U.S. Department of Veterans Affairs
Veterans Health Administration
PBM Academic Detailing Services

Taking the Pressure Off Hypertension (HTN) Management

Quick Reference Guide

General hypertension treatment

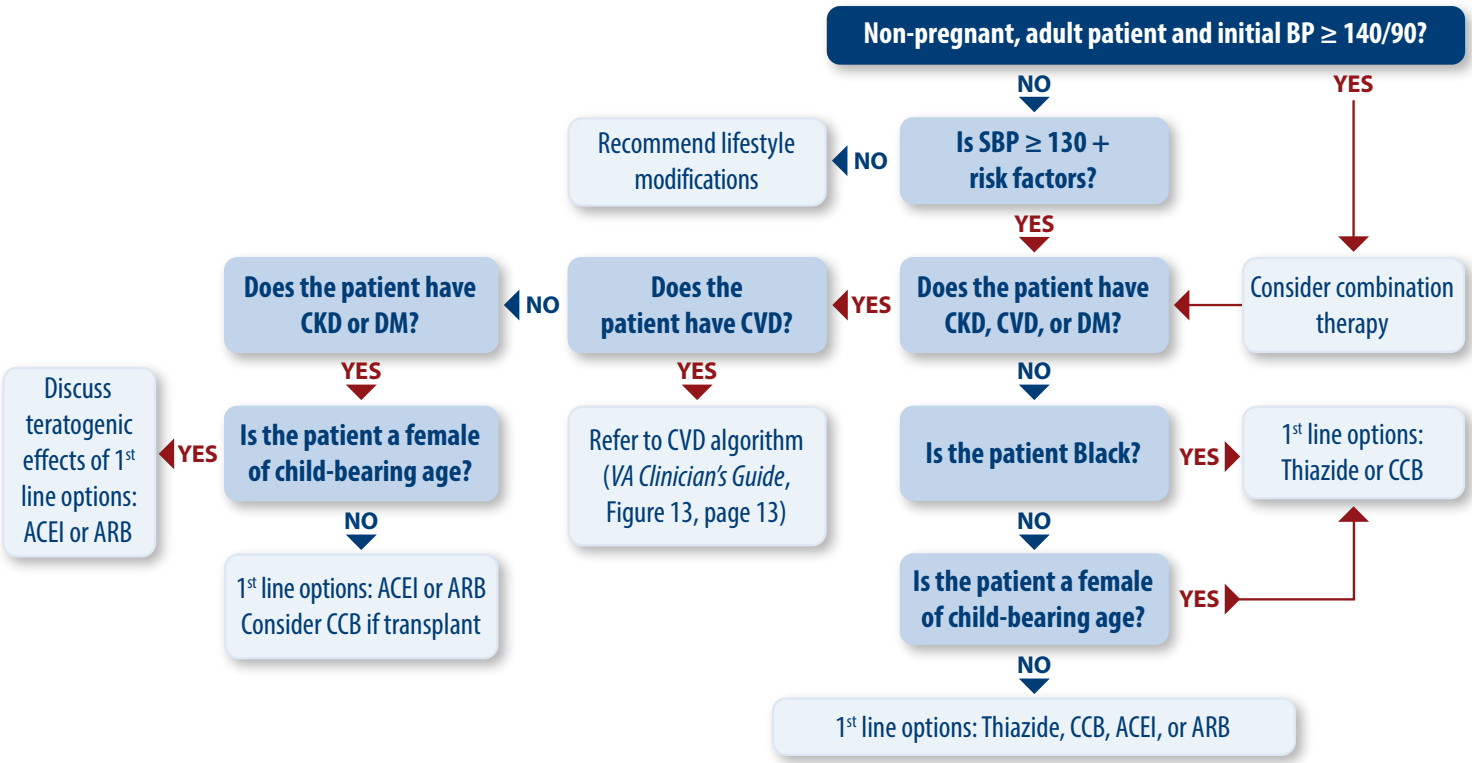
Goal and treatment selection should be based on individualized patient factors (age, comorbidities, etc.) and shared decision-making.

General population blood pressure goals[1-6]		
	VA/DOD (2020)[a]	**ACC/AHA (2017)[b]**
Adults < 60 years old	< 130/90	< 130/80
Older adults ≥ 60 years old	< 150/90	

[a]The Department of Veterans Affairs and the Department of Defense (VA/DOD); [b]American College of Cardiology/American Heart Association (ACC/AHA); [c]American Diabetes Association (ADA); [d]The National Kidney Foundation Kidney Disease Outcomes Quality Initiative (KDOQI); [e]Kidney Disease Improving Global Outcomes (KDIGO); [f]American Congress of Obstetricians and Gynecologists (ACOG)

Special populations blood pressure goals	
Diabetes	< 130/80[b,c] < 140/90[a,c] < 150/90 if limited life expectancy[c]
CKD	< 120/80 if non-dialysis[d,e] < 130/80 if kidney transplant[d,e]
HF, stroke, or ASCVD with > 10% 10-year risk	< 130/80[b]
Pregnancy with chronic HTN	< 120-159/80-109[f] < 110-35/85 if DM[a]

Hypertension: initial drug therapy algorithm[1,2,6]



ACEI: angiotensin-converting enzyme inhibitor; ARB: angiotensin receptor blocker; ASCVD: atherosclerotic cardiovascular disease; BB: beta blocker; BP: blood pressure; CCB: calcium channel blocker; CKD: chronic kidney disease; CVD: cardiovascular disease; DM: diabetes mellitus; HF: heart failure; HTN: hypertension; SBP: systolic blood pressure

Antihypertensive considerations for select populations[1-7,10]

Please refer to full provider guide for more details regarding select populations and use clinical judgment when making individualized care plans.

Select populations	Medication class					
	Thiazide	CCB	ACEI/ARB	MRA	BB	Other
HFrEF, HFpEF		– HFrEF (amlodipine, if needed; avoid nifedipine)	++	++	++ bisoprolol, carvedilol, metoprolol succinate	
Reduced LVEF, asymptomatic			++			
Post MI			++	++	++ 3 years post-MI with preserved EF	
Diabetes	+	+	++			
Angina *(Caution using verapamil or diltiazem with BB)*		++ amlodipine, nifedipine			++	
Atrial fibrillation/ flutter rate control		++ verapamil, diltiazem	+ ARB may help with recurrence of Afib		++	
ESRD/dialysis	–		–	–		– aliskiren
Post TIA/CVA	++		++			
Essential tremor					+ propranolol	
Migraine		+ verapamil, diltiazem	+		+ metoprolol, propranolol	
Raynaud's phenomenon		+ amlodipine, nifedipine				
Pregnancy, intent		+ nifedipine	✗	✗	+ labetalol	+ methyldopa
Heart block (2nd, 3rd degree)		**✗ avoid verapamil and diltiazem without pacemaker**			**✗ avoid without pacemaker**	
Depression					–	– clonidine
Hyperkalemia	+		–	–		– aliskiren
Renal artery stenosis			–			– aliskiren
Erectile dysfunction	– chlorthalidone			–		– clonidine

++ Compelling indication; + Positive effect; ✗ Contraindicated (CI); – Caution/potential negative effect; ☐ Neutral/unknown effect/evidence unclear

ACEI: angiotensin-converting enzyme inhibitor; Afib: atrial fibrillation; ARB: angiotensin receptor blocker; BB: beta blocker; BP: blood pressure; CCB: calcium channel blocker; CVA: cerebrovascular accident; EF: ejection fraction; ESRD: end stage renal disease; HFpEF: heart failure with preserved ejection fraction; HFrEF: heart failure with reduced ejection fraction; LVEF: left ventricular ejection fraction; MI: myocardial infarction; MRA: mineralocorticoid receptor antagonist; TIA: transient ischemic attack

Oral antihypertensive medications[1-6,11]

Class	Drug	Usual dose range (mg)	Class equivalent dose*,¥ (mg/day)	Considerations and monitoring
Thiazide diuretics	Chlorthalidone	12.5-25 daily	12.5	• Chlorthalidone preferred (long half-life; CVD benefit) • May cause hyperuricemia/gout • Monitor for ↓ K+, Na, Mg levels • May combine with K+ sparing diuretic (triamterene, amiloride) • HCTZ > 25mg not likely to give additional BP lowering and may increase adverse drug reactions
	HCTZ	12.5-25 daily	25	
CCB (DHP)	Amlodipine	2.5-10 daily	5	• May cause ankle edema (dose dependent vasodilation), flushing, headache, constipation • Avoid use in HFrEF; amlodipine may be used if required
	Felodipine	2.5-10 daily	5	
	Nifedipine SA	30-90 daily	30	
CCB (Non-DHP)	Diltiazem ER	120-360 daily	N/A	• Avoid use with BB due to increased risk of bradycardia/heart block • Avoid IR for chronic treatment of HTN • Avoid use in HFrEF • Consider drug-drug interactions (CYP3A4)
	Verapamil ER	120-360/day given once or twice daily	N/A	
ACEI	Benazepril	10-40/day given once or twice daily	10	• Do not use in combination with ARBs • Avoid in pregnancy, history of angioedema, bilateral renal artery stenosis • Monitor for ↑ K+ levels, kidney function • May consider stopping ACEI if a clinically significant change (~30% increase) in SCr is noted
	Enalapril	5-40/day given once or twice daily	10	
	Fosinopril	10-40 daily	10	
	Lisinopril	5-40 daily	10	
	Ramipril	2.5-20/day given once or twice daily	2.5	
ARB	Candesartan	8-32 daily	16	• Avoid in pregnancy, bilateral renal artery stenosis • Avoid in history of angioedema (lower risk after 6 week washout from ACEI) • Lower incidence of RASI induced cough • Alternative to ACEI intolerability • May consider stopping ACEI if a clinically significant change (~30% increase) in SCr is noted
	Irbesartan	150-300 daily	150	
	Losartan	25-100/day given once or twice daily	50	
	Olmesartan	20-40 daily	20	
	Telmisartan	20-80 daily	40	
	Valsartan	80-320 daily	80	
MRA	Spironolactone	25-50/day given once or twice daily	25	• Avoid in eGFR <30 mL/min, K+ >5 mEq/L • May cause menstrual irregularities, gynecomastia (lower incidence with eplerenone) • Monitor BMP within 1-2 weeks of initiation and dose changes
	Eplerenone	50-100/day given once or twice daily	50	
BB	Atenolol§	25-100/day given once or twice daily	50	• May be appropriate in patients with IHD or HF • In patients with HFrEF: bisoprolol, metoprolol succinate, and carvedilol are preferred • In patients with HFrEF and weight > 85 kg, the target dose of carvedilol is 50 mg twice daily • Avoid abrupt discontinuation • Use cardio-selective BB in bronchospastic airway disease (atenolol, bisoprolol, metoprolol)
	Bisoprolol§	2.5-10 daily	5	
	Carvedilol IR	6.25-25 twice daily	25	
	Labetalol	100-400 twice daily	200	
	Metoprolol§	IR: 50-100 twice daily ER: 25-200 daily	100	
	Propranolol	80-160 daily	80	

(continued on next page)

Oral antihypertensive medications[1-6,11] *(continued)*

Class	Drug	Usual dose range (mg)	Class equivalent dose*,¥ (mg/day)	Considerations and monitoring
Vasodilator	Hydralazine	40-200/day given three or four times daily	N/A	• May use diuretic + BB to ↓ edema and reflex tachycardia • May cause headache, dose-related systemic lupus erythematosus • In HF, must be used in combination with isosorbide mono/dinitrate
	Minoxidil	5-40/day given one to three times daily	N/A	• May use diuretic + BB to ↓ edema and reflex tachycardia • May cause hypertrichosis, volume retention, hirsutism
Alpha agonist	Clonidine	Oral: 0.1-0.3 twice daily Patch: 0.1-0.3 weekly	N/A	• May use loop diuretic + BB to ↓ edema and reflex tachycardia • Alternative formulation available: weekly transdermal patch
	Methyldopa	500-1000/day given two or three times daily	N/A	• Not considered drugs of choice in the elderly (CNS effects) • Tolerance may develop with methyldopa; may require addition of a diuretic or methyldopa dose increase • Avoid methyldopa in patients with liver disease

Review manufacturer's prescribing information for complete drug information. *Equivalent doses are approximate and only applicable to drugs in the same drug class; individual responses may vary. ¥When switching products, consider medication allergies, indication, renal function, liver function, and other comorbid conditions. §Denotes Beta-1 selectivity.

For questions about formulary status, please use VA Formulary Advisor at www.va.gov/formularyadvisor.

ACEI: angiotensin-converting enzyme inhibitor; ARB: angiotensin receptor blocker; BB: beta blocker; BMP: basic metabolic panel; BP: blood pressure; CCB: calcium channel blocker; CNS: central nervous system; CVD: cardiovascular disease; DHP: dihydropyridine; eGFR: estimated glomerular filtration rate; ER: extended release; F: formulary; HCTZ: hydrochlorothiazide; HF: heart failure; HFrEF: heart failure with reduced ejection fraction; HTN: hypertension; IHD: ischemic heart disease; IR: immediate release; K+: potassium; MRA: mineralocorticoid receptor antagonist; non-DHP: non-dihydropyridine; NF: non-formulary; RASI: renin-angiotensin system inhibitors; SA: sustained action; SCr: serum creatinine

Did you know there are formulary combination antihypertensives?

Consider combination products to improve adherence, reduce pill burden, and decrease copay costs.

COMBINATION CLASSES

Diuretics
- Hydrochlorothiazide/triamterene
- Hydrochlorothiazide/spironolactone

Thiazide/ACEI
- Hydrochlorothiazide/lisinopril

Thiazide/ARB
- Hydrochlorothiazide/losartan

BB/thiazide
- Atenolol/chlorthalidone

CCB/ACEI
- Amlodipine/benazepril

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