

| NAME:Generic/TRADE (Dosage strength & forms) | Pregnancy rating: All ACEI & ARBs | FOOD EFFECT | Class / Prodrug | ONSET & (PEAK) | Duration (hrs) ²¹ | INDICATIONS: ✓HPB Other Indications-US FDA | DOSE: INITIAL (Maximum) | USUAL DOSE # RANGE | \$ COST / 30 Day |
|---|--|----------------------|---------------------------------|---------------------|---------------------------------|---|----------------------------|--|----------------------|
| ANGIOTENSIN CONVERTING ENZYME INHIBITORS ACEI: ROLE: 1ST LINE: HF, Diabetes, Post MI, Uncomplicated HTN, LVH, Prior CVA/TIA, renal disease & ALL Coronary Artery Disease pts. | | | | | | | | | |
| Benazepril (5 ⁵ , 10 ⁵ , 20 ⁵ mg tab) | LOTENSIN | ↓ rate not extent | carboxy / PD-YES | 60min (2-4hr) | 24 | ✓BP | 5mg OD (40mg OD) | 10mg po OD 20mg po OD | 32 36 |
| Captopril (6.25, 12.5, 25 ⁵ , 50 ⁵ , 100 ⁵ mg tab) | CAPOTEN | ↓ absorption | sulfhydryl/ PD-NO | 15-30min (1-2hr) | 6-12 | ✓BP ✓HF ✓Post MI ✓Diabetic Nephropathy | 6.25mg BID (150mg TID) | 25mg po BID 50mg po TID HFTD | 24 52 |
| Cilazapril (1 ⁵ , 2.5 ⁵ , 5 ⁵ mg tab) Cilazapril/HCT • (5mg/12.5 ⁵ mg tab) | INHIBACE INHIBACE PLUS | ↓ absorption | carboxy / PD-YES | 60min (3-7hr) | 12-24 | ✓BP ✓HF | 1mg OD (10mg OD) | 5mg po OD 10mg po OD 5mg/12.5mg po OD | 36 66 36 |
| Enalapril (2.5 ⁵ , 5 ⁵ , 10, 20mg tab) Enalapril/HCT • (5mg/12.5mg, 10mg/25mg tab) | VASOTEC (Enalaprilat Val 1.25mg/ml) VASERETIC | NONE | carboxy / PD-YES | 60min (4-6hr) | 12-24 | ✓BP (including Age >6yr) ✓HF (10-20mg bid) HFTD Post MI, Pheochromocytoma, Scleroderma Renal Crisis | 2.5mg OD (20mg BID) | 10mg po OD 20mg po OD 10mg po BID 10mg/25mg po OD | 43 50 78 43 |
| Fosinopril (10 ⁵ , 20mg tab) | MONOPRIL | ↓ rate not extent | phosphoryl / PD-YES | 60min (2-6hr) | 24 | ✓BP HF | 10mg OD (40mg OD) | 20mg po OD 40mg po OD | 31 55 |
| Lisinopril (5 ⁵ , 10, 20mg tab) Lisinopril/HCT • (10mg/12.5mg; 20mg/12.5mg; 20mg/25mg tab) | ZESTRIL, PRINIVIL ZESTORETIC, PRINZIDE | NONE | carboxy / PD-NO | 60min (4-6hr) | 24 | ✓BP (10-40mg od ^{ALLHAT}) ✓HF (10-35mg od) HFTD ^{ATLAS} Uremic hypertrophic cardiomyopathy | 2.5-5mg OD (40mg OD) | 10-20mg po OD 10mg/12.5mg po OD 20mg/12.5mg po OD | 30-35 30 35 |
| Perindopril (2, 4 ⁵ , 8 mg tab) Perindopril/Indapamide COVERSIL PLUS (4/1.25mg tab) | COVERSYL COVERSYL PLUS | may ↓ effect | carboxy / PD-YES | 60min (2-4hr) | 24 | ✓BP, HF ^{CAD pts → EUROPA} 8mg od ^{PROGRESS} ↓stroke when indapamide added to perindopril | 2mg OD (16mg OD) | 4-8mg po OD 4/1.25 mg po OD ²² | 34-45 41 |
| Quinapril 5 ⁵ , 10, 20, 40mg tab) Quinapril/HCT • (10mg/12.5 ⁵ mg; 20mg/12.5 ⁵ mg; 20/25mg) | ACCUPRIL ACCURETIC | ↓ rate not extent | carboxy / PD-YES | 60min (2-4hr) | 24 | ✓BP ✓HF | 5mg OD (40mg OD) | 10mg po OD 40mg po OD 20mg/12.5mg po OD | 38 38 38 |
| Ramipril (1.25, 2.5, 5, 10mg capsule) | ALTACE | NONE | carboxy / PD-YES | 60min (4-6hr) | 24 | ✓BP, Post MI, HF (5mg bid) HFTD ✓High CV risk ^{HOPE} (vs placebo) | 1.25-2.5 OD (20mg OD) | 5mg po OD 10mg po ^{HOPE} ²³ | 34 41 |
| Trandolapril (0.5 ⁵ , 1, 2, 4 ⁵ mg capsule) | MAVIK | ↓ rate not extent | carboxy / PD-YES | 30min (2-4hr) | 24 | ✓BP | 0.5-2mg OD (4mg OD) | 2mg po OD 4mg po OD | 35 41 |
| ANGIOTENSIN II RECEPTOR BLOCKERS ARBs: ROLE: 1ST LINE: Diabetes, uncomplicated HTN, ISH, LVH & alternative for patients who do not tolerate ACE inhibitor-induced cough/side effects. | | | | | | | | | |
| Candesartan cilexetil (8 ⁵ , 16 ⁵ mg tab) 16/12.5 ⁵ mg HCT• | ATACAND ATACAND PLUS | NONE | PD-YES | ? (3-5 hr) | 24 | ✓BP heart failure → (CHARM 32mg od \$87) | 4mg OD (32mg OD) | 8mg po OD 16mg po OD | 47 47 |
| Eprosartan (400, 600 mg tab) | TEVETEN | ↓ rate | PD-NO | ?(4hr) | 12-24 | ✓BP | 400mg OD (800mg OD) | 600mg po OD | 44 |
| Irbesartan (75, 150, 300mg tab) Irbesartan/HCT • (150mg /12.5mg, 300mg/12.5mg tab) | AVAPRO AVALIDE | NONE | PD-NO | 60min (2-4 hr) | 24 | ✓BP ✓Delay diabetic/early nephropathy ^{IRMA II, IDNT} | 75mg OD (300mg OD) | 150mg po OD 300mg po OD 150mg/12.5mg po OD | 46 46 46 |
| Losartan (25, 50, 100mg tab) Losartan/HCT • (50mg / 12.5mg tab; DS =100mg/25mg tab) | COZAAR HYZAAR | NONE | Active Metabolite: E-3174 | 60min (3-6hr) | 12-24 | ✓BP, Delay diabetic nephropathy ^{RENAAL} LVH pts → losartan 100mg od \$48 ↓stroke vs atenolol ^{5vs6.7%; NNT=59 LIFE} | 25mg OD (100mg OD) | 25mg po OD 50mg po OD 50mg/12.5mg po OD | 48 48 48 |
| Telmisartan (40 ⁵ , 80 ⁵ mg tab) 80/12.5mg HCT• tab | MICARDIS MICARDIS PLUS | NONE | PD-NO | 60min (3hr) | 24 | ✓BP | 40mg OD (80mg OD) | 80mg po OD 80mg/12.5mg po OD | 45 45 |
| Valsartan (80, 160mg cap / tab) Valsartan/HCT • 80 & 160mg/12.5mg, 160/25 tab DIOVAN HCT | DIOVAN DIOVAN HCT | ↓ rate not extent | PD-NO | 2 hr (4-6 hr) | 12-24 | ✓BP heart failure → (Val-HeFT 160mg bid) post MI → (Valiant 160mg bid \$82) | 80mg OD (320mg OD) | 80-160mg po OD ^{VALUE} 160mg/12.5mg po OD | 45 45 |

• ZESTORETIC, PRINZIDE, VASERETIC, INHIBACE PLUS, COVERSIL PLUS, ACCURETIC, ATACAND PLUS, AVALIDE, HYZAAR, MICARDIS PLUS & DIOVAN HCT → synergistic low-dose combos → ↓BP more than doubling the ACEI/ARB dose.
 # IF Renal Dysfunction → use low dose; MONITOR²⁴: SCr, BUN, fluid balance & lytes upon & after 1 week of starting. If ↑K >5.6 or ↑SCr rise >30% over baseline this may warrant stopping the ACEI or ARB (if not related to ↓ volume).
 † scored tab X = non formulary SK. ACE=angiotensin converting enzyme ARB=angiotensin receptor blocker BP=blood pressure COST=markup & fee HCT=hydrochlorothiazide HF=heart failure HFTD=heart failure target dose ISH=isolated systolic htn LVH=left ventricular hypertrophy MI=myocardial infarction PD=prodrug
Renal Risk factors for acute renal failure: bilateral renal artery stenosis, stenosis of a solitary kidney, HF with aggressive diuretic therapy or excessive vasodilation, or volume depletion from any cause.
 HF: Relatively high TARGET DOSES often used in HF studies with reduced mortality as outcome (NOT all patients able to tolerate target dose). May use lower initial dose & titrate as tolerated (monitor BP & renal function)
INTERACTIONS ACEI: diuretics, K sparing → ↑K⁺, lithium ↑ lithium levels, NSAIDs ↓ BP effect & potassium ↑K⁺; **ARB:** ↑ lithium; losartan → fluconazole & rifampin ↓ losartan effect, & ↓ uric acid level; telmisartan → ↑ digoxin level; irbesartan → fluconazole ↑ irbesartan effect.
SIDE Effects cough 10% with ACEI, dry / nonproductive, loss of taste, rash esp. captopril (sulfa), headache, dizziness, ↓ BP, fatigue, ↑K⁺, acute renal failure, angioedema ~0.5%, hepatotoxicity, dysgeusia, pancreatitis & blood dyscrasias (**ARBs** generally less cough, headache & dizziness than ACEIs).
Contraindications: ACEI & ARBs: bilateral artery stenosis (or solitary kidney stenosis if only 1 kidney), history of angioedema & pregnancy. © not covered by NIHB

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- ¹ Major Outcomes in High-Risk Hypertensive Patients Randomized to Angiotensin-Converting Enzyme Inhibitor or Calcium Channel Blocker vs Diuretic. The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (**ALLHAT**). The ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. JAMA. 2002;288:2981-2997.
- ² 2001 Canadian Hypertension Recommendations: What's New & What's Not so New but is Still Important. CJHP 2002;55:4651.
- ³ FA McAlister, M Levine, KB Zarnke, et al. The 2000 recommendations for the management of hypertension. Can J Cardiol 2001; 17(5):543-559.
- ⁴ 1999 Canadian recommendations for the management of hypertension. CMAJ 1999;161(Suppl):S1-S16.
- ⁵ **1999 World Health Organization**—International Society of Hypertension Guidelines:Management of Hypertension. J Hypertens 1999;17:151-183.
- ⁶ 6th Report-Joint National Committee on Prevention, Detection, Evaluation & Treatment of High Blood Pressure. Arch Intern Med 1997;157:2413-46.
- ⁷ Drugs for hypertension. Med Lett Drugs Ther 2001;43:17-22.
- ⁸ Drugs in Pregnancy & Lactation, 6th Ed. Briggs GE, et al. Wilkins; Baltimore, MD.
- ⁹ Micromedex 2004 →/hcs.micromedex.com.
- ¹⁰ Hansten & Horn's Drug Interactions: Analysis & Management-Facts & Comparisons 2003.
- ¹¹ **Treatment Guidelines: Drugs for Hypertension** from The Medical Letter Feb **2003**.
- ¹² The **2004** Canadian Hypertension Education Program **Recommendations** www.chs.md
- ¹³ ALLHAT Working Group. Major cardiovascular events in hypertensive patients randomized to doxazosin vs chlorthalidone: the antihypertensive and lipid-lowering treatment to prevent heart attack trial (**ALLHAT**). JAMA 2000;283:1967-75.
- ¹⁴ Liu P, Arnold JM, Belenkie I, Demers C, Dorian P, Gianetti N, Haddad H, Howlett J, Ignazewski A, Jong P, McKelvie R, Moe G, Parker JD, Rao V, Rouleau JL, Teo K, Tsuyuki R, White M, Huckel V, Issac D, Johnstone D, LeBlanc MH, Lee H, Newton G, Niznick J, Ross H, Roth S, Roy D, Smith S, Sussex B, Yusuf S. The 2002/3 Canadian Cardiovascular Society consensus guideline update for the diagnosis and management of **heart failure**. Can J Cardiol. **2003** Mar 31;19(4):347-56.
- ¹⁵ **Treatment Guidelines: Drugs for Treatment of Heart Failure** from The Medical Letter April **2003**
- ¹⁶ Jessup M, Brozena S. Heart Failure. N Engl J Med 2003;348:2007-18.
- ¹⁷ The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (The **JNC 7**); JAMA. **2003** May;289(19):2560-72.
- ¹⁸ Pfeffer Marc A, Swedberg Karl, Granger Christopher B. et al, Effects of candesartan on mortality and morbidity in patients with chronic heart failure: the **CHARM**-Overall programme. Lancet 2003 **362**: 759-66.
- ¹⁹ The EUROpean trial On reduction of cardiac events with Perindopril in stable coronary Artery disease Investigators. Efficacy of perindopril in reduction of cardiovascular events among patients with stable coronary artery disease: randomised, double-blind, placebo-controlled, multicentre trial (the **EUROPA** study). Lancet 2003; 362: 782-88.
- ²⁰ Pfeffer MA, McMurray JJ, Velazquez EJ, Rouleau JL, Kober L, Maggioni AP, Solomon SD, Swedberg K, Van De Werf F, White H, Leimberger JD, Henis M, Edwards S, Zelenkofske S, Sellers MA, Califf RM. Valsartan, Captopril, or Both in Myocardial Infarction Complicated by Heart Failure, Left Ventricular Dysfunction, or Both. (the **VALIANT** study). N Engl J Med. 2003 Nov 10
- ²¹ Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ; Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension. 2003 Dec;42(6):1206-52. Epub 2003 Dec 01.
- ²² **PROGRESS** Collaborative Group. Randomised trial of perindopril-based blood-pressure-lowering regimen among 6,105 individuals with previous stroke or transient ischaemic attack. Lancet 2001 Sep29;358(9287):1033-41.
- ²³ Yusuf S, Sleight P, Pogue J, Bosch J, Davies R, Dagenais G. The Heart Outcomes Prevention Evaluation (**HOPE**) Study Investigators, Effects of an Angiotensin-Converting-Enzyme Inhibitor, Ramipril, on Cardiovascular Events in High-Risk Patients. N Engl J Med 2000 342: 145-153.
- ²⁴ Palmer, B. Managing Hyperkalemia Caused by Inhibitors of the Renin-Angiotensin-Aldosterone System. N Engl J Med 2004;351:585-92.