Hypertension Management

High Blood Pressure Guideline Summary: The 2017 Guideline for the Prevention, Detection, Evaluation, & Management of High Blood Pressure in Adults represents an update of the Joint National Committee (JNC) guidelines from 2003. The guidelines include information from studies on related risk of CVD & monitoring, & include thresholds to start drug treatment & goals.

Classifying High Blood Pressure (BP) in Adults

CATEGORY	SYSTOLIC Blood Pressure (SBP) in mmHg		DIASTOLIC Blood Pressure (DBP) in mmHg
Normal	< 120	AND	< 80
Elevated	120–129	AND	< 80
Hypertension (HTN)			
• Stage 1	130–139	OR	80–89
• Stage 2	≥ 140	OR	≥ 90

Patient with high SBP & DBP in 2 categories: select the higher category.
Caution: BP is based on an average of ≥ 2 readings taken on ≥ 2 occasions.
BP measurements in clinical trial may not represent typical level of care & patient motivation.

Use of CVD Risk Estimation* and Blood Pressure Threshold to Guide Drug Treatment
Use of BP-lowering medications are recommended for:
• ***Primary prevention*** of CVD for patients with no history of CVD **AND** 10-year ASCVD risk < 10% & SBP ≥ 140 mmHg or DBP ≥ 90 mmHg • ***Primary prevention*** of CVD for patients with 10-year ASCVD risk ≥ 10% & average SBP ≥ 130 mmHg or average DBP ≥ 80 mmHg • ***Secondary prevention*** of recurrent CVD events for patients with clinical CVD & average SBP ≥ 130 mmHg or average DBP ≥ 80 mmHg
Initial Monotherapy Versus Initial Combination Drug Therapy
• ***Stage 1 hypertension (HTN) & BP goal < 130/80 mmHg***: Start 1 antihypertensive drug. Titrate dose & sequentially add other agents to achieve BP target. • ***Stage 2 hypertension & average BP > 20/10 mmHg above target***: Start 2 first-line agents of different classes, either as separate agents or in fixed-dose combination.
Initial Medication Options
• ***First-line agents***: ACE or ARB, thiazide diuretics, & CCB

*Notes: *ACC/AHA Risk Estimator Plus: http://tools.acc.org/ASCVD-Risk-Estimator-Plus/ (Accessed 2018); ASCVD was defined as a first congenital heart disease death, nonfatal myocardial infarction or nonfatal stroke. CVD = cardiovascular disease; ASCVD = atherosclerotic cardiovascular disease; ACE = angiotensin conversion enzyme inhibitor; ARB = angiotensin receptor blocker; CCB = calcium channel blocker.*

Hypertension Management *(continued)*

Considerations in Care – Management of High Blood Pressure

CONSIDERATION	DESCRIPTION	
Blood Pressure Management	• Accurate management is critical. • Consider out-of-office & self-monitoring to confirm & titrate medications. • Measurement values may vary depending on time & location taken.	
Screen/Manage Other CVD Risk Factors	• Smoking; diabetes; dyslipidemia; weight; low fitness; poor diet; stress; sleep apnea • Testing	
	BASIC testing	Complete blood count; fasting blood glucose; lipid profile; serum creatinine with estimated glomerular filtration rate (eGFR); serum electrolytes (K^+; Na^{2+}; Ca^{2+}); thyroid-stimulating hormone (TSH); urinalysis; electrocardiogram)
	OPTIONAL testing	Echocardiogram; uric acid; urine albumin to creatinine ratio
Screen for Secondary Causes of HTN	• Screen for common secondary causes with new-onset or uncontrolled hypertension. • If more specific clinical symptoms are present, consider uncommon secondary causes. **What to Screen For**	
	COMMON Causes to prompt need to	
	Screen for secondary causes of hypertension Primary aldosteronism (elevated aldosterone/renin ratio) CKD (chronic kidney disease) (eGFR < 60 mL/min/1.73 m^2) Renal artery stenosis (young female, known atherosclerotic disease, worsening kidney function) Obstructive sleep apnea (snoring, witnessed apnea, excessive daytime sleepiness)	• Abrupt onset • Age < 30 • Drug resistant/induced: uncontrolled BP after treatment with ≥ 3 antihypertensives • Excessive target organ damage (e.g., cerebral vascular disease; retinopathy; left ventricular hypertrophy, heart failure [HF] with preserved ejection fraction [EF] or with reserved EF; coronary artery disease [CAD]; chronic kidney disease; peripheral artery disease; albuminuria) • OR onset of diastolic HTN in older adults • OR unprovoked or excessive hypokalemia
	UNCOMMON Causes **(< 1%)**	• Acromegaly • Aortic coarctation • Congenital adrenal hyperplasia • Mineralocorticoid excess syndrome (not primary aldosteronism) • Cushing syndrome • Hypo-hyperthyroidism or primary hyperparathyroidism • Phenochromocytoma/paraganglioma

Follow-up	ADULT PATIENT GROUP	FREQUENCY OF FOLLOW-UP
	Low risk with elevated BP or stage 1 HTN with ASCVD risk < 10%	Repeat BP after 3 to 6 months of nonpharmacological therapy
	Stage 1 HTN & high ASCVD risk (≥ 10% 10-year ASCVD risk)	Repeat BP after 1 month of nonpharmacologic & antihypertensive drug therapy
	Stage 2 HTN	Evaluate by primary care provider (PCP) within 1 month of diagnosis; treat with combo of non-pharmacologic & 2 antihypertensive drugs from different classes; repeat evaluation in 1 month
	Very high average BP (systolic ≥ 160 mmHg or diastolic ≥ 100 mmHg)	Evaluate promptly; monitor carefully & adjust dose upward as needed
	Normal BP	Repeat BP evaluation annually

Causes of Drug-Induced Elevations in Blood Pressure

Hypertension Management *(continued)*

Type of Medication	Medication	Recommendation
NON-PRESCRIPTION	**Alcohol**	• Limit to ≤ 1 drink (women); ≤ 2 drinks (men).
	Caffeine	• Limit to < 300 mg/day. • Avoid in uncontrolled HTN. • May only have acute effect on BP.
	Decongestants (phenylephrine; pseudoephedrine)	• Use for short duration. • Avoid in severe or uncontrolled HTN. • Consider alternative.
	Herbals (ephedra [ma-huang]; St. John's Wort with MAOIs* and yohimbine)	• Avoid use.
	Illicit Drug Use (cocaine; methamphetamine)	• Avoid use.
	Nonsteroidal Anti-Inflammatory Agents (NSAIDs)	• Avoid use. • Consider alternative analgesic.
PRESCRIPTION	**Antidepressants** (MAOIs*; SNRIs;** TCAs***)	• Consider alternatives (selective seratonin reuptake inhibitors [SSRIs]). • Avoid tyramine containing foods if on MAOIs*.
	Amphetamines (amphetamine; methylphenidate; dexmethylphenidate; dextroamphetamine)	• Discontinue or decrease dose. • Consider alternatives (behavioral therapy).
	Atypical Antipsychotics (clozapine; olanzapine)	• Discontinue or limit use. • Consider alternatives (behavioral therapy; lifestyle modifications; other agents [with less weight gain, diabetes or dyslipidemia risk]; e.g., aripiprazole; ziprasidone).
	Oral Contraceptives	• Use low-dose estrogens (20 to 30 mcg ethinyl estradiol) or progestin only. • Consider alternatives (e.g., barrier method; abstinence; intrauterine devices [IUD]). • Avoid in uncontrolled HTN.
	Immunosuppressants (cyclosporine)	• Consider changing to tacrolimus, which may be associated with fewer BP effects.
	Systemic corticosteroids	• Avoid or limit use if possible. • Consider other routes (inhaled, topical) when feasible.

*Notes: *MAOI = monoamine oxidase inhibitors; **SNRIs = seratonin norepinephrine reuptake inhibitors; ***TCA = tricyclic antidepressants.*

Hypertension Management *(continued)*

Management of High Blood Pressure in Specific Patient Populations

Population	Additional Description of Population	Target Blood Pressure (BP) or Recommended Treatment
Adults	Confirmed HTN* & known cardiovascular disease (CVD) or 10-year ASCVD** risk > 10%	< 130/80 mmHg
	Confirmed HTN without added markers of ↑ CVD risk	< 130/80 mmHg
Older Persons (> 65 years old)	Noninstitutionalized ambulatory community-dwelling adults with average systolic BP (SBP) ≥ 130 mmHg	< 130 mmHg
	HTN + high burden of comorbidity + limited life expectancy	Clinical judgment, patient preference, & team-based care; consider risk/benefit for decisions on intensity of BP ↓ & antihypertensive drugs
Hypertensive Adults + Heart Failure (HF) Risk	To prevent HF in hypertensive adults	< 130/80 mmHg
Hypertension + HFrEF	GDMT*** titrated to BP	< 130/80 mmHg Nondihydropyridine calcium channel blockers (CCBs) not recommended
Hypertension + HFpEF	Volume overload	Control HTN with diuretics
	HFpEF & persistent HTN after volume overload is managed	Angiotensin-converting enzyme inhibitors (ACE [-]) or angiotensin receptor blockers (ARBs) & beta blockers; titrate to SBP < 130 mmHg
Hypertension + CKD	HTN + CKD	< 130/80 mmHg
	HTN + CKD Stage ≥ 3 OR Stage 1 or 2 + albuminuria (≥ 300 mg/d, OR ≥ 300 mg/g albumin-to-creatinine ratio OR equivalent in 1st morning void)	ACE (-) to slow CKD progression or an ARB if ACE (-) intolerant
Hypertension + DM	BP ≥ 130/80 mmHg	Start antihypertensive drug to goal of < 130/80 mmHg; ACE (-), ARBs, diuretics, & CCBs = effective
	With albuminuria	ACE (-) or ARBs
Race and Ethnicity	Black adults with HTN but no HF or CKD, + DM	Thiazide-type diuretic or CCB for initial treatment
	Hypertensive adults, especially black adults	≥ 2 antihypertensives to achieve target of < 130/80 mmHg

*Notes: *hypertension; **atherosclerotic cardiovascular disease; ***guideline-directed medication therapy; HFrEF = heart failure with reduced ejection fraction; HFpEF = heart failure with preserved ejection fraction; CKD = chronic kidney disease; DM = diabetes mellitus.*