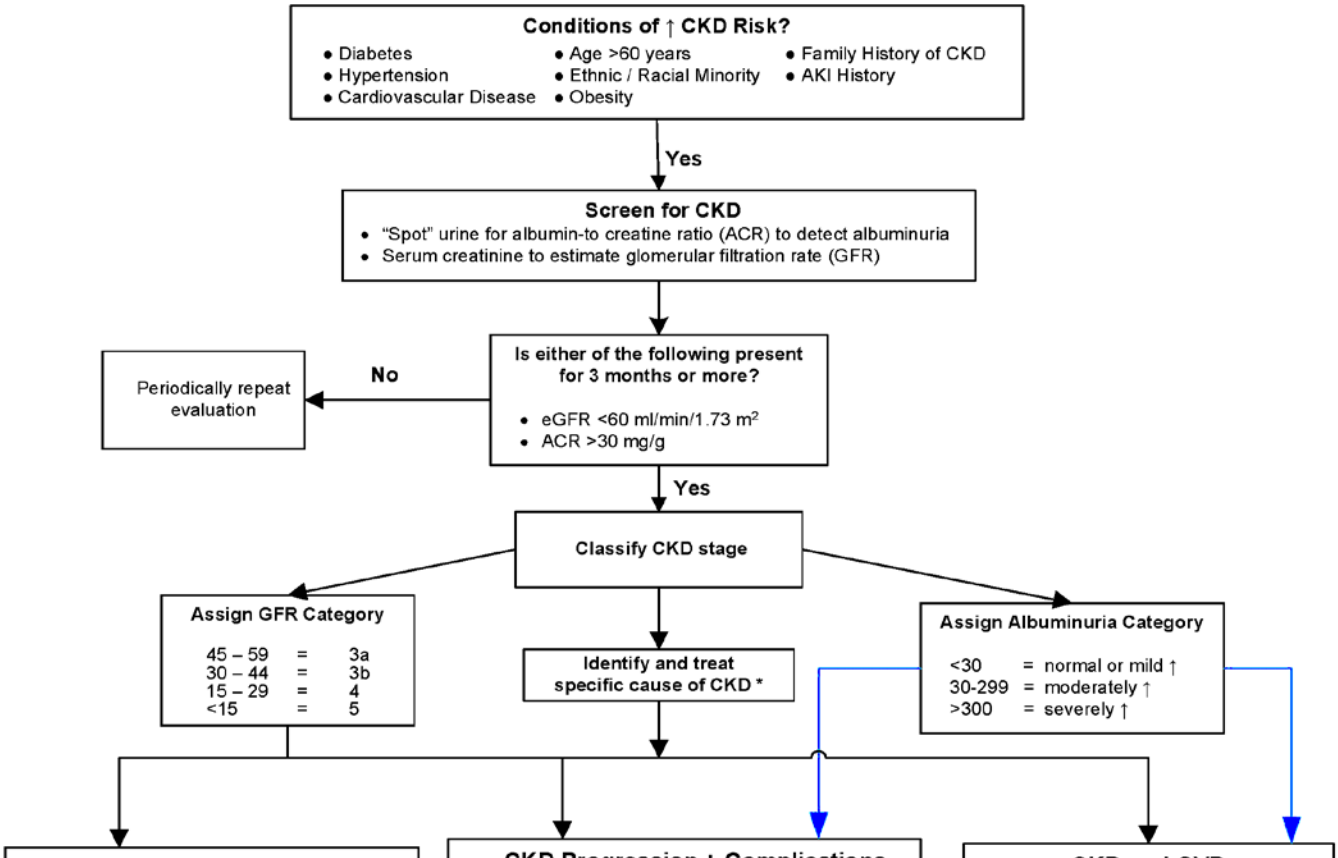
National Kidney Foundation®

How to Manage Your CKD Patients



Patient Safety

- **eGFR <60 = Patient Safety Risk**
  - Drug dosing consider eGFR
  - Reduce risk of AKI volume depletion
  - Contrast-induced AKI prevention
    - ✓ Avoid contrast or minimize dose
    - ✓ Consider isotonic saline infusion before, during and after procedure
    - ✓ Withhold metformin, RAAS blockers and diuretics
- **eGFR 45 - <60**
  - Avoid prolonged NSAIDs
  - Continue metformin use
- **eGFR 30 - <45**
  - Avoid prolonged NSAIDs
  - Use metformin with close monitoring at 50% dose
- **eGFR <30**
  - Avoid any NSAIDs
  - Avoid bisphosphonates
  - Avoid metformin
  - Avoid PICC; lines use single and double lumen central catheters instead
  - Monitor PT INR closely given increased risk of warfarin anticoagulation bleeding

* **Cause of CKD** is classified based on presence or absence of systemic disease and the location within the kidney of observed or presumed pathologic-anotomic findings.

CKD Progression + Complications

- **Blood Pressure Goal <140/90**
- **Consider BP goal <130/80 only if ACR >300**
  - ACE-I or ARB for HTN if ACR >30
  - Avoid ACE-I and ARB in general
  - Diuretic usually required
  - Dietary sodium <2000 mg/day
- **DM - Target HbA1c ~7%**
- **CKD Complications Testing**
  - Anemia – CKD 3+ Evaluation if Hb <13.0 for men and <12.0 for women. Treat iron deficiency first. Use ESA to treat Hb <10 g/dl (Target 9-11.5) or refer to nephrology
  - Acidosis – Bicarbonate goal >22-26 use sodium bicarbonate 650 mg thrice daily
  - CKD-MBD – CKD 3b+ calcium, phosphate, 25-OH vitamin D, and iPTH. Supplement vitamin D deficiency. If hyperphosphatemia or significant iPTH elevation refer to nephrology
- **Vaccination for influenza + pneumococcus**
- **Nephrology Referral**
  - eGFR <30 or ACR >300 mg/g
  - 25% decrease in eGFR (AKI or progressive CKD may be difficult to distinguish)
  - 2^0 hyperparathyroidism
  - Persistent hyperkalemia /metabolic acidosis
  - Recurrent kidney stones
  - Unexplained hematuria
  - Hereditary or unknown cause of CKD

CKD and CVD

- **CKD = ↑CVD risk**
- **Consider lipid lowering therapy**
  - All >50 years
  - 18-50 years at high CVD risk
    - ✓ (h/o CAD, DM, h/o ischemic CVA, 10 yr risk of MI >10%)
- **ASA for secondary prevention unless bleeding risk outweighs benefits**

Abbreviations

ACE-I, angiotensin-converting-enzyme inhibitor; **ACR**, albumin-to-creatinine ratio; **AER**, albumin excretion rate; **AKI**, acute kidney injury; **ARB**, angiotensin receptor blocker; **ASA**, acetylsalicylic acid (aspirin); A stage, Albuminuria category; **CAD**, coronary artery disease; **CKD**, chronic kidney disease; **CKD-MBD**, chronic kidney disease mineral and bone disorder; **CVA**, cerebrovascular accident; **CVD**, cardiovascular disease; **DM**, diabetes mellitus; **eGFR**, estimated glomerular filtration rate; **ESA**, erythropoietin-stimulating agent; **Hb**, hemoglobin; **HTN**, hypertension; **iPTH**, intact-parathyroid hormone; **NSAIDs**, nonsteroidal anti-inflammatory drugs; **25-OH vitamin D**, 25-OH vitamin D; **PICC**, peripherally inserted central catheter line; **PT INR**, prothrombin time, international normalized ratio; **RAAS**, renin angiotensin aldosterone system.

Reference: 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.* 2014;63(5):713-735.

How to Evaluate for Chronic Kidney Disease

Know the criteria for chronic kidney disease (CKD).

- Abnormalities of kidney structure or function, present for >3 months, with implications for health
- Either of the following must be present for >3 months:
  - Markers of kidney damage (one or more)
  - GFR <60 ml/min/1.73 m^2

Screen for CKD with two simple tests.

- "Spot" urine for albumin-to-creatinine ratio (ACR) to detect albuminuria
- Serum creatinine to estimate glomerular filtration rate (GFR)

What if CKD is detected?

- Classify CKD based on cause, GFR category, and albuminuria category
- Implement a clinical action plan based on patient's CKD classification (See flip side)
  - Consider co-management with a nephrologist if the clinical action plan cannot be carried out
  - Refer to a nephrologist when GFR <30 mL/min/1.73 m^2 or ACR >300 mg/g
- Learn more at www.kidney.org/professionals

Why should you classify CKD?

- To have a more precise picture of each patient's condition
- To guide decisions for testing and treatment
- To evaluate patient's risk of progression and complications
- Because neither the category of GFR nor the category of albuminuria alone can fully capture prognosis of CKD

References

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.* 2014;63(5):713-735.

Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney Inter*, Suppl. 2013;3:1-150.

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How do you classify CKD?

- Identify cause of CKD*
- Assign GFR category
- Assign albuminuria category

*Cause of CKD is classified based on presence or absence of systemic disease and the location within the kidney of observed or presumed pathologic-anotomic findings.

GFR categories in CKD

Category	GFR (ml/min/1.73 m^2)	Terms
G1	e90	Normal or high
G2	60-89	Mildly decreased*
G3a	45-59	Mildly to moderately decreased
G3b	30-44	Moderately to severely decreased
G4	15-29	Severely decreased
G5	<15	Kidney failure

*Relative to young adult level.
In the absence of evidence of kidney damage, neither GFR category G1 nor G2 fulfill the criteria for CKD.

Albuminuria categories in CKD

Category	ACR (mg/g)	Terms
A1	<30	Normal to mildly increased
A2	30–300	Moderately increased*
A3	>300	Severely increased†

*Relative to young adult level. ACR 30–300 mg/g for >3 months indicates CKD.
†Including nephrotic syndrome (albumin excretion ACR >2220 mg/g)

Abbreviations

A Stage, albuminuria category; ACE-I, angiotensin-converting-enzyme inhibitor; ACR, albumin-to-creatinine ratio; AER, albumin excretion rate; AKI, acute kidney injury; ARB, angiotensin receptor blocker; ASA, acetylsalicylic acid (aspirin); CAD, coronary artery disease; CKD, chronic kidney disease; CKD-MBD, chronic kidney disease mineral and bone disorder; CVA, cerebrovascular accident; CVD, cardiovascular disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; ESA, erythropoietin-stimulating agent; G Stage, GFR category; Hb, hemoglobin; HTN, hypertension; iPTH, intact-parathyroid hormone; NSAIDs, nonsteroidal anti-inflammatory drugs; PICC, peripherally inserted central catheter line; PT INR, prothrombin time, international normalized ratio; RAAS, renin angiotensin aldosterone system.