

CLINICAL IMPLEMENTATION OF THE UPDATED BP GUIDELINES

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DUALITY OF INTEREST

- Consultant for: Merck, Janssen, Bayer, Vascular Dynamics
- Grant/ Clinical Trials Research support from: Janssen, Bayer, Vascular Dynamics
- Employee of: University of Chicago Medicine

Like physical guidelines designed to ensure that hikers stay on the safest path through tricky terrain, expert medical guidelines aim to steer clinicians toward best practices.

Merriam Webster Dictionary 2016; Bakris GL and Sorrentino MN Engl J Med 2018; 378:497-499

SO WHAT'S REALLY NEW IN 2017 BP GUIDELINES AND HOW CAN WE IMPLEMENT THESE CHANGES

ACC/AHA FOCUS ON CV RISK TO DETERMINE BP GOALS

- For adults with confirmed hypertension and greater than 10% 10-year CVD event risk, a BP target of < 130/80 mm Hg is recommended

COEXISTENCE OF HYPERTENSION AND RELATED CHRONIC CONDITIONS

COR	LOE	Recommendation for Coexistence of Hypertension and Related Chronic Conditions
I	B-NR	Screening for and management of other modifiable CVD risk factors are recommended in adults with hypertension.

HYPERTENSION

Modifiable Risk Factors*	Relatively Fixed Risk Factors†
<ul style="list-style-type: none"> Current cigarette smoking, secondhand smoking Diabetes mellitus Dyslipidemia/hypercholesterolemia Overweight/obesity Physical inactivity/low fitness Unhealthy diet 	<ul style="list-style-type: none"> CKD Family history Increased age Low socioeconomic/educational status Male sex Obstructive sleep apnea Psychosocial stress

*Factors that can be changed and, if changed, may reduce CVD risk.
 †Factors that are difficult to change (CKD, low socioeconomic/educational status, obstructive sleep apnea, cannot be changed (family history, increased age, male sex), or, if changed through the use of current intervention techniques, may not reduce CVD risk (psychosocial stress).
 CKD indicates chronic kidney disease; and CVD, cardiovascular disease.

ASCVD Risk Calculator

*Indicated for use if there is one ASCVD and the LDL cholesterol is <160 mg/dL.
 †Lifetime risk factors include: Total cholesterol of 170 mg/dL, HDL cholesterol of 60 mg/dL, Systolic BP of 110 mm Hg. Not taking medications for hypertension. Not a diabetic. Not a smoker.

<https://itunes.apple.com/us/app/ascvd-risk-estimator/id808875968?mt=8>

BP MEASUREMENT

OF BP

Key Steps for Proper BP Measurements

- Step 1: Properly prepare the patient.
- Step 2: Use proper technique for BP measurements.
- Step 3: Take the proper measurements needed for diagnosis and treatment of elevated BP/hypertension.
- Step 4: Properly document accurate BP readings.
- Step 5: Average the readings.
- Step 6: Provide BP readings to patient.

Table 8 Office blood pressure measurement

Patients should be seated comfortably in a quiet environment for 5 min before beginning BP measurements.

Three BP measurements should be recorded, 1–2 min apart, and additional measurements only if the first two readings differ by ≥ 10 mmHg. BP is recorded as the average of the last two BP readings.

Additional measurements may have to be performed in patients with unstable BP values due to arrhythmias, such as in patients with AF, in whom manual auscultatory methods should be used as most automated devices have not been validated for BP measurement in patients with AF.²⁴

Use a standard bladder cuff (12–13 cm wide and 35 cm long) for most patients, but have larger and smaller cuffs available for larger (arm circumference ≥ 32 cm) and thinner arms, respectively.

The cuff should be positioned at the level of the heart, with the back and arm supported to avoid muscle contraction and isometric exercise-dependant increases in BP.

When using auscultatory methods, use phase I and V (sudden reductio/disappearance) Korotkoff sounds to identify SBP and DBP, respectively.

Measure BP in both arms at the first visit to detect possible between-arm differences. Use the arm with the higher value as the reference.

Measure BP 1 min and 3 min after standing from a seated position in all patients at the first measurement to exclude orthostatic hypotension. Lying and standing BP measurements should also be considered in subsequent visits in older people, people with diabetes, and people with other conditions in which orthostatic hypotension may frequently occur.

Record heart rate and use pulse palpation to exclude arrhythmias.

ESH BP Measurement
Williams B et al. European Heart Journal (2018) 39, 3021–3104

**Both Guidelines Stress Proper Cuffs be Used
Selection Criteria for BP Cuff Size for Measurement of
BP in Adults**

Arm Circumference	Usual Cuff Size
22–26 cm	Small adult
27–34 cm	Adult
35–44 cm	Large adult
45–52 cm	Adult thigh

Out-of-Office and Self-Monitoring of BP

COR	LOE	Recommendation for Out-of-Office and Self-Monitoring of BP
I	A ^{SR}	Out-of-office BP measurements are recommended to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions.

SR indicates systematic review.

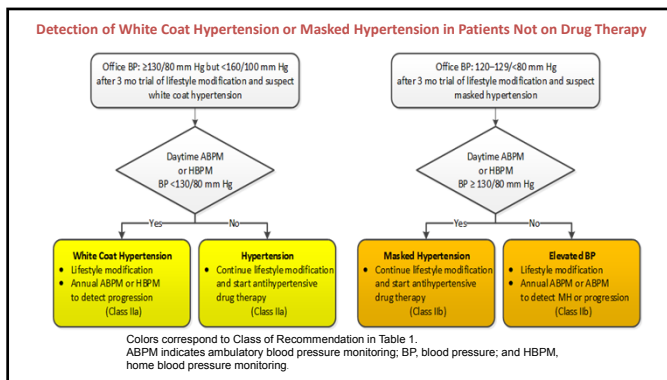


Table 3. Association of Hypertension Phenotypes with All-Cause and Cardiovascular Mortality in Cox Regression Models.^a

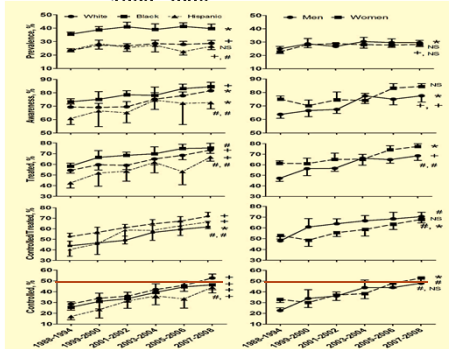
Mortality and Blood-Pressure Phenotype	All Patients	Deaths	Model 1†		Model 2‡	
			Hazard Ratio (95% CI)	P Value	Hazard Ratio (95% CI)	P Value
All-cause mortality						
Normotension	4,221	76	Reference	—	Reference	—
Controlled hypertension	6,692	202	0.76 (0.57–0.99)	0.04	0.81 (0.62–1.07)	0.133
White-coat hypertension	6,628	109	2.24 (1.74–2.88)	<0.001	1.79 (1.18–2.32)	<0.001
White-coat uncontrolled hypertension	11,042	669	1.30 (1.01–1.66)	0.045	1.06 (0.82–1.37)	0.66
Masked hypertension	2,278	113	2.92 (2.18–3.90)	<0.001	2.83 (2.12–3.79)	<0.001
Masked uncontrolled hypertension	3,092	217	1.89 (1.44–2.47)	<0.001	1.96 (1.50–2.56)	<0.001
Sustained hypertension	12,555	595	2.16 (1.86–2.99)	<0.001	1.80 (1.41–2.31)	<0.001
Sustained uncontrolled hypertension	17,402	1607	1.90 (1.49–2.42)	<0.001	1.43 (1.11–1.85)	0.006
Cardiovascular mortality						
Normotension	4,221	22	Reference	—	Reference	—
Controlled hypertension	6,692	84	0.90 (0.55–1.46)	0.66	0.95 (0.59–1.55)	0.84
White-coat hypertension	6,628	94	2.36 (1.48–3.76)	<0.001	1.96 (1.22–3.15)	0.005
White-coat uncontrolled hypertension	11,042	223	1.23 (0.78–1.94)	0.37	1.04 (0.65–1.66)	0.86
Masked hypertension	2,278	32	2.92 (1.70–5.03)	<0.001	2.85 (1.66–4.90)	<0.001
Masked uncontrolled hypertension	3,092	95	2.20 (1.36–3.55)	0.001	2.27 (1.41–3.68)	0.001
Sustained hypertension	12,555	172	2.42 (1.55–3.78)	<0.001	1.94 (1.23–3.07)	0.005
Sustained uncontrolled hypertension	17,402	573	1.93 (1.23–3.01)	0.004	1.57 (1.00–2.47)	0.046

^aBanegas JR, et al. N Engl J Med 2018;378:1509-20.

CLINICAL IMPLICATIONS OF SPRINT

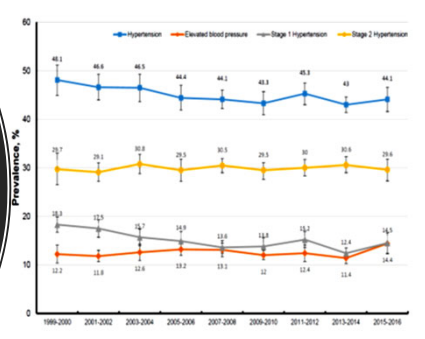
- A. All patients with >15% 10 year CV risk without diabetes who can tolerate a BP <130/80 mmHg should strive to achieve this goal to maximally reduce CV risk.
- B. Older patients with >15% 10 year CV risk should strive to achieve BP goals of <130/80 mmHg, if they can tolerate it such levels.
- C. Increase in serum creatinine of up to 30% should be tolerated in the presence of BP goal achievement as they are hemodynamic changes and not associated with kidney injury.

Prevalence, Awareness, Treatment, for 1988-1994 & Control 1998-2006



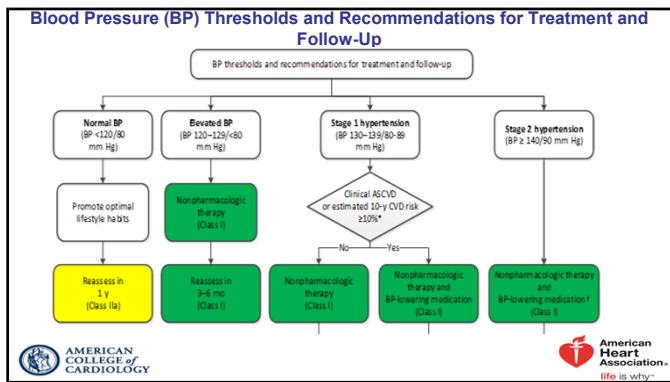
Egan B et al. JAMA 2010;303:2043-2050

Trends in Age-adjusted Prevalence of Hypertension and Elevated BP Defined by the 2017 ACC/AHA New Criteria: United States, 1999-2016



Liu B et al. JAMA Internal Med 2018

Hypertension*		Approximate Impact SBP		
Intervention	Dose	Hypertension	Normotension	
Physical activity	Nonpharmacologic Intervention			
	Aerobic	• 90-150 min/wk • 65%-75% heart rate reserve	-5/8 mm Hg -2/4 mm Hg	
	Dynamic Resistance	• 90-150 min/wk • 50%-80% 1 rep maximum • 0 exercises, 3 sets/exercise, 10 repetitions/set	-4 mm Hg	-2 mm Hg
Healthy diet	Isometric Resistance	• 4 x 2 min (hand grip), 1 min rest between exercises, 30%-40% maximum voluntary contraction, 3 sessions/wk • 8-10 wk	-5 mm Hg	-4 mm Hg
	DASH dietary pattern	Diet rich in fruits, vegetables, whole grains, and low-fat dairy products with reduced content of saturated and total fat	-11 mm Hg	-3 mm Hg
Weight loss	Weight/body fat	Ideal body weight is best goal but at least 1 kg reduction in body weight for most adults who are overweight	-5 mm Hg	-2/3 mm Hg
	Reduced intake of dietary sodium	Dietary sodium	<1,500 mg/d is optimal goal but at least 1,000 mg/d reduction in most adults	-5/6 mm Hg -2/3 mm Hg
Enhanced intake of dietary potassium	Dietary potassium	3,500-5,000 mg/d, preferably by consumption of a diet rich in potassium	-4/5 mm Hg	-2 mm Hg
	Modest reduction in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol to: • Men: <2 drinks daily • Women: <1 drink daily	-4 mm Hg -3 mm Hg



Initiation of hypertension treatment according to office BP

Recommendations	Class ^a	Level ^b
Prompt initiation of BP-lowering drug treatment is recommended in patients with grade 2 or 3 hypertension at any level of CV risk, simultaneous with the initiation of lifestyle changes. ^{2,8}	I	A

Williams B et al. European Heart Journal (2018) 39, 3021-3

AHA/ACC 2017		
COR	LOE	Recommendation for Choice of Initial Medication
I	A ^{SR}	For initiation of antihypertensive drug therapy, first-line agents include thiazide diuretics, CCBs, and ACE inhibitors or ARBs.
COR	LOE	Recommendations for Choice of Initial Monotherapy Versus Initial Combination Drug Therapy*
I	C-EO	Initiation of antihypertensive drug therapy with 2 first-line agents of different classes, either as separate agents or in a fixed-dose combination, is recommended in adults with stage 2 hypertension and an average BP more than 20/10 mm Hg above their BP target.
IIa	C-EO	Initiation of antihypertensive drug therapy with a single antihypertensive drug is reasonable in adults with stage 1 hypertension and BP goal <130/80 mm Hg with dosage titration and sequential addition of other agents to achieve the BP target.

ESH on Initial Combination Therapy

- Very strong proponents of combo therapy

- Preferred use of two-drug combination therapy for the initial treatment of most people with hypertension.
- A single-pill treatment strategy for hypertension with the preferred use of SPC therapy for most patients.
- Simplified drug treatment algorithms with the preferred use of an ACE inhibitor or ARB, combined with a CCB and/or a thiazide/thiazide-like diuretic, as the core treatment strategy for most patients, with beta-blockers used for specific indications.

Williams B et al. European Heart Journal (2018) 39, 3021–3104

Racial and Ethnic Differences in Treatment		
COR	LOE	Recommendations for Race and Ethnicity
I	B-R	In black adults with hypertension but without HF or CKD, including those with DM, initial antihypertensive treatment should include a thiazide-type diuretic or CCB.
I	C-LD	Two or more antihypertensive medications are recommended to achieve a BP target of less than 130/80 mm Hg in most adults with hypertension, especially in black adults with hypertension.

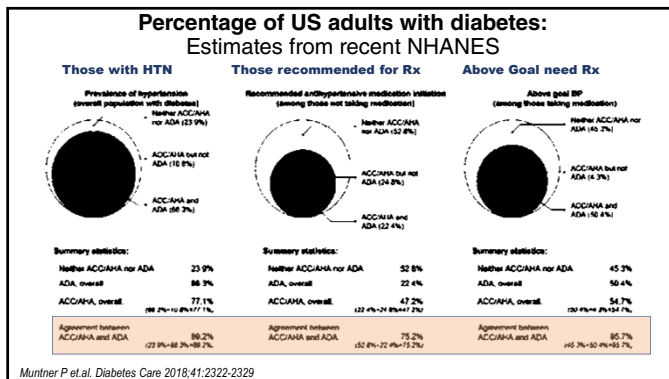


Chronic Kidney Disease		
COR	LOE	Recommendations for Treatment of Hypertension in Patients With CKD
I	SBP: B-RSR	Adults with hypertension and CKD should be treated to a BP goal of less than 130/80 mm Hg.
	DBP: C-EO	
IIa	B-R	In adults with hypertension and CKD (stage 3 or higher or stage 1 or 2 with albuminuria ≥ 300 mg/d, or ≥ 300 mg/g albumin-to-creatinine ratio or the equivalent in the first morning void)), treatment with an ACE inhibitor is reasonable to slow kidney disease progression.
IIb	C-EO	In adults with hypertension and CKD (stage 3 or higher or stage 1 or 2 with albuminuria ≥ 300 mg/d, or ≥ 300 mg/g albumin-to-creatinine ratio in the first morning void)), treatment with an ARB may be reasonable if an ACE inhibitor

Take Home Message of ADA position paper on guidelines



The ADA recommendations distinguish BP thresholds used to diagnose hypertension from those used as treatment targets,^{1,2} as they distinguish hemoglobin A_{1c} thresholds used to diagnose diabetes from those used as treatment targets.³ With this view, there is no clear rationale to change the BP thresholds used to define hypertension from 140/90 mm Hg or higher (as recommended in ADA guidelines and others) to 130/80 mm Hg or higher (as recommended by the ACC/AHA guidelines).³ Among people with diabetes and most other conditions with high cardiovascular risk, the prevalence of hypertension is already high and would not increase substantially by applying lower BP thresholds. Rather, most adults

de Boer, J, Bakris G, Cannon C JAMA 2018, April 3rd





Age-Related Issues

COR	LOE	Recommendations for Treatment of Hypertension in Older Persons
I	A	Treatment of hypertension with a SBP treatment goal of less than 130 mm Hg is recommended for noninstitutionalized ambulatory community-dwelling adults (≥65 years of age) with an average SBP of 130 mm Hg or higher.
IIa	C-EO	For older adults (≥65 years of age) with hypertension and a high burden of comorbidity and limited life expectancy, clinical judgment, patient preference, and a team-based approach to assess risk/benefit is reasonable for decisions regarding intensity of BP lowering and choice of antihypertensive drugs.

Clinician's Sequential Flow Chart for the Management of Hypertension

Measure office BP accurately
Detect white coat hypertension or masked hypertension by using ABPM and HBPM
Evaluate for secondary hypertension
Identify target organ damage
Introduce lifestyle interventions
Identify and discuss treatment goals
Use ASCVD risk estimation to guide BP threshold for drug therapy
Align treatment options with comorbidities
Account for age, race, ethnicity, sex, and special circumstances in antihypertensive treatment
Initiate antihypertensive pharmacological therapy
Insure appropriate follow-up
Use team-based care
Connect patient to clinician via telehealth
Detect and reverse nonadherence
Detect white coat effect or masked uncontrolled hypertension
Use health information technology for remote monitoring and self-monitoring of BP

ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.

ONE OPTION TO ACHIEVE GUIDELINE APPROACH

PATIENT ARRIVES 30 MINUTES PRIOR TO VISIT. NURSE/PA DOES THE FOLLOWING

- BP measurement according to guidelines- 7 min
- BP meds review and updates-3 min
- Lifestyle review and discussion-7-10min
- CV risk assessment via ASCVD app-1 min
- All information presented to physician to start visit
