



1 in 3 American Adults is at Risk for Kidney Disease

Learn more at www.kidney.org/screening

What can you do?

1. 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:
 - ACR >30 mg/g
 - Markers of kidney damage (one or more)
 - GFR <60 mL/min/1.73 m²

2. Recognize risk factors

- Diabetes
- Hypertension
- Age 60 years or older
- Family history of CKD, diabetes, or hypertension
- U.S. ethnic minority status
- History of acute kidney injury

3. 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)

4. Classify CKD to guide testing and treatment

- Assign albuminuria category
- Identify cause of CKD¹
- Assign GFR category
- Classify CKD based on ACR and GFR at www.kidney.org/ckdchart

5. Diagnose and implement a clinical action plan based on patient's CKD classification

- Consider comanagement with a nephrologist if the clinical action plan cannot be carried out.³
- Refer to a nephrologist when GFR <30 mL/min/1.73 m² or ACR >300 mg/g

Albuminuria categories in CKD²

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)

GFR categories in CKD²

Category	GFR	Terms	Clinical Presentations
G1	≥90	Normal or high	Markers of kidney damage (nephrotic syndrome, nephritic syndrome, tubular syndromes, urinary tract symptoms, asymptomatic urinalysis abnormalities, asymptomatic radiologic abnormalities, hypertension due to kidney disease)
G2	60-89	Mildly decreased*	
G3a	45-59	Mildly to moderately decreased	<ul style="list-style-type: none"> Mild-to-severe complications: <ul style="list-style-type: none"> Anemia Mineral and bone disorder <ul style="list-style-type: none"> Elevated parathyroid hormone Cardiovascular disease <ul style="list-style-type: none"> Hypertension Lipid abnormalities Low serum albumin
G3b	30-44	Moderately to severely decreased	
G4	15-29	Severely decreased	
G5	<15	Kidney failure	<ul style="list-style-type: none"> Includes all of the above Uremia

GFR = mL/min/1.73 m²

*Relative to young adult level

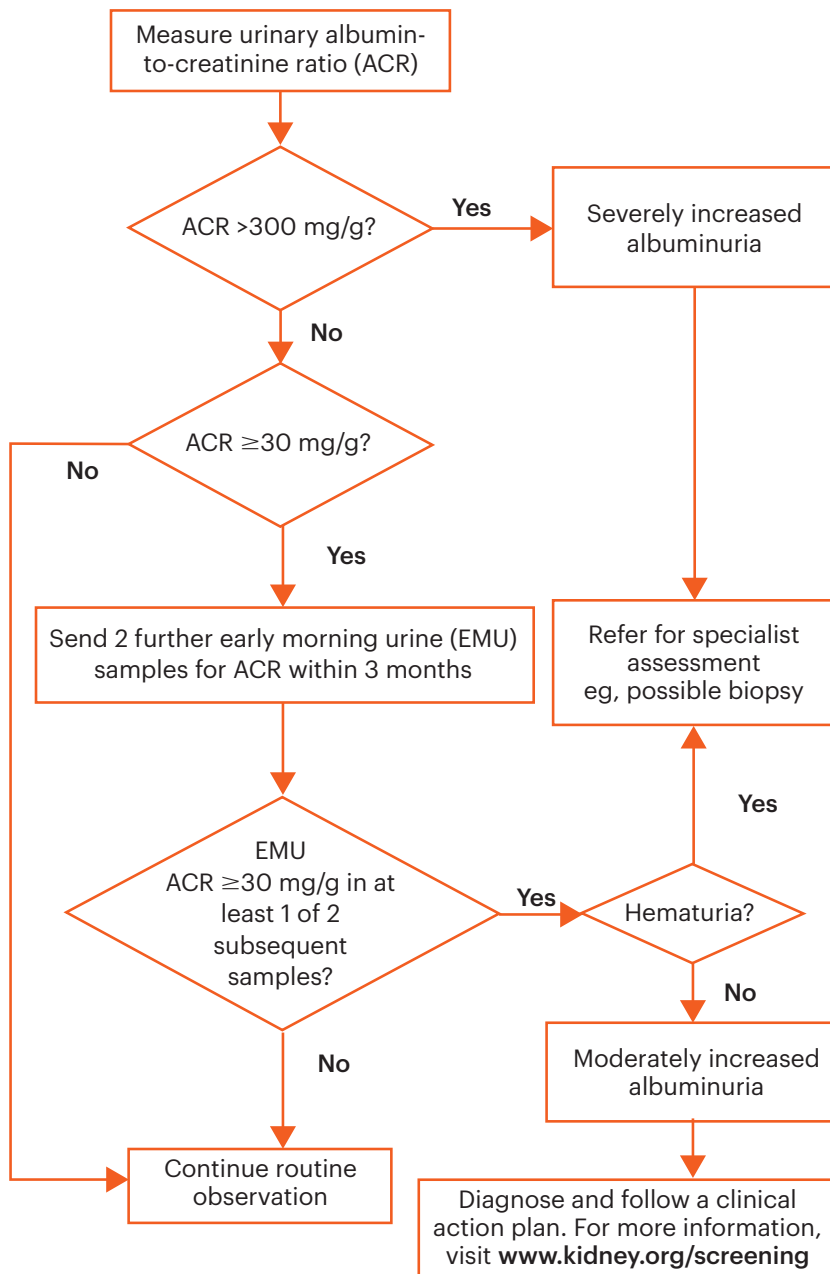
In the absence of evidence of kidney damage, neither GFR category G1 nor G2 fulfill the criteria for CKD. Refer to a nephrologist and prepare for a kidney replacement therapy when GFR <30 mL/min/1.73m²

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

2. 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.* 2013;Suppl.3;1-150.

3. National Kidney Foundation. Kidney Disease Outcomes Quality Initiative (KDOQI) US Commentary on the 2012 KDIGO clinical practice guideline for the evaluation and management of CKD. *Am J Kidney Dis.* 2014;63:713-735. Retrieved from www.kidney.org/ckdcommentary

How do you detect albuminuria?



Adapted from Lamb EJ, Price CP. Kidney function tests. In: Burtis CA, Ashwood E, Bruns DE., eds. *Tietz Textbook of Clinical Chemistry and Molecular Diagnostics*. 5th Ed. Philadelphia, PA; Elsevier; 2012:669-708.

How do you estimate GFR?

- Use serum creatinine with age, gender, and race in the recommended CKD-EPI creatinine equation (2009). Available free at www.kidney.org/gfr
- Use confirmatory tests in specific circumstances when eGFR based on serum creatinine is less accurate:
 - Cystatin C-based equations
 - Combined cystatin and creatinine-based equations

Do you know?

- **Serum creatinine alone should not be used to estimate kidney function.** This is because a rise in blood creatinine levels is observed only after significant loss of functioning nephrons. A better way to measure kidney function is to estimate GFR with equations that use serum creatinine levels and some or all of the following variables: gender, age, weight, and race.
- **Normal GFR varies according to age, sex, and body size;** in young adults it is approximately 120-130 mL/min/1.73 m² and declines with age. A persistently reduced GFR is a specific indication of CKD.
- **All patients with CKD should be tested for albuminuria at least annually.** Persistent and increased albuminuria is an independent risk factor for CKD progression.
- **Measuring urinary ACR in a spot urine sample is the recommended method to evaluate albuminuria.** ACR is calculated by dividing albumin concentration in milligrams by creatinine concentration in grams. Creatinine assists in adjusting albumin levels for varying urine concentrations, which allows for more accurate results versus albumin alone.

Abbreviations: ACR, albumin-to-creatinine ratio; CKD, chronic kidney disease; EMU, early morning urine; GFR, glomerular filtration rate.

Siemens Healthcare Diagnostics supports the goals of the National Kidney Foundation to increase awareness, prevention, and treatment of chronic kidney disease (CKD). Through early intervention and education, the Alliance encourages timely testing for at-risk individuals by Primary Care Practitioners.

National Kidney Foundation is not involved in the manufacture of any Siemens Healthcare Diagnostics products. Always consult a physician or qualified healthcare provider for advice regarding your health.

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Strategic Alliance
for Education
and Screening

For more information on the Strategic Alliance for Education and Screening, along with clinical care information, go to:

www.kidney.org/screening

For more information on urine ACR testing, please visit:
www.siemens.com/acr