VA/DoD CLINICAL PRACTICE GUIDELINE

Hypertension in Primary Care

KEY ELEMENTS OF THE GUIDELINE

Screening

» Screen adults for hypertension periodically, preferably annually.

Diagnosis

» Obtain proper BP measurement and diagnose patients with normotension (BP <120/80 mmHg), prehypertension (SBP 120-139 or DBP 80-89 mmHg), or hypertension (SBP ≥ 140 or DBP ≥ 90 mmHg).

» Confirm the diagnosis of HTN by checking BP on a separate visit within 1-4 weeks. Consider offering Home BP monitoring or Ambulatory BP monitoring to confirm the diagnosis.

» Use history, physical exam, and ECG to assess for cardiac risk factors and target organ damage and check lab tests including electrolytes, urinalysis, basic metabolic panel, and lipid profile.

Therapy

» Target a goal BP of <150/90 mmHg in most patients, and < 150/85 in patients with diabetes.

» Implement shared decision making to assess patient values and preferences.

» Recommend lifestyle modification including : diet, limited sodium intake, physical activity, weight-loss and limit alcohol intake to all patients with hypertension.

» Use Thiazide-type diuretics as first-line therapy in patient with hypertension.

» Use ACEI, ARBs, or long-acting DHP CCBs as second line therapy in patients with hypertension.

» Individualize therapy for patients with specific comorbid conditions such as diabetes, heart failure, history of MI, and chronic kidney disease.

Access to full guideline and toolkit:
http://www.healthquality.va.gov or,
https://www.qmo.amedd.army.mil
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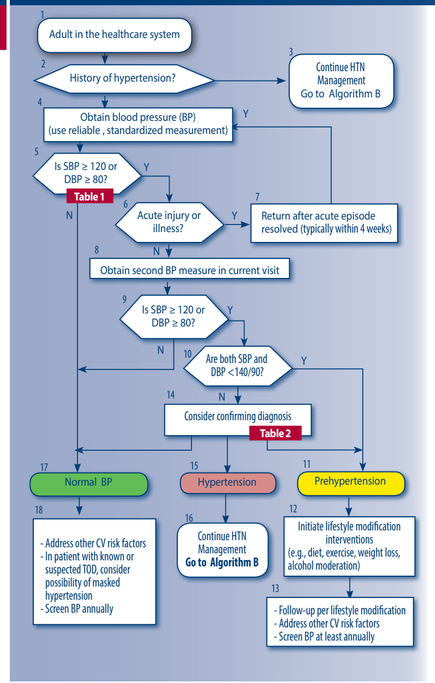
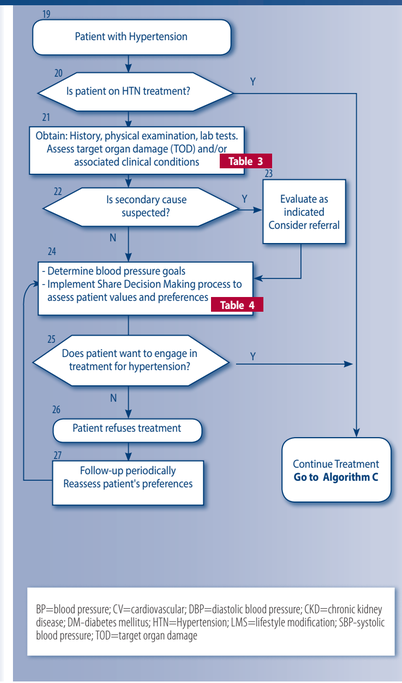
VA/DoD Evidence-Based Practice

Algorithm A: *Screening and Diagnosis*



Algorithm B: *Management of HTN*



BP=blood pressure; CV=cardiovascular; DBP=diastolic blood pressure; CKD=chronic kidney disease; DM-diabetes mellitus; HTN=Hypertension; LMS=lifestyle modification; SBP-systolic blood pressure; TOD=target organ damage

Algorithm C: *Treatment*

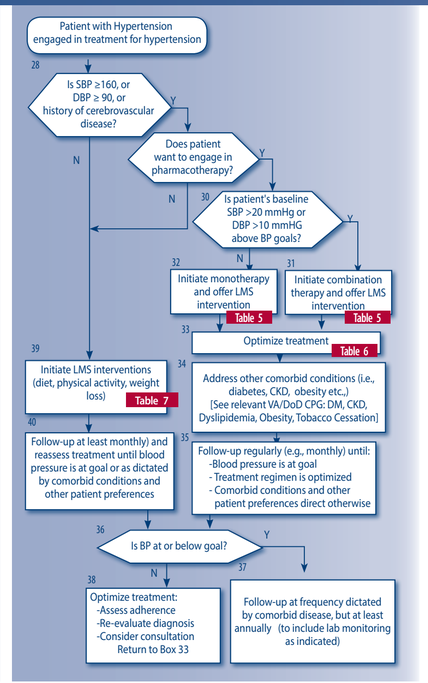


TABLE 1 Blood Pressure Levels

	SBP (mmHg)		DBP (mmHg)	Follow-up
Normal	< 120	and	< 80	Recheck in one year
Prehyperten-sion *	120-139	and/or	80-89	Recheck in one year
Hypertension	≥ 140	or	≥ 90	Confirm within 1-4 weeks

* But not ≥ 140 SBP, or ≥ 90 DBP

TABLE 2 Confirm Diagnosis

If the follow-up BP values is within prehypertensive range or provider/patient is uncertain about diagnosis, consider Home BP Monitoring, or 24-hrs Ambulatory BP Monitoring to confirm the diagnosis

Follow-up BP Values (mmHg)	Diagnosis
SBP ≥ 140, or DBP ≥ 90	Hypertension
HBPM: SBP ≥ 135, or DBP≥ 85 *	Hypertension
24-hr ABPM: SBP ≥ 130, or DBP ≥ 80 *	Hypertension

* If HBP or ABP is less than the values above, consider diagnosis as prehypertension, or white coat hypertension depending on BP reading. (see Table 1)

ABPM= Ambulatory Blood Pressure Monitoring HBPM =Home Blood Pressure Monitoring

TABLE 3 Recommended Lab Tests

» Urinalysis (UA); if positive for protein consider a quantitative measure of albumin to creatinine ratio

» Basic metabolic panel (Blood chemistry (potassium, sodium, blood urea nitrogen [BUN], creatinine, glucose)

» Non-fasting lipid profiles

» Twelve-lead electrocardiography (ECG)

» Hematocrit and calcium (optional)

TABLE 4 Goals for Blood Pressure

Without diabetes:	<150/90 mmHg
With diabetes:	<150/85 mmHg *<140/85 mmHg

* Suggested for patients with diabetes who tolerate the antihypertensive medications necessary to reach this goal

TABLE 5 Initial Drug Therapy

General Population (including patient with coronary disease, prior MI, or diabetes):

» 1st line: Thiazide type diuretics

» 2nd line: ACEIs, ARBs, or long acting DHP CCBs

Additional drug classes may be added as needed to reach BP goal. (Refer to Table 8)

Specific Population

» For patients with **CKD**, recommend ACEIs or ARBs as 1st line therapy

» For **African American patients,** recommend **NOT** using ACEIs or ARBs as monotherapy

» For **African American with CKD,** suggest combining a thiazide-type diuretic with ACEI or ARB.

ACEI=angiotensin-converting enzyme inhibitor; ARB=angiotensin II receptor blocker; DHP CCB=dihydropyridine calcium channel blocker; CKD=chronic kidney disease

TABLE 6 Optimize Treatment

» Optimize treatment
  - Titrate initial drug
  - Add another agent from a different class

» Assess adherence

» Reevaluate diagnosis (resistant HTH)

» Consider evaluation for interfering substances or contributing secondary causes of hypertension

» Consider specialty consultation for patients with resistant hypertension.

TABLE 7 Nutrient Composition of the DASH Diet *

Nutrient	Recommended Intake
Saturated Fat	6% of total calories
Total Fat	27% of total calories
Carbohydrate	55% of total calories
Fiber	30 grams/day
Protein	18% of total calories
Cholesterol	150 mg/day
Total calories (energy)†	Balance energy intake and expenditure to maintain desirable body weight/prevent weight gain

† Daily calorie expenditure should include at least 30 minutes of moderate physical activity/day. To avoid weight gain, the total should be approximately 60 minutes per day.

* Additional information on the DASH diet is available at: http://www.nhlbi.nih.gov/health/health-topics/topics/dash

TABLE 8 The Mediterranean Diet *

Food	Goal
Recommended	
Olive Oil	≥ 4 tbsp. per day
Tree nuts and peanuts	≥ 3 servings per week
Fresh fruits including natural fruit juices	≥ 3 servings per day
Vegetables	≥ 2 servings per day
Seafood (primarily fatty fish)	≥ 3 servings per week
Legumes	≥ 3 servings per week
Sofrito†	≥ 2 servings per week
White Meat	In place of red meat
Wine with meals	≥ 7 glasses per week, for those who drink
Discouraged	
Soda drinks	< 1 drink per day
Commercial baked goods, sweets, pastries‡	< 3 servings per week
Spread fats	< 1 serving per day
Red and processed meats	< 1 serving per day

† Sofrito is a sauce made with tomato and onion, and often includes garlic, herbs, and olive oil.
‡ Commercial bakery goods, sweets, and pastries included cakes, cookies, biscuits, and custard, and did not include those that are homemade

*Dietary patterns vary both within and among countries in the Mediterranean region, precluding a single standardized definition of the Mediterranean diet, though certain characteristic features are generally agreed upon by those studying its potential health effects. The table above represents the specific dietary recommendations used in the research study constituting our evidence base for this section of the guideline.

TABLE 9 Thresholds to Initiate Pharmacologic Treatment and Treatment Goals

- Initiate pharmacologic treatment at SBP or DBP threshold
- Once pharmacologic treatment is initiated, treat to SBP and DBP goals

Patient Age [years]	Initiate SBP	Initiate DBP	Goal SBP	Goal DBP	Comments
General					
18-29	≥160	≥90	<150	<90	
30-59	≥160	**≥90**	<150	<90	
> 60	**≥160**	**≥90**	**<150**	**<90**	Lower threshold (160 >SBP >140) suggested using shared decision making
Patient with Diabetes					
18-29	≥160 *	≥90*	**<150**	**<85**	Lower SBP goal (<140) suggested if tolerate medication
30-59	≥160*	**≥90***	**<150**	**<85**	Lower SBP goal (<140) suggested if tolerate medication
>60	**≥160***	**≥90***	**<150**	**<85**	Lower SBP goal (<140) suggested if tolerate medication Lower threshold (160 >SBP >140) suggested using shared decision making*
Patient with History of Cerebrovascular Disease					
18-29	≥140	≥90*	<150*	<90*	
30-59	≥140	**≥90***	<150*	**<90***	
>60	≥140	**≥90***	**<150***	**<90***	

Bold - Recommended values based on strong evidence;
Non-bold - Suggested values
* Evidence was not reviewed which indicated the blood pressure value should be different from the general population.

TABLE 10 Recommended Dosage for Selected Hypertension Drug Therapy

Drug[a]	Usual Dose Range	Comments [h]
Thiazide-type Diuretics		
Chlorthalidone[b]	12.5-25 mg daily	• May cause hyperuricemia/gout. Monitor K+ levels. • May cause photosensitivity (rare). • Refer to Recommendation 42 and associated discussion in the CPG for further information.
HCTZ[b]	12.5-50 mg daily [f] 12.5 mg may be considered as an initial dose with titration recommended to 25 to 50 mg daily	
Indapamide	IR: 2.5 mg daily SR: 1.25 – 2.5 mg daily	• SR not currently available in the US. • For complete drug information, review the manufacturer's prescribing information.
Angiotensin-Converting Enzyme Inhibitors		
Benazepril	10-40 mg/day (daily or divided bid)	• When pregnancy is detected, discontinue as soon as possible, due to potential for fetal and neonatal morbidity and death. Patients of childbearing potential should also be educated about the risks. • Do not use if history of angioedema. • Avoid concomitant use of ACEI with ARB or direct renin inhibitor due to increased risk of hypotension, syncope, increased K+, and changes in renal function (See recommendation #44). • Monitor K+ and kidney function; use caution if combined with, K+ sparing diuretic, or K+ supplement. • Consider interruption or discontinuation in patients who develop clinically significant decline in kidney function after initiation of therapy, until further work-up, as indicated (e.g., renal artery stenosis).
Enalapril	5-40 mg/day (daily or divided bid)	
Fosinopril	10-40 mg daily	
Lisinoprilb	10-40 mg daily	
Ramipril [b,c]	2.5-20 mg/day (daily or divided bid) (10 mg daily for CV risk prevention)	
Angiotensin II Receptor Blockers		
Azilsartan[c]	40-80 mg daily	• When pregnancy is detected, discontinue as soon as possible. Drugs that act directly on the renin angiotensin system can cause injury and death to the developing fetus. Patients of childbearing potential should also be educated about the risks. • Avoid concomitant use of ACEI with angiotensin II receptor blocker or direct renin inhibitor due to increased risk of hypotension, syncope, increased K+, and changes in renal function (See recommendation #44). • Monitor K+ and kidney function; use caution if combined with, K+ sparing diuretic, or K+ supplement. • Consider interruption or discontinuation in patients who develop clinically significant decline in kidney function after initiation of therapy, until further work-up, as indicated (e.g., renal artery stenosis).
Candesartan[c]	8-32 mg daily	
Eprosartan[c]	400-800 mg/daily (daily or divided bid)	
Irbesartan[c]	150-300 mg daily	
Losartan[b]	25-100 mg/day (daily or divided bid)	
Olmesartan[c]	20-40 mg daily	
Telmisartan[c]	20-80 mg daily	
Valsartan[b,d]	80-320 mg daily	
Long-Acting Dihydropyridine Calcium Channel Blockers		
Amlodipine[b]	2.5-10 mg daily	• Monitor adverse effects (DHP CCBs may cause ankle edema, dizziness, flushing, headache). • Use with caution in patients with hepatic or kidney dysfunction.
Felodipine	2.5-10 mg daily	
Nifedipine SR[b]	30-120 mg daily	
Aldosterone/mineralocorticoid Receptor Antagonists		
Eplerenone[c]	50-100 mg/day (daily or divided bid)	• Avoid use if hyperkalemia or severe kidney dysfunction. • Monitor K+ and kidney function; consider risk vs. benefit if combined with ACEI, ARB, K+ sparing diuretic, or K+ supplement. • Higher risk of gynecomastia with spironolactone than eplerenone.
Spironolactone[b]	25-50 mg/daily	
Other Potassium-Sparing Diuretics		
Amiloride[c]	5-10 mg daily	• Avoid use if hyperkalemia or severe kidney dysfunction. • Helpful in reducing hypokalemia caused by thiazide diuretics.
Alpha-Adrenergic Blockers		
Doxazosin	1-16 mg daily	• Initiate at low doses (1 mg) • Administer 1st dose at bedtime to avoid syncope. • Avoid as monotherapy (See recommendation #46 in the CPG).
Prazosin	2-20 mg/day (Divided bid or tid)	
Terazosin[b]	1-20 mg daily	
Beta-Adrenergic Blockers		
Noncardioselective:		• Discontinue with slow taper over one week. • Avoid combination with non-DHP CCB due to increased risk of bradycardia. • As doses increase, cardioselectivity decreases. • Beta-blockers should be used cautiously in asthma
Propranolol	IR: 80-160 mg/day (divided bid) SR: 80-160 mg daily	
Cardioselective:		
Atenolol[b]	25-100 mg daily (adjust dose in CKD)	
Metoprolol tartrate[b]	IR: 50-300 mg/day (daily or divided bid)	
Metoprolol succinate (XL) [b,d]	SR: 25-200 mg/day	
Long-Acting Non-Dihydropyridine Calcium Channel Blockers		
Verapamil SR[b]	120-480 mg divided daily-bid	• Verapamil may cause constipation; verapamil is contraindicated in AV node dysfunction (2nd or 3rd degree heart block), systolic HF and lower LV function.
Diltiazem SR[b]	120-540 mg daily	• Diltiazem may reduce sinus rate and cause heart block. • Use CCBs with caution in patients with liver or kidney dysfunction
Combined Alpha-beta adrenergic blockers		
Carvedilol	IR[e]: 12.5-50 mg/day (divided bid) SR[e]: 20-80 mg/day	• Precautions for beta-blockers apply.
Labetalolc	200-800 mg/day (divided bid)	
Peripherally Acting Adrenergic Agents		
Reserpine	0.1-0.25 mg daily	• Monitor for sedation, and nasal congestion. • Reserpine not currently available in the U.S. due to changes in requirements for raw materials (re-verified 10/15/2014). Refer to FDA Drug Shortages for current information.
Direct Acting Vasodilators		
Minoxidil	2.5-100 mg/day (daily or divided bid)	• Direct acting vasodilators often need concomitant use of diuretic and beta-blocker to reduce edema and reflex tachycardia. • Monitor for hypertrichosis and pericardial effusions with minoxidil. • Monitor for headache and SLE (dose-related) with hydralazine.
Hydralazine[b]	50-200 mg/day (divided bid)	
• Centrally Acting Antiadrenergic Drugs		
Clonidine Tablet[b]	0.1-0.8 mg/day (divided bid)	• Monitor for somnolence and dry mouth. Taper dose to discontinue.
Clonidine patch	0.1-0.3 mg patch weekly	• Clonidine patches may be useful in selected Patients.
Methyldopa	500-2,000 mg/day (divided bid)	

[a] Partial list; refer to http://www.pbm.va.gov/nationalformulary.asp for items available on the VA National Formulary (VANF) and refer to http://pec.ha.osd.mil/formulary_search.php?submenuheader=1 for items available on the DoD Uniform Formulary. All drugs listed are on the DoD Uniform Formulary. [b] DoD Basic Core Formulary (BCF) item. [c] Item not on VANF [d] Restricted to patients with chronic heart failure in VA.

ACEI=angiotensin-converting enzyme inhibitor; ARB=angiotensin II receptor blocker; AV=atrioventricular; bid=twice daily; CCB=calcium channel blockers; CKD=chronic kidney disease; CV=cardiovascular; HCTZ=hydrochlorothiazide; HF=heart failure; IR=immediate-release; K+=potassium; LV=left ventricular; SLE=systemic lupus erythematosus; SR=sustained-release