Percentage of US Population by eGFR and Albuminuria Category: KDIGO 2012 and NHANES 1999–2006				Persistent albuminuria categories Description and range			
				A1	A2	A3	
				Normal to mildly increased	Moderately increased	Severely increased	
				<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>300 mg/g >30 mg/mmol	
GFR categories (ml/min/1.73 m²) Description and range	G1	Normal or high	≥90	55.6	1.9	0.4	57.9
	G2	Mildly decreased	60-89	32.9	2.2	0.3	35.4
	G3a	Mildly to moderately decreased	45-59	3.6	0.8	0.2	4.6
	G3b	Moderately to severely decreased	30-44	1.0	0.4	0.2	1.6
	G4	Severely decreased	15-29	0.2	0.1	0.1	0.4
	G5	Kidney failure	<15	0.0	0.0	0.1	0.1
				93.2	5.4	1.3	100.0

FIGURE 32-1 Distribution of chronic kidney disease in the United States by glomerular filtration rate (GFR) and albuminuria categories.

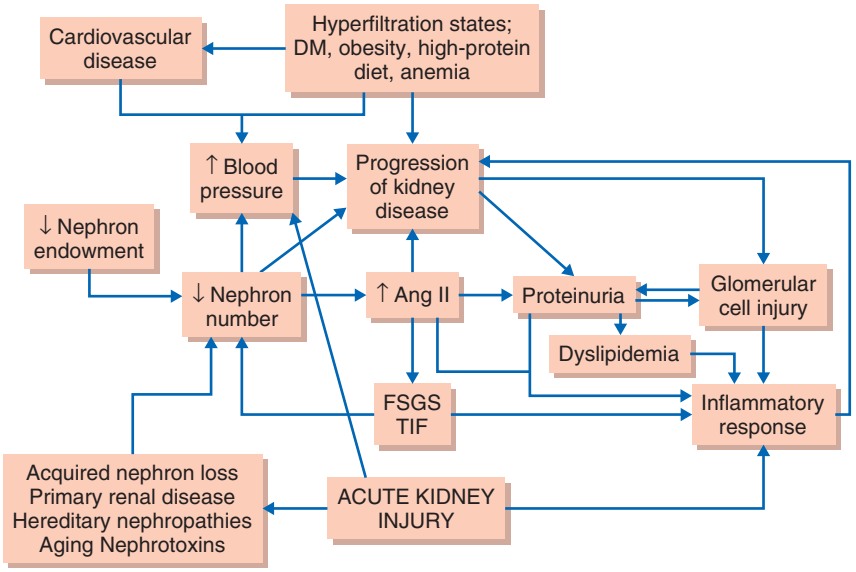

FIGURE 32-2 A simplified depiction of risk factors interacting with pathophysiologic mechanisms to accelerate progression of chronic kidney disease. Ang II, Angiotensin II; DM, diabetes mellitus; FSGS, focal segmental glomerulosclerosis; TIF, tubulointerstitial fibrosis. (Modified from Taal MW, Brenner BM: Predicting initiation and progression of chronic kidney disease: developing renal risk scores, Kidney Int 70:1694–1705, 2006.)

mechanisms to accelerate CKD progression. Detailed studies have elucidated interrelated mechanisms, including glomerular hemodynamic responses to nephron loss, proteinuria, and pro-inflammatory responses. Activation of the renin-angiotensin-aldosterone system (RAAS) pathway and increased production of transforming growth factor-β (TGF-β) also contribute to renal fibrosis. Interventions that reduce intraglomerular pressure, such as protein restriction and the use of angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs), help attenuate progression of renal disease and further support the importance of glomerular hemodynamics and RAAS in progressive kidney disease.

CLINICAL PRESENTATION

General Features of Uremic Syndrome

Kidney disease commonly manifests first as abnormalities on laboratory or other diagnostic tests. Patients with CKD may not have symptoms until advanced stages, in which the GFR is less than 15 mL/minute. *Uremia* is a systemic syndrome that negatively affects every organ system. Uremic syndrome is likely the consequence of many factors, including retained molecules, deficiencies of important hormones, and metabolic abnormalities, rather than the effect of a single uremic toxin (E-Fig. 32-3). Excess urea can cause symptoms of fatigue, nausea,