Chronic Kidney Disease is a heterogeneous group of disorders characterized by alterations in kidney structure or function for three or more months.1

Patients with abnormal eGFRs are at significantly increased risk for all-cause and cardiovascular mortality, ESRD, acute kidney injury and CKD progression in comparison to patients with normal eGFRs.2 With this in mind, it is recommended that primary care providers proactively identify and manage early stage CKD to reduce the risk of disease progression and associated complications.

Clinical criteria for diagnosing CKD

The clinician should consider linking CKD to other medical conditions such as hypertension (ICD-10: I12.0, I12.9, I13.0, I13.10, I13.11, I13.2), diabetes (E10.22 - type 1 DM, E11.22 - type 2 DM) and anemia (D63.1). CKD diagnostic criteria include duration of abnormal glomerular filtration rate (GFR) and/or indicators of kidney damage (e.g., albuminuria, urine sediment abnormalities, or structural abnormalities detected by imaging).1

When evaluating lab findings (e.g., creatinine, BUN, electrolytes, etc.), clinicians should consider context (e.g., patient’s age, acute kidney injury/acute renal failure, malnutrition, major limb amputation, & cirrhosis) and transient causes (e.g., volume depletion, exposure to nephrotoxic substances, etc.)

The chronicity for CKD may be documented or inferred by evaluating past measures of GFR or proteinuria past urine dipsticks and sediment examination abnormal renal image findings (e.g., reduced kidney volume, reduction in cortical thickness, and cysts) or prospectively documenting abnormal GFRs and/or proteinuria for three or more months.

Staging CKD assists in clinical management, including risk stratification for disease progression and development of complications. The staging criteria include disease cause, Albuminuria category and GFR category.

Currently, the most common indirect measure of glomerular filtration is based upon serum creatinine. Serum creatinine is used to calculate GFR in individuals with stable kidney function (e.g., normal kidney function or CKD). GFR estimation (eGFR) equations incorporate known demographic and clinical variables that address unmeasured physiologic factors affecting serum creatinine concentration thereby GFR estimates. Three equations, Cockcroft-Gault equation, MDRD study equation, and CKD-EPI equation, are used with recognized limitations.

The National Kidney Foundation recommends using the 2009 CKD-EPI equation to calculate eGFR for the general population and individuals with GFR near or above 60mL/min per 1.73m. A calculator for the CKD-EPI equation is found at www.kidney.org/professionals/kdoqi/gfr_calculator.cfm.

Clinical Recommendations Overview

(Refer to the table on the back of this document for specific recommendations.)

Avoid nephrotoxic substances – e.g., NSAIDs, aminoglycosides and iodinated radiographic contrast.

Consider starting ACE Inhibitors or ARBs for BP control and proteinuria reduction for renal protection. ACEIs and ARBs contribute to decrease in GFR. Consider dose adjustment and/or consult with nephrologist if GFR has a consistent reduction of greater than 25-30%.

Consider consulting with nephrologist at any point in the disease progression.
Plan of Care for CKD Stages I-5

<table>
<thead>
<tr>
<th>CKD Stage (ICD-10-CM)</th>
<th>Description (GFR – mL/min/1.73m²)</th>
<th>Clinical presentation/clinician action</th>
<th>Monitoring/testing</th>
<th>Treatment considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/normal</td>
<td>GFR &gt; 90</td>
<td>Often risk factors present SCREEN for CKD with GFR and ADDRESS – co-morbidities START – CKD risk reduction</td>
<td>Every 12 months</td>
<td>Tobacco cessation; Weight reduction; Aspirin approximately 75mg q day</td>
</tr>
<tr>
<td>1 N18.1</td>
<td>Kidney damage and GFR &gt; 90 AER &gt; 30 mg/24 hours; ACR &gt; 30 mg/g (&gt; 5 mg/mol) Most lower GFRs are age related. If no proteinuria no further evaluation.</td>
<td>Often asymptomatic IDENTIFY etiology of CKD DIAGNOSE &amp; TREAT CKD risk factors and comorbid conditions</td>
<td>Every 12 months</td>
<td>Consult nephrology consult if eGFR declines by &gt; 4 mL/min/yr</td>
</tr>
<tr>
<td>2 N18.2 (mild)</td>
<td>Kidney damage and GFR 60-89 AER &gt; 30 mg/24 hours; ACR &gt; 30 mg/g (&gt; 5 mg/mol) Most lower GFRs are age related. If no proteinuria no further evaluation.</td>
<td>Mild complications ESTIMATE CKD progression rate DIAGNOSE &amp; TREAT CVD risk factors and co-morbid conditions</td>
<td>Every 3-12 months</td>
<td>Avoid nephrotoxins; rule out AKI/ARF (e.g., obstruction)</td>
</tr>
<tr>
<td>3 N18.3 (moderate)</td>
<td>NIA – GFR 45-59 NIB – GFR 30-44 Complications more frequent Proteinuria is a serious CV risk factor and prognostic importance for progression of CKD Moderate complications ESTIMATE CKD progression rate DIAGNOSE &amp; TREAT CVD risk factors and co-morbid conditions Kidney image study (e.g., US or CT) CONSIDER nephrology consult</td>
<td>Baseline</td>
<td>Every 3-6 months</td>
<td>Avoid nephrotoxins; based on renal function; rule out ARF (e.g., obstruction) Nutritional assessment – any time once Stage III-V</td>
</tr>
<tr>
<td>4 N18.4 (severe)</td>
<td>GFR 15-29 Major increase in CVD risk – equivalent to a major CVD event Severe complications CONSULT nephrology START discussions kidney replacement therapy DIAGNOSE &amp; TREAT CVD risk factors and co-morbid conditions ADJUST drug dosages</td>
<td>Baseline</td>
<td>Every 3-6 months</td>
<td>Specific patient/family education; kidney replacement therapy modality Immunizations: TIV, PPV-23, HBV (consider Tdap, VZ) Reinforce dietary prescription, Renal-formulated multivitamin Vascular access surgery evaluation, protect dominant arm</td>
</tr>
<tr>
<td>5 N18.5</td>
<td>GFR &lt;5 mL per minute/no dialysis treatment</td>
<td>Managed by nephrologist</td>
<td></td>
<td>Managed by nephrologist</td>
</tr>
<tr>
<td>ESRD N18.6</td>
<td>Requires dialysis treatment - use additional code to identify dialysis status (39.2)</td>
<td>Managed by nephrologist</td>
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<tr>
<td>N18.9 CKD, unspecified</td>
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</tbody>
</table>

Abbreviations

- ACEI – angiotensin-converting enzyme inhibitor
- ALKB – acute kidney injury
- ARB – angiotensin II receptor blocker
- ARF – acute renal failure
- BP – blood pressure
- BUN – blood urea nitrogen
- Ca – calcium
- CCKD – chronic kidney disease
- CR – serum creatinine
- CVD – cardiovascular disease
- DM – diabetes mellitus
- FBS – fasting blood sugar
- GFR/eGFR – glomerular filtration rate/estimated glomerular filtration rate
- HB – hemoglobin
- HBV ab – hepatitis B virus antibody
- P – phosphate
- PTH/PTHrP – parathyroid hormone/intact parathyroid hormone
- TSAT – transferrin saturation
- UA – urine analysis
- UAER – urine albumin to creatinine ratio
- UPCR – urine protein creatinine ratio
- US – ultrasound
- 25(OH)D – 25-hydroxyvitamin D

References