### STAGE & GFR
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<tr>
<th>Normal</th>
<th>&gt;90 mL/min/1.73 m²</th>
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#### RISK Factors:
- age >60 years, obesity, autoimmune disorders, DM, HTN, kidney stones, ADPKD, prior ARF, UTDs, toxic drug exposures, and FH of CKD, especially in African Americans, Native Americans, and Asians

- Screen for general and specific conditions
- Screen for CKD w/GFR

#### SCREEN FOR CKD RISK REDUCTION INTERVENTION STRATEGIES

**Screen for general and specific conditions**

- Screen for CKD w/GFR

**Initiate CKD risk reduction/intervention strategies**

**CLINICAL TESTING**

- **Fasting Lipids:** every 6–12 mo to validate medication adherence
- **Electrolytes:** Glucose, BUN, SCr, GFR: every 12 mo
- **UA for Hematuria or Proteinuria & Microscopic Exam**

**TREATMENT CONSIDERATIONS**

- **Smoking Cessation**
- **Weight Reduction**, if BMI >30 kg/m²

**TARGETS**

- **BP:** <140/90 mmHg

**Lipids:** Use 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults (ATP 4)

**Glucose:** Premeal level, 80–130 mg/dL; A1C <7%

### Stage 1

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<th>Stage 1</th>
<th>&gt;90 mL/min/1.73 m²</th>
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#### Kidney damage with normal GFR (urinary, imaging or histologic abnormalities).

- **GFR** term is not applied clinically in the absence of albuminuria and/or abnormal imaging and/or abnormal urinalysis

- **Cause:** diagnose etiology of CKD

- **Identify and treat CVD risk factors and comorbid conditions**

- **Albuminuria:** identify and quantify by ACR or UPC

#### ESTIMATE CKD Progression Rate

**BP monitoring:** every 12 mo if normal

**Electrolytes:** Glucose, BUN, SCr, GFR: every 12 mo

**Fasting Lipids:** every 6–12 mo to validate medication adherence

**UA with Microscopic Evaluation**

**Albuminuria:** UPC or ACR every 12 mo, depending on severity

**Consult Nephrology if GFR declines by ≥4 mL/min/yr**

**Antiproteinuric therapy with ACEI or ARB**

**TARGETS**

- **BP:** <140/90 mmHg

**Lipids:** Use ATP 4 guidelines (see above)

**Albuminuria:** UPC <0.2 or ACR <30 mg/g

### Stage 2

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<th>Stage 2</th>
<th>60–89 mL/min/1.73 m²</th>
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#### Kidney damage with mild GFR (urinary, imaging or histologic abnormalities) MOST lower GFRs in this range are due to age-related GFR decline

- **“GFR” term is not applied clinically in the absence of albuminuria and/or abnormal imaging and/or abnormal urinalysis**

- **Cause:** diagnose etiology of CKD

- **Identify and treat CVD risk factors and comorbid conditions**

- **Albuminuria:** determine presence and quantify by ACR or UPC

#### ESTIMATE CKD Progression Rate

**BP monitoring:** every 3–12 mo

**Electrolytes:** Glucose, BUN, SCr, GFR: every 6–12 mo

**Fasting Lipids:** every 6–12 mo to validate medication adherence

**UA with Microscopic Evaluation**

**Albuminuria:** ACR or UPC every 3–12 mo, depending on severity

**Rule Out AKI (eg, obstruction)**

**Renal Dietitian Consultation**

**TARGETS**

- **BP:** <140/90 mmHg

**Lipids:** Use ATP 4 guidelines (see above)

**Hgb:** 9–11 g/dL

**Albuminuria:** UPC <0.2 or ACR <30 mg/g

### Stage 3A

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<th>Stage 3A</th>
<th>45–59 mL/min/1.73 m²</th>
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#### Moderate decline of GFR (complications more frequent at CKD stage 3 as GFR decreases to <60 mL/min/1.73 m²)

**Proteinuria** is a serious CV risk factor and has prognostic importance for CKD progression

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<th>Stage 3B</th>
<th>30–44 mL/min/1.73 m²</th>
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#### SEVERE decline of GFR (major increase in CVD risk, ie, CKD stage 4 should be considered equivalent to a major CVD clinical event)

**Nephrology** consultation with transition of CKD care to Nephrology or co-management

**Initiate decisions regarding kidney replacement therapy, vascular access, kidney transplantation (GFR >20), and/or end-of-life discussion**

**Diagnose and treat CVD risk factors and comorbid conditions**

**Albuminuria:** determine presence and quantify by ACR or UPC

**Adjust drug-dosing of orally renally excreted drugs for GFR (may substitute GFR for creatinine clearance)**

**BP monitoring:** every 1 mo

**Electrolytes:** Glucose, BUN, SCr, GFR: every 3–6 mo

**CBC, TSAT, ferritin:** every 6–12 mo or at each ESA injection

**CKD-MBD:** Ca/P/PTH/Alk Phos/25(OH)D: every 6–12 mo; follow-up levels depend on trend analysis and CKD progression. Evaluate for extraskelatal calcification (aorta, cardiac vessels and valves).

**Albuminuria:** UPC or ACR: every 3–12 mo

**CKD-specific education:** kidney replacement therapy modality

**NUTRITION:** dietary Na and K restriction. Renal dietitian consult

**Immunize:** QIV, PPV 13, PPSV 23, HBV, Tdap and VZ

**TARGETS**

- **Hgb:** 9–11 g/dL

- **Iron parameters:** TSAT >20%, ferritin >100 ng/mL after oral or IV iron (initiate ESA after achieving iron parameters)

**Lipids:** moderate to high intensity statin therapy

**Ca & P:** normal ranges with P–binders & dietary restriction (no Ca-based P–binders if vascular/valvular calcification)

**25(OH)D:** ≥30 ng/mL with vitamin D

**PTh:** 130–600 ng/mL, treat with calcitriol or vitamin D analogs if PTH progressively increases

**NaHCO3:** 22–26 mEq/L and titrate NaHCO3 therapy

**Albuminuria:** UPC <0.2 or ACR <30 mg/g

### Comments

- Early recognition, evaluation, and treatment of CKD in a multidisciplinary fashion, decreases morbidity, mortality, and healthcare costs.

- **GFR:** <20–29 mL/min/1.73 m² in persons >65 years may not require Nephrology evaluation in all cases, unless there is heavy albuminuria/proteinuria (ACR >300 mg/g or UPC 0.5–1.0 g/g) or a progressive decline in GFR (> 4 mL/min/1.73 m²).

- Always consider reversible etiologies of acute kidney injury (AKI) at any stage of CKD, eg, urinary tract outlet obstruction, volume depletion, and adverse drug reactions.

- Avoid or cautiously use nephrotoxic medications and contrast agents as required.

- **CKD stage 5 patients require management by a nephrologist.**