

# Defining and Treating Nephropathy

**Table 1 Defining Abnormalities & Staging CKD**

Category	Spot collection
Normal	<30 µg/mg creatinine
Microalbuminuria	30-299 µg/mg creatinine
Macro (clinical)-albuminuria	300 µg/mg creatinine

**Stages of CKD**

Stage	Description	GFR (ml/min per 1.73 m <sup>2</sup> body surface area)
1	Kidney damage* with normal or increased GFR	90
2	Kidney damage* with mildly decreased GFR	60-89
3	Moderately decreased GFR	30-59
4	Severely decreased GFR	15-29
5	Kidney failure	<15 or dialysis

\* Kidney damage defined as abnormalities on pathologic, urine, blood, or imaging tests.

Abbreviations: CKD, chronic kidney disease; GFR, glomerular filtration rate.

Source: Adapted from: American Diabetes Association. *Diabetes Care*. 2008;31:S12-S54

American Diabetes Association. Standards of Medical Care in Diabetes-2008. *Diabetes Care*. 2008;31:S12-S54. Available online <http://care.diabetesjournals.org/>.

Klausen K, Borch-Johnsen K, Feldt-Rasmussen B, et al. Very low

Levels of microalbuminuria are associated with increased risk of coronary heart disease and death independently of renal function, hypertension, and diabetes. *Circulation*. 2004;110:32-35.

Gall MA, Hougaard P, Borch-Johnsen K, Parving HH. Risk factors for development of incipient and overt diabetic nephropathy in patients with non-insulin dependent diabetes mellitus: prospective, observational study. *BMJ*. 1997;314:783-788.

DCCT. Effect of intensive therapy on the development and progression of diabetic nephropathy in the Diabetes Control and Complications Trial. The Diabetes Control and Complications (DCCT) Research Group. *Kidney Int*. 1995;47:1703-1720.

Remuzzi G, Macia M, Ruggenenti P. Prevention and treatment of diabetic renal disease in type 2 diabetes: the BENEDICT study. *J Am Soc Nephrol*. 2006;17:S90-S97.

Courtesy of [www.diabetesincontrol.com](http://www.diabetesincontrol.com) The leader in diabetes news and studies

**Table 2 Treating Nephropathy**

- When treating non-pregnant patients with micro- or macroalbuminuria, either ACE inhibitors or ARBs should be used as part of a blood pressure lowering regimen to achieve a goal around 130/80 mm Hg.
- There are few adequate head-to-head comparisons of ACE inhibitors and ARBs, but there is clinical trial support for each of the following statements:
  - ACE inhibitors have been shown to delay the progression of nephropathy in patients with type 1 diabetes with hypertension and any degree of albuminuria.
  - Both ACE inhibitors and ARBs have been shown to delay the progression to macroalbuminuria in patients with type 2 diabetes, hypertension, and microalbuminuria.
  - ARBs have been shown to delay the progression of nephropathy in patients with type 2 diabetes, hypertension, macroalbuminuria, and renal insufficiency (serum creatinine >1.5 mg/dl).
  - If one class is not tolerated, the other should be substituted.
- Reduction of protein intake to 0.8–1.0 g · kg body wt<sup>-1</sup> · day<sup>-1</sup> in individuals with diabetes and the earlier stages of CKD and to 0.8 g · kg body wt<sup>-1</sup> · day<sup>-1</sup> in the later stages of CKD may improve measures of renal function (eg, urine albumin excretion rate and GFR) and is recommended.
- Continued monitoring of urine albumin excretion to assess response to therapy and progression of disease is recommended.

Abbreviations: CKD, chronic kidney disease; GFR, glomerular filtration rate; ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker.

Source: Adapted from: George L. Bakris, MD, and American Diabetes Association. *Diabetes Care*. 2008;31:S12-S54.