The following guideline recommends diagnosis and aggressive management of chronic kidney disease by clinical stage.

### Eligible Population

- **All adults at increased risk for CKD**
  - Screening & Diagnosis [D]
    - For patients at increased risk for CKD (e.g., diabetes mellitus, hypertension, family history of kidney disease, age > 60 years, obesity, metabolic syndrome, history of acute kidney injury) assess for markers of kidney damage:
      - Measure blood pressure [A] at least two times/year, more frequently if indicated.
      - Obtain serum creatinine and estimated GFR\(^1\). If < 60 and no prior GFR, repeat within 90 days to establish trend. Monitor GFR annually.
      - Obtain albumin-to-creatinine ratio\(^2\) (first morning or random spot urine specimen).
      - Urinalysis, fasting lipid profile, electrolytes, BUN.

### Key Components

#### Risk Factor Management & Patient Education

- At each routine health exam:
  - Optimize management of comorbid conditions (e.g. diabetes mellitus/glucose control, hypertension, urinary tract obstruction, cardiovascular disease)\(^3\).
  - Educate on therapeutic lifestyle changes: weight maintenance if BMI < 25, weight loss if BMI > 25, exercise and physical activity, nutrition therapy, moderation of alcohol intake, smoking cessation.

#### Core Principles of Treatment [D]

- Intensive management of risk factors.
- Inform patient of serious progressive nature of CKD and its risks.
- Review medications for dose adjustment, drug interactions, adverse effects, and therapeutic levels. Modify dosage for renal cleared medications, e.g. Metformin, ciprofloxacin.
- Update vaccines: HBV, influenza, Tdap, and Pneumococcal Conjugate Vaccine (Prevnar\(^*\)) and Pneumococcal Polysaccharide Vaccine (Pneumovax\(^*\)).
- Salt restriction for patients with CKD and hypertension.
- Incorporate self-management behaviors into treatment plan at all stages of CKD [B].
- Develop clinical plan based on disease stage [B].

### Clinical plan based on CKD stage and albuminuria

**Stage 1 (GFR > 90):** Monitor GFR and microalbuminuria at least annually based on risk, smoking cessation, consider ACE and/or ARB therapy. BP goal ≤ 130/80 for macroalbuminuria (> 300) or diabetes mellitus, otherwise ≤ 140/90. Nephrology referral if macroalbuminuria.

**Stage 2 (GFR 60-89):** Nephrology referral if GFR decline > 5 mL/min/yr, if macroalbuminuria > 300; maintain BP goals as above.

**Stage 3a (GFR 45-59):** Nephrology referral if anemic or abnormal PTH, VitD, Ca, or phosphorus, or GFR < 45 mL/min. Avoid contrast, if possible. Avoid NSAIDs. Low-dose ASA allowed.

**Stage 3b (GFR 30-44):** Nephrology referral.

**Stage 4 (GFR 15-29):** Nephrology co-management; consider case management if available. CKD education and discussion of choices and options, advance care planning.

**Stage 5 (GFR < 15):** Renal replacement therapy when needed.

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\(^1\)Units for GFR = ml/min/1.73 m\(^2\)

\(^2\)Albuminuria mg/24 hours

\(^3\)Reference MQIC guidelines on diabetes, hypertension, hypercholesterolemia, and obesity (www.mqic.org).

**Levels of Evidence for the most significant recommendations:**

- A = randomized controlled trials
- B = controlled trials, no randomization
- C = observational studies
- D = opinion of expert panel
