

Dosing of ACE-Inhibitors and ARBs

Drug Name	Starting Dose ³	Goal Dose in CKD ³	Dosing in renal dysfunction ^{1,2,4}
ACE-Inhibitors			
Benazepril (Lotensin)	10 mg daily	20-40 mg/d in 1-2 divided doses	CrCl < 30 mL/minute or patients taking diuretics, start 5 mg/day.
Captopril (Capoten)	6.25-25 mg three times per day	25-150 mg 2 or 3 times per day	<p>Reduce initial dose and use smaller increments to titrate at 1-2 week intervals. Then, back-titrate to lowest effective dose.</p> <p>CrCl 10—50 ml/min: reduce recommended dose by 25%.</p> <p>CrCl < 10 ml/min: reduce recommended dose by 50%. Removed by hemodialysis; consider giving a dose within 4 hours after dialysis.</p> <p>Diabetic neuropathy (proteinuria >500 mg/day in type 1 diabetics with retinopathy): 25 mg TID</p>
Enalapril (Vasotec)	5 mg daily	10-40 mg daily in 1-2 divided doses	<p>HTN: Start with 2.5 mg/day if CrCL ≤ 30 mL/minute; 2.5 mg on dialysis day in hemodialysis patients (dose on non-dialysis days based on BP)</p> <p>CHF: Start with 2.5mg/day under close supervision if serum Na <130 mEq/L or serum Cr>1.6 mg/dL. May titrate at intervals of =>4 days to 2.5 mg BID, then 5 mg BID and higher as needed to maximum of 40 mg/day.</p> <p>Removed by hemodialysis; consider giving a dose within 4 hours after dialysis.</p>
Fosinopril (Monopril)	10 mg daily	20-40 mg daily	Dosage adjustment not required; biliary excretion increases in renal dysfunction. Start with 5 mg/day QD in patients with CHF and renal dysfunction. Not removed by hemodialysis.

Lisinopril (Prinivil, Zestril)	10 mg daily	20-40 mg daily	<p>HTN: Start with 5 mg/day if CrCl 10-30 mL/minute. Max dose is 40 mg/day.</p> <p>CrCl < 10mL/min: reduce initial dosage to 2.5 mg PO once daily</p> <p>CHF: Start with 2.5 mg QD if CrCl <30 mL/minute. Acute MI: Use caution if serum creatinine >2mg/dL.</p> <p>Removed by hemodialysis; consider giving a dose within 4 hours after dialysis.</p>
Moexipril (Univasc)	7.5 mg daily	7.5-30 mg daily in 1-2 divided doses	<p>HTN: Start with 3.75 mg QD if CrCl is ≤ 40 mL/minute.</p> <p>Max dose is 15 mg/day.</p> <p>No data on removal by hemodialysis.</p>
Perindopril (Aceon)	4 mg daily	4-16 mg daily in 1-2 divided doses	<p>Safety and efficacy not established with CrCl < 30 mL/minute. For CrCl > 30 mL/minute, initial dose is 2 mg/day and maximum dose is 8 mg/day.</p> <p>Removed by hemodialysis; consider giving a dose within 4 hours after dialysis.</p>
Quinapril (Accupril)	10-20 mg daily	20-80 mg daily in 1-2 divided doses	<p>HTN: Start with 10 mg/day if CrCl > 60 mL/minute; 5 mg/day if CrCl is 30-60 mL/minute; and 2.5 mg/day if CrCl is 10-30 mL/minute.</p> <p>CHF: Start with 5 mg/day if CrCl >30 mL/minute; 2.5 mg/day if CrCl 10-30 mL/minute.</p> <p>Not removed by hemodialysis.</p>
Ramipril (Altace)	2.5 mg daily	1.25-20 mg daily in 1-2 divided doses	<p>Reduction in risk of MI, stroke, and CV mortality: Start with 25% of usual dose if CrCl <40 mL/minute.</p> <p>HTN: Start with 1.25 mg QD if CrCl < 40 mL/minute. Max dose is 5 mg/day.</p> <p>CHF post-MI: Start with 1.25 mg QD if CrCl < 40 mL/minute. May increase to 1.25 mg BID. Max dose is 2.5 mg BID.</p> <p>Removed by hemodialysis; consider giving a dose within 4 hours after dialysis.</p>
Trandolapril (Mavik)	1 mg daily	2-4 mg daily	<p>Start with 0.5 mg/day if CrCl <30 mL/minute.</p> <p>No data on removal by hemodialysis.</p>

ARBs			
Candesartan (Atacand)	16 mg as monotherapy	2-32 mg daily in 1-2 divided doses	8 mg po daily is well tolerated in patients with mild/moderate renal impairment. A lower starting dose of ≤ 8 mg may be initiated in patients with severe renal impairment.
Eprosartan (Teveten)	600 mg daily (monotherapy)	400-800 mg daily in 1-2 divided doses	No dosage adjustment necessary.
Irbesartan (Avapro)	150 mg daily	150-300 mg daily	No dosage adjustment necessary unless patient is volume depleted.
Losartan (Cozaar)	25-50 mg daily	25-100 mg daily in 1-2 divided doses	No dosage adjustment necessary unless patient is volume depleted.
Olmесartan (Benicar)	20 mg daily (monotherapy)	20-40 mg daily	No dosage adjustment necessary.
Telmisartan (Micardis)	40 mg daily	40-80 mg daily	No dosage adjustment necessary.
Valsartan (Diovan)	80 or 160 mg daily	80-320 mg daily	CrCl < 10 mL/minute: use in adults has not been studied; use with caution.

References:

1. Allen, J. "Comparison of Oral ACE inhibitors." Pharmacist's Letter/ Prescriber's Letter, 2002.
2. Clinical Pharmacology. Gold Standard. 2008.
3. NKF K/DOQI Guidelines. American Journal of Kidney Diseases, 2007.
4. MicroMedex. Thomson Healthcare, Inc. 2008.