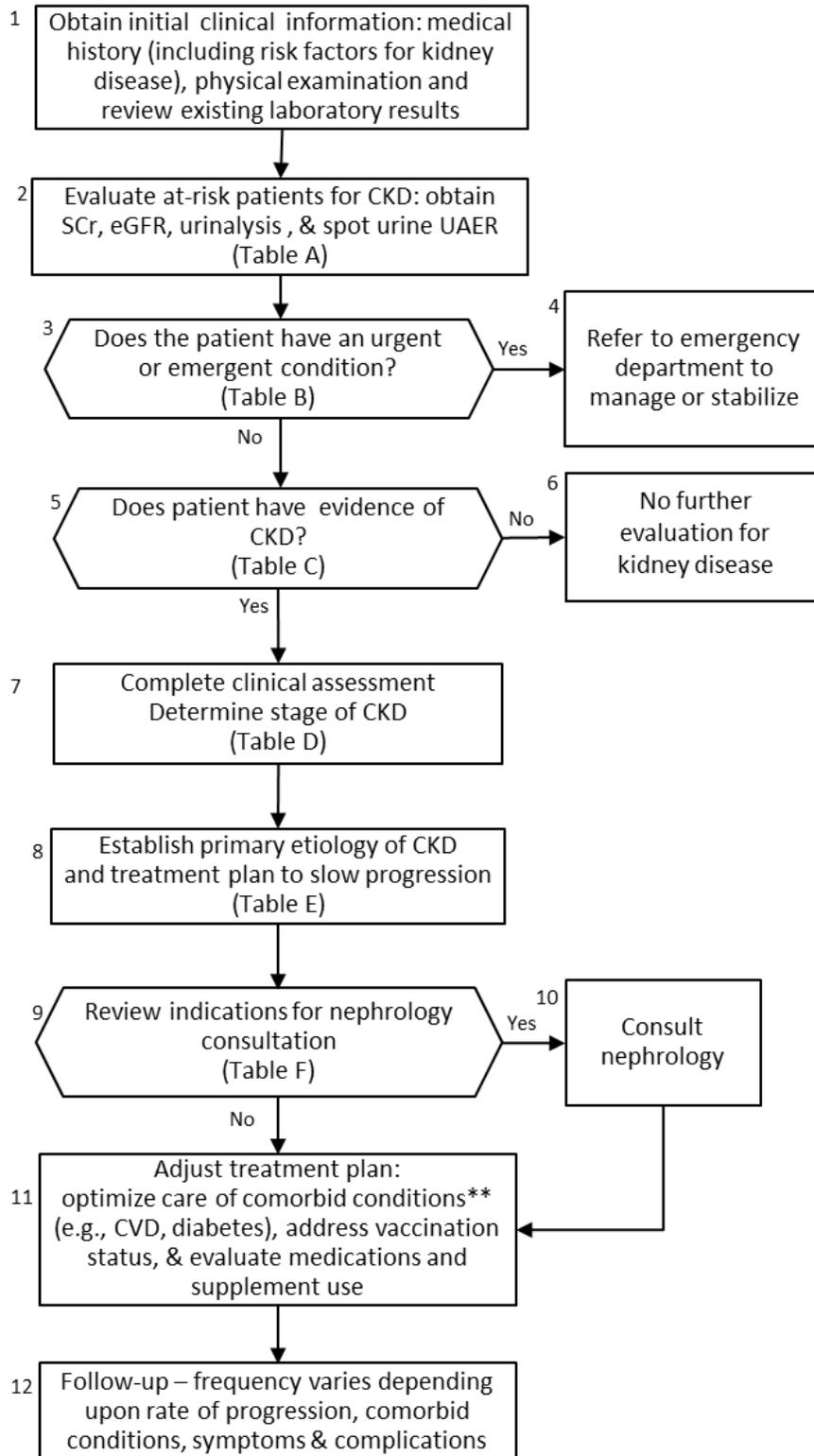


VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF
CHRONIC KIDNEY DISEASE IN PRIMARY CARE

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Algorithm



**As appropriate, refer to the following VA/DoD Clinical Practice Guidelines: Chronic Heart Failure, Diabetes, Hypertension, Dyslipidemia, Obesity & Tobacco Cessation

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Table A: At-Risk Populations

- Diabetes, hypertension, other end organ disease (e.g., chronic heart failure [CHF]), or a personal or family history of kidney disease
- Systemic illness (e.g., human immunodeficiency virus [HIV], systemic lupus erythematosus, multiple myeloma)
- History of acute kidney injury (AKI) (e.g., acute tubular necrosis, urinary tract obstruction, interstitial nephritis)
- Elderly patients
- Races and ethnicities associated with increased risk (e.g., African Americans, Hispanics, Native Americans)

Table B: Urgent/Emergent Conditions

- Acute unexplained decline in kidney function
- Heart failure/volume overload
- Hyperkalemia (potassium ≥ 6 mEq/L)
- Signs or symptoms of uremia

Table C: Criteria for Confirmed CKD

CKD is defined as sustained abnormality for >3 months of

Either:

- eGFR < 60 mL/min/1.73m²

Or any of the following:

- Albuminuria
- Urine sediment abnormality
- Abnormal renal histology
- Structural renal abnormality by imaging
- History of renal transplantation

VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF
CHRONIC KIDNEY DISEASE IN PRIMARY CARE

Pocket Card

| Table D: Stage of CKD | | |
|-----------------------|-----------------------------------|--|
| Stage | eGFR (ml/min/1.73m ²) | Description |
| G1 | ≥90 | Kidney damage with normal or increased GFR |
| G2 | 60-89 | Kidney damage with mildly decreased GFR |
| G3a | 45-59 | Mildly – Moderately decreased GFR |
| G3b | 30-44 | Moderately – Severely decreased GFR |
| G4 | 15-29 | Severely decreased GFR |
| G5 | <15 or dialysis | Kidney failure |

| Albuminuria | | |
|-------------|----------------------------------|----------------------------|
| Category | Range (mg albumin/ g creatinine) | Description |
| A1 | <30 | Normal to mildly increased |
| A2 | 30-300 | Moderately increased |
| A3 | >300 | Severely increased |

| Table E: Strategies to Slow Progression |
|--|
| <ul style="list-style-type: none"> • Control of hypertension with preferential use of either an ACEI or an ARB in patients with proteinuria • Individualized control of hyperglycemia • Dietary protein restriction in patients with stage 3 and 4 CKD (consider consultation with nephrologist or renal dietitian) • Correction of metabolic acidosis • Avoid nephrotoxic agents |

| Table F: Indications for Nephrology Consultation*† |
|---|
| <ul style="list-style-type: none"> • eGFR <30 ml/min/1.73m² • Rapid decline of eGFR (>5ml/min/1.73m² per year) • Complications of CKD (e.g., anemia, calcium or phosphorus abnormalities) • Nephrotic range proteinuria (>3.5 grams/24 hours) • Underlying cause of CKD or proteinuria is unclear • Patient’s level of disease exceeds the level of comfort of the primary care provider |

*NB: Referral should be made following shared decision making with patient that ensures the referral focus is consistent with the patient values and preferences

†This list is not exhaustive, consult the CKD CPG (discussion of Recommendation 16) for more information

VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF
CHRONIC KIDNEY DISEASE IN PRIMARY CARE

Pocket Card

| Table G: Select Medications Requiring Dose Adjustments or to be Used with Caution in Patients with CKD* ^{1,2,3} | | |
|--|--|--|
| <ul style="list-style-type: none"> • Most antibiotics (macrolides, clindamycin, and metronidazole are exceptions) and antiviral agents • Multiple anti-cancer therapies (cytotoxic drugs, targeted agents, biologics) • Hypoglycemic agents <ul style="list-style-type: none"> ○ Acarbose ○ Miglitol ○ Glyburide ○ Chlorpropamide ○ Insulin ○ Metformin ○ Exenatide ○ Repaglinide ○ Alogliptin ○ Saxagliptin ○ Sitagliptin ○ Canagliflozin ○ Dapagliflozin ○ Empagliflozin • Cardiovascular agents <ul style="list-style-type: none"> ○ Atenolol ○ Sotalol ○ Digoxin ○ Dofetilide ○ Potassium-sparing diuretics | <ul style="list-style-type: none"> • RAAS blockers <ul style="list-style-type: none"> ○ ACEIs ○ ARBs ○ Aliskiren ○ Eplerenone, spironolactone • Anticoagulants <ul style="list-style-type: none"> ○ Apixaban ○ Dabigatran ○ Rivaroxaban ○ Low Molecular Weight Heparins • Opioid analgesics <ul style="list-style-type: none"> ○ Codeine ○ Fentanyl ○ Hydrocodone ○ Hydromorphone ○ Meperidine ○ Methadone ○ Morphine ○ Oxycodone ○ Oxymorphone ○ Tapentadol ○ Tramadol • NSAIDs • Gabapentin • Levetiracetam • Lithium • Memantine • Risperidone, Paliperidone | <ul style="list-style-type: none"> • Antidepressants <ul style="list-style-type: none"> ○ Bupropion ○ Citalopram ○ Desipramine ○ Duloxetine ○ Mirtazapine ○ Paroxetine ○ Venlafaxine • Bisphosphonates • Gout agents <ul style="list-style-type: none"> ○ Allopurinol ○ Colchicine • H2-blockers • PDE5 inhibitors <ul style="list-style-type: none"> ○ Sildenafil ○ Tadalafil • Statins <ul style="list-style-type: none"> ○ Fluvastatin ○ Lovastatin ○ Pitavastatin ○ Pravastatin ○ Rosuvastatin ○ Simvastatin • Fibric acid derivatives <ul style="list-style-type: none"> ○ Fenofibrate ○ Gemfibrozil |

*Note this is not a comprehensive list; consult individual product information or alternate sources on dosing and/or precautions in patients with kidney function impairment.

¹ Lassiter J, Bennett WM, Olyaei AJ. Drug dosing in elderly patients with chronic kidney disease. Clin Geriatr Med. Aug 2013;29(3):657-705.

² Inker LA, Astor BC, Fox CH, et al. KDOQI US commentary on the 2012 KDIGO clinical practice guideline for the evaluation and management of CKD. Am J Kidney Dis. May 2014;63(5):713-735.

³ Hedayati SS, Yalamanchili V, Finkelstein FO. A practical approach to the treatment of depression in patients with chronic kidney disease and end-stage renal disease. Kidney Int. Feb 2012;81(3):247-255.

VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF
CHRONIC KIDNEY DISEASE IN PRIMARY CARE

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| Table H: Dosing Recommendations for ACEIs and ARBs in Patients with CKD ^{a,b} | | |
|--|--|--|
| DRUG | USUAL DOSE RANGE | COMMENTS/CAUTIONS |
| Angiotensin-Converting Enzyme Inhibitors (ACEIs) | | |
| Benazepril | 10 – 40 mg divided once or twice daily | <ul style="list-style-type: none"> ○ Start with lower or less frequent doses in patients with CKD (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 kidney function (e.g., one-to-two weeks after initiation or dose adjustment) ○ Concomitant therapy with potassium-sparing diuretics, potassium supplements, and/or additional RAAS blockers may result in hyperkalemia. ○ Boxed Warning: due to the potential risk for fetal morbidity and mortality in patients taking an ACEI during pregnancy, it is recommended that therapy be discontinued as soon as a woman becomes pregnant; alternate therapy should be considered. ○ Contraindicated in patients with a history of angioedema on an ACEI. |
| Captopril ^c | 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 ^c | 7.5 – 30 mg divided once or twice daily | |
| Perindopril | 4 – 8 mg divided once or twice daily | |
| Quinapril | 10 – 40 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 Blockers (ARBs) | | |
| Azilsartan | 80 mg once daily | <ul style="list-style-type: none"> ○ 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, potassium supplements, and/or additional RAAS blockers may result in hyperkalemia. ○ Boxed Warning: due to the potential risk for fetal morbidity and mortality in patients taking an ARB during pregnancy, it is recommended that therapy be discontinued as soon as a woman becomes pregnant; alternate therapy should be considered. ○ Use with caution in patients with a history of angioedema on an ACEI. ○ An ARB may be considered in patients unable to tolerate an ACEI due to cough. |
| Candesartan | 8 – 32 mg once daily | |
| Eprosartan | 400 – 800 mg divided once or twice daily | |
| Irbesartan | 150 – 300 mg once daily | |
| Losartan | 25 – 100 mg divided once or twice daily | |
| Olmesartan | 20 – 40 mg once daily | |
| Telimisartan | 20 – 80 mg once daily | |
| Valsartan | 80 – 320 mg once daily | |

Refer to www.pbm.va.gov for a current list of medications on the VA National Formulary

^a Adapted from VA/DoD Clinical practice guideline for management of chronic kidney disease in primary care. Washington DC: Department of Veteran Affairs and Department of Defense; Version 2.0 - 2007.

^b Facts & Comparisons® eAnswers <http://www.factsandcomparisons.com/online-products/>. Accessed 2014 Apr 25.

^c One hour before meals, on an empty stomach.

VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF
CHRONIC KIDNEY DISEASE IN PRIMARY CARE

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Acronyms List

| | |
|-------|---|
| ACEI | angiotensin-converting enzyme inhibitor |
| AKI | acute kidney injury |
| ARB | angiotensin II receptor blockers |
| CHF | chronic heart failure |
| CVD | cardiovascular disease |
| DM | diabetes mellitus |
| eGFR | estimated glomerular filtration rate |
| GFR | glomerular filtration rate |
| HIV | human immunodeficiency virus |
| NSAID | non-steroidal anti-inflammatory drug |
| RAAS | renin-angiotensin-aldosterone system |
| RRT | renal replacement therapy |
| SCr | serum creatinine |
| UAER | urinary albumin excretion rate |