HYPERTENSION: ARE WE GOING TOO LOW?

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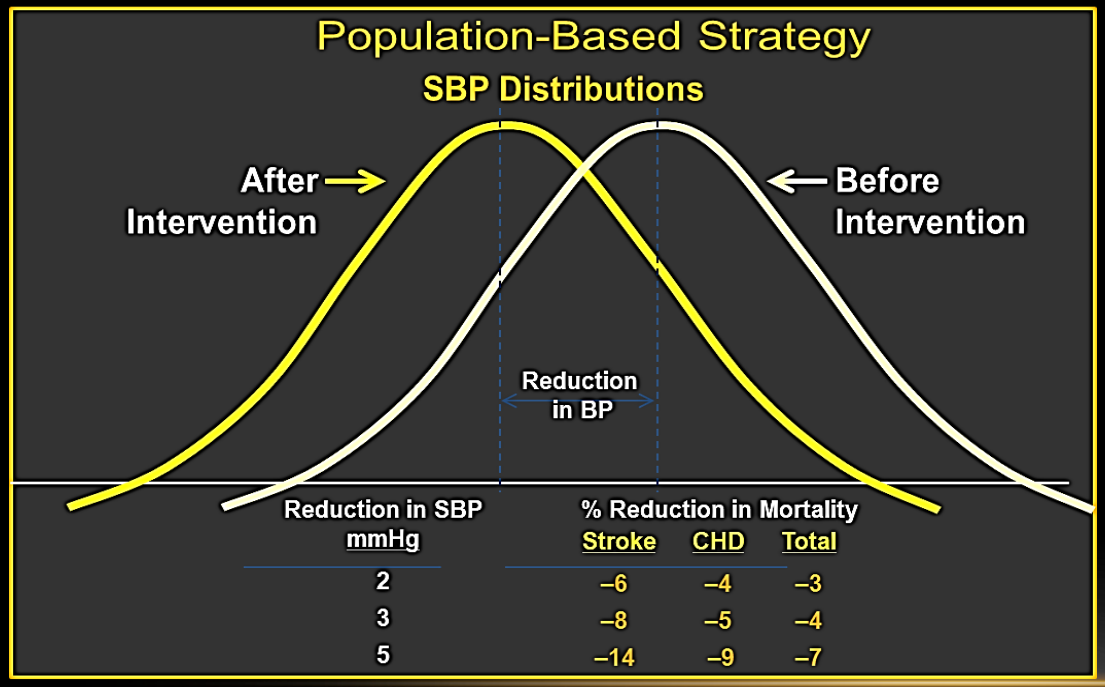
RISK REDUCTION WITH BP CONTROL

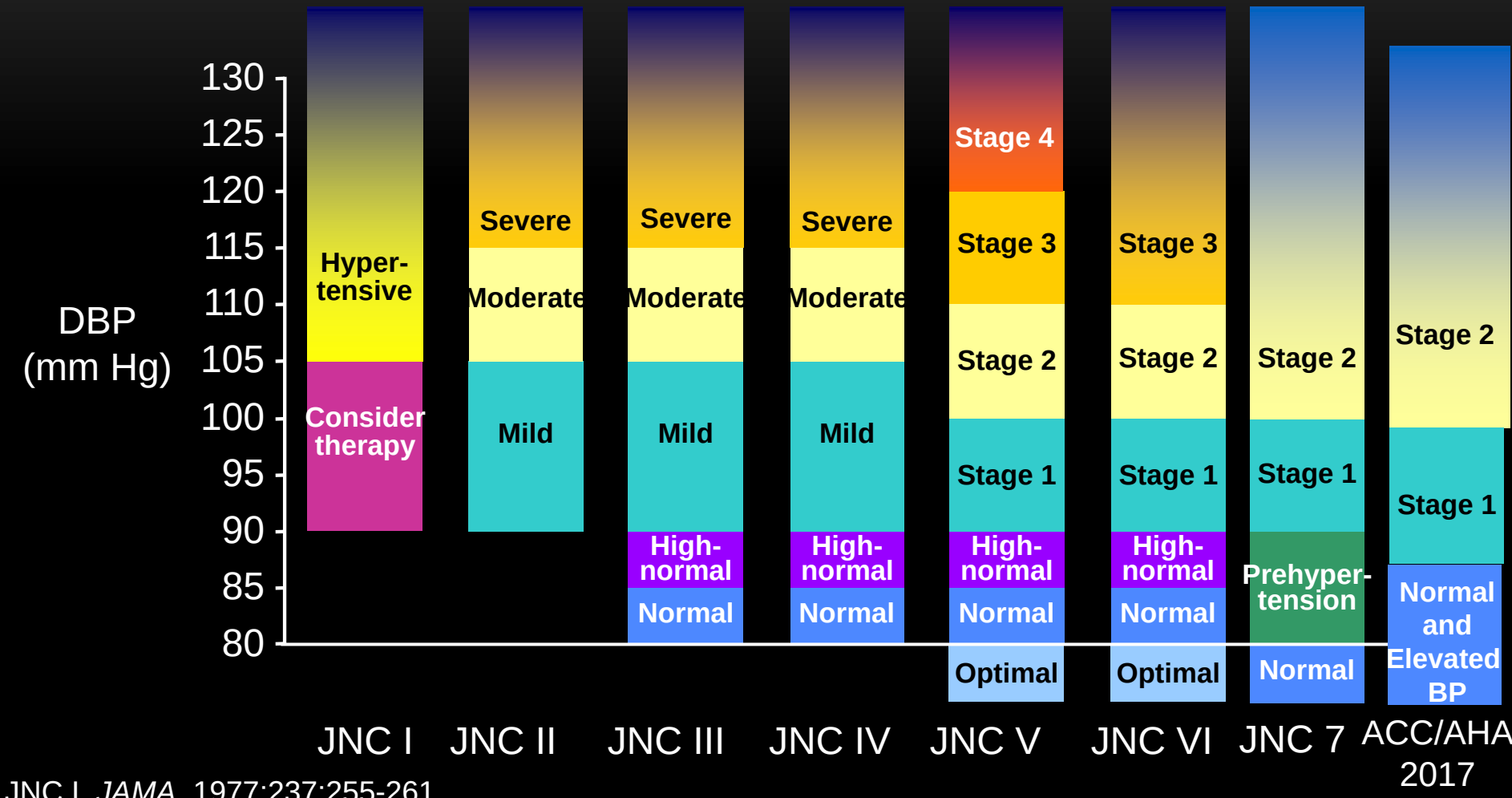
- Risk of CVD and stroke can be greatly reduced with effective antihypertensive therapy.
- A 10/5 mm Hg lower diastolic BP would predict a **40%** reduction in stroke risk.
- Risk is reduced even with as little as a **2 mm Hg** BP reduction:



On a population basis, therefore, every mm Hg in BP lowering can be of potential clinical importance , especially in reducing the risk of stroke.

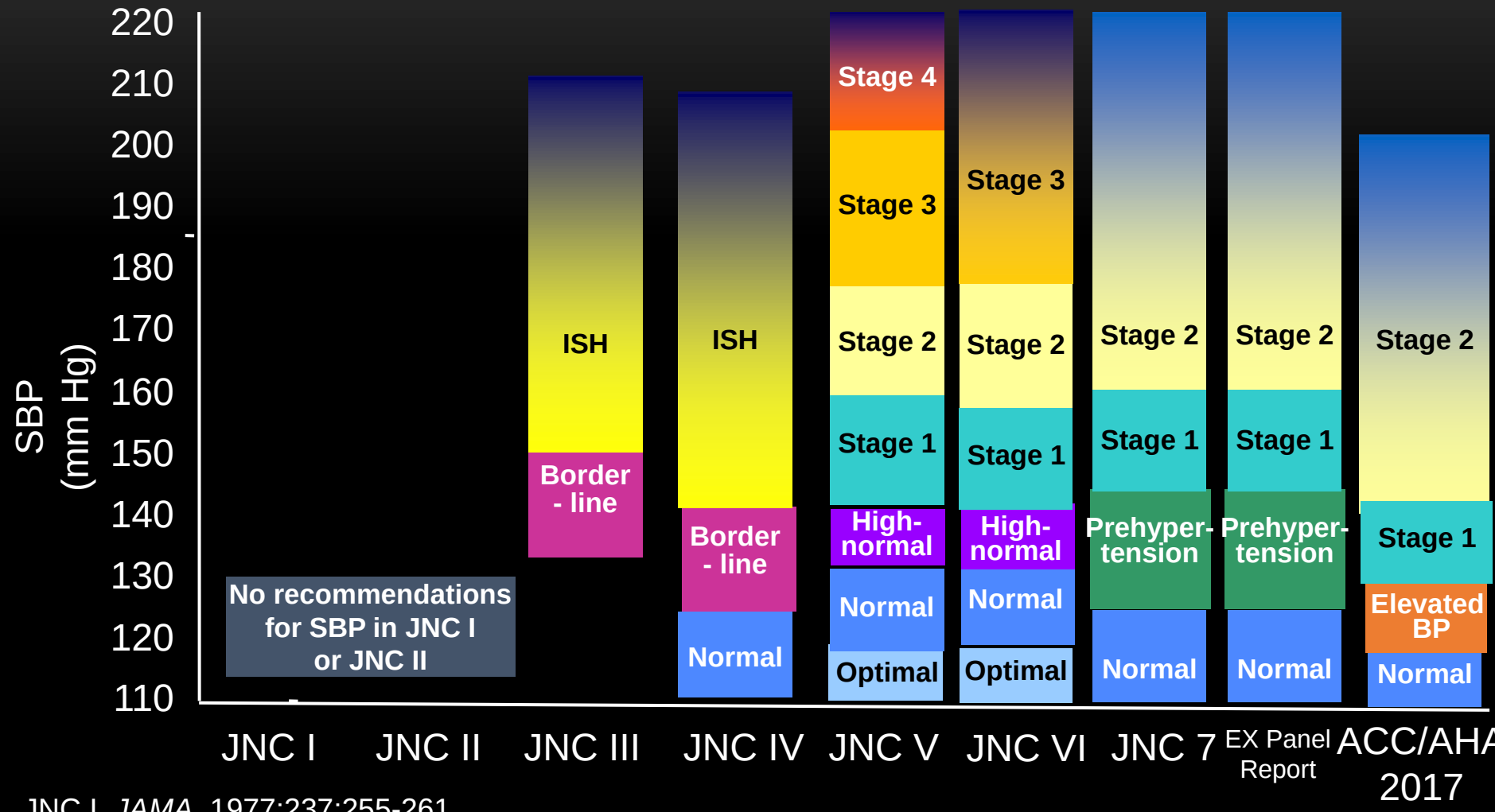
Chobanian A et.al. JAMA. 2003;289:2560-2572.

JNC/AHA/ACC BP CLASSIFICATIONS: DBP



JNC I. *JAMA.* 1977;237:255-261.
JNC II. *Arch Intern Med.* 1980;140:1280-1285.
JNC III. *Arch Intern Med.* 1984;144:1047-1057.
JNC IV. *Arch Intern Med.* 1988;148:1023-1038
JNC V. *Arch Intern Med.* 1993;153:154-183.
JNC VI. *Arch Intern Med.* 1997;157:2413-2446.
JNC 7. *JAMA.* 2003;289:2560-2572.
Expert Panel Report-JAMA 2014;311:507-520
ACC/AHA BP Guidelines Hypertension 2017-in press

JNC/AHA-ACC BP CLASSIFICATIONS: SBP



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SO WHAT'S REALLY NEW IN 2017 BP GUIDELINES

- Focus on earlier risk identification
- Lower BP goal <130/80 mmHg
- New classification of BP Stages
- Strong emphasis on

A) BP measurement

B) Home BP for improved patient adherence/enpowerment

C) Lower goals for older people

D) Appropriate Use of RAS blockers in CKD

MAJOR UNDERLYING PREMISE FOR ACHIEVEMENT OF 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
- *Previous guidelines recommended this for CKD and diabetes only*

COEXISTENCE OF HYPERTENSION AND RELATED CHRONIC CONDITIONS

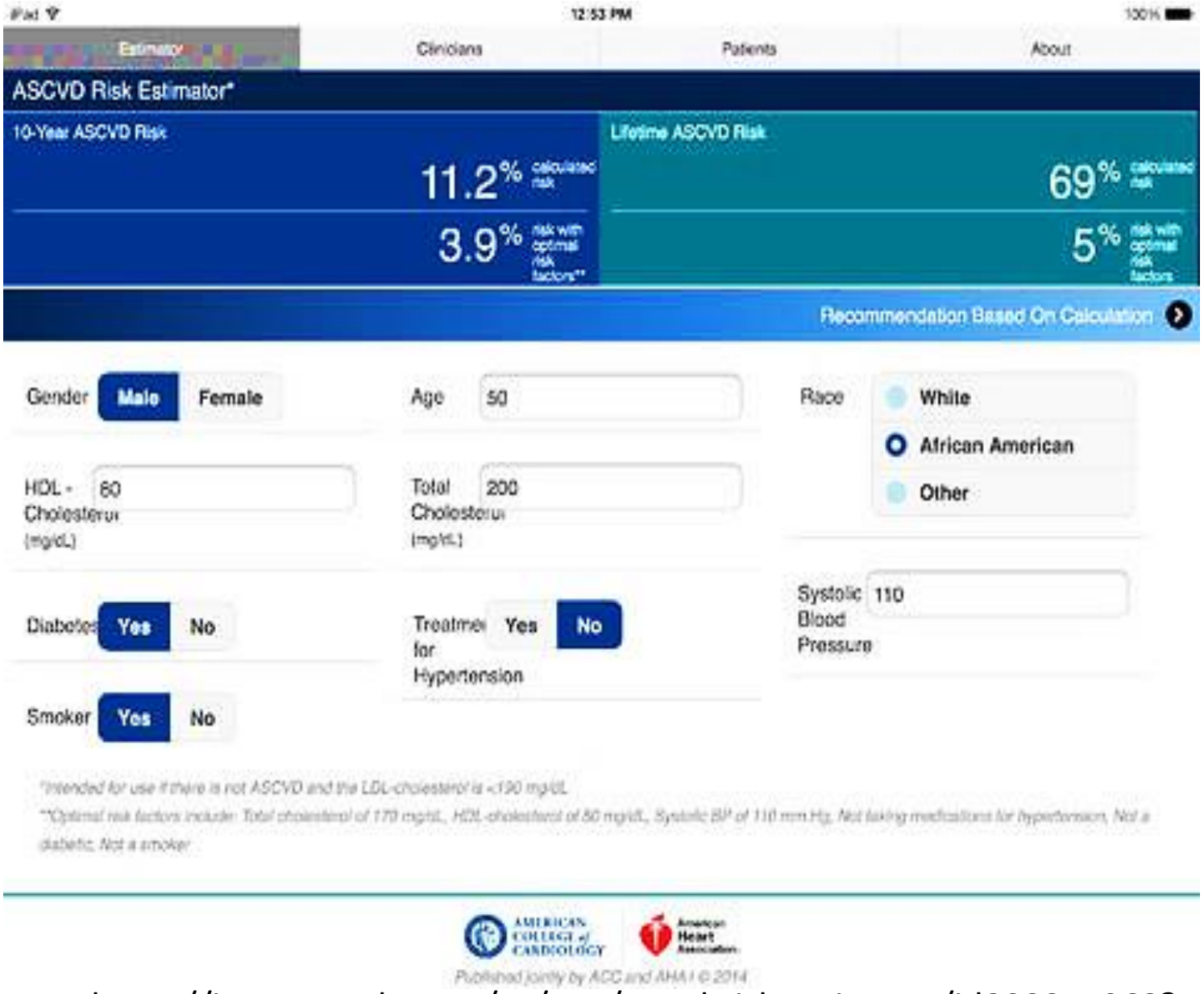
COR	LOE	Recommendation for Coexistence of Hypertension and Related Chronic Conditions
I	B-NR	Screening for and management of other modifiable CVD risk factors are recommended in adults with hypertension.

CVD RISK FACTORS COMMON IN PATIENTS WITH HYPERTENSION

Modifiable Risk Factors*	Relatively Fixed Risk Factors†
• Current cigarette smoking, secondhand smoking • Diabetes mellitus • Dyslipidemia/hypercholesterolemia • Overweight/obesity • Physical inactivity/low fitness • Unhealthy diet	• CKD • Family history • Increased age • Low socioeconomic/educational status • Male sex • Obstructive sleep apnea • Psychosocial stress

†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



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

Categories of BP in Adults*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category. BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in DBP, diastolic blood pressure; and SBP systolic blood pressure.

So Are We Going to Low?

- It is a Matter of How you measure the BP

CHECKLIST FOR ACCURATE 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.

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.

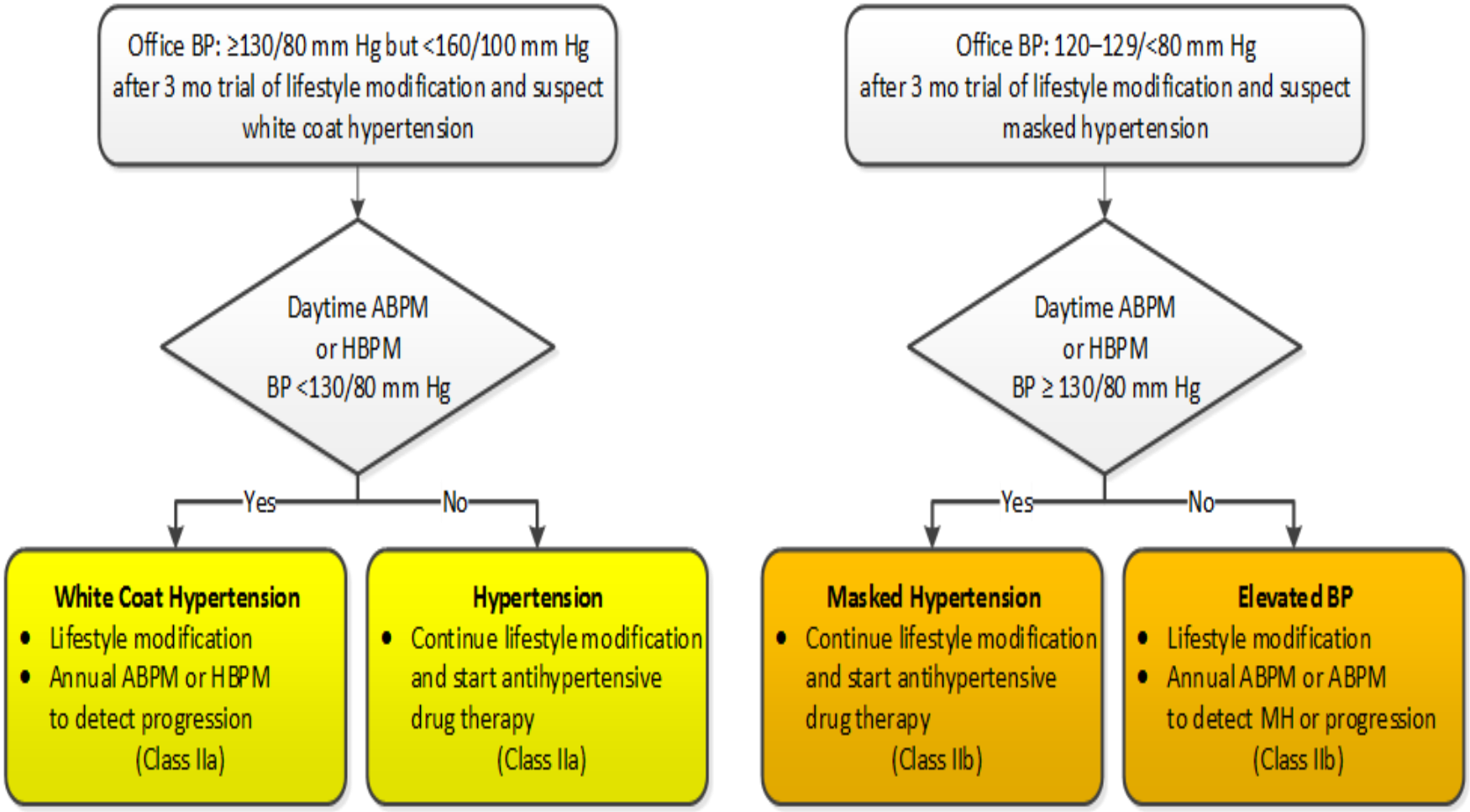
SR indicates systematic review.

Corresponding Values of SBP/DBP for Clinic, HBPM, Daytime, Nighttime, and 24-Hour ABPM Measurements

Clinic	HBPM	Daytime ABPM	Nighttime ABPM	24-Hour ABPM
120/80	120/80	120/80	100/65	115/75
130/80	130/80	130/80	110/65	125/75
140/90	135/85	135/85	120/70	130/80
160/100	145/90	145/90	140/85	145/90

ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; DBP diastolic blood pressure; HBPM, home blood pressure monitoring; and SBP, systolic blood pressure.

Detection of White Coat Hypertension or Masked Hypertension in Patients Not on Drug Therapy



Colors correspond to Class of Recommendation in Table 1.
ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; and HBPM, home blood pressure monitoring.

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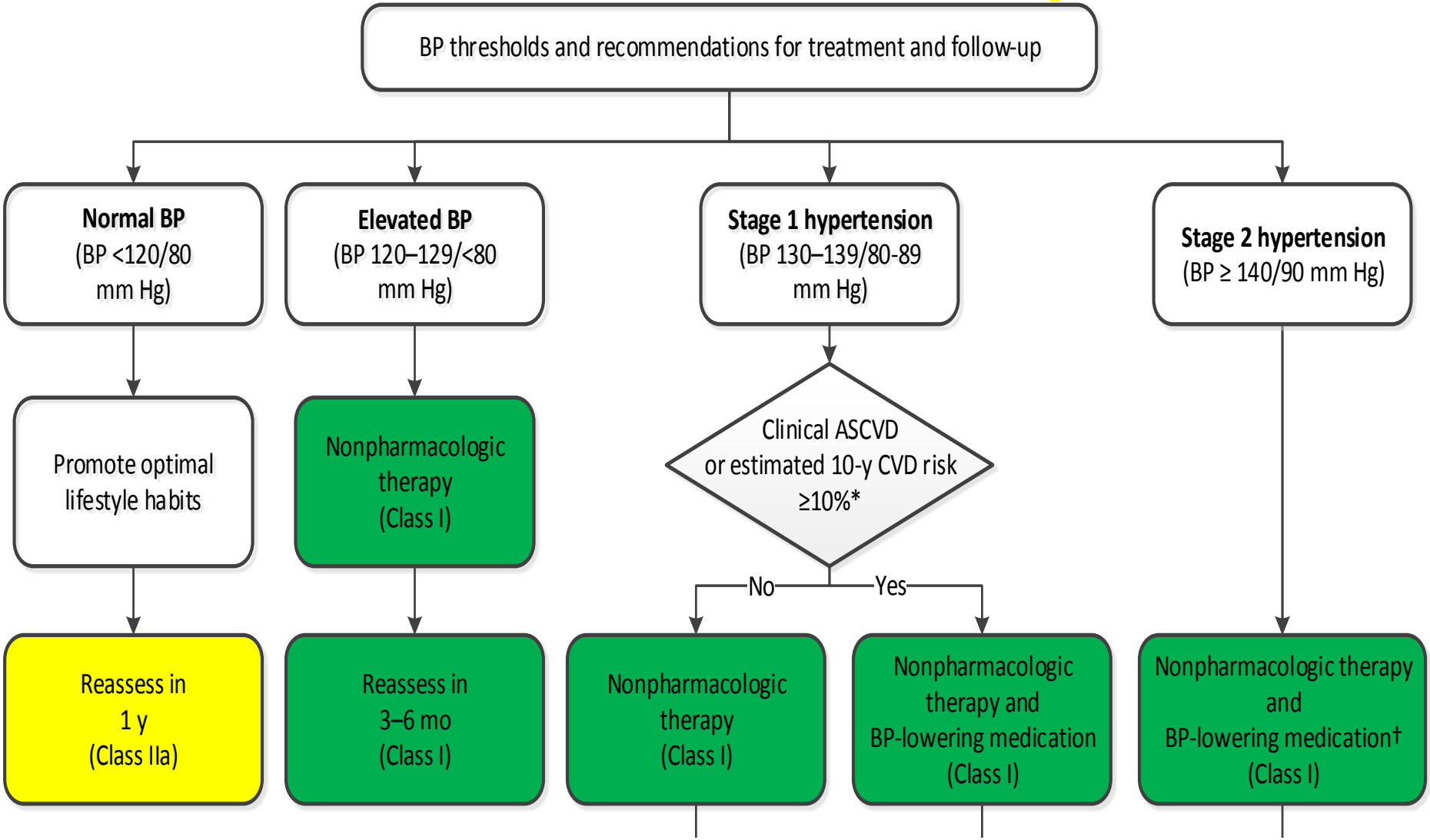
Best Proven Nonpharmacologic Interventions for Prevention and Treatment of Hypertension*

	Nonpharmacologic Intervention	Dose	Approximate Impact on SBP	
			Hypertension	Normotension
Physical activity	**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 • 6 exercises, 3 sets/exercise, 10 repetitions/set	-4 mm Hg	-2 mm Hg
	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
Healthy diet	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
Moderation 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

Blood Pressure (BP) Thresholds and Recommendations for Treatment and Follow-Up (continued on next slide)



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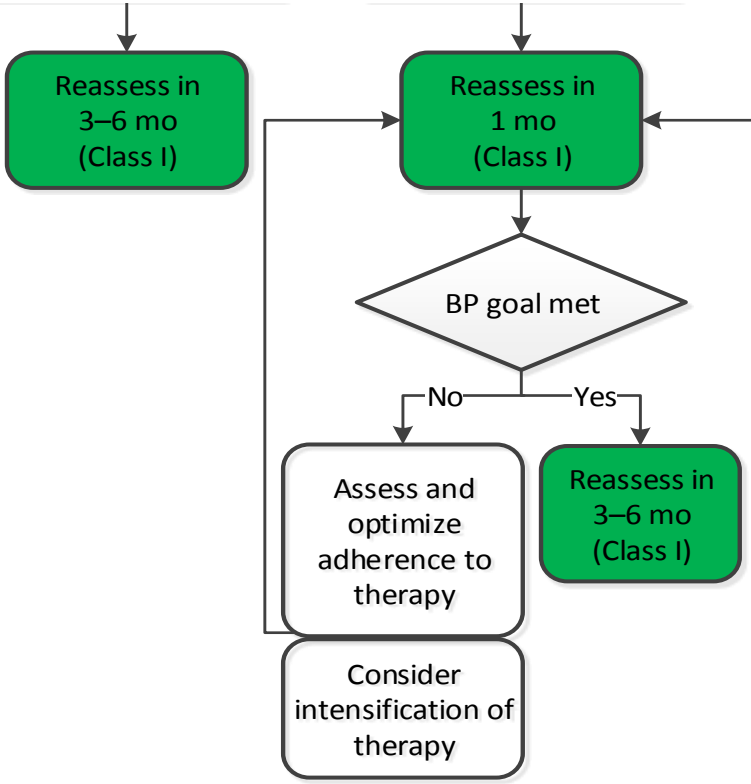


*Using the ACC/AHA Pooled Cohort Equations. Note that patients with DM or CKD are automatically placed in the high-risk category. For initiation of RAS inhibitor or diuretic therapy, assess blood tests for electrolytes and renal function 2 to 4 weeks after initiating therapy.

†**Consider initiation of pharmacological therapy for stage 2 hypertension with 2 antihypertensive agents of different classes.** Patients with stage 2 hypertension and BP ≥160/100 mm Hg should be promptly treated, carefully monitored, and subject to upward medication dose adjustment as necessary to control BP. Reassessment includes BP measurement, detection of orthostatic hypotension in selected patients (e.g., older or with postural symptoms), identification of white coat hypertension or a white coat effect, documentation of adherence, monitoring of the response to therapy, reinforcement of the importance of adherence, reinforcement of the importance of treatment, and assistance with treatment to achieve BP target.

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.

Choice of Initial Monotherapy Versus Initial Combination Drug Therapy

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.

DIABETES STATEMENTS FROM AHA/ACC 2017 BP GUIDELINES

- In adults with DM and hypertension, antihypertensive drug treatment should be initiated at a BP greater than or equal to 130/80 mm Hg with a treatment goal of less than 130/80 mm Hg **(Level 1 B)**
- In adults with DM and hypertension, all classes of antihypertensive agents are useful and effective **(Level 1A)**
- In adults with DM and hypertension, ACE inhibitors or ARBs may be considered in the presence of albuminuria **(Level 2B)**

Whelton P et.al. Hypertension 2017

2017 BP GUIDELINE GOALS ADA

- Need to Assess CV Risk of Individual Patient

(Assumption: all people with Type 2 Diabetes will have a >10% 10 year CV risk)

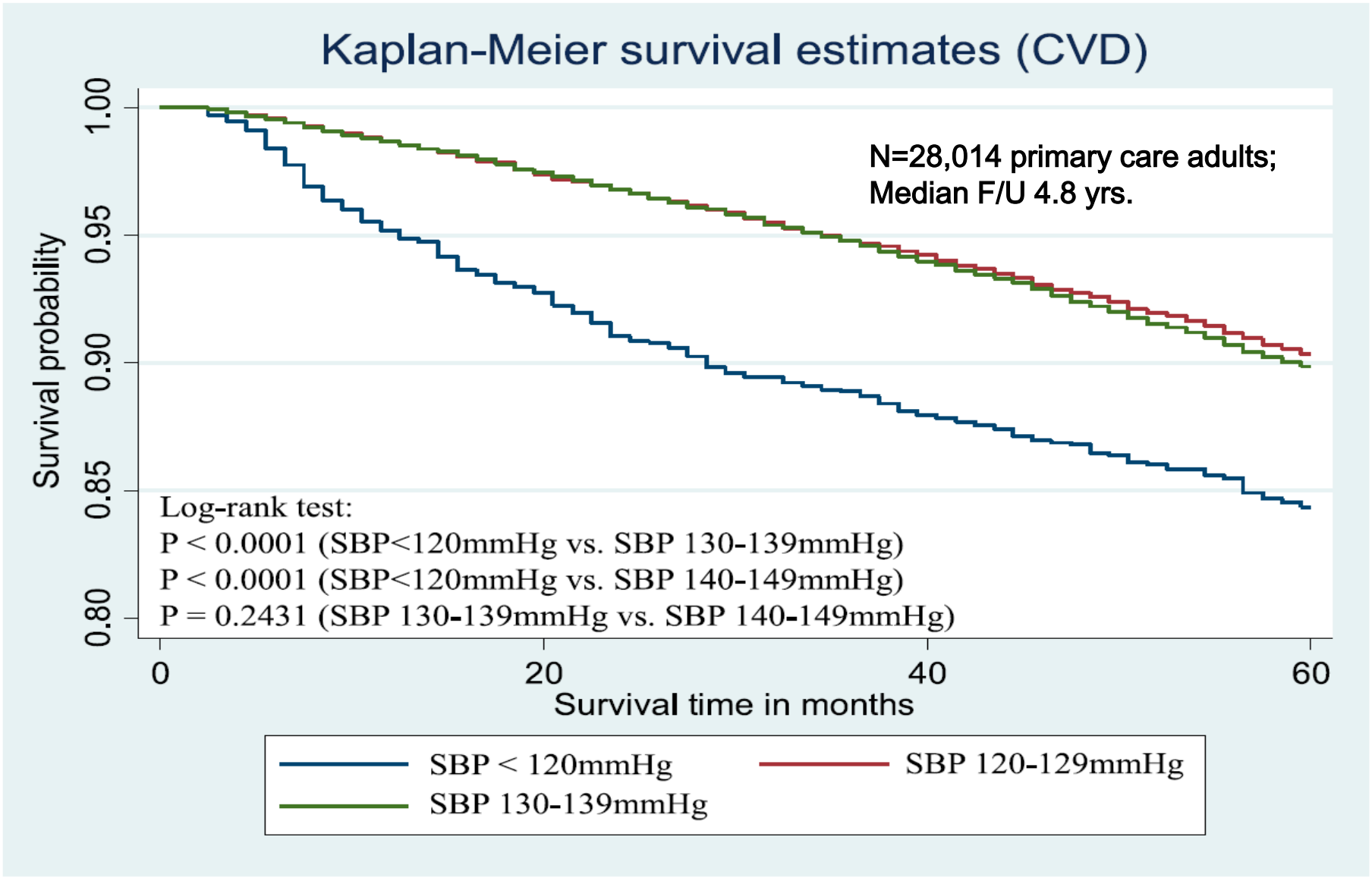
- <140/90 mmHg-Level IA evidence
- 130/80 mmHg- Level 2B evidence
- Avoid Diastolic BP < 60 (no specific guidance given in AHA/ACC guidelines)

ADA Clinical Practice Guidelines-Diabetes Care (Suppl.) Jan 2017; DeBoer I, Bangalore S, Zoungas S…et.al. and Bakris GL Diabetes Care 2017;40-1273-1284

Table 1—Baseline characteristics among subjects with different SBPs

	SBP <120 mmHg (*n* = 2,079)	SBP <130 mmHg (*n* = 10,851)	SBP <140 mmHg (*n* = 15,084)	*P* value
Sociodemographics				
Male	48.24%	47.29%	46.55%	0.911
Age (years)	67.14 ± 11.65	65.87 ± 11.23	67.45 ± 11.09	0.800
Current smoker	11.34%	10.26%	9.30%	0.820
Clinical parameters				
HbA_{1c} (%)	7.06 ± 1.17	7.14 ± 1.10	7.22 ± 1.16	0.962
HbA_{1c} (mmol/mol)	53.63 ± 12.74	54.50 ± 12.00	55.43 ± 12.70	0.962
SBP (mmHg)	148.50 ± 13.39	149.77 ± 12.86	153.03 ± 13.59	0.813
DBP (mmHg)	79.82 ± 11.34	80.34 ± 10.88	80.09 ± 11.06	0.850
LDL-C (mmol/L)	2.94 ± 0.90	2.94 ± 0.96	2.98 ± 1.06	0.790
TC/HDL-C ratio	4.22 ± 1.37	4.21 ± 1.27	4.25 ± 1.56	0.969
Triglyceride (mmol/L)	1.66 ± 1.13	1.68 ± 1.06	1.67 ± 1.18	0.970
BMI (kg/m^2)	25.77 ± 4.24	26.18 ± 4.28	26.34 ± 4.37	0.445
eGFR <60 mL/min/1.73 m^2	7.25%	6.16%	6.60%	0.817
Disease characteristics				
Duration of diabetes (years)	7.40 ± 6.61	6.93 ± 6.56	7.53 ± 6.80	0.910
Charlson Index	4.15 ± 1.17	4.04 ± 1.11	4.18 ± 1.09	0.821

Yan EYF et.al. Diabetes Care April 2018-https://doi.org/10.2337/dc17-2443



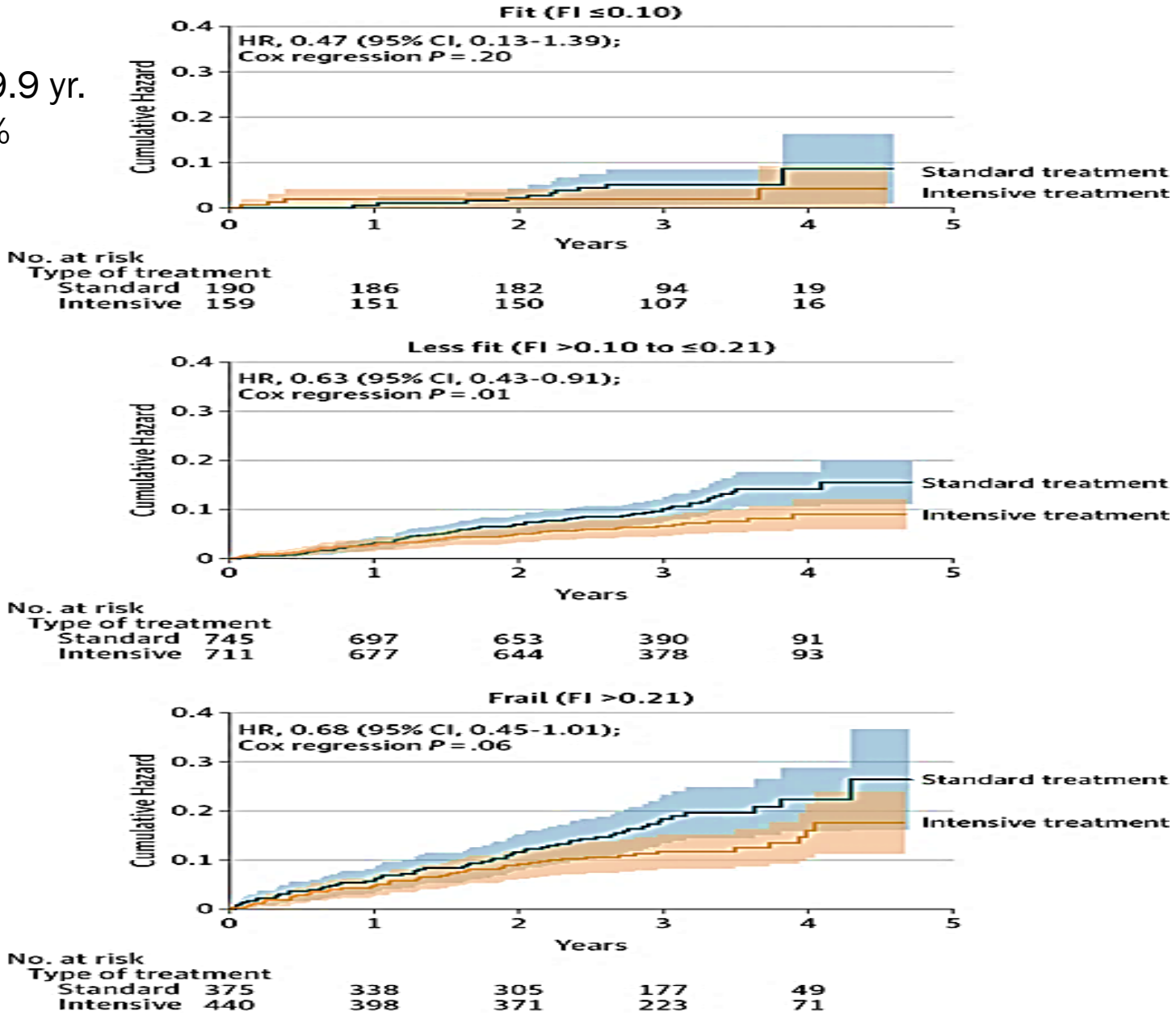
Yan EYF et.al. Diabetes Care April 2018-https://doi.org/10.2337/dc17-2443

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.

Primary Cardiovascular Disease Outcome in SPRINT Among Participants Aged 75 Years or Older by Baseline Frailty Status. Tinted regions 95% confidence intervals; FI, 37-item frailty index; HR, hazard ratio.

N=2636
Mean Age-79.9 yr.
Females-38%



Williamson JD, Supiano,M.A.,….et.al. and Pajewski,N.M JAMA. Published online May 19, 2016. doi:10.1001/jama.2016.7050

RESPONSE TO DEFICITS WHEN NOTED BY AHA/ACC COMMITTEE

Problems

- Treat everyone the same regardless of pre-existing vascular status or magnitude of coronary artery disease. Use clinical judgement in such cases
- Lowering BP, that similar to when diabetologists did it, increases perception of disease burden. People need to be evaluated by risk and with obesity many more are at risk.
- Ignoring wide pulse pressure at baseline and stipulating that those over 70 have BP <130 mmHg, while the subgroup with wide pulse pressure at baseline can't tolerate those levels.-Use your judgement
- No information about diastolic BP goal in treatment. There was no diastolic lower goal in SPRINT that yielded problems. Again use clinical judgement.

Bakris G and Sorrentino M N Eng J Med 2018;378:497-499

BP Thresholds for and Goals of Pharmacological Therapy in Patients With Hypertension According to Clinical Conditions

Clinical Condition(s)	BP Threshold, mm Hg	BP Goal, mm Hg
General		
Clinical CVD or 10-year ASCVD risk ≥10%	≥130/80	<130/80
No clinical CVD and 10-year ASCVD risk <10%	**≥140/90**	<130/80
Older persons (≥65 years of age; noninstitutionalized, ambulatory, community-living adults)	≥130 (SBP)	<130 (SBP)
Specific comorbidities		
Diabetes mellitus	≥130/80	<130/80
Chronic kidney disease	≥130/80	<130/80
Chronic kidney disease after renal transplantation	≥130/80	<130/80
Heart failure	≥130/80	<130/80
Stable ischemic heart disease	≥130/80	<130/80
Secondary stroke prevention	**≥140/90**	<130/80
Secondary stroke prevention (lacunar)	≥130/80	<130/80
Peripheral arterial disease	≥130/80	<130/80

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.