Treating Hypertension: New Guidelines

What number did they just say ?!?!

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Hypertension Overview

1 billion people affected world wide and 32 million in the US

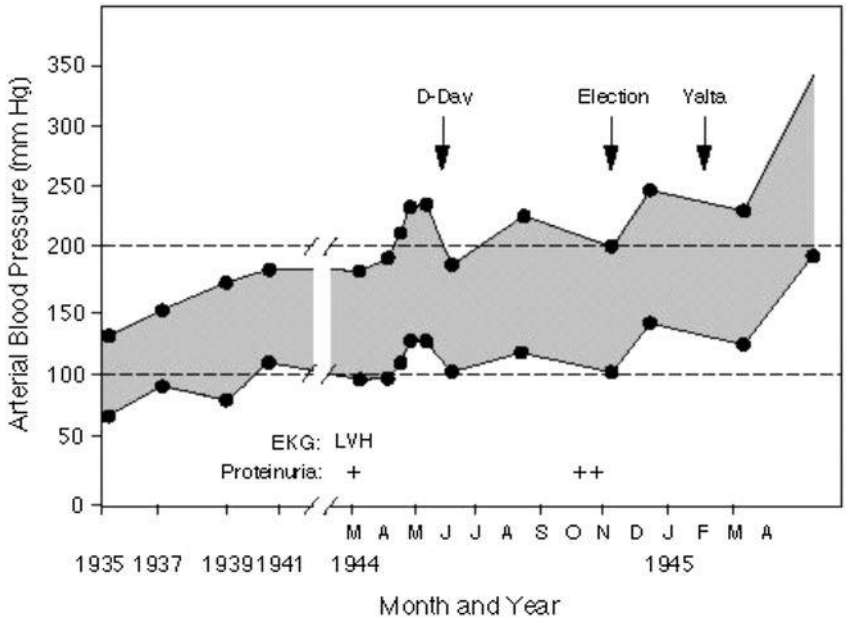
Two-thirds of those above 60yo have hypertension

By 50yo, isolated systolic hypertension (ISH) is the most common form of hypertension and is associated with the greatest risk of organ injury

One of the most common causes of preventable death

Complications include heart disease, stroke, kidney disease, age-related dementia

Franklin D. Roosevelt, the 32nd president of the USA, shortly before his fatal cerebral haemorrhage (left) and his blood pressure during his presidency until his death (right; from Ref. 2).



European Heart Journal

Thomas F. Lüscher, and Isabella Sudano Eur Heart J 2015;eurheartj.ehv621

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Benefits of hypertension treatment: VA Cooperative Study Group

143 subjects were recruited
Baseline DBP 115 to 130mmHg
SBP typically 190 to 220 at baseline in both groups
Patients randomized to any drug or placebo
- Methyl-dopa and:
  - Hydralazine
  - Reserpine
  - HCTZ

Subject were followed for 16 to 21 months
Treatment group achieved an average BP of 143/91
Event numbers:
- Placebo group: 39%
- Treatment group: 3%

Table 4.—Incidence of Mortality and Morbidity

	Placebo-Treated Patients	Actively Treated Patients
Deaths	4	0
Class A events	10	0
Subtotal	**14**	**0**
Other treatment failures	7	1
Total terminating events	**21**	**1**
Class B events (nonterminating)	6	1
Total	**27**	**2**

JAMA, Dec 11, 1967 • V[redacted] No 11

Benefits of hypertension treatment: Studies of “milder” hypertension

Medical Research Council (MRC) Study of hypertension

17,354 subjects recruited with baseline DBP between 90 and 109

- Average BP was 159/98 at baseline

Subjects randomized to placebo or treatment

- Treatment goal was DBP < 90
- Thiazide diuretic or beta blocker used

Subjects followed for 5 years

Average blood pressure in the treatment group was 137/87

Benefits of hypertension treatment: Studies of “milder” hypertension

TABLE VI—*Main events for both sexes together. Numbers and rates per 1000 patient years*

	Active treatment†		Placebos		% Difference‡ (95% confidence limits)	Absolute difference/ 1000 patient years§ (95% confidence limits)
	No	Rate	No	Rate		
Strokes						
Fatal	18	0·4	27	0·6	34	0·2
Non-fatal	42	1·0	82	1·9	49	0·9
Total	60	1·4	109	2·6	45 (25, 60)	1·2 (0·6, 1·7)
Coronary events						
Fatal	106	2·5	97	2·3	−9	−0·2
Non-fatal	116	2·7	137	3·2	16	0·5
Total	222	5·2	234	5·5	6 (−13, 21)	0·3 (−0·7, 1·3)
All cardiovascular events*	286	6·7	352	8·2	19 (5, 31)	1·6 (0·4, 2·7)
All cardiovascular deaths	134	3·1	139	3·3	4 (−22, 24)	0·1 (−0·6, 0·9)
Non-cardiovascular deaths	114	2·7	114	2·7	0 (−29, 23)	0·0 (−0·7, 0·7)
All deaths	248	5·8	253	5·9	2 (−16, 18)	0·1 (−0·9, 1·2)

*Not necessarily equal to the total of strokes plus coronary events because it also includes “other relevant deaths” and death due to other cardiovascular causes such as ruptured aneurysms.
†Randomised either to bendrofluazide or to propranolol.
‡Percentage difference between rates on active and on placebo therapy.
§Absolute difference between rates on active treatment and on placebo therapy.

BMJ, 1985

Benefits of hypertension treatment: Studies of systolic hypertension in older patients

SHEP:

- 4700 subjects with isolated systolic hypertension (DBP < 90)
- Baseline BP 160-219/<90
- Randomized to SBP reduction of > 20mmHg
- Achieved avg BP 143/68
- 28% reduction in CHD, 36% reduction in CVA

STOP:

- 1600 subjects with SBP between 180 and 230
- Baseline BP 195/102
- Randomized to SBP drop of > 20mmHg
- Achieved avg BP 166/85
- 46% reduction is stroke, 43%reduction in mortality

Table 1. Antihypertensive Drug Trials: Risk Reductions for Coronary Heart Disease*

	Active			Control			Risk Reductions, % (95% CI)		P	
	Fatal	Total	N	Fatal	Total	N	Fatal	Total	Fatal	Total
14 previous trials	316	671	18 487	356	771	18 407	11 (−4-24)	14 (4-22)	.12	.007
SHEP	59	104	2365	74†	142	2371	21	28	.19	.01
STOP-Hypertension	10	31	812	20	32	815	49	3	.07	.91
MRC (older adults)	85	128	2183	110	159	2213	22	19	.08	.08
17 trials	470	934	23 847	560	1104	23 806	16 (5-26)	16 (8-23)	.006	.0001

*SHEP indicates Systolic Hypertension in the Elderly program; STOP, Swedish Trial in Old Patients; MRC, Medical Research Council; and CI, confidence interval.

†Includes one death due to myocardial infarction based on death certificate coding classification as a death of indeterminate cause in the SHEP final result.

Table 3. Antihypertensive Drug Trials: Risk Reductions for Total Vascular Mortality*

	Active		Control		Risk Reductions, % (95% CI)	P
	Vascular Deaths	N	Vascular Deaths	N		
14 previous trials	489	18 487	613	18 407	21 (11-30)	.0002
SHEP	101†	2365	130†	2371	23	.05
STOP-Hypertension	17	812	41	815	57	.001
MRC (older adults)	161	2183	180	2213	10	.35
17 trials	768	23 847	964	23 806	21 (13-28)	<.0001

*See Table 1 footnotes for expansion of abbreviations.

†Includes 11 deaths in the active treatment group and 10 in the control group due to either cardiovascular diseases or unknown causes based on death certificate coding. These were classified as deaths of indeterminate cause in the SHEP final results.

Arch Int Med., 1993

JNC 7 Recommendations (2003)

Classification of Blood Pressure (BP)*

Category	SBP mmHg		DBP mmHg
Normal	<120	and	<80
Prehypertension	120–139	or	80–89
Hypertension, Stage 1	140–159	or	90–99
Hypertension, Stage 2	≥160	or	≥100

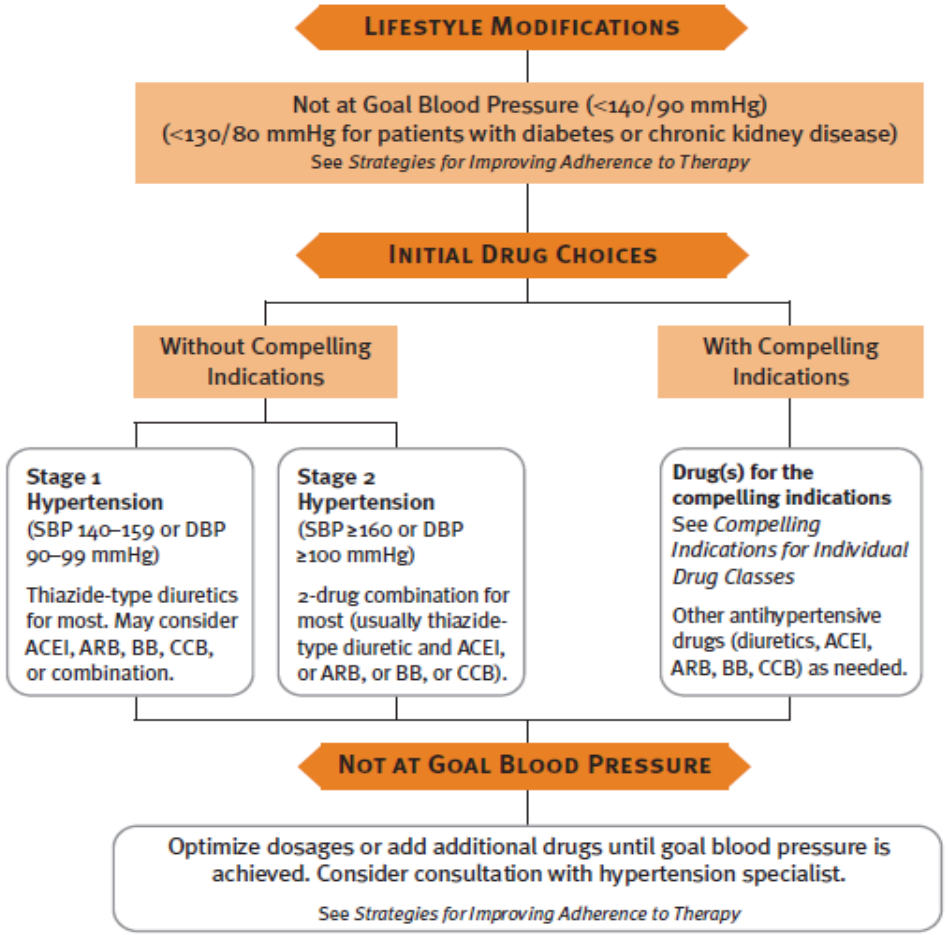
* See *Blood Pressure Measurement Techniques* (reverse side)
Key: SBP = systolic blood pressure DBP = diastolic blood pressure

TREATMENT

Principles of Hypertension Treatment

- Treat to BP <140/90 mmHg or BP <130/80 mmHg in patients with diabetes or chronic kidney disease.
- Majority of patients will require two medications to reach goal.

Algorithm for Treatment of Hypertension



From: **2014 Evidence-Based Guideline for the Management of High Blood Pressure in AdultsReport From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8)**

JAMA. 2014;311(5):507-520. doi:10.1001/jama.2013.284427

Table 1. Comparison of Current Recommendations With JNC 7 Guidelines

Topic	JNC 7	2014 Hypertension Guideline
Methodology	Nonsystematic literature review by expert committee including a range of study designs Recommendations based on consensus	Critical questions and review criteria defined by expert panel with input from methodology team Initial systematic review by methodologists restricted to RCT evidence Subsequent review of RCT evidence and recommendations by the panel according to a standardized protocol
Definitions	Defined hypertension and prehypertension	Definitions of hypertension and prehypertension not addressed, but thresholds for pharmacologic treatment were defined
Treatment goals	Separate treatment goals defined for "uncomplicated" hypertension and for subsets with various comorbid conditions (diabetes and CKD)	Similar treatment goals defined for all hypertensive populations except when evidence review supports different goals for a particular subpopulation
Lifestyle recommendations	Recommended lifestyle modifications based on literature review and expert opinion	Lifestyle modifications recommended by endorsing the evidence-based Recommendations of the Lifestyle Work Group
Drug therapy	Recommended 5 classes to be considered as initial therapy but recommended thiazide-type diuretics as initial therapy for most patients without compelling indication for another class Specified particular antihypertensive medication classes for patients with compelling indications, ie, diabetes, CKD, heart failure, myocardial infarction, stroke, and high CVD risk Included a comprehensive table of oral antihypertensive drugs including names and usual dose ranges	Recommended selection among 4 specific medication classes (ACEI or ARB, CCB or diuretics) and doses based on RCT evidence Recommended specific medication classes based on evidence review for racial, CKD, and diabetic subgroups Panel created a table of drugs and doses used in the outcome trials
Scope of topics	Addressed multiple issues (blood pressure measurement methods, patient evaluation components, secondary hypertension, adherence to regimens, resistant hypertension, and hypertension in special populations) based on literature review and expert opinion	Evidence review of RCTs addressed a limited number of questions, those judged by the panel to be of highest priority.
Review process prior to publication	Reviewed by the National High Blood Pressure Education Program Coordinating Committee, a coalition of 39 major professional, public, and voluntary organizations and 7 federal agencies	Reviewed by experts including those affiliated with professional and public organizations and federal agencies; no official sponsorship by any organization should be inferred

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CCB, calcium channel blocker; CKD, chronic kidney disease; CVD, cardiovascular disease; JNC, Joint National Committee; RCT, randomized controlled trial

Benefits of hypertension treatment: Treatment goals

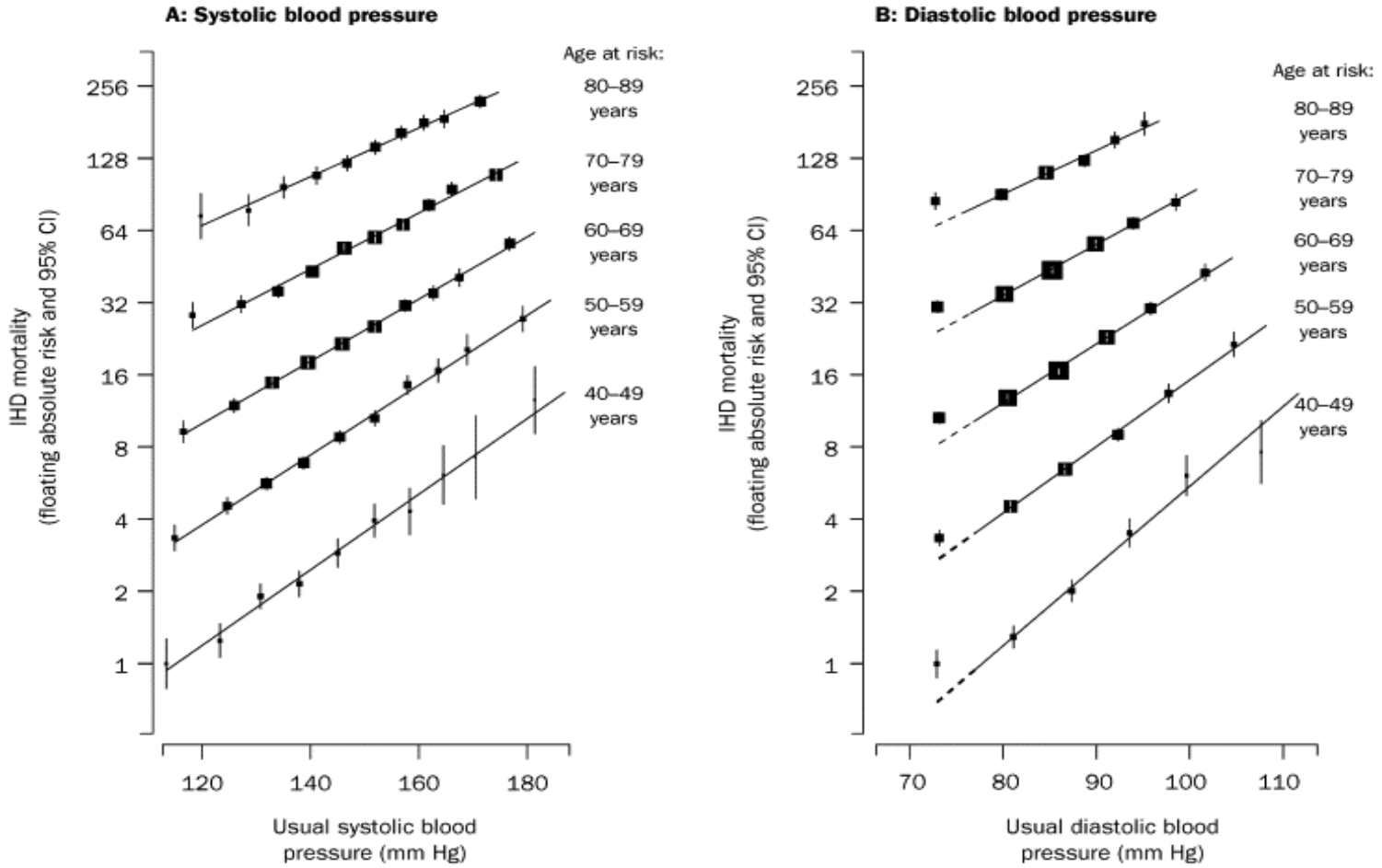
Based on these studies, reduction of blood pressure below 140/90 led to a 16% reduction in coronary events and a 40% reduction in stroke

Previous treatment goals:

< 60yo - < 140 / < 90

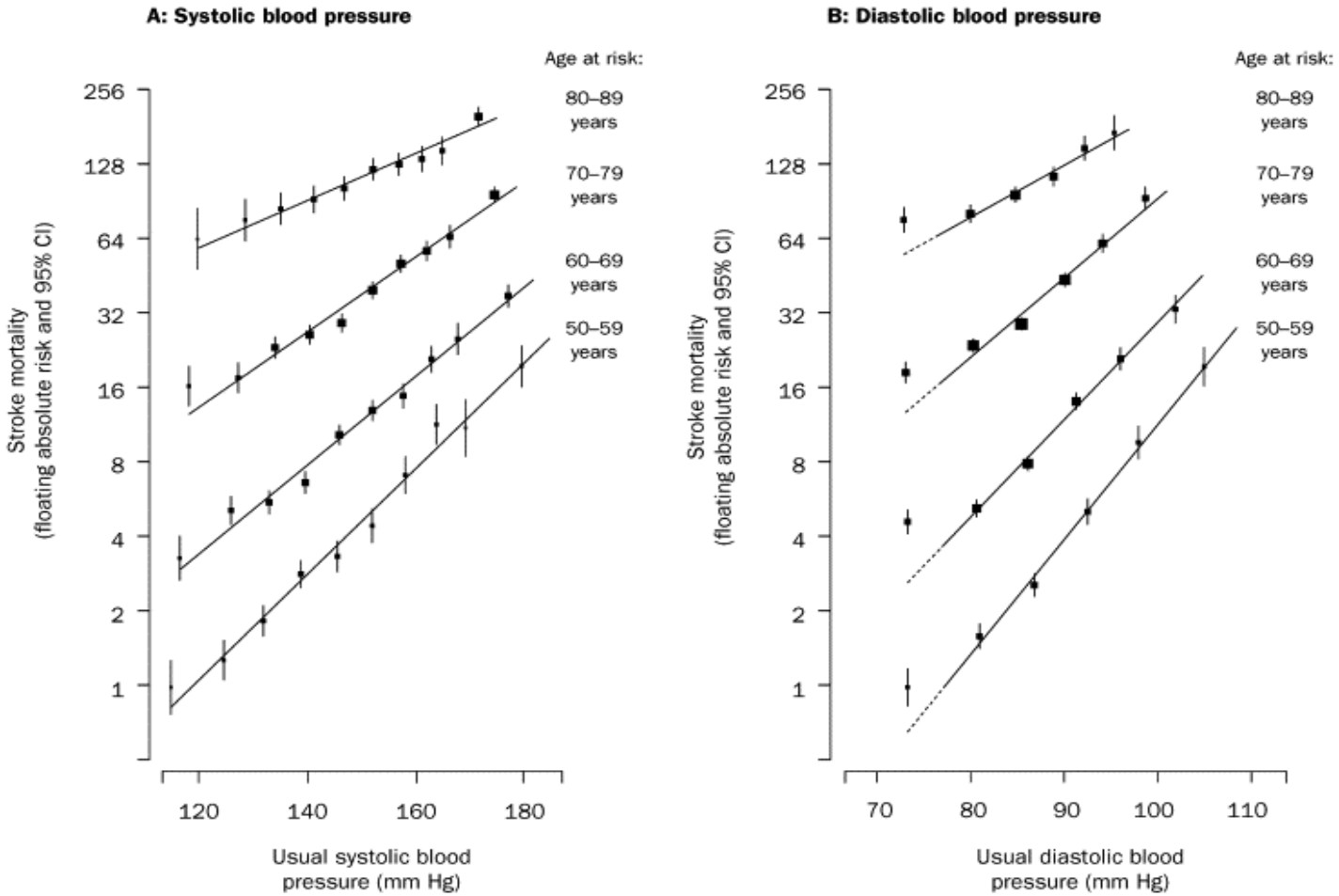
> 60yo - < 150 / < 90 except for certain populations such as chronic kidney disease with or without proteinuria or diabetics

Hypertension:
What do observational studies say?



Lancet, Volume 360, Issue 9349, 2002, 1903–1913

Hypertension:
What do observational studies say?

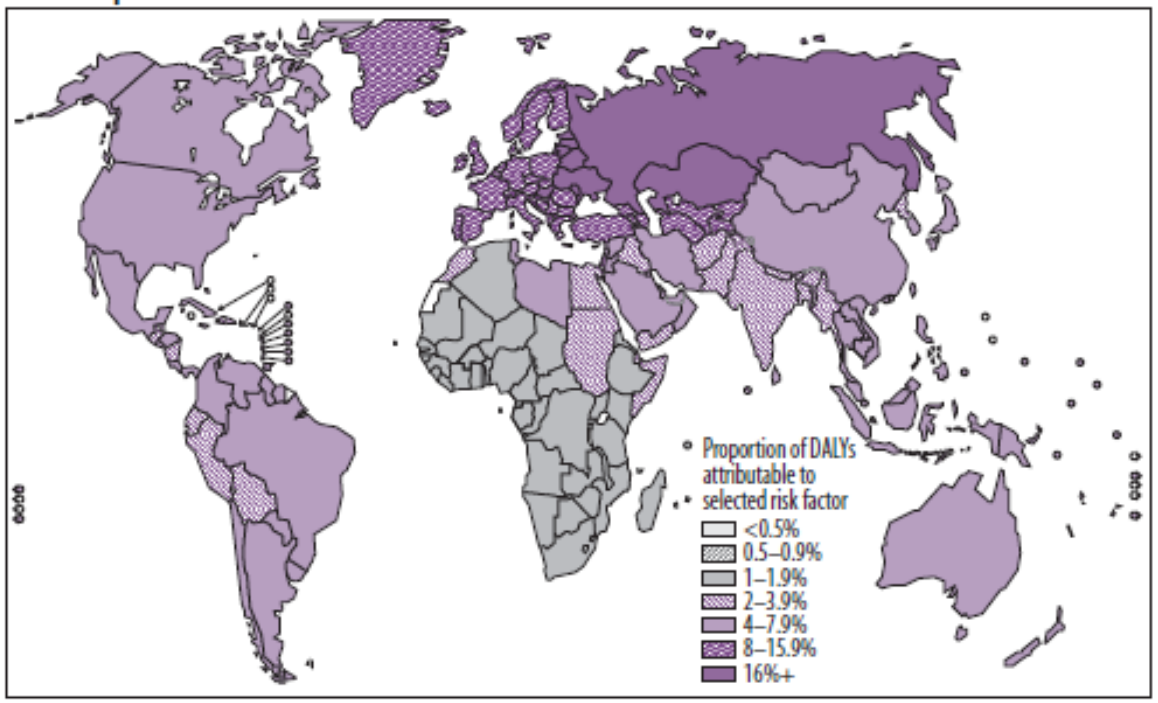


Lancet, Volume 360, Issue 9349, 2002, 1903–1913

Hypertension:
What do observational studies say?

Figure 4.3 Burden of disease attributable to diet-related risk factors and physical inactivity (% DALYs in each subregion)

A. Blood pressure



WHO, 2002

Impact of suboptimal blood pressures (SBP>115mmHg):

7.1 million (13%) deaths

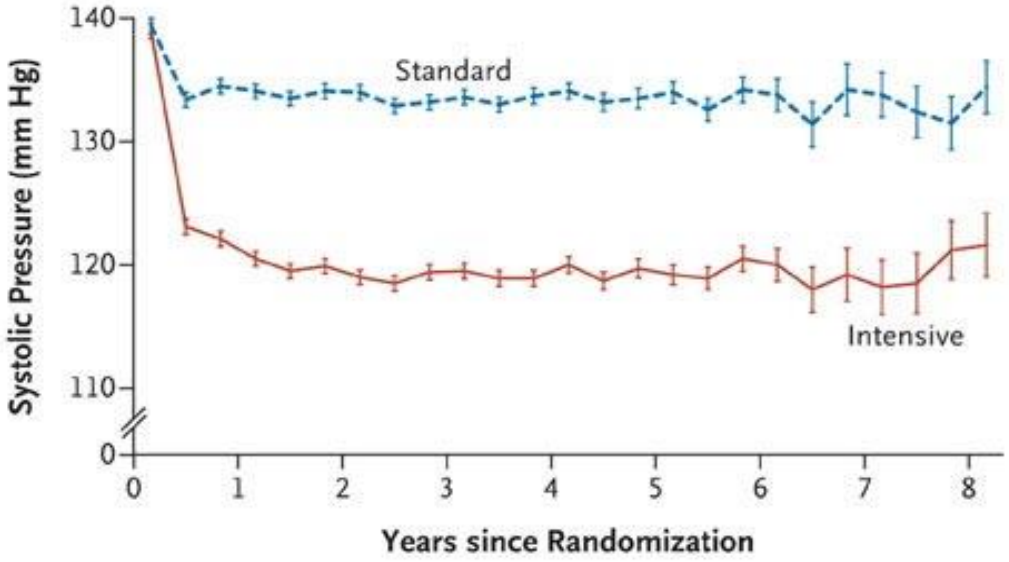
49% ischemic heart disease

62% cerebrovascular disease

64 million disability adjusted life years lost

Half of these are associated with a SBP<145mmHg

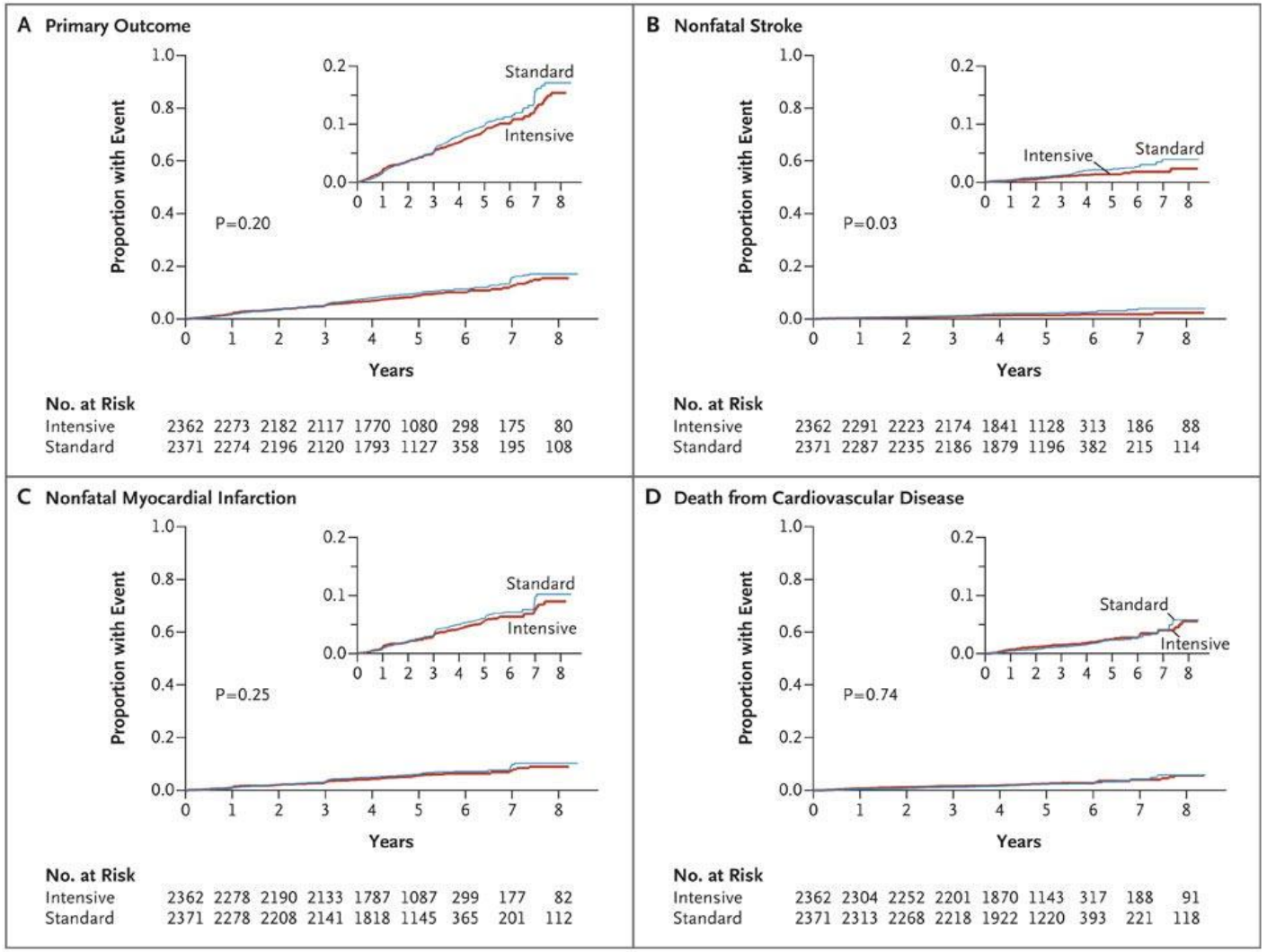
Is an induced systolic blood pressure goal below 120mmHg beneficial? The ACCORD Experience



Mean No. of Medications Prescribed								
Intensive	3.2	3.4	3.4	3.5	3.5	3.5	3.4	3.4
Standard	1.9	2.1	2.1	2.2	2.2	2.3	2.3	2.3
No. of Patients								
Intensive	2174	2071	1973	1792	1150	445	156	156
Standard	2208	2136	2077	1860	1241	504	203	201

The ACCORD Study Group. N Engl J Med 2010;362:1575-1585.

Is a induced systolic blood pressure goal below 120mmHg beneficial? The ACCORD Experience

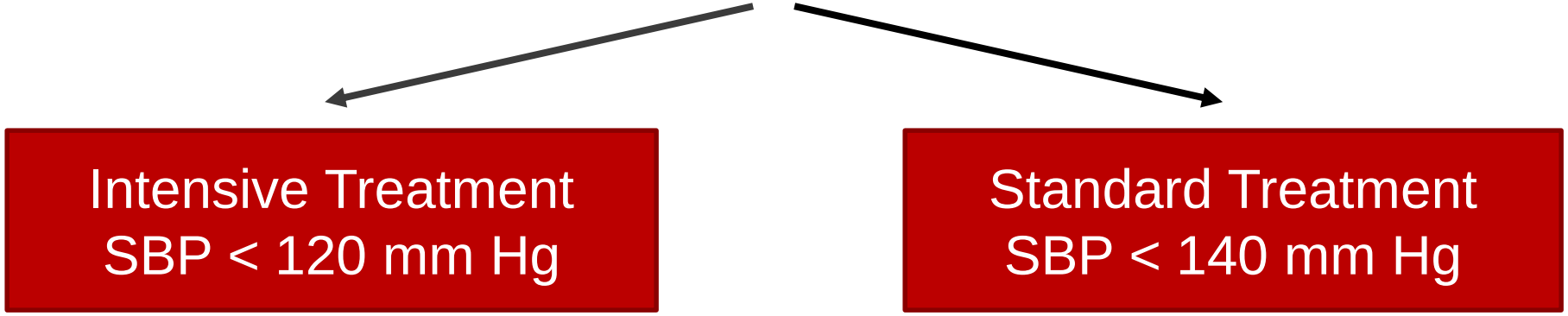


The ACCORD Study Group. N Engl J Med 2010;362:1575-1585.

Systolic Blood Pressure Intervention Trial

SPRINT Research Question

SPRINT was designed as a randomized controlled clinical trial to examine the effect of a more intensive high blood pressure treatment strategy than is currently recommended (standard treatment).



SPRINT Major Inclusion Criteria

- ≥50 years old
- Systolic blood pressure : 130 – 180 mm Hg
- Additional cardiovascular disease (CVD) risk (one or more of the following)
  - Presence of clinical or subclinical CVD (not stroke)
  - Chronic kidney disease (CKD), defined as eGFR 20 – 59 mL/min/1.73m^2
  - Framingham Risk Score for 10-year CVD risk ≥ 15%
    - Not needed if eligible based on preexisting CVD or CKD
  - Age ≥ 75 years

SPRINT Major Exclusion Criteria

- Stroke
- Diabetes mellitus
- Polycystic kidney disease
- Congestive heart failure (symptoms or EF < 35%)
- Proteinuria >1g/d
- CKD with eGFR < 20 mL/min/1.73m^2 (MDRD)
- Adherence flags

SPRINT Pre-specified Subgroups of Special Interest

Age (<75 vs. ≥75 years)

Gender (Men vs. Women)

Race/ethnicity (Black vs. non-Black)

Renal Disease (eGFR <60 vs. ≥60 mL/min/1.73m^2)

CVD (CVD vs. no prior CVD)

Level of BP (Baseline SBP tertiles: ≤132, 132≤145, ≥145 mm Hg)

SPRINT Primary Outcome

The primary outcome was a composite of

- Non-fatal myocardial infarction (MI)
- Acute coronary syndrome not resulting in MI (non-MI ACS)
- Non-fatal stroke
- Non-fatal acute decompensated heart failure (HF)
- Cardiovascular disease death

SPRINT Additional Outcomes

- CVD secondary outcomes:
  - Individual categories of MI, non-MI ACS, all stroke, all heart failure, CVD mortality, all-cause mortality, primary outcome + all-cause mortality
- Renal outcomes:
  - Main secondary outcome: >50% decline in eGFR or ESRD in CKD subgroup
  - Additional secondary outcomes:
    - Non-CKD subgroup
      - Incidence of decreased eGFR (>30% decrease in eGFR to <60 mL/min/1.73m^2)
    - All trial participants
      - Incidence of albuminuria : doubling of urinary albumin/creatinine (<10 to >10mg/g)

SPRINT Additional Outcomes

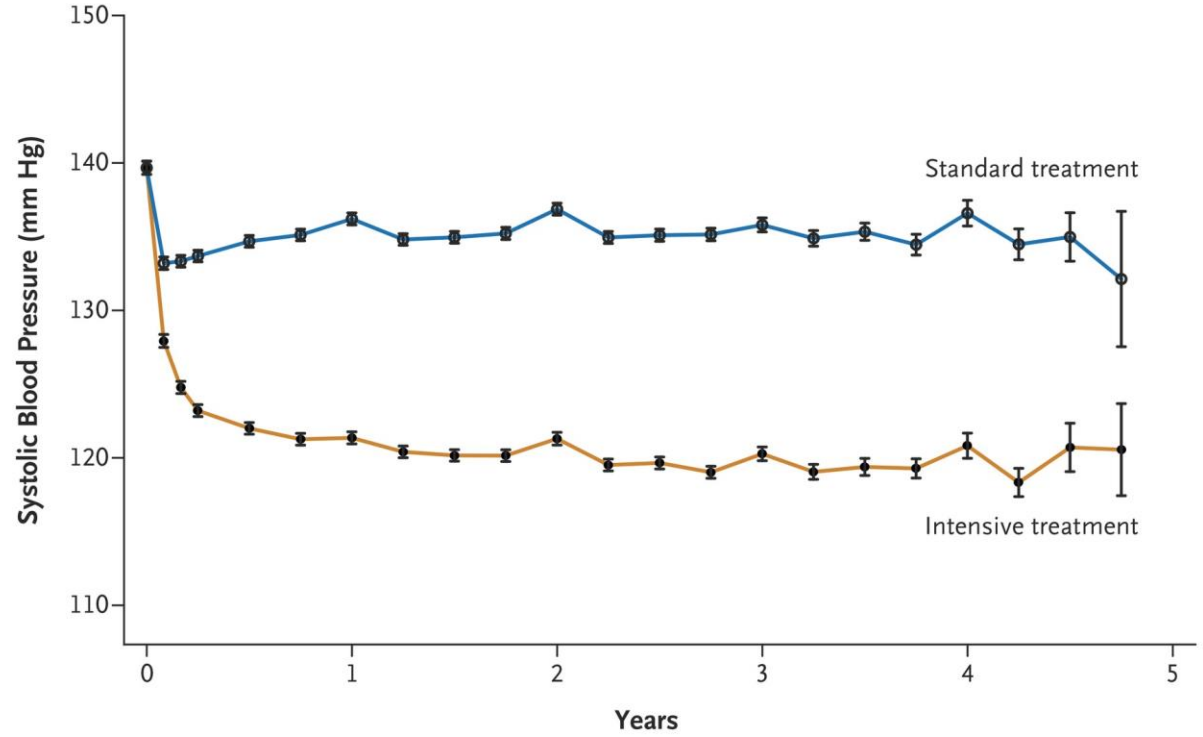
Dementia and cognitive function outcomes:

- Main secondary outcome: Incident dementia (all-cause)
- Additional secondary outcomes:
  - Mild cognitive impairment
  - MRI

Health-related quality of life assessments

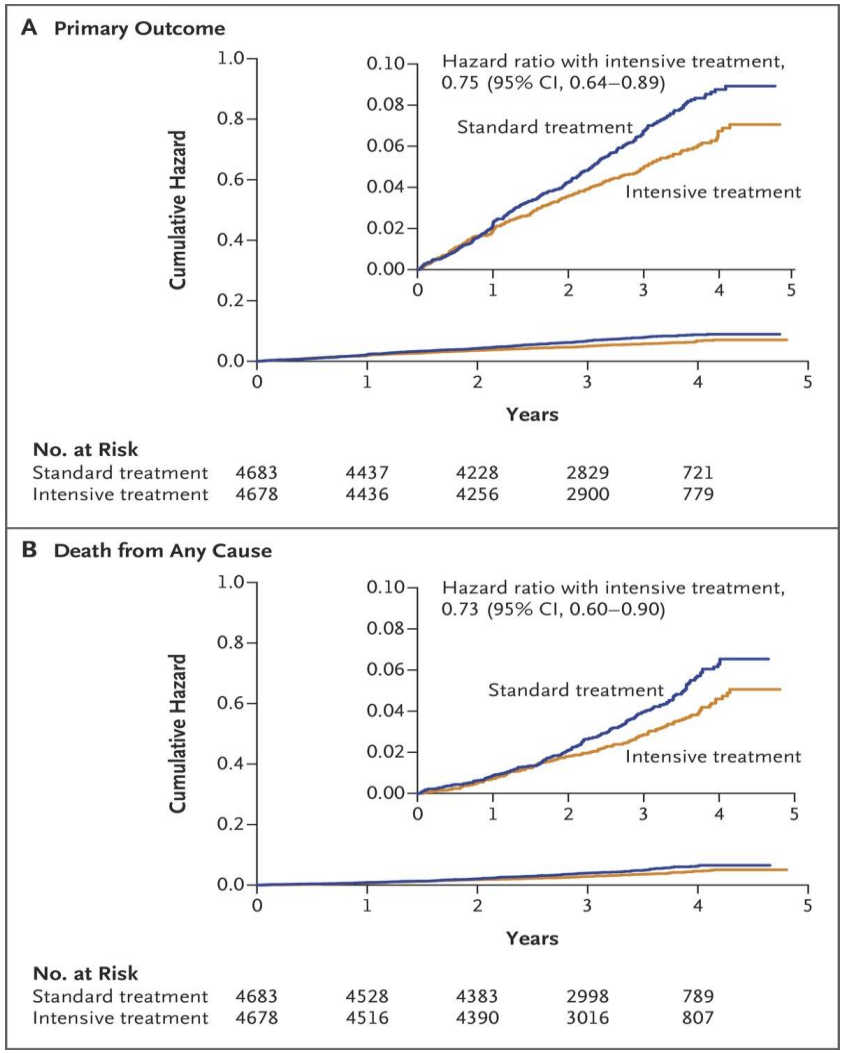
Other, including economic analyses

SPRINT: Systolic Blood Pressure in the Two Treatment Groups over the Course of the Trial



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

SPRINT: Primary Outcome and Death from Any Cause

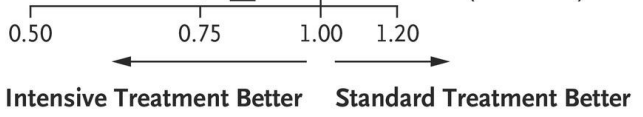


SPRINT: Primary Outcome and its Components: Event Rates/Hazard Ratios

	Intensive		Standard			
	No. of Events	Rate, %/year	No. of Events	Rate, %/year	HR (95% CI)	P value
Primary Outcome	243	1.65	319	2.19	0.75 (0.64, 0.89)	<0.001
All MI	97	0.65	116	0.78	0.83 (0.64, 1.09)	0.19
Non-MI ACS	40	0.27	40	0.27	1.00 (0.64, 1.55)	0.99
All Stroke	62	0.41	70	0.47	0.89 (0.63, 1.25)	0.50
All HF	62	0.41	100	0.67	0.62 (0.45, 0.84)	0.002
CVD Death	37	0.25	65	0.43	0.57 (0.38, 0.85)	0.005

SPRINT: Forest Plot of Primary Outcome According to Subgroups

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)	



SPRINT: Renal Disease Outcomes

		Intensive		Standard			
		Events	%/yr	Events	%/yr	HR (95% CI)	P
Participants with CKD at Baseline							
	Primary CKD outcome	**14**	**0.33**	**15**	**0.36**	**0.89 (0.42, 1.87)**	**0.76**
	≥50% reduction in eGFR*	10	0.23	11	0.26	0.87 (0.36, 2.07)	0.75
	Dialysis	6	0.14	10	0.24	0.57 (0.19, 1.54)	0.27
	Kidney transplant	0	-	0	-	-	.
	Secondary CKD Outcome						
	Incident albuminuria**	49	3.02	59	3.90	0.72 (0.48, 1.07)	0.11
Participants without CKD at Baseline							
	Secondary CKD outcomes						
	≥30% reduction in eGFR*	127	1.21	37	0.35	3.48 (2.44, 5.10)	<.0001
	Incident albuminuria**	110	2.00	135	2.41	0.81 (0.63, 1.04)	0.10

Confirmed on a second occasion ≥90 days apart
****Doubling of urinary albumin/creatinine ratio from <10 to >10 mg/g***

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Serious Adverse Events* (SAE) During Follow-up

	Number (%) of Participants		
	Intensive	Standard	HR (P Value)
All SAE reports	1793 (38.3)	1736 (37.1)	1.04 (0.25)
SAEs associated with Specific Conditions of Interest			
Hypotension	110 (2.4)	66 (1.4)	1.67 (0.001)
Syncope	107 (2.3)	80 (1.7)	1.33 (0.05)
Injurious fall	105 (2.2)	110 (2.3)	0.95 (0.71)
Bradycardia	87 (1.9)	73 (1.6)	1.19 (0.28)
Electrolyte abnormality	144 (3.1)	107 (2.3)	1.35 (0.020)
Acute kidney injury or acute renal failure	193 (4.1)	117 (2.5)	1.66 (<0.001)

SPRINT Systolic Blood Pressure Intervention Trial

*Fatal or life threatening event, resulting in significant or persistent disability, requiring or prolonging hospitalization, or judged important medical event.

Number (%) of Participants with a Monitored Clinical Measure During Follow-up

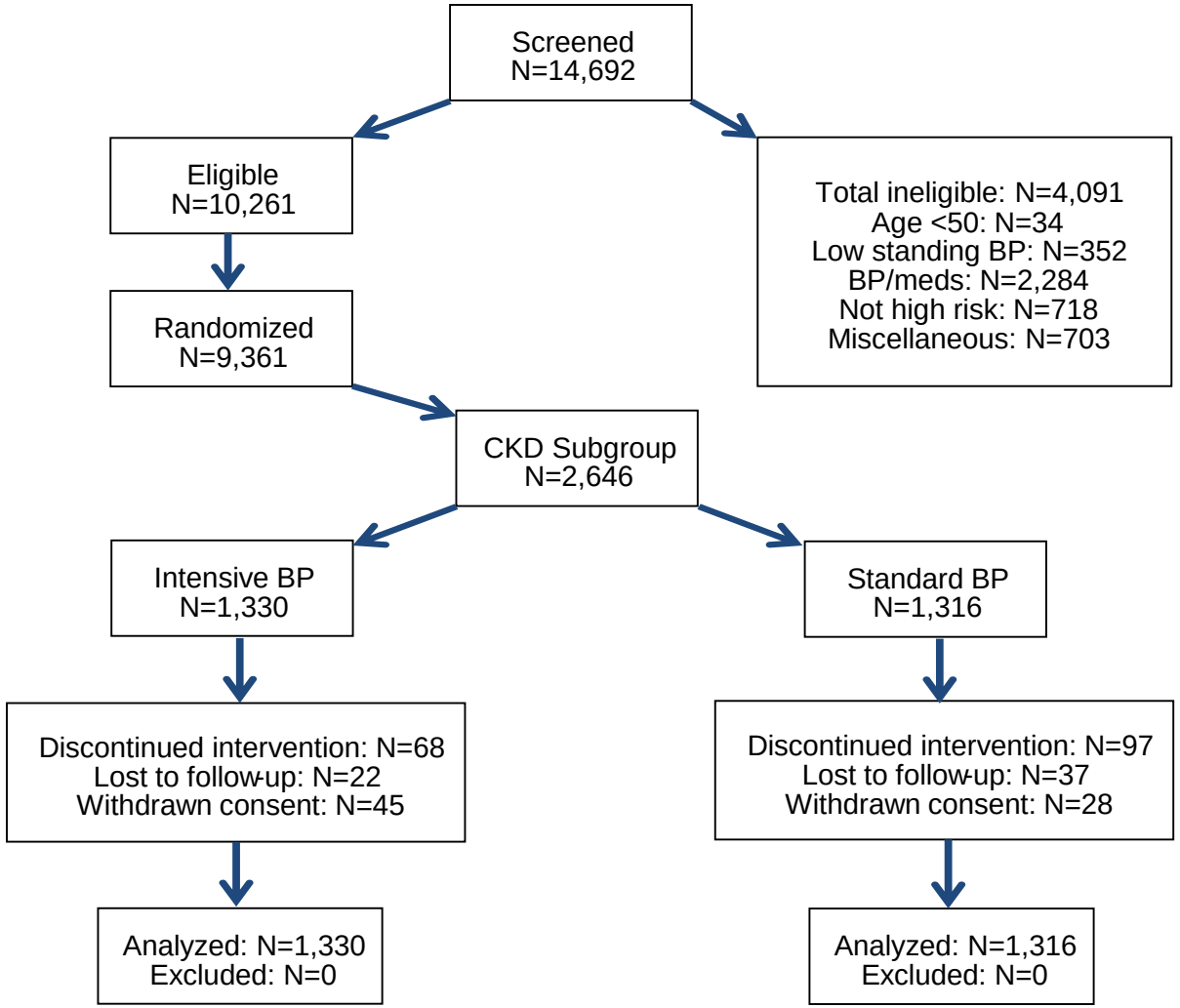
	Number (%) of Participants		
	Intensive	Standard	HR (P Value)
Laboratory Measures[1]			
Sodium <130 mmol/L	180 (3.9)	100 (2.2)	1.76 (<0.001)
Potassium <3.0 mmol/L	114 (2.5)	74 (1.6)	1.50 (0.006)
Potassium >5.5 mmol/l	176 (3.8)	171 (3.7)	1.00 (0.97)
Signs and Symptoms			
Orthostatic hypotension[2]	777 (16.6)	857 (18.3)	0.88 (0.013)
Orthostatic hypotension with dizziness	62 (1.3)	71 (1.5)	0.85 (0.35)

1. Detected on routine or PRN labs; routine labs drawn quarterly for first year, then q 6 months
2. Drop in SBP ≥20 mmHg or DBP ≥10 mmHg 1 minute after standing (measured at 1, 6, and 12 months and yearly thereafter)

SPRINT Systolic Blood Pressure Intervention Trial

The Ohio State University Wexner Medical Center

SPRINT: SPRINT CKD Results



Alfred K. Cheung et al. JASN doi:10.1681/ASN.2017020148

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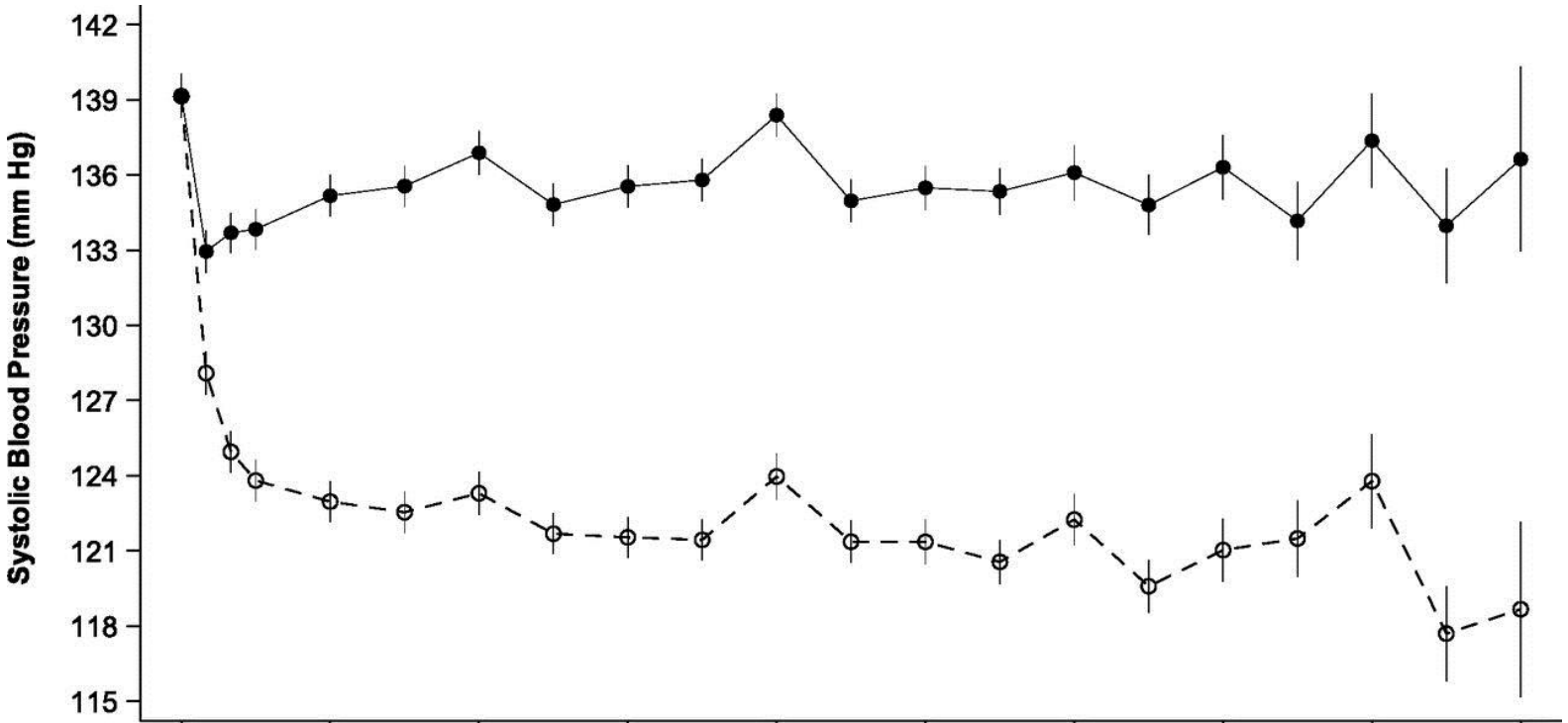
SPRINT: SPRINT CKD Results



	Number With Data									
Standard:	1316	1215	1156	1117	1087	1022	766	480	230	46
Intensive:	1330	1246	1194	1145	1136	1054	804	515	268	58
	Mean Number of Meds									
Standard:	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0
Intensive:	2.1	2.9	3.0	3.0	3.0	3.0	2.9	2.9	3.0	3.1

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Alfred K. Cheung et al. JASN doi:10.1681/ASN.2017020148

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SPRINT: SPRINT CKD Results

Outcome	Intensive Treatment, *n*=1330		Standard Treatment, *n*=1316		Intensive Treatment Versus Standard Treatment	
	Events	%/yr	Events	%/yr	HR (95% CI)	*P* Value
Primary[a] outcome	112	2.68	131	3.19	0.81 (0.63 to 1.05)	0.12
Myocardial infarction	44	1.03	45	1.07	0.94 (0.62 to 1.44)	0.79
Acute coronary syndrome	15	0.35	11	0.26	1.35 (0.60 to 3.08)	0.47
Stroke	27	0.63	27	0.64	0.99 (0.57 to 1.70)	0.96
Heart failure	41	0.96	52	1.24	0.72 (0.47 to 1.10)	0.13
CVD death	18	0.41	30	0.70	0.57 (0.31 to 1.02)	0.06
All-cause death	70	1.61	95	2.21	0.72 (0.53 to 0.99)	0.04
Primary outcome or all-cause death	152	3.62	179	4.35	0.82 (0.66 to 1.02)	0.08
Primary outcome or cardiovascular procedure	127	3.06	161	3.98	0.81 (0.63 to 1.05)	0.12

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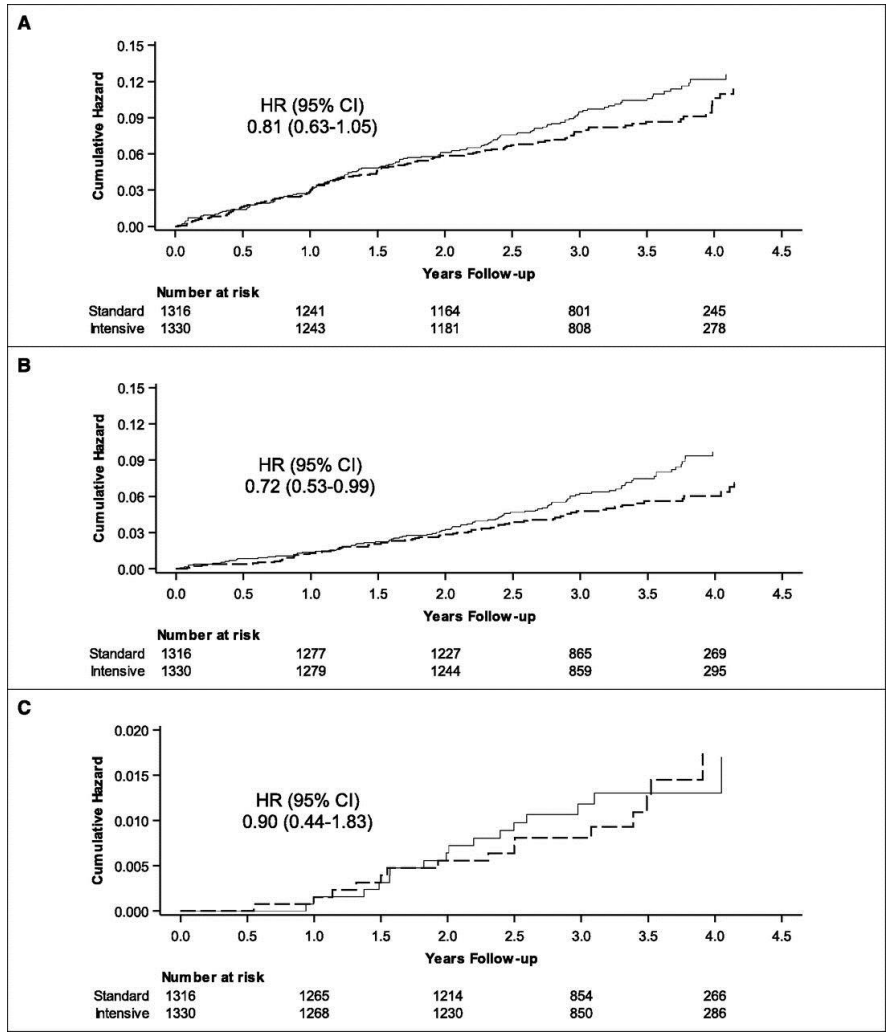
SPRINT: SPRINT CKD Results



Kaplan-Meier curves for pre-specified outcomes in SPRINT participants with CKD.

Panel A shows the primary cardiovascular outcome, defined as the composite of myocardial infarction, acute coronary syndrome, stroke, acute decompensated heart failure, and death from cardiovascular causes.

Panel B shows the all-cause death outcome.

Panel C shows the main kidney outcome, defined as the composite of a decrease in eGFR of ≥50% from baseline (confirmed by repeat testing ≥90 days later) or the development of ESRD.

The broken lines depict the intensive group; the solid lines depict the standard group.

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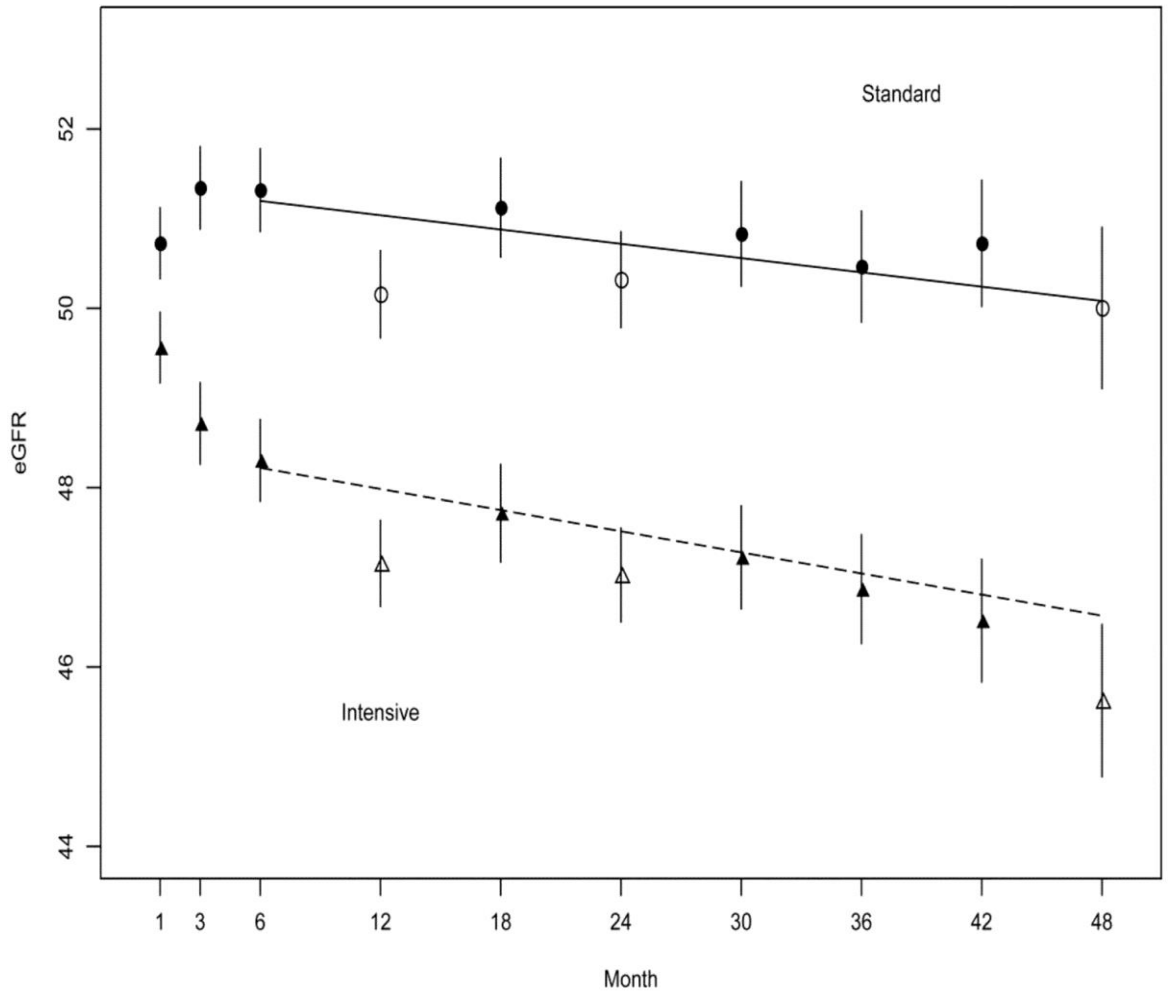

Two phases of eGFR changes during follow-up in the SPRINT participants with CKD. The rate of change in eGFR using the values at 6 months after randomization as the baseline was **−0.47 ml/min per 1.73 m^2 per year in the intensive group** (broken line and triangles) and **−0.32 ml/min per 1.73 m^2 per year in the standard group** (solid line and circles; *P*=0.03). Open symbols denote fasting visits; closed symbols denote nonfasting visits.

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eGFR Reduction from Baseline, %[a]	No. of Events (% per 1 yr)[b]		Intensive Treatment Versus Standard Treatment	
	Intensive Treatment, *n*=1330	Standard Treatment, *n*=1316	HR (95% CI)	*P* Value
50	10 (0.25)	12 (0.31)	0.79 (0.34 to 1.83)	0.58
40	30 (0.74)	19 (0.49)	1.51 (0.85 to 2.68)	0.16
30	92 (2.33)	44 (1.15)	2.03 (1.42 to 2.91)	<0.01

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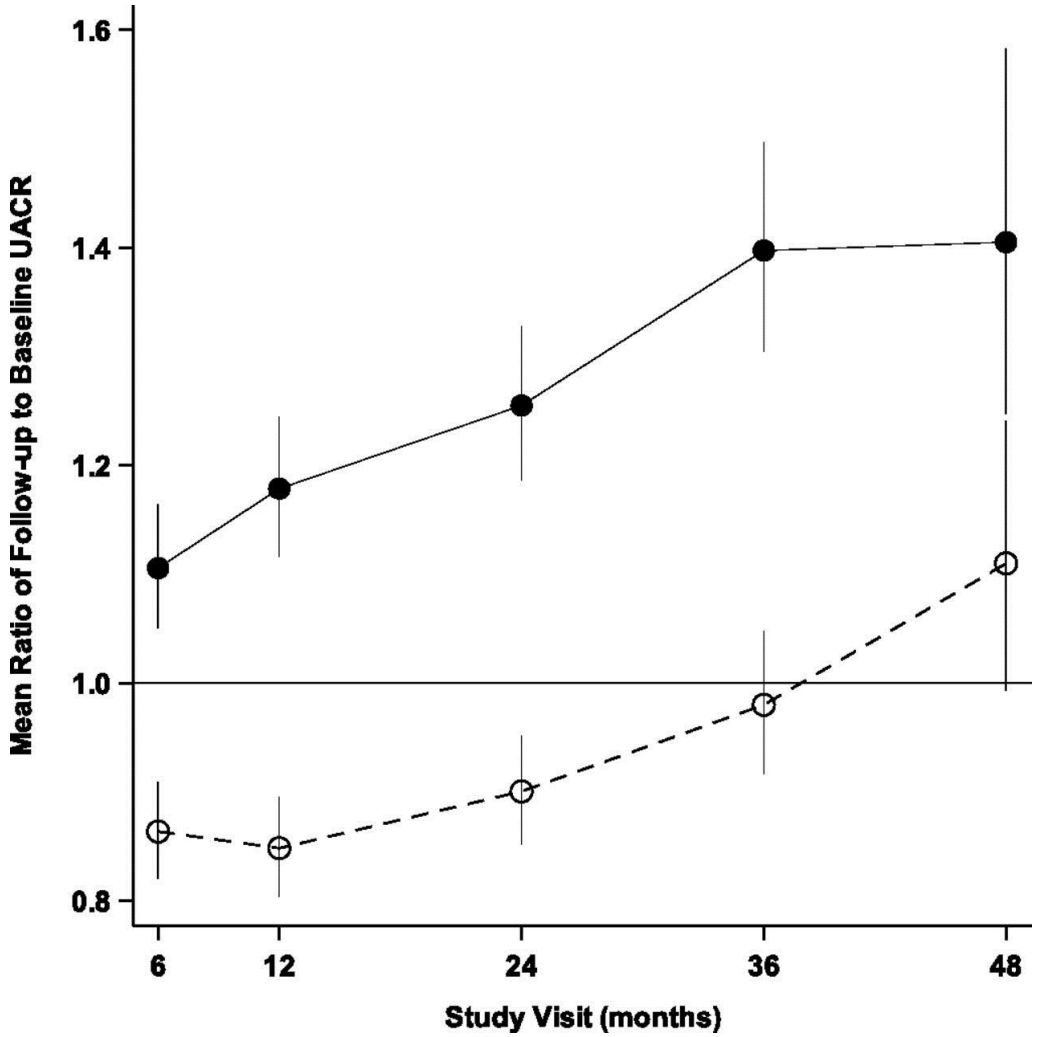

Urinary albumin-to-creatinine ratio (UACR) in the SPRINT participants with CKD. Geometric mean ratios of postrandomization to baseline UACR with 95% CIs. The broken line and open circles depict the intensive treatment group; the solid line and closed circles depict the standard treatment group. The horizontal line at 1.0 depicts equality of means (*i.e.*, no change in UACR).

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SPRINT: Questions

Generalizability of the SPRINT population

- 16.8 million (7.6%) of US adults
- 8.2 million (16.7%) of those with treated HTN

Cognitive outcomes

Long term renal effects

AKI events

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

Executive Summary

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

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AHA/ACC 2017 Hypertension Guidelines: New Elements

Classification of hypertension

Previous guidelines (32% of US adults have hypertension)

Normal	SBP<120	or	DBP<80
Prehypertension	SBP 120 to 139	or	DBP 80-89
Stage I	SBP 140 to 159	or	DBP 90-99
Stage II	SBP ≥160	or	DBP ≥100

New guidelines (46% of US adults have hypertension)

Normal	BP<120/80		
Elevated	120-129/<80		
Stage I	SBP 130-139	or	DBP 80-89
Stage II	SBP ≥ 140	or	DBP >90

AHA/ACC 2017 Hypertension Guidelines: New Elements

Two different thresholds for starting blood pressure medications

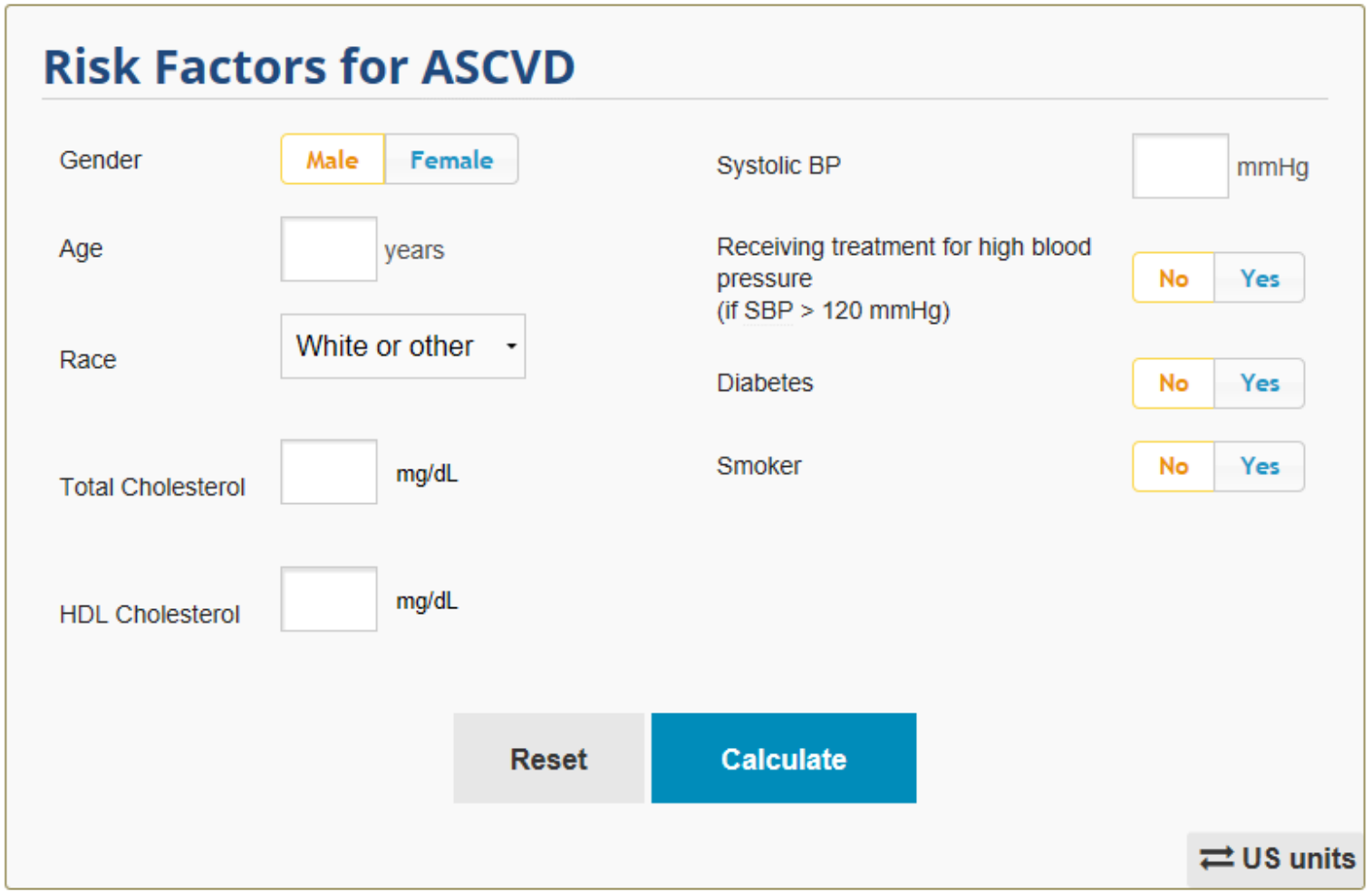
- ≥130/80
- ≥140/90

Utilization of cardiac risk factor scoring system (Pooling Cohort 10-year CVD Risk Estimator)

Same blood pressure goals for all individuals regardless of age or comorbidities

Specific instructions for monitoring blood pressure in the office and at home

Pooled Cohort Estimator of Cardiac Risk



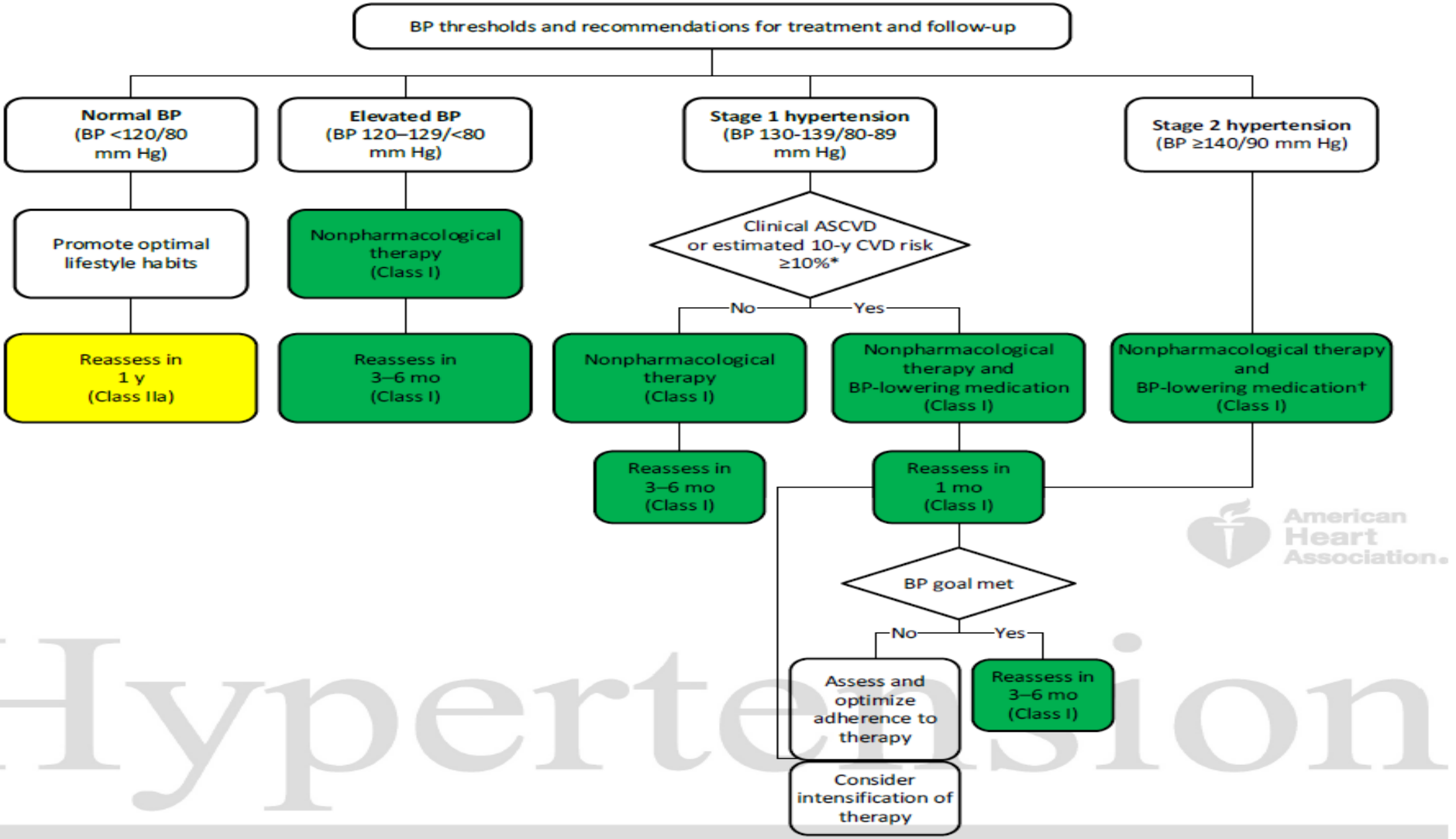
Accessed from Clincalc.com, 03/2018

Table 23. 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

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

Figure 4. Blood Pressure (BP) Thresholds and Recommendations for Treatment and Follow-Up



American Heart Association.
Hypertension

Table 15. Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension

	Nonpharmacological Intervention	Dose	Approximate Impact on SBP		
			Hypertension	Normotension	Reference
Weight loss	Weight/body fat	Best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1-kg reduction in body weight.	-5 mm Hg	-2/3 mm Hg	(1)
Healthy diet	DASH dietary pattern	Consume a 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	(6, 7)
Reduced intake of dietary sodium	Dietary sodium	Optimal goal is <1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.	-5/6 mm Hg	-2/3 mm Hg	(9, 10)

American Heart Association.

University

Hypertension

Enhanced intake of dietary potassium	Dietary potassium	Aim for 3500–5000 mg/d, preferably by consumption of a diet rich in potassium.	-4/5 mm Hg	-2 mm Hg	(13)
Physical activity	Aerobic	● 90–150 min/wk ● 65%–75% heart rate reserve	-5/8 mm Hg	-2/4 mm Hg	(18, 22)
	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	(18)
	Isometric resistance	● 4 × 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	(19, 30)
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol† to: ● Men: ≤2 drinks daily	-4 mm Hg	-3 mm Hg	(22-24)

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Points of controversy

- Reliance on meta-analysis vs randomized controlled trials (RCTs)
- Focus on systolic blood pressure
- Use of Pooling Cohort for risk assessment
  - SPIRNT utilized Framingham Risk Score > 15%
  - New guideline suggest > 10%
- Unknown long-term effects on kidney disease and cognitive function
  - SPRINT ASK is currently gathering data
- American College of Physicians and American Academy of Family Physicians have not endorsed the new guidelines
- Universal acceptance of the new guidelines is still being considered

Summary of ACP and AAFP guidelines

Recommendation 1:

ACP and AAFP recommend that clinicians **initiate treatment in adults aged 60 years or older with systolic blood pressure persistently at or above 150 mm Hg to achieve a target systolic blood pressure of less than 150 mm Hg** to reduce the risk for stroke, cardiac events, and possibly mortality. (Grade: strong recommendation, high-quality evidence).

ACP and AAFP recommend that clinicians select the treatment goals for adults aged 60 years or older based on a periodic discussion of the benefits and harms of specific blood pressure targets with the patient.

Summary of ACP and AAFP guidelines

Recommendation 2:

ACP and AAFP recommend that clinicians **consider initiating or intensifying pharmacologic treatment in adults aged 60 years or older with a history of stroke or transient ischemic attack to achieve a target systolic blood pressure of less than 140 mm Hg to reduce the risk for recurrent stroke.** (Grade: weak recommendation, moderate-quality evidence).

ACP and AAFP recommend that clinicians select the treatment goals for adults aged 60 years or older based on a periodic discussion of the benefits and harms of specific blood pressure targets with the patient.

Summary of ACP and AAFP guidelines

Recommendation 3:

ACP and AAFP recommend that clinicians **consider initiating or intensifying pharmacologic treatment in some adults aged 60 years or older at high cardiovascular risk, based on individualized assessment, to achieve a target systolic blood pressure of less than 140 mm Hg.** (Grade: weak recommendation, low-quality evidence).

ACP and AAFP recommend that clinicians select the treatment goals for adults aged 60 years or older based on a periodic discussion of the benefits and harms of specific blood pressure targets with the patient.

Summary

The new blood pressure guidelines have many benefits

- Increased recognition of the problem of hypertension
- Emphasis on individual risk assessment
- Specific non-pharmacologic recommendations for BP reduction
- Encouraging home BP evaluation

Long term cognitive and renal outcomes associated with more intensive blood pressure targets are still to be defined

Goal of blood pressure therapies should be customized after discussions with the patient

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