Hypertension Management in 2019: How to Define the Optimal BP Level as per Guidelines?

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Disclosures

None

SPECIAL FOCUS ISSUE: BLOOD PRESSURE

JACC FOCUS SEMINAR: CV HEALTH PROMOTION

Prevention and Control of Hypertension

JACC Health Promotion Series

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ABSTRACT

Hypertension, the leading risk factor for cardiovascular disease, originates from combined genetic, environmental, and social determinants. Environmental factors include overweight/obesity, unhealthy diet, excessive dietary sodium, inadequate dietary potassium, insufficient physical activity, and consumption of alcohol. Prevention and control of hypertension can be achieved through targeted and/or population-based strategies. For control of hypertension, the targeted strategy involves interventions to increase awareness, treatment, and control in individuals. Corresponding population-based strategies involve interventions designed to achieve a small reduction in blood pressure (BP) in the entire population. Having a usual source of care, optimizing adherence, and minimizing therapeutic inertia are associated with higher rates of BP control. The Chronic Care Model, a collaborative partnership among the patient, provider, and health system, incorporates a multilevel approach for control of hypertension. Optimizing the prevention, recognition, and care of hypertension requires a paradigm shift to team-based care and the use of strategies known to control BP.
(J Am Coll Cardiol 2018;72:1278-93)

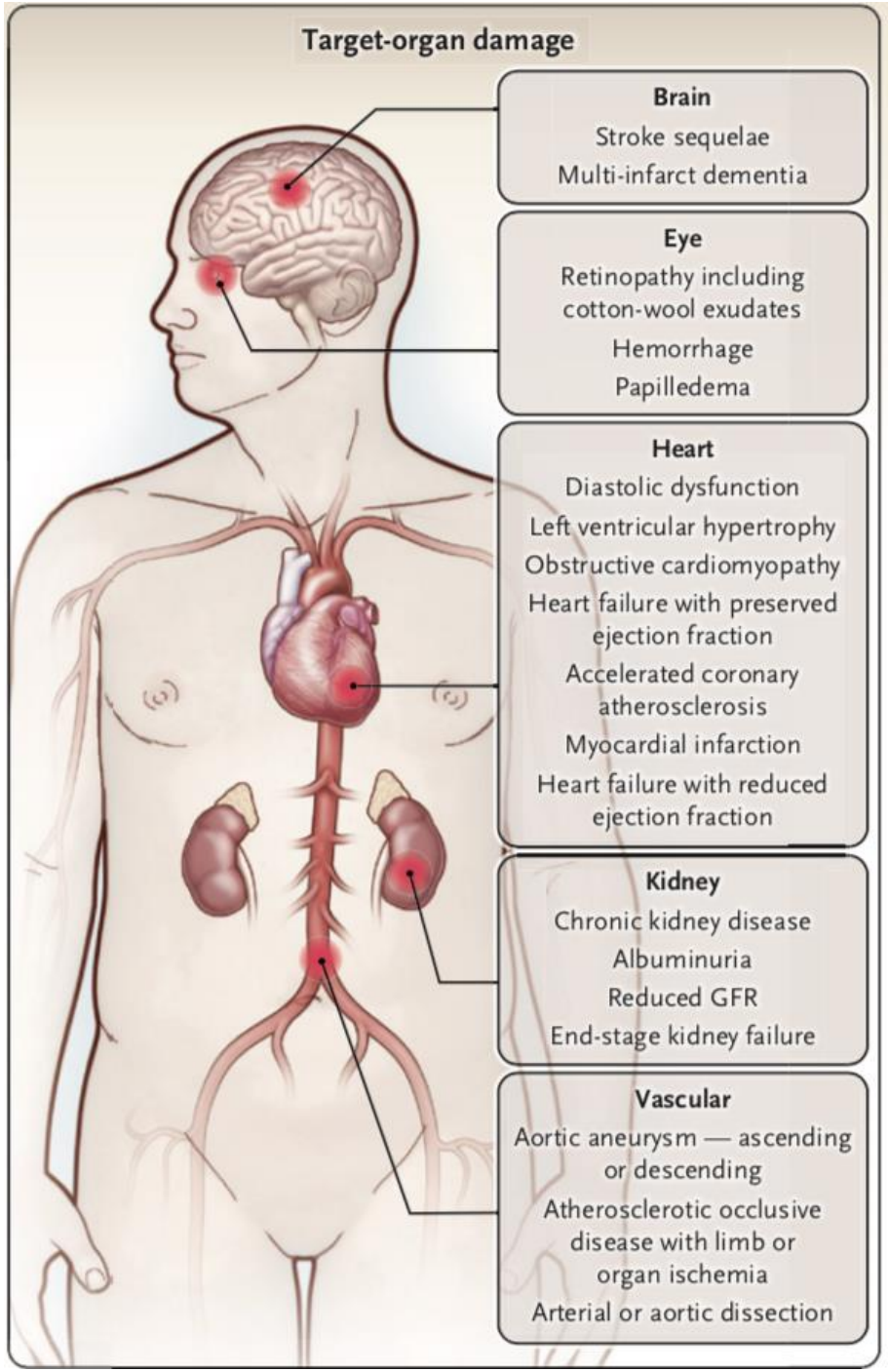
Causes

Genetic predisposition

Lifestyle (high sodium intake, weight gain, excess alcohol intake)

Medications (prescription or over-the-counter NSAIDs, stimulants, and decongestants) or illicit drugs

Secondary causes (renal, renovascular, endocrine, urologic)



Taler S. N Engl J Med 2018;378:636-44.

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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CLINICAL PRACTICE GUIDELINE

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

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ESC European Society of Cardiology
European Heart Journal (2018) **39**, 3021–3104
doi:10.1093/eurheartj/ehy339

ESC/ESH GUIDELINES

2018 ESC/ESH Guidelines for the management of arterial hypertension

The Task Force for the management of arterial hypertension of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH)

Authors/Task Force Members: Bryan Williams* (ESC Chairperson) (UK), Giuseppe Mancia* (ESH Chairperson) (Italy), Wilko Spiering (The Netherlands), Enrico Agabiti Rosei (Italy), Michel Azizi (France), Michel Burnier (Switzerland), Denis L. Clement (Belgium), Antonio Coca (Spain), Giovanni de Simone (Italy), Anna Dominiczak (UK), Thomas Kahan (Sweden), Felix Mahfoud (Germany), Josep Redon (Spain), Luis Ruilope (Spain), Alberto Zanchetti† (Italy), Mary Kerins (Ireland), Sverre E. Kjeldsen (Norway), Reinhold Kreutz (Germany), Stephane Laurent (France), Gregory Y. H. Lip (UK), Richard McManus (UK), Krzysztof Narkiewicz (Poland), Frank Ruschitzka (Switzerland), Roland E. Schmieder (Germany), Evgeny Shlyakhto (Russia), Costas Tsioufis (Greece), Victor Aboyans (France), and Ileana Desormais (France)

Table 3 Classification of office blood pressure[a] and definitions of hypertension grade[b]

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	120–129	and/or	80–84
High normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension[b]	≥140	and	<90

Table 1. Classification of Blood Pressure in Adults.*

Blood-Pressure Category	Definition
Normal	Systolic pressure of <120 mm Hg and diastolic pressure of <80 mm Hg
Elevated	Systolic pressure of 120–129 mm Hg and diastolic pressure of <80 mm Hg
Hypertension	
Stage 1	Systolic pressure of 130–139 mm Hg or diastolic pressure of 80–89 mm Hg
Stage 2	Systolic pressure of ≥140 mm Hg or diastolic pressure of ≥90 mm Hg

Average of 2 or more readings taken on 2 or more occasions

ACC/AHA Versus ESC/ESH on Hypertension Guidelines

JACC Guideline Comparison

George Bakris, MD,[a] Waleed Ali, MD,[a] Gianfranco Parati, MD[b]

HIGHLIGHTS

- Blood pressure guidelines are updated as new data from clinical trials emerge.
- The 2018 ACC/AHA and ESC/ESH guidelines interpreted similar data with a fundamental difference of 2 different blood pressure goals: <130/80 mm Hg for ACC/AHA and <140/90 mm Hg for ESC/ESH.
- Other differences include the approach to assess risk and goals in older people at 130/70 to 139/79 mm Hg for ESC/ESH but <130/80 mm Hg for ACC/AHA.
- Guideline implementation should include patient participation and cooperation. This is a large part of the ESC/ESH guideline and mentioned but not emphasized in the ACC/AHA guideline.

ACC/AHA BP 2017	ESC/ESH BP 2018
Similarities	
• More emphasis on home BP monitoring and patient empowerment • Single-pill combination in those 20/10 mm Hg above goal • More attention to detail of BP measurement • Focus on improving adherence • Restriction of beta-blockers to patients with comorbidities or compelling indications • BP telemonitoring and digital health solutions recommended during follow-up (strong support)	• Wider use of home BP monitoring to confirm diagnosis • Initial single-pill combination as initial therapy • More attention to detail of BP measurement • Detection of poor adherence • Restriction of beta-blockers to patients with comorbidities or compelling indications • BP telemonitoring and digital health solutions recommended during follow-up (mild support)
Differences	
• Emphasis on absolute CV risk computed through ASCVD risk calculator with >10% 10-year risk more aggressive • Focus on prevention of hypertension • Detailed guidance for ethnic/racial groups (i.e., black and Hispanic) • New definition of hypertension >130/80 mm Hg for everyone, with threshold and target the same, regardless of age • No discussion of isolated systolic hypertension • Concise mention of organ damage assessment • Similar SBP targets for all patients • No mention of environmental and altitude effects on BP	• Emphasis on absolute CV risk computed using SCORE system coupled with risk modifiers and assessment of HMOD, with >10% 10-year CV risk more aggressive • No specific attention to prevention as BP approaches 130/80 mm Hg • Much less attention to specific ethnic/racial groups • Retained definition of hypertension >140/90 mm Hg and encouraged patient discussion and education to achieve <130/80 mm Hg in those who require it by the evidence (<140/90 mm Hg in older persons) • Limits on BP reduction, not <120/70 mm Hg • Detailed discussion of isolated systolic hypertension • Detailed description of HMOD • Personalized approach to definition of SBP targets • Environmental and altitude effects on BP mentioned

HMOD - hypertension-mediated organ damage; SCORE-¼ Systematic Coronary Risk Evaluation.

Guideline Differences	American College of Cardiology/American Heart Association (ACC/AHA)			European Society of Cardiology/European Society of Hypertension (ESC/ESH)		
Level of blood pressure (BP) defining hypertension	Systolic (mm Hg)	and/ or	Diastolic (mm Hg)	Systolic (mm Hg)	and/ or	Diastolic (mm Hg)
Office/Clinic BP	≥ 130		≥ 80	≥ 140		≥ 90
Daytime mean	≥ 130		≥ 80	≥ 135		≥ 85
Nighttime mean	≥ 110		≥ 65	≥ 120		≥ 70
24-hour mean	≥ 125		≥ 75	≥ 130		≥ 80
Home BP mean	≥ 130		≥ 80	≥ 135		≥ 85
BP targets for treatment	< 130/80 mm Hg			Systolic targets < 140 mm Hg and close to 130 mm Hg		
Initial Combination Therapy	Initial single-pill combination therapy in patients > 20/10 mm Hg above BP goal			Initial single-pill combination therapy in patients ≥ 140/90 mm Hg		
Hypertensive requiring intervention	> 130/80 mm Hg			≥ 140/90 mm Hg		

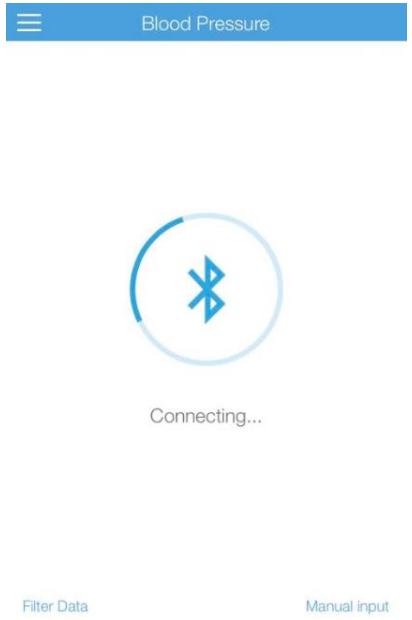
Blood Pressure Goals in Patients with Hypertension According to Clinical Condition

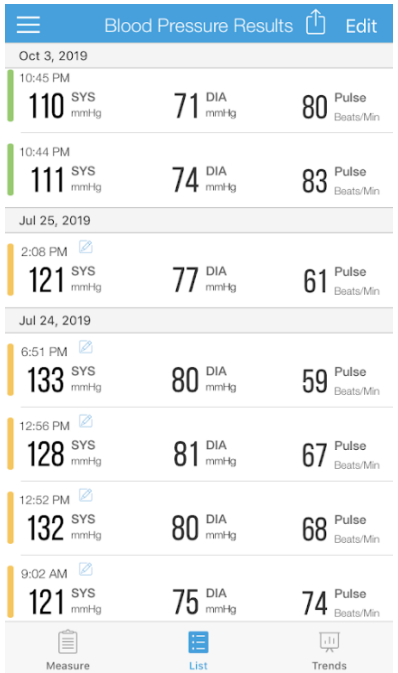
Category	ESC/ESH 2018	AHA/ACC 2017
Age ≥65 yrs	130 to <140/70 to 79 mm Hg	<130/<80 mm Hg
Diabetes	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg
Coronary artery disease	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg
Chronic kidney disease (eGFR <60 ml/min/1.73 m^2)	130 to <140/70 to 79 mm Hg	<130/<80 mm Hg
Post-stroke	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg

Guideline Similarities	ACC/AHA	ESC/ESH
Importance of home BP monitoring	• Take BP at home, twice in the morning and twice in the evening, in the week before clinic • Bring the BP machine in annually for validation	
Therapy	• Restrict beta blockers to patients with comorbidities or other indications • Initial single pill combination as initial therapy	
Follow-up	• Detect poor adherence and focus on improvement • BP telemonitoring and digital health solutions recommended	

Bakris, G. et al. J Am Coll Cardiol. 2019;73(23):3018-26.

iHealth Feel Wireless Bluetooth Blood Pressure Monitor-MFi Certified,FSA-Eligible Upper Arm Blood Pressure Cuff, BP...





HOME BLOOD PRESSURE MONITORING

Please follow these important steps for home blood pressure monitoring:

1. Buy a Wireless **iHealth** (for your iPhone or Android) Blood Pressure Monitor- It costs between $70-99. Sometimes there are deals on Amazon. Make sure this is the **arm** blood pressure cuff. **Do not buy a wrist or finger machine, as these are not accurate.** Alternatively, you may purchase an arm cuff model from your local pharmacy, Omron is a reputable brand
2. For wireless users, download the app "iHealth" to your phone and sync the wireless cuff with your Bluetooth.
3. Take your blood pressure **two times a day**- The blood pressure, pulse and time will be automatically recorded on the iHealth application on your phone.
4. **Take your blood pressures at different times of the day. Take it once a day at home and once a day at work.** If you do not work, take it twice daily at home.
5. When taking your blood pressure, sit at a table and rest your arm at the level of your heart. It does not matter which arm you use. Wait a few minutes and then take your blood pressure. Do not let your arm hang down. **If your initial blood pressure is elevated (more than 135/85 mmHg) take it one more time several minutes after the first. Do not take it more than two times.**
6. **Please E-mail them to me in 3-4 weeks.**
7. There is no need to call us for *any one individual blood pressure reading, whether it is high or low*. However, if you are concerned that a series of blood pressure readings are too high or low, please let us know.

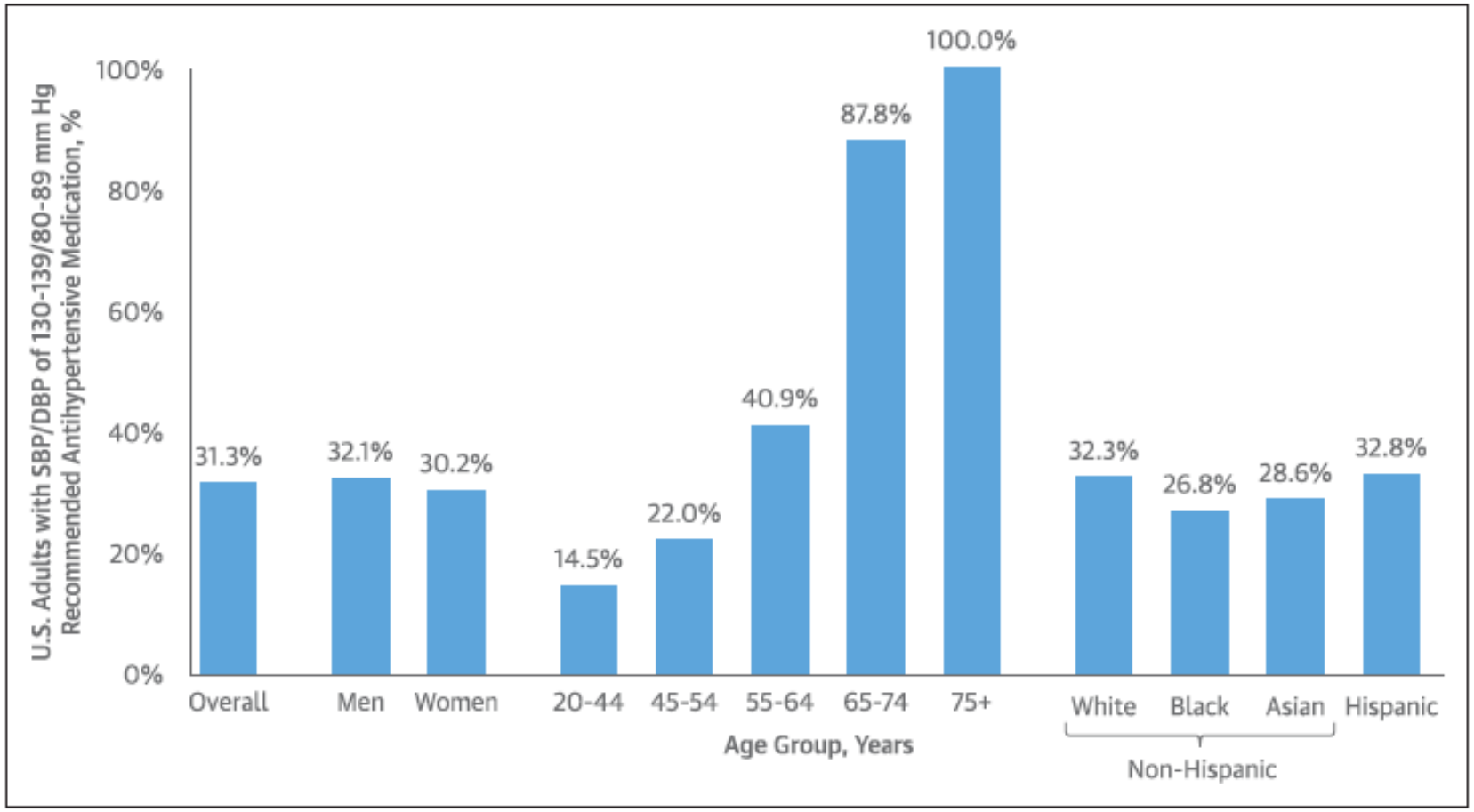


Figure 1. Percentage of US adults with SBP of 130 to 139 mm Hg or DBP of 80 to 89 mm Hg recommended for antihypertensive medication according to the 2017 ACC/AHA guideline.

Muntner P et l. Circulation 2018;137:109–118.

Long-term and recent trends in hypertension awareness, treatment, and control in 12 high-income countries: an analysis of 123 nationally representative surveys

*NCD Risk Factor Collaboration (NCD-RisC)**

Summary

Background Antihypertensive medicines are effective in reducing adverse cardiovascular events. Our aim was to compare hypertension awareness, treatment, and control, and how they have changed over time, in high-income countries.

Methods We used data from people aged 40–79 years who participated in 123 national health examination surveys from 1976 to 2017 in 12 high-income countries: Australia, Canada, Finland, Germany, Ireland, Italy, Japan, New Zealand, South Korea, Spain, the UK, and the USA. We calculated the proportion of participants with hypertension, which was defined as systolic blood pressure of 140 mm Hg or more, or diastolic blood pressure of 90 mm Hg or more, or being on pharmacological treatment for hypertension, who were aware of their condition, who were treated, and whose hypertension was controlled (ie, lower than 140/90 mm Hg).

Findings Data from 526 336 participants were used in these analyses. In their most recent surveys, Canada, South Korea, Australia, and the UK had the lowest prevalence of hypertension, and Finland the highest. In the 1980s and early 1990s, treatment rates were at most 40% and control rates were less than 25% in most countries and age and sex groups. Over the time period assessed, hypertension awareness and treatment increased and control rate improved in all 12 countries, with South Korea and Germany experiencing the largest improvements. Most of the observed increase occurred in the 1990s and early-mid 2000s, having plateaued since in most countries. In their most recent surveys, Canada, Germany, South Korea, and the USA had the highest rates of awareness, treatment, and control, whereas Finland, Ireland, Japan, and Spain had the lowest. Even in the best performing countries, treatment coverage was at most 80% and control rates were less than 70%.

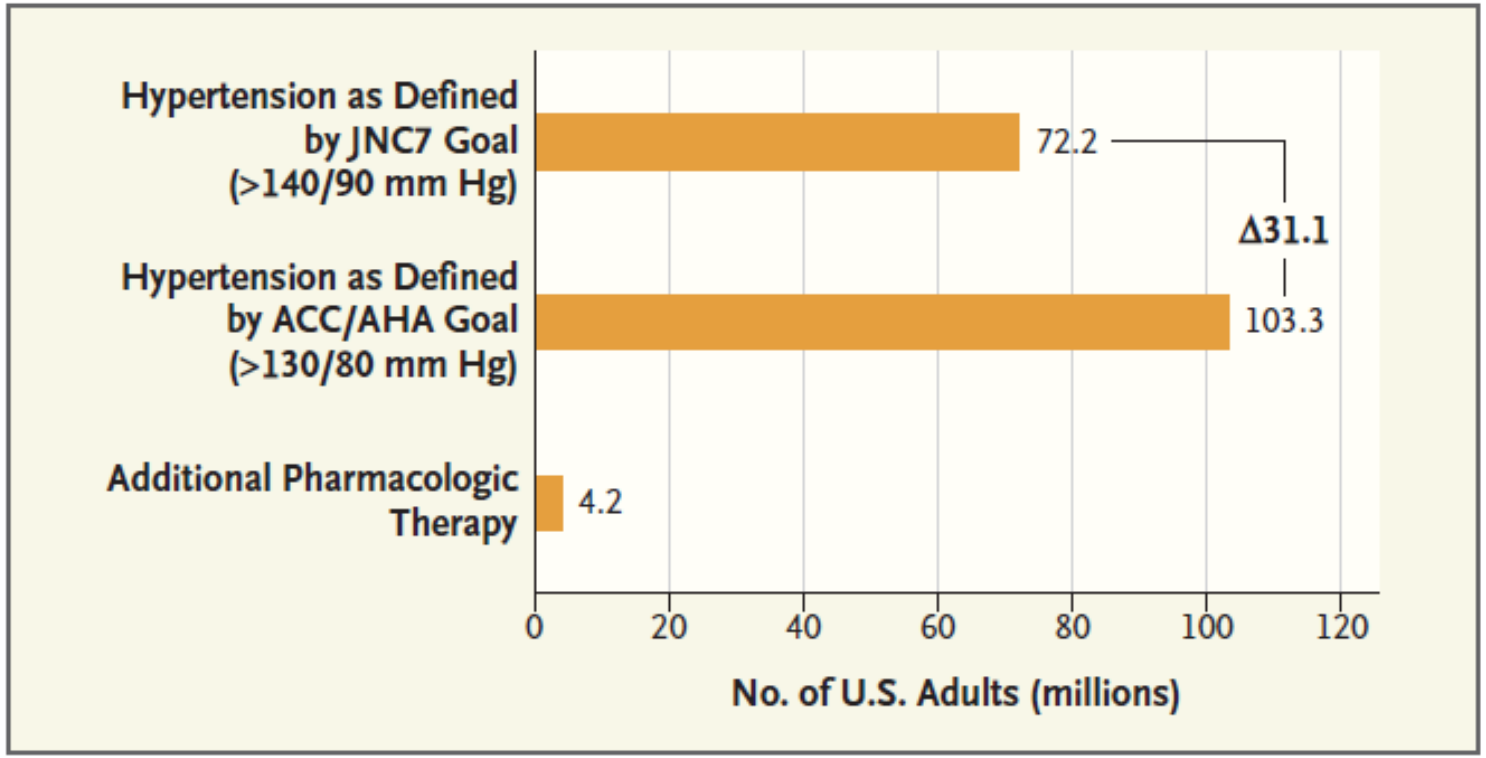
Interpretation Hypertension awareness, treatment, and control have improved substantially in high-income countries since the 1980s and 1990s. However, control rates have plateaued in the past decade, at levels lower than those in high-quality hypertension programmes. There is substantial variation across countries in the rates of hypertension awareness, treatment, and control.

***Lancet* 2019; 394: 639–51**

Awareness, Treatment, Control in Men and Women Aged 40–79 years

	Women				Men			
	Prevalence	Awareness	Treatment	Control	Prevalence	Awareness	Treatment	Control
Australia (2012)	33%	75%	65%	38%	39%	67%	55%	28%
Canada (2016–17)	36%	72%	66%	50%	34%	84%	81%	69%
Finland (2017)	52%	77%	59%	29%	59%	74%	55%	26%
Germany (2008–11)	43%	87%	80%	58%	46%	82%	70%	48%
Ireland (2009–11)*	43%	56%	50%	26%	56%	46%	39%	17%
Italy (2008–12)	45%	77%	68%	31%	56%	69%	56%	23%
Japan (2015)	40%	66%†	55%	29%	56%	65%†	52%	24%
New Zealand (2015–16)	41%	75%	62%	35%	45%	69%	55%	28%
South Korea (2016)	34%	76%	74%	53%	44%	68%	65%	46%
Spain (2015)‡	36%	69%	56%	29%	53%	64%	51%	25%
UK (2016)	36%	70%	59%	37%	40%	67%	55%	37%
USA (2015–16)	44%	86%	80%	54%	45%	79%	70%	49%

***Lancet* 2019; 394: 639–51**



U.S. Adults with Hypertension as Defined by the JNC7 and ACC/AHA Guidelines and Effect on Use of Pharmacologic Therapy.

Muntner P, Carey RM, Gidding S, et al.Potential US population impact of the 2017ACC/AHA high blood pressure guideline.Circulation 2018; 137: 109-18.

Effect of Systolic and Diastolic Blood Pressure on Cardiovascular Outcomes

Alexander C. Flint, M.D., Ph.D., Carol Conell, Ph.D., Xiushui Ren, M.D., Nader M. Banki, M.D., Sheila L. Chan, M.D., Vivek A. Rao, M.D., Ronald B. Melles, M.D., and Deepak L. Bhatt, M.D., M.P.H.

ABSTRACT

BACKGROUND

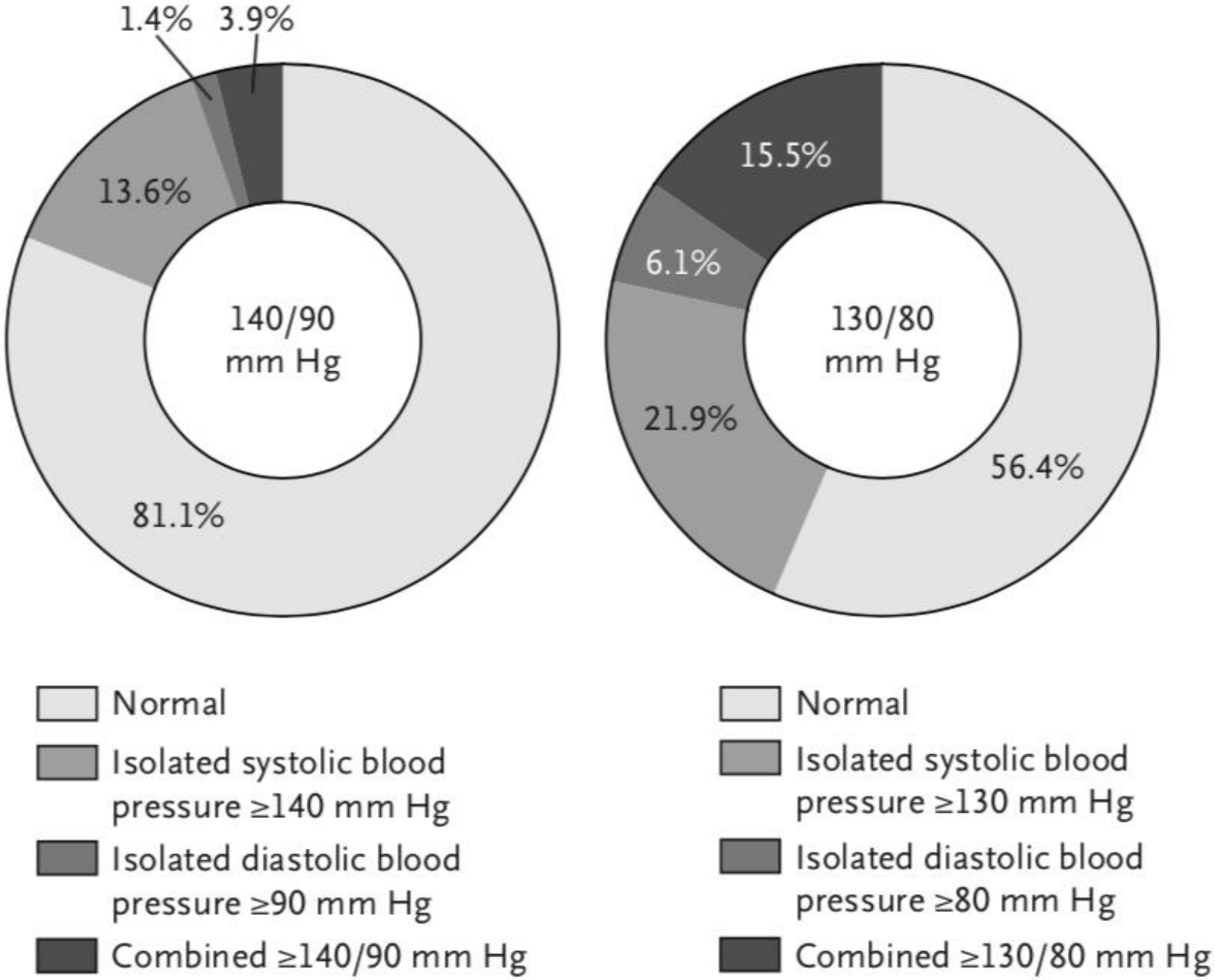
The relationship between outpatient systolic and diastolic blood pressure and cardiovascular outcomes remains unclear and has been complicated by recently revised guidelines with two different thresholds (≥140/90 mm Hg and ≥130/80 mm Hg) for treating hypertension.

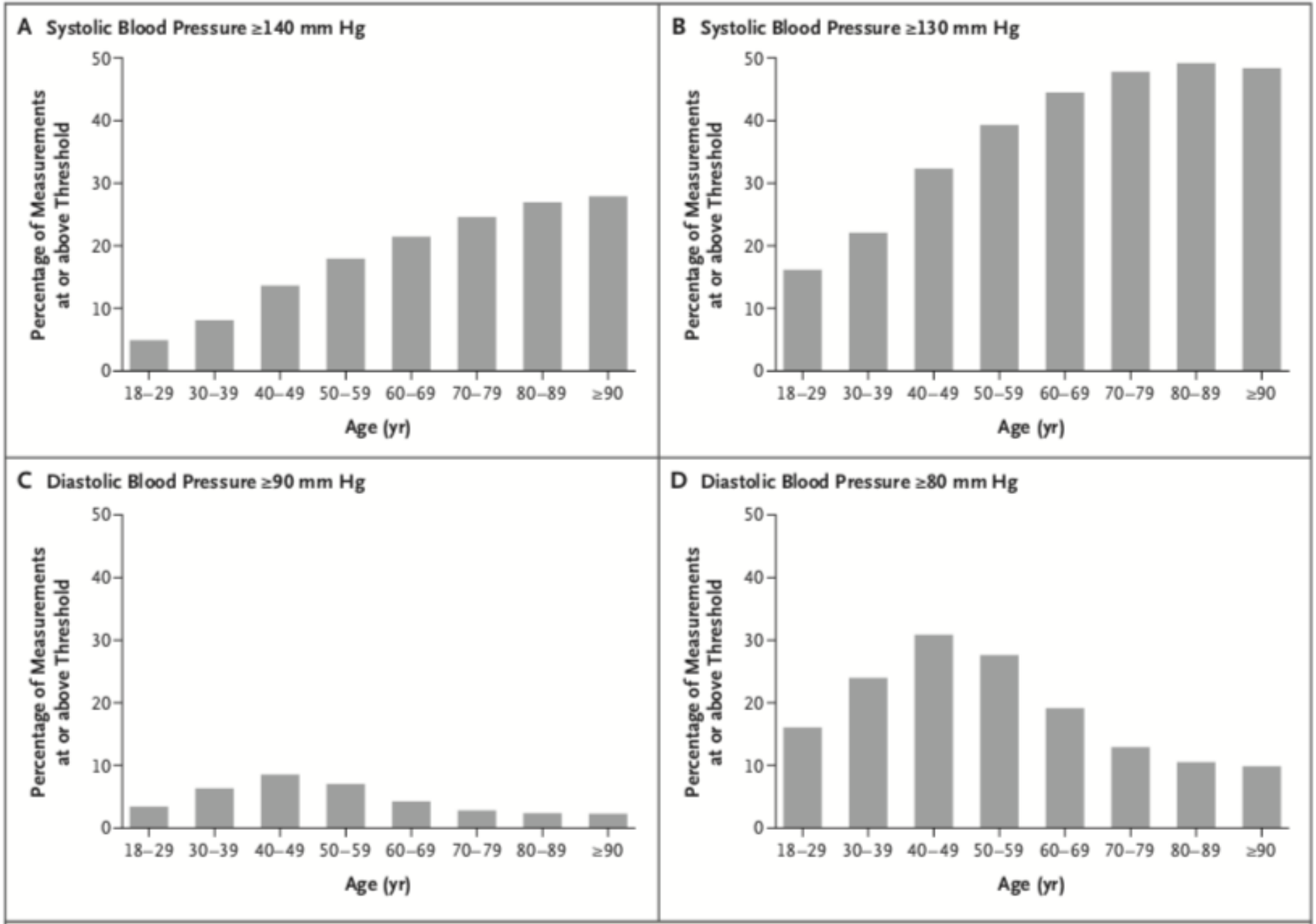
METHODS

Using data from 1.3 million adults in a general outpatient population, we performed a multivariable Cox survival analysis to determine the effect of the burden of systolic and diastolic hypertension on a composite outcome of myocardial infarction, ischemic stroke, or hemorrhagic stroke over a period of 8 years. The analysis controlled for demographic characteristics and coexisting conditions.

N Engl J Med 2019;381:243-51.

Blood-Pressure Categorization According to Threshold




A Systolic Blood Pressure ≥140 mm Hg
B Systolic Blood Pressure ≥130 mm Hg
C Diastolic Blood Pressure ≥90 mm Hg
D Diastolic Blood Pressure ≥80 mm Hg
Percentage of Measurements at or above Threshold
0
10
20
30
40
50
18–29
30–39
40–49
50–59
60–69
70–79
80–89
≥90
Age (yr)

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 NOVEMBER 26, 2015 VOL. 373 NO. 22

A Randomized Trial of Intensive versus Standard Blood-Pressure Control

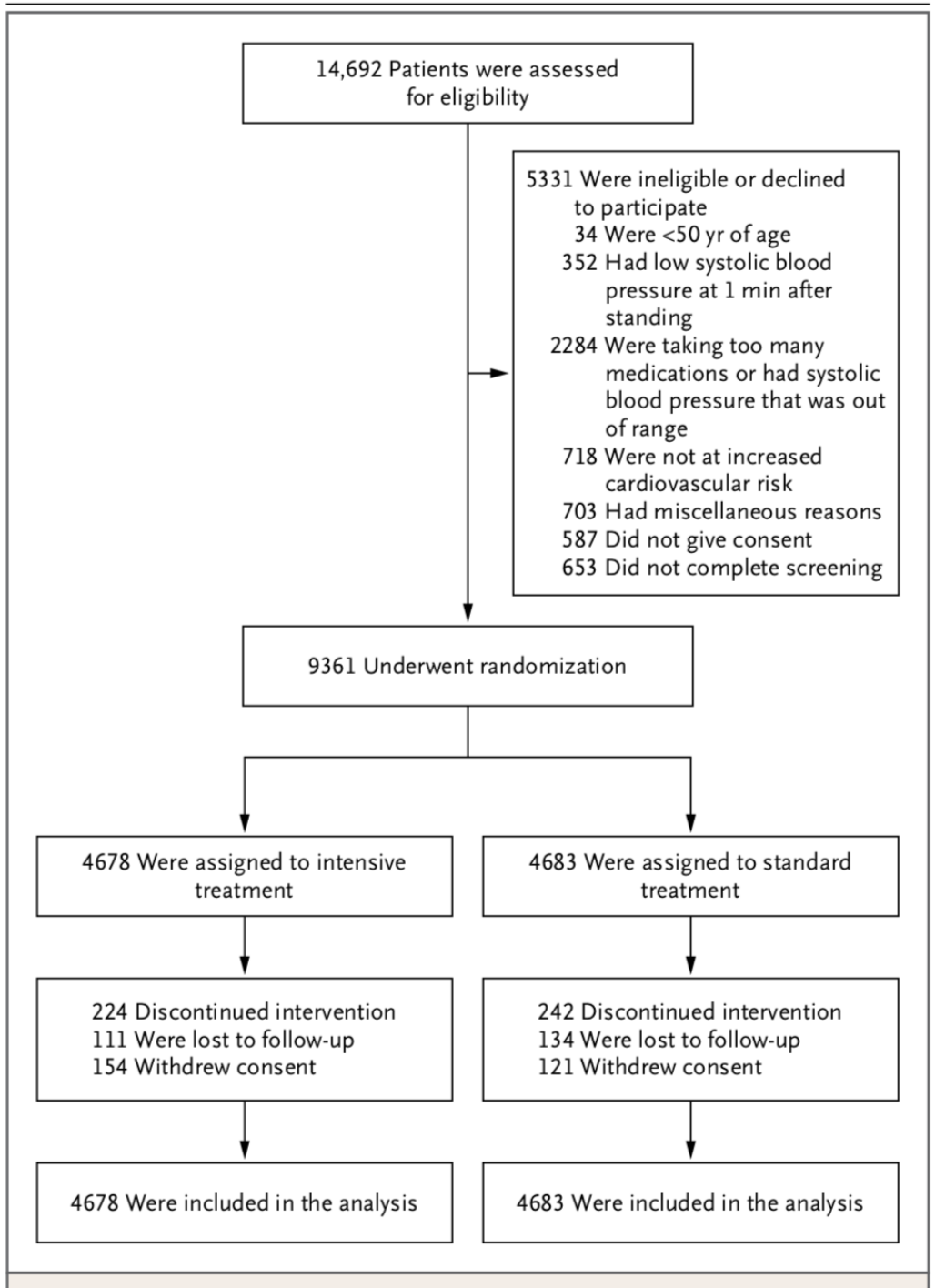
The SPRINT Research Group*

N Engl J Med 2015;373:2103-16.

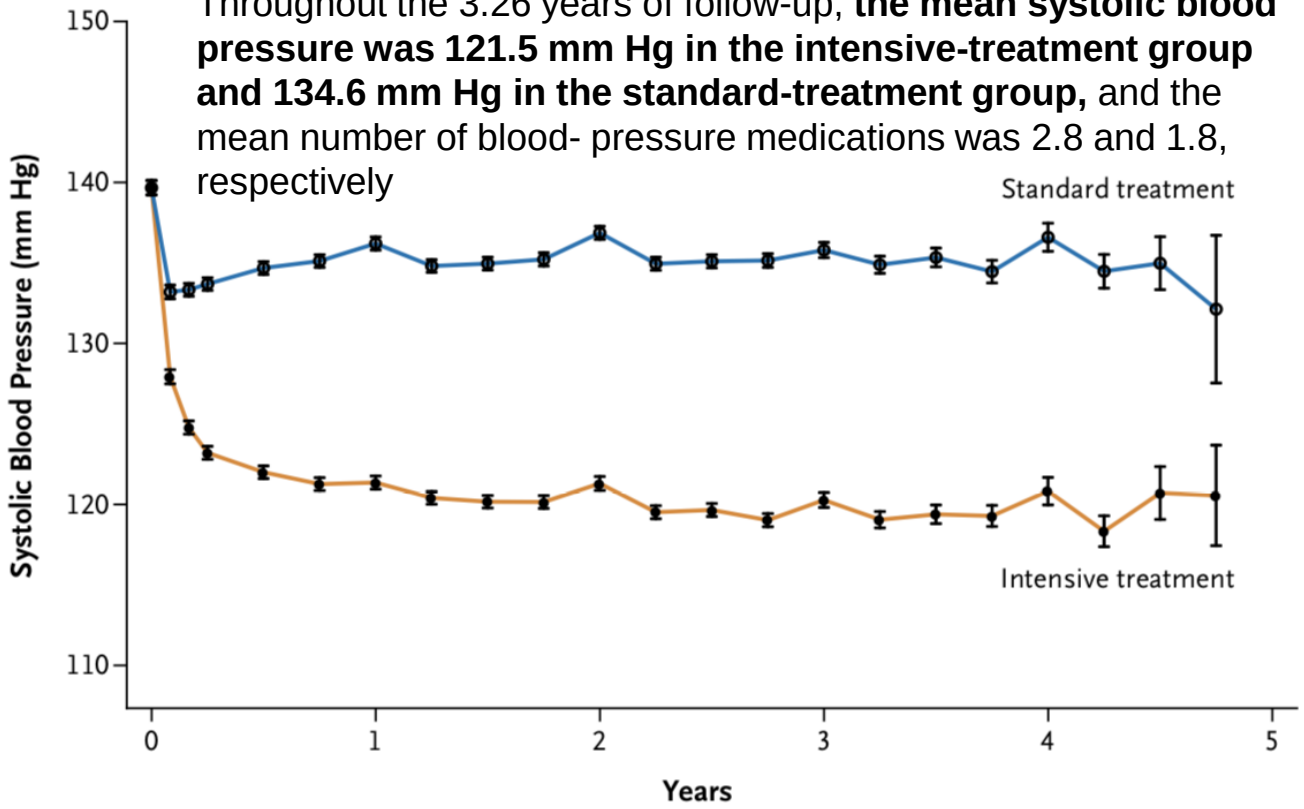
- 9361persons with a systolic blood pressure of 130mmHg or higher and an increased cardiovascular risk, **but without diabetes**, to a systolic blood-pressure target of less than 120 mm Hg (intensive treatment) or a target of less than 140 mm Hg (standard treatment).

- The **primary composite outcome** was myocardial infarction, other acute coronary syndromes, stroke, heart failure, or death from cardiovascular causes.

N Engl J Med 2015;373:2103-16.



Throughout the 3.26 years of follow-up, **the mean systolic blood pressure was 121.5 mm Hg in the intensive-treatment group and 134.6 mm Hg in the standard-treatment group,** and the mean number of blood- pressure medications was 2.8 and 1.8, respectively



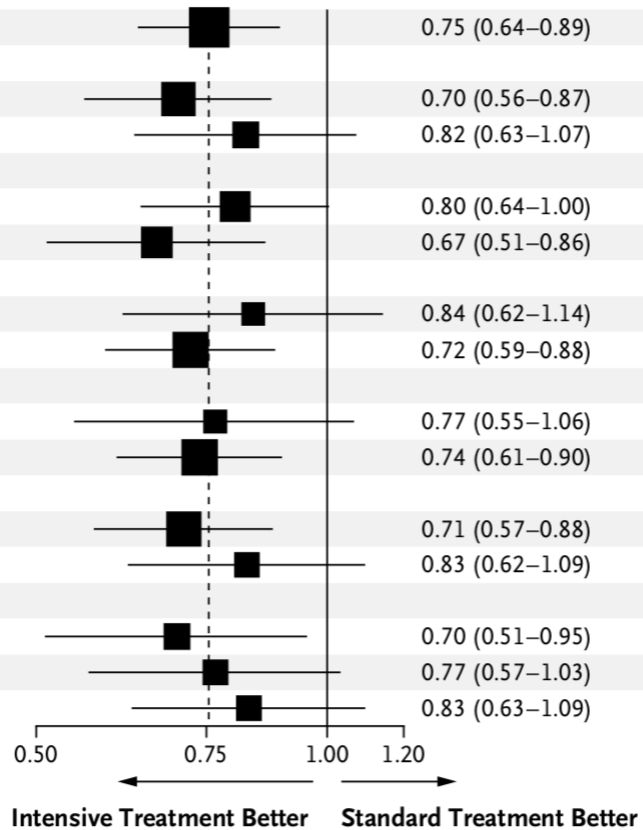
No. with Data										
Standard treatment	4683	4345	4222	4092	3997	3904	3115	1974	1000	274
Intensive treatment	4678	4375	4231	4091	4029	3920	3204	2035	1048	286
Mean No. of Medications										
Standard treatment	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Intensive treatment	2.3	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0

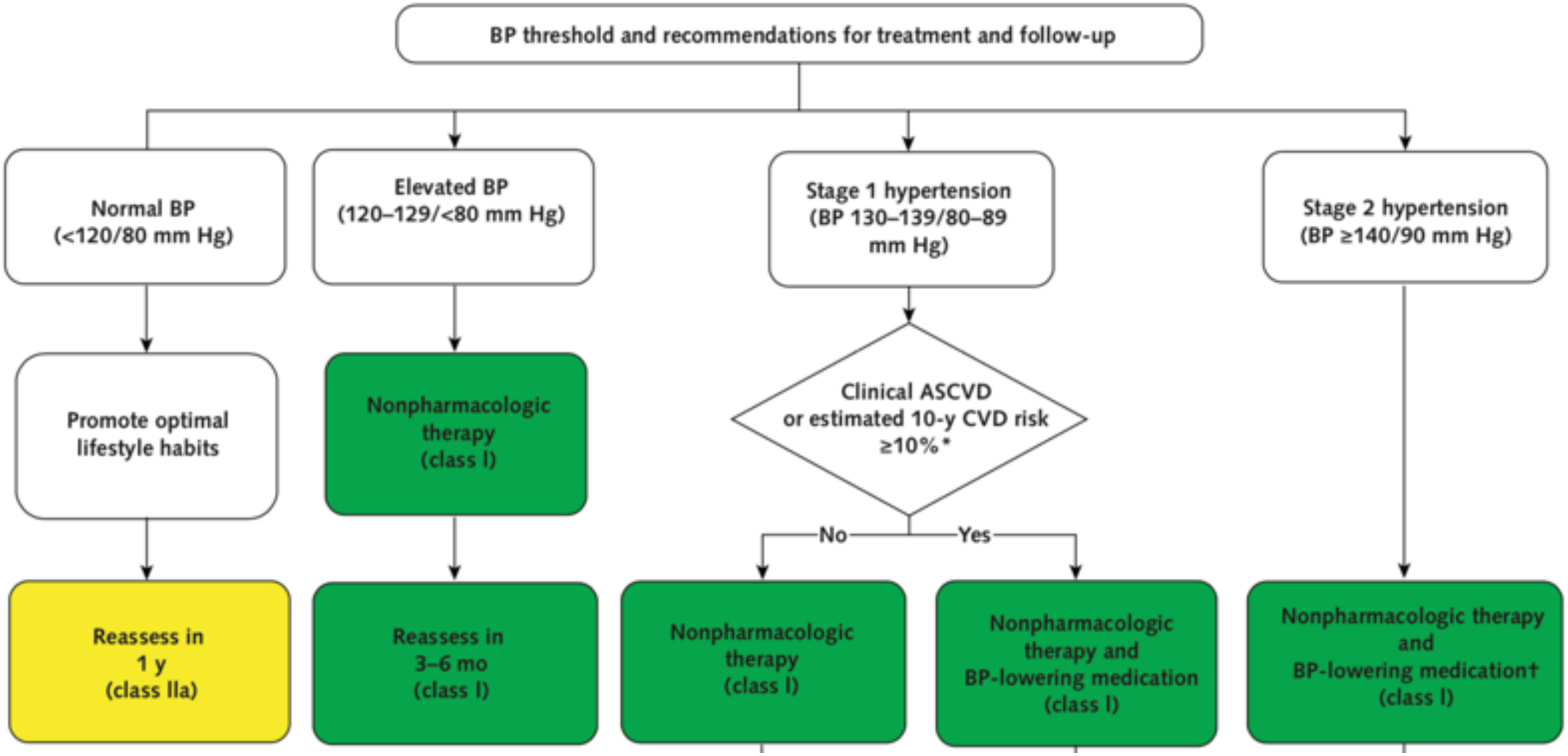
N Engl J Med 2015;373:2103-16.

Table 2. Primary and Secondary Outcomes and Renal Outcomes.*

Outcome	Intensive Treatment		Standard Treatment		Hazard Ratio (95% CI)	P Value
	no. of patients (%)	*% per year*	*no. of patients (%)*	*% per year*		
All participants	**(N=4678)**		**(N=4683)**			
Primary outcome†	243 (5.2)	1.65	319 (6.8)	2.19	0.75 (0.64–0.89)	<0.001
Secondary outcomes						
Myocardial infarction	97 (2.1)	0.65	116 (2.5)	0.78	0.83 (0.64–1.09)	0.19
Acute coronary syndrome	40 (0.9)	0.27	40 (0.9)	0.27	1.00 (0.64–1.55)	0.99
Stroke	62 (1.3)	0.41	70 (1.5)	0.47	0.89 (0.63–1.25)	0.50
Heart failure	62 (1.3)	0.41	100 (2.1)	0.67	0.62 (0.45–0.84)	0.002
Death from cardiovascular causes	37 (0.8)	0.25	65 (1.4)	0.43	0.57 (0.38–0.85)	0.005
Death from any cause	155 (3.3)	1.03	210 (4.5)	1.40	0.73 (0.60–0.90)	0.003
Primary outcome or death	332 (7.1)	2.25	423 (9.0)	2.90	0.78 (0.67–0.90)	<0.001
Participants with CKD at baseline	**(N=1330)**		**(N=1316)**			
Composite renal outcome‡	14 (1.1)	0.33	15 (1.1)	0.36	0.89 (0.42–1.87)	0.76
≥50% reduction in estimated GFR§	10 (0.8)	0.23	11 (0.8)	0.26	0.87 (0.36–2.07)	0.75
Long-term dialysis	6 (0.5)	0.14	10 (0.8)	0.24	0.57 (0.19–1.54)	0.27
Kidney transplantation	0		0			
Incident albuminuria¶	49/526 (9.3)	3.02	59/500 (11.8)	3.90	0.72 (0.48–1.07)	0.11
Participants without CKD at baseline‖	**(N=3332)**		**(N=3345)**			
≥30% reduction in estimated GFR to <60 ml/min/1.73 m^2§	127 (3.8)	1.21	37 (1.1)	0.35	3.49 (2.44–5.10)	<0.001
Incident albuminuria¶	110/1769 (6.2)	2.00	135/1831 (7.4)	2.41	0.81 (0.63–1.04)	0.10

Subgroup	Intensive Treatment	Standard Treatment	Hazard Ratio (95% CI)	P Value for Interaction
	no. of patients with primary outcome/total no. (%)			
Overall	243/4678 (5.2)	319/4683 (6.8)	0.75 (0.64–0.89)	
Previous CKD				0.36
No	135/3348 (4.0)	193/3367 (5.7)	0.70 (0.56–0.87)	
Yes	108/1330 (8.1)	126/1316 (9.6)	0.82 (0.63–1.07)	
Age				0.32
<75 yr	142/3361 (4.2)	175/3364 (5.2)	0.80 (0.64–1.00)	
≥75 yr	101/1317 (7.7)	144/1319 (10.9)	0.67 (0.51–0.86)	
Sex				0.45
Female	77/1684 (4.6)	89/1648 (5.4)	0.84 (0.62–1.14)	
Male	166/2994 (5.5)	230/3035 (7.6)	0.72 (0.59–0.88)	
Race				0.83
Black	62/1454 (4.3)	85/1493 (5.7)	0.77 (0.55–1.06)	
Nonblack	181/3224 (5.6)	234/3190 (7.3)	0.74 (0.61–0.90)	
Previous cardiovascular disease				0.39
No	149/3738 (4.0)	208/3746 (5.6)	0.71 (0.57–0.88)	
Yes	94/940 (10.0)	111/937 (11.8)	0.83 (0.62–1.09)	
Systolic blood pressure				0.77
≤132 mm Hg	71/1583 (4.5)	98/1553 (6.3)	0.70 (0.51–0.95)	
>132 to <145 mm Hg	77/1489 (5.2)	106/1549 (6.8)	0.77 (0.57–1.03)	
≥145 mm Hg	95/1606 (5.9)	115/1581 (7.3)	0.83 (0.63–1.09)	




BP threshold and recommendations for treatment and follow-up
Normal BP (<120/80 mm Hg)
Elevated BP (120–129/<80 mm Hg)
Stage 1 hypertension (BP 130–139/80–89 mm Hg)
Stage 2 hypertension (BP ≥140/90 mm Hg)
Promote optimal lifestyle habits
Nonpharmacologic therapy (class I)
Clinical ASCVD or estimated 10-y CVD risk ≥10%*
No
Yes
Reassess in 1 y (class IIa)
Reassess in 3–6 mo (class I)
Nonpharmacologic therapy (class I)
Nonpharmacologic therapy and BP-lowering medication (class I)
Nonpharmacologic therapy and BP-lowering medication† (class I)

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

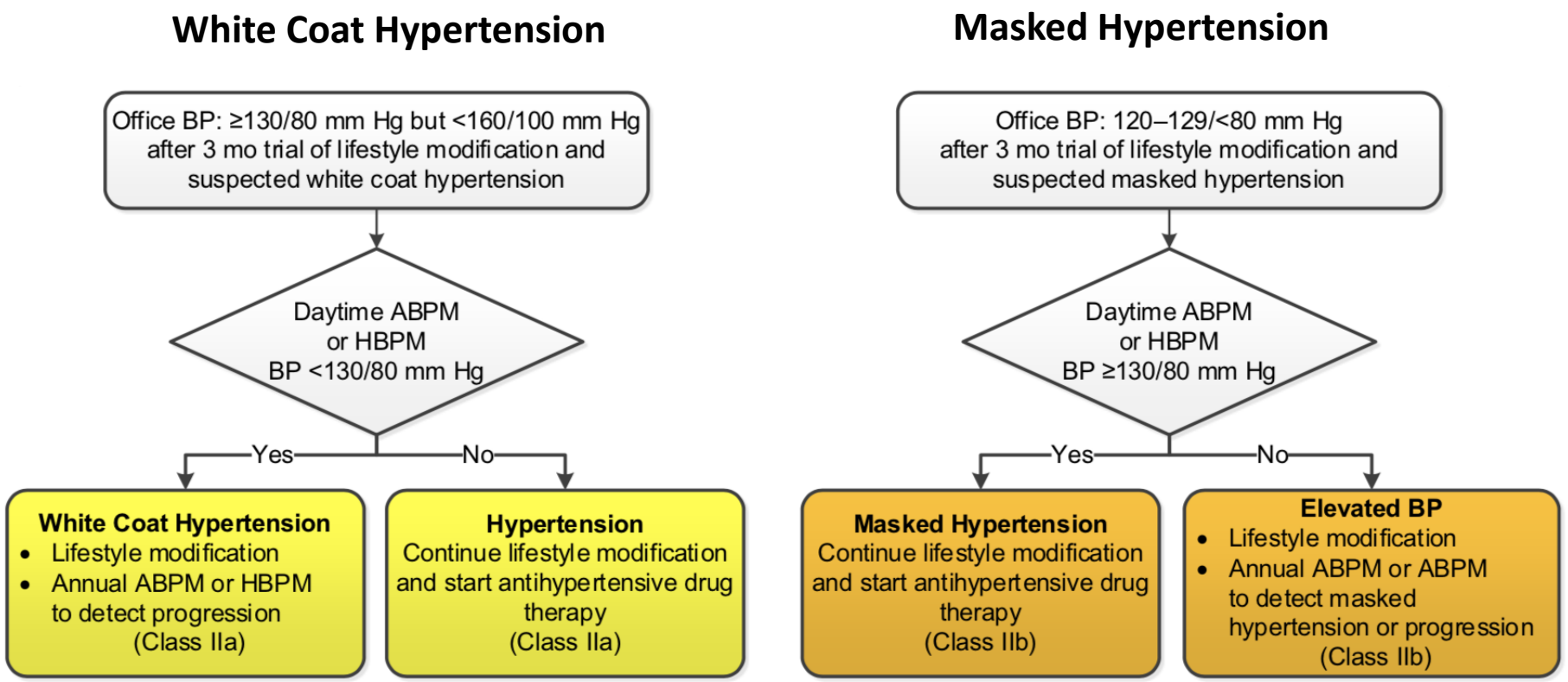


TABLE 2 Best Proven Nonpharmacologic Interventions for Prevention and Treatment of Hypertension

Nonpharmacologic Intervention	Dose	Approximate Impact on SBP	
		Hypertension	Normotension
Physical activity			
Aerobic	• 90-150 min/week • 65%-75% heart rate reserve	−5/8 mm Hg	−2/4 mm Hg
Dynamic resistance	• 90-150 min/week • 50%-80% 1 repetition maximum • 6 exercises, 3 sets/exercise, 10 repetitions/set	−4 mm Hg	−2 mm Hg
Isometric resistance	• 4 × 2 min (hand grip), 1 min rest between exercises, 30%-40% maximum voluntary contraction, 3 sessions/week, • 8-10 weeks	−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 ≥1 kg reduction in body weight for most adults who are overweight	−5 mm Hg	−2/3 mm Hg
Reduced intake of dietary [Na^+]			
Dietary sodium	<1,500 mg/day is optimal goal but ≥1,000 mg/day reduction in most adults	−5/6 mm Hg	−2/3 mm Hg
Enhanced intake of dietary [K^+]			
Dietary potassium	3,500-5,000 mg/day, 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/day • Women: <1 drink/day	−4 mm Hg	−3 mm Hg

DASH = Dietary Approaches to Stop Hypertension; SBP = systolic blood pressure.

Choice of Initial Medication

Recommendation for Choice of Initial Medication References that support the recommendation are summarized in Online Data Supplement 27 and Systematic Review Report.		
COR	**LOE**	**Recommendation**
I	A[SR]	1. For initiation of antihypertensive drug therapy, first-line agents include thiazide diuretics, CCBs, and ACE inhibitors or ARBs.[S8.1.6-1,S8.1.6-2]

SR indicates systematic review.

Causes of Failure to Normalize BP

- Lack of health insurance
- Lack of access to health care
- Absence of a usual source of care
- Failure to diagnose HT
  - Failure to screen for high BP
  - Inaccurate BP measurement
  - Failure to recognize masked HT
- Clinician therapeutic inertia
  - Failure to treat masked HT
  - Failure to initiate treatment when HT is present
  - Failure to intensify therapy in a treated patient when BP is above goal
- Inadequate patient education
- Absence of shared decision-making
- Inadequate lifestyle recommendations and counseling
- Low adherence to lifestyle modification and/or prescribed antihypertensive medication
- Absence of home or ambulatory BP monitoring and reporting
- Low patient and/or provider awareness of BP target
- Absence of systematic follow-up

Carey RM et al. JACC Focus Seminar. Prevention and Control of Hypertension. J Am Coll Cardiol 2018;72:2996-3011.

Methods to Assess and Improve Adherence

Assessment of Adherence
Indirect
Patient self-report; lacks accuracy
Adherence scales (e.g., Hill-Bone Compliance Scale); slight accuracy improvement
Prescription refill data, slight accuracy improvement
Direct
Medication Event Monitoring System*; increased accuracy over indirect methods
Witnessed medication intake; increased accuracy over indirect methods
Drug monitoring in blood or urine†; most accurate method currently available
Drug monitoring using drug fluorometry, accurate but experimental
Drug sensor, accurate but experimental

Improvement in Adherence
Educate patients, their families, and caregivers about hypertension, its consequences, and the possible adverse effects of antihypertensive medications
Address patient health literacy
Collaborate with patients to establish goals of therapy and the plan of care
Use antihypertensive agents dosed once daily and fixed-dose combinations
Use low-cost and generic medications whenever possible
Consolidate refill schedule to obtain all prescribed medication at a single pharmacy visit
Use motivation adherence scales to identify barriers
Assess for medication nonadherence regularly and systematically
Use team-based care
Maintain contact with patient via telehealth technology

*Uses an electronic pillbox or pill bottle that records each time the cap is opened. †Uses high-pressure liquid chromatography with tandem mass spectrometry.

Carey RM et al. JACC Focus Seminar. Prevention and Control of Hypertension. J Am Coll Cardiol 2018;72:2996-3011.

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CARDIOVASCULAR MEDICINE AND SOCIETY

Therapeutic Inertia in Cardiovascular Disease Prevention

Time to Move the Bar

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Clinical inertia is defined as the failure to initiate or intensify therapy when treatment goals are not met and is a well-recognized barrier to improving patient care and clinical outcomes

One key contributor to TI is poor guideline implementation and slow integration of new knowledge into practice. However, even when clinicians are aware of the guidelines, there is still considerable resistance to changing previous practice habits. The pervasiveness of this problem in prevention of CV morbidity and mortality and other areas of medicine cannot be overstated.

A community-based comprehensive intervention to reduce cardiovascular risk in hypertension (HOPE 4): a cluster-randomised controlled trial

Jon-David Schwalm, Tara McCready, Patricio Lopez-Jaramillo, Khalid Yusoff, Amir Attaran, Pablo Lamelas, Paul A Camacho, Fadhlina Majid, Shrikant I Bangdiwala, Lehana Thabane, Shofiqul Islam, Martin McKee, Salim Yusuf

Summary

Background Hypertension is the leading cause of cardiovascular disease globally. Despite proven benefits, hypertension control is poor. We hypothesised that a comprehensive approach to lowering blood pressure and other risk factors, informed by detailed analysis of local barriers, would be superior to usual care in individuals with poorly controlled or newly diagnosed hypertension. We tested whether a model of care involving non-physician health workers (NPHWs), primary care physicians, family, and the provision of effective medications, could substantially reduce cardiovascular disease risk.

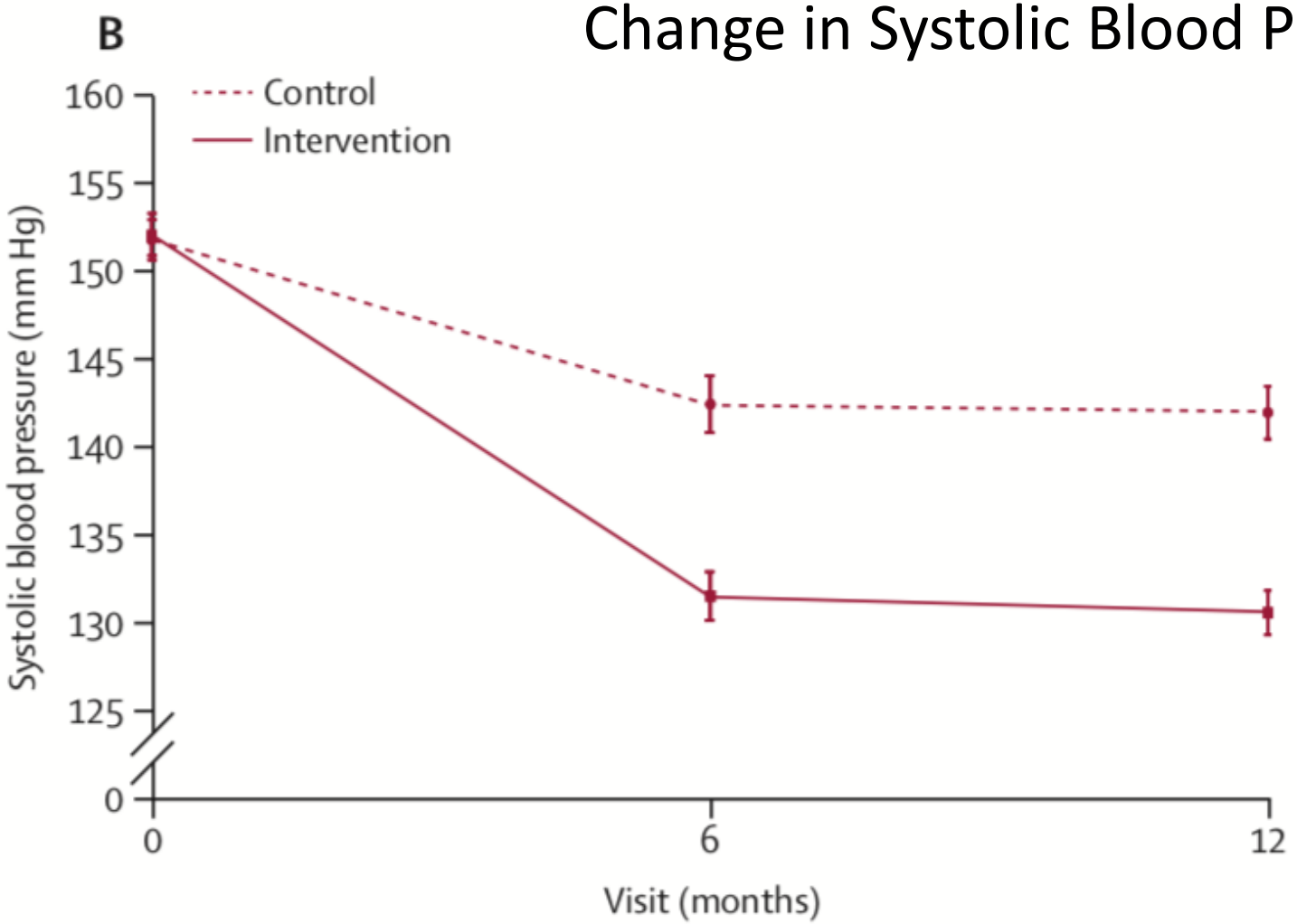
Methods HOPE 4 was an open, community-based, cluster-randomised controlled trial involving 1371 individuals with new or poorly controlled hypertension from 30 communities (defined as townships) in Colombia and Malaysia. 16 communities were randomly assigned to control (usual care, n=727), and 14 (n=644) to the intervention. After community screening, the intervention included treatment of cardiovascular disease risk factors by NPHWs using tablet computer-based simplified management algorithms and counselling programmes; free antihypertensive and statin medications recommended by NPHWs but supervised by physicians; and support from a family member or friend (treatment supporter) to improve adherence to medications and healthy behaviours. The primary outcome was the change in Framingham Risk Score 10-year cardiovascular disease risk estimate at 12 months between intervention and control participants. The HOPE 4 trial is registered at ClinicalTrials.gov, NCT01826019.

Findings All communities completed 12-month follow-up (data on 97% of living participants, n=1299). The reduction in Framingham Risk Score for 10-year cardiovascular disease risk was –6·40% (95% CI 8·00 to –4·80) in the control group and –11·17% (–12·88 to –9·47) in the intervention group, with a difference of change of –4·78% (95% CI –7·11 to –2·44, p<0·0001). There was an absolute 11·45 mm Hg (95% CI –14·94 to –7·97) greater reduction in systolic blood pressure, and a 0·41 mmol/L (95% CI –0·60 to –0·23) reduction in LDL with the intervention group (both p<0·0001). Change in blood pressure control status (<140 mm Hg) was 69% in the intervention group versus 30% in the control group (p<0·0001). There were no safety concerns with the intervention.

Interpretation A comprehensive model of care led by NPHWs, involving primary care physicians and family that was informed by local context, substantially improved blood pressure control and cardiovascular disease risk. This strategy is effective, pragmatic, and has the potential to substantially reduce cardiovascular disease compared with current strategies that are typically physician based.

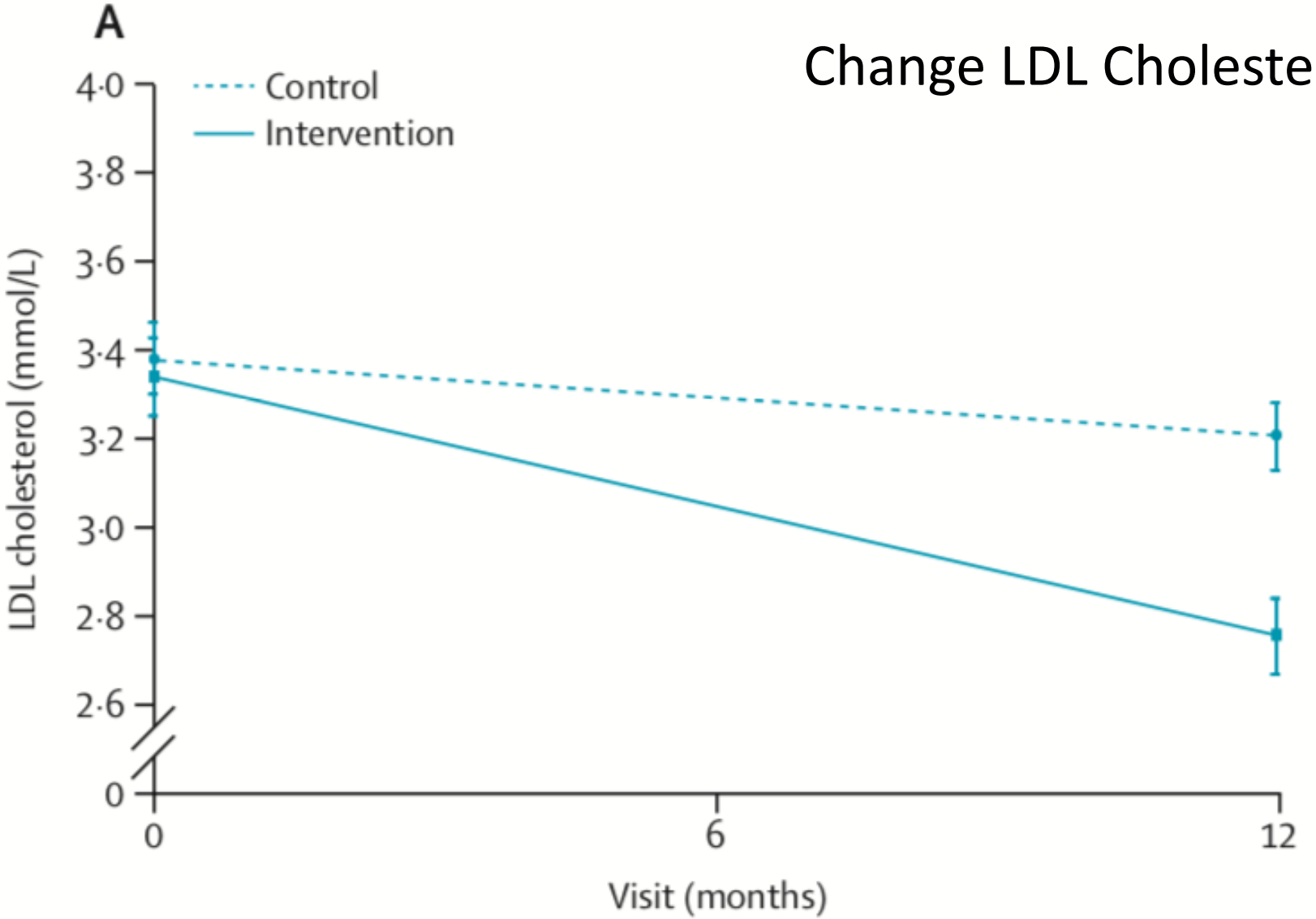
Lancet. 2019 Aug 30.

Change in Systolic Blood Pressure



	Control (N=674)	Intervention (N=602)	Control (N=665)	Intervention (N=587)	Control (N=674)	Intervention (N=602)
Mean (95% CI)	151·75 (150·62–152·88)	152·05 (150·88–153·25)	142·40 (140·8–144·0)	131·47 (130·1–132·9)	141·99 (140·48–143·49)	130·60 (129·35–131·83)

Change LDL Cholesterol



	Control (N=636)	Intervention (N=585)	Control (N=636)	Intervention (N=585)
Mean (95% CI)	3·38 (3·30–3·46)	3·34 (3·25–3·43)	3·21 (124) (3·13–3·28)	2·75 (106) (2·67–2·84)

KEY CLINICAL POINTS

INITIAL TREATMENT OF HYPERTENSION

- The 2017 ACC–AHA Hypertension Guideline redefines hypertension as a systolic blood pressure of 130 mm Hg or more or a diastolic blood pressure of 80 mm Hg or more and lowers the blood-pressure target to less than 130/80 mm Hg.
- This blood-pressure target is supported by the SPRINT trial, which showed lower hypertension-associated morbidity and all-cause mortality with a systolic blood-pressure target of less than 120 mm Hg than with a target of less than 140 mm Hg; electrolyte abnormalities, syncope, and acute kidney injury were more common in the lower-target group.
- The initial assessment should consider coexisting conditions, including cardiovascular disease, diabetes mellitus, chronic kidney disease, and elevated risk of cardiovascular disease, in determining when to start blood-pressure–lowering medication.
- Recommended lifestyle modifications include restriction of dietary sodium intake, weight loss if the patient is overweight, exercise, moderation of alcohol intake, and increased consumption of potassium-rich foods.
- The initial antihypertensive agent should generally be selected from one of four drug classes shown to reduce cardiovascular events: ACE inhibitors, angiotensin-receptor blockers, calcium-channel blockers, and thiazide-type diuretics.
- Repeat visits are required to ensure ongoing hypertension control.

N Engl J Med 2018;378:636-44.

Thank You