New US guidelines Nov 2017

Actualités en HTA pendant l'année 2017

P Xhignesse et JM Krzesinski

Définition de l'HTA et classification de la pression artérielle (mmHg)

ESH 2013

Catégorie	Systolique	Diastolique
Optimal	< 120	< 80
Normal	120-129	80-84
Normal haute	130-139	85-89
Hypertension de Grade 1 (légère)	140-159	90-99
Hypertension de Grade 2 (modérée)	160-179	100-109
Hypertension de Grade 3 (sévère)	≥ 180	≥ 110
Hypertension systolique isolée	≥ 140	< 90

HTA= PA> ou = 140 et/ou 90 mmHg

New US guidelines Nov 2017

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

This document was approved by the American College of Cardiology Clinical Policy Approval Committee and the American Heart Association Science Advisory and Coordinating Committee in September 2017 and by the American Heart Association Executive Committee in October 2017.

Qu’apportent ces nouvelles mesures?

- 1. Nouvelle définition de l’HTA
- 2. Mesures de PA strictes
- 3. Prise en charge selon le risque CV
- 4. Nouvelles cibles de PA

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3. Classification of BP

3.1. Definition of High BP

Recommendation for Definition of High BP References that support the recommendation are summarized in Online Data Supplement 2.		
COR	**LOE**	**Recommendation**
I	B-NR	**1. BP should be categorized as normal, elevated, or stage 1 or 2 hypertension to prevent and treat high BP (Table 6) (1-20).**

Whelton PK, et al.

2017 High Blood Pressure Clinical Practice Guideline: Executive Summary

Table 6. 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

3.3. Prevalence of High BP

Table 7. Prevalence of Hypertension Based on 2 SBP/DBP Thresholds*†

	SBP/DBP ≥130/80 mm Hg or Self-Reported Antihypertensive Medication†		SBP/DBP ≥140/90 mm Hg or Self-Reported Antihypertensive Medication‡	
Overall, crude	46%		32%	
	Men (n=4717)	Women (n=4906)	Men (n=4717)	Women (n=4906)
Overall, age-sex adjusted	48%	43%	31%	32%
Age group, y				
20–44	30%	19%	11%	10%
45–54	50%	44%	33%	27%
55–64	70%	63%	53%	52%
65–74	77%	75%	64%	63%
75+	79%	85%	71%	78%
Race-ethnicity§				
Non-Hispanic white	47%	41%	31%	30%

Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies

Lancet 2002; **360:** 1903–13

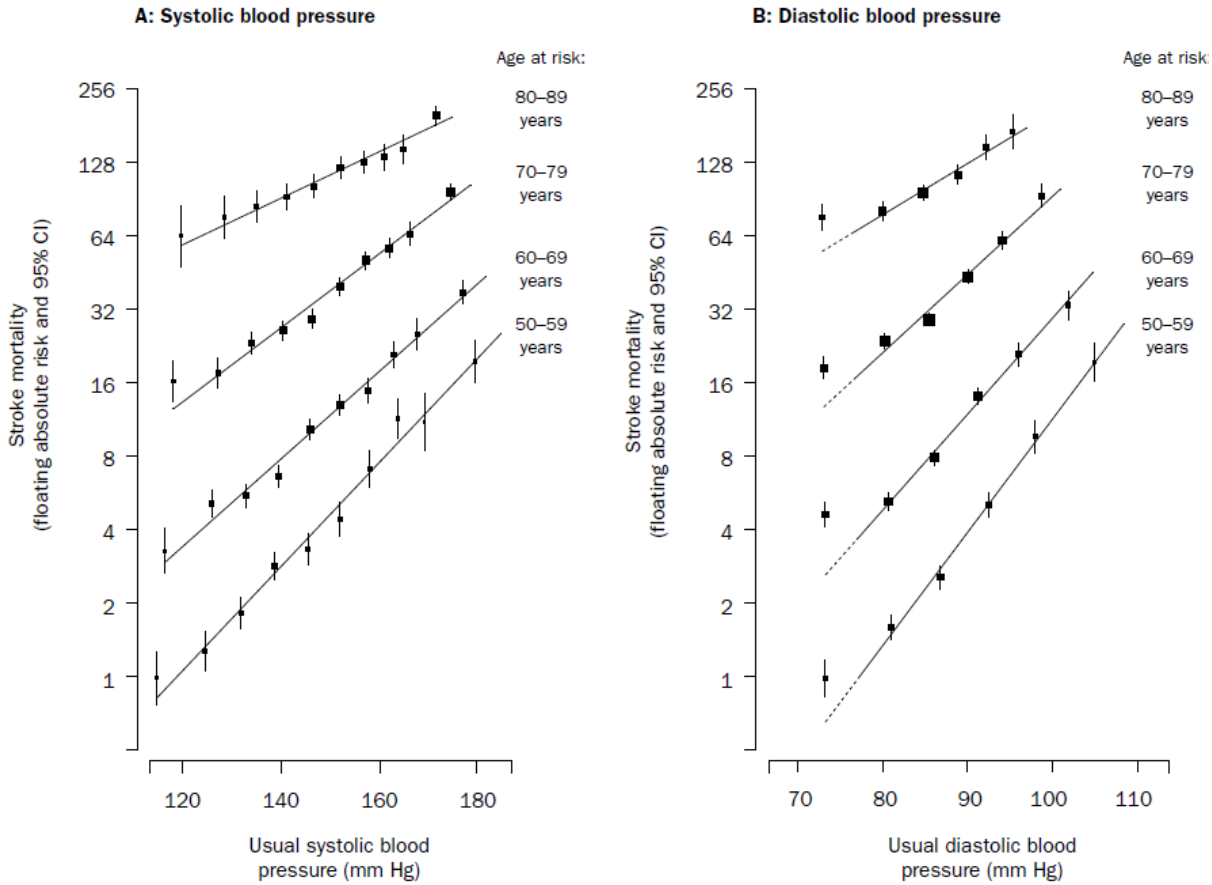


Figure 2: **Stroke mortality rate in each decade of age versus usual blood pressure at the start of that decade**

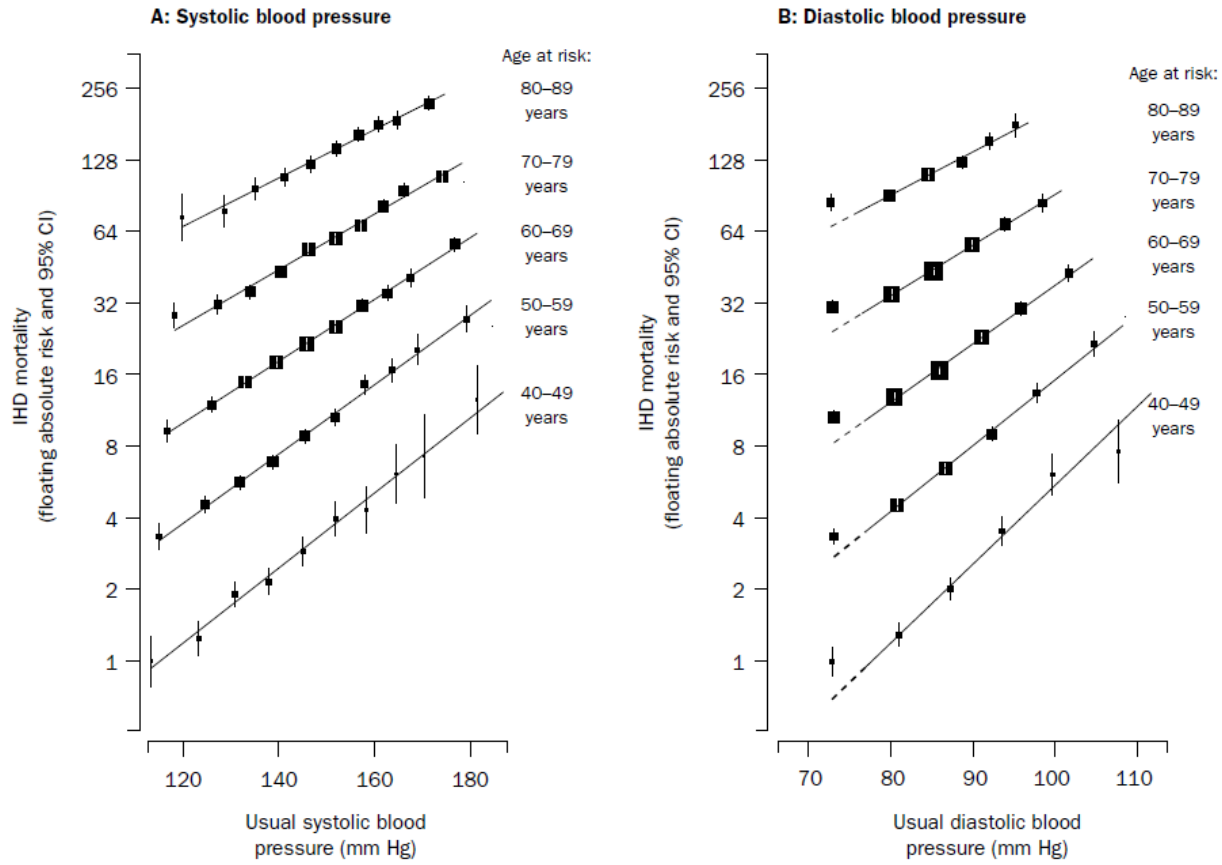
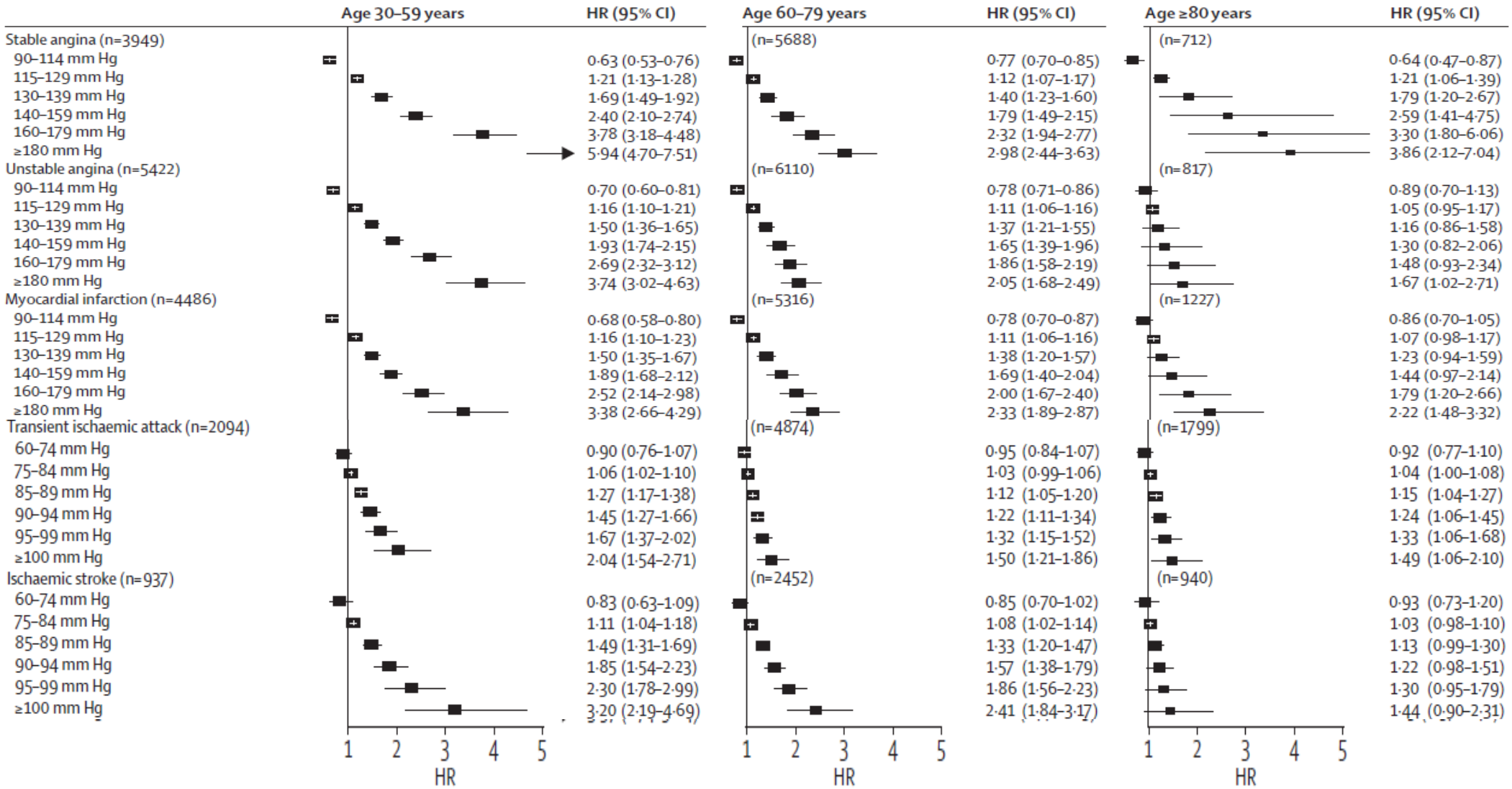


Figure 4: **Ischaemic heart disease (IHD) mortality rate in each decade of age versus usual blood pressure at the start of that decade**

Blood pressure and incidence of twelve cardiovascular diseases: lifetime risks, healthy life-years lost, and age-specific associations in 1·25 million people

Lancet 2014; 383: 1899–911

Eleni Rapsomaniki, Adam Timmis, Julie George, Mar Pujades-Rodriguez, Anoop D Shah, Spiros Denaxas, Ian R White, Mark J Caulfield, John E Deanfield, Liam Smeeth, Bryan Williams, Aroon Hingorani, Harry Hemingway



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4.1. Accurate Measurement of BP in the Office

Recommendation for Accurate Measurement of BP in the Office		
COR	**LOE**	**Recommendation**
I	C-EO	1. For diagnosis and management of high BP, proper methods are recommended for accurate measurement and documentation of BP (Table 8).

- Appareil utilisé doit être calibré
- Le patient ne doit pas avoir fumé, pris du café 30’ avant la mesure, il doit avoir vidé sa vessie et être assis depuis 5’ au calme.
- Le bras doit être soutenu, le brassard de taille correcte placé au niveau du cœur, pas de mesure au dessus des vêtements.
- Prendre la mesure aux 2 bras et garder la plus élevée, moyenne de ≥ 2 mesures obtenues ≥ 2 occasions différentes
- Heure de la prise du traitement anti HTA notée

Table 9. 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

4.2. Out-of-Office and Self-Monitoring of BP

Recommendation for Out-of-Office and Self-Monitoring of BP References that support the recommendation are summarized in Online Data Supplement 3 and Systematic Review Report.		
COR	**LOE**	**Recommendation**
I	A^{SR}	1. Out-of-office BP measurements are recommended to confirm the diagnosis of hypertension (Table 11) and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions (1-4).

- Patient doit être formé à l'utilisation du matériel fourni
- Position de mesure correcte : patient assis, au repos, brassard au niveau du pli du coude
- Idéalement: 2 mesures à 1' d'intervalle chaque matin avant traitement et chaque soir avant diner. 1 semaine de mesures; 2 semaines après changement de traitement et/ou 1 semaine avant RDV suivant.
- Bien noter les mesures (mieux appareil avec mémoire interne)

Table 11. 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

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8.1.2. BP Treatment Threshold and the Use of CVD Risk Estimation to Guide Drug Treatment of Hypertension

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Recommendations for BP Treatment Threshold and Use of Risk Estimation* to Guide Drug Treatment of Hypertension

References that support recommendations are summarized in Online Data Supplement 23.

COR	LOE	Recommendations
I	SBP: A DBP: C-EO	1. **Use of BP-lowering medications is recommended for secondary prevention of recurrent CVD events in patients with clinical CVD and an average SBP of 130 mm Hg or higher or an average DBP of 80 mm Hg or higher, and for primary prevention in adults with an estimated 10-year atherosclerotic cardiovascular disease (ASCVD) risk of 10% or higher and an average SBP 130 mm Hg or higher or an average DBP 80 mm Hg or higher (1-9).**
I	C-LD	2. **Use of BP-lowering medication is recommended for primary prevention of CVD in adults with no history of CVD and with an estimated 10-year ASCVD risk <10% and an SBP of 140 mm Hg or higher or a DBP of 90 mm Hg or higher (3, 10-13).**

*ACC/AHA Pooled Cohort Equations (http://tools.acc.org/ASCVD-Risk-Estimator/) (13a) to estimate 10-year risk of atherosclerotic CVD. ASCVD was defined as a first CHD death, non-fatal MI or fatal or non-fatal stroke.

Estimate Risk

Unit of Measure US SI

Reset all

App intended for primary prevention patients (without ASCVD) and with LDL-C < 190 mg/dL (4.921 mmol/L)

Patient Demographics

Current Age

Age must be between 40-79

Sex

Male | Female

Race

White

African American

Other

Current Labs/Exam

Total Cholesterol (mmol/L)

Value must be between 3.367 - 8.288

HDL Cholesterol (mmol/L)

Value must be between 0.518 - 2.59

LDL Cholesterol (mmol/L)

Value must be between 0.777-7.770

Systolic Blood Pressure (mm of Hg)

Value must be between 90-200

Personal History

History of Diabetes?

Yes | No

On Hypertension Treatment?

Yes | No

Smoker:

Yes

Former

No

On a Statin?

Yes | No

On Aspirin Therapy?

Yes | No

Do you want to compare to risk level at a previous visit?

Tip: This will also allow the app to more precisely calculate a patient's current risk by accounting for changes in their risk factor levels over time.

Yes | No

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8.1.5. BP Goal for Patients With Hypertension

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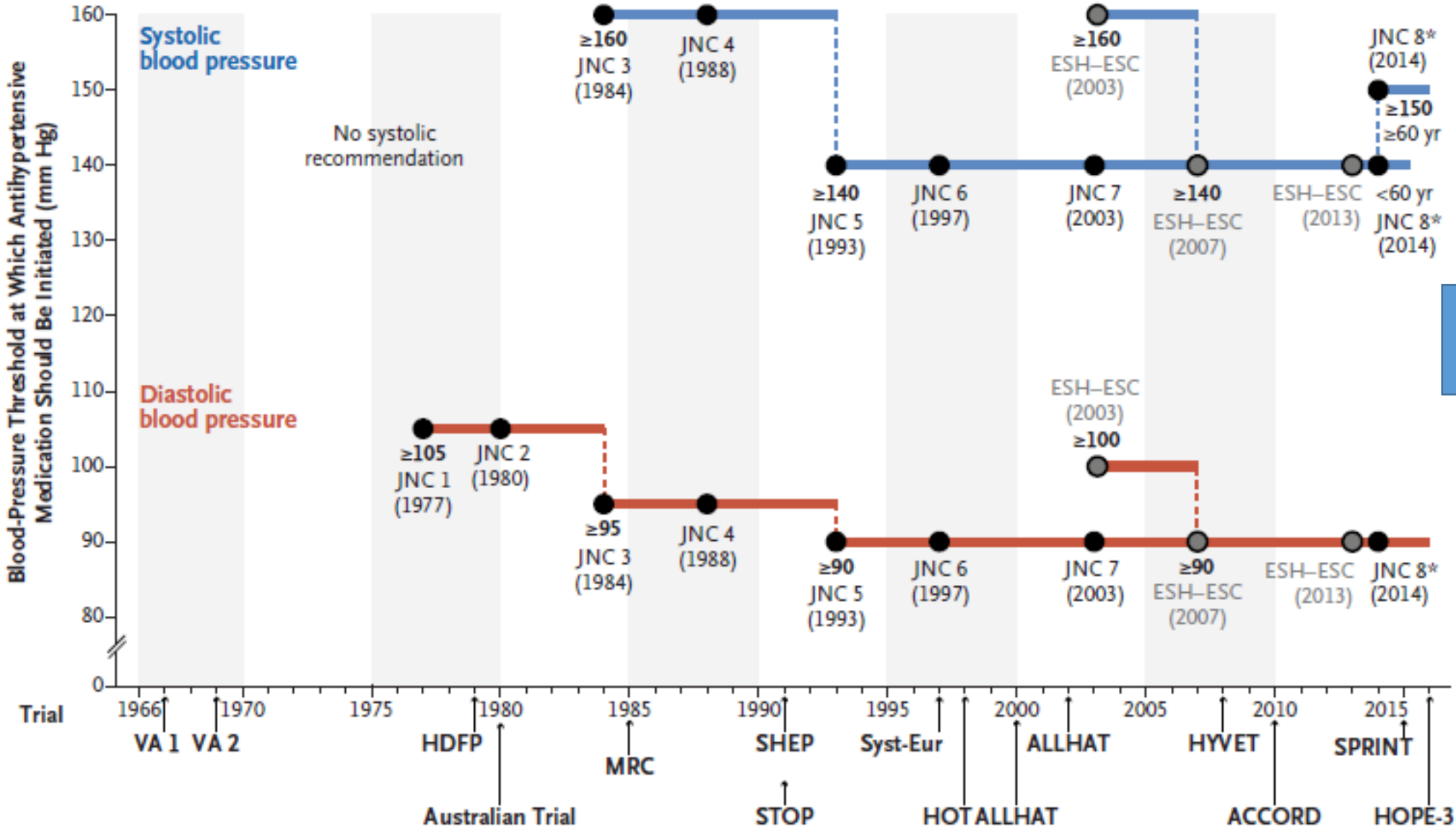
Recommendations for BP Goal for Patients With Hypertension References that support recommendations are summarized in Online Data Supplement 26 and Systematic Review Report.		
COR	**LOE**	**Recommendations**
I	SBP: B-R[SR] DBP: C-EO	1. For adults with confirmed hypertension and known CVD or 10-year ASCVD event risk of 10% or higher (see Section 8.1.2), a BP target of less than 130/80 mm Hg is recommended (1-5).
IIb	SBP: B-NR DBP: C-EO	2. For adults with confirmed hypertension, without additional markers of increased CVD risk, a BP target of less than 130/80 mm Hg may be reasonable (6-9).

Evolution des cibles en PA sur 50 ans



New US guidelines Nov 2017 ?

ESH–ESC and JNC 7 Summary: Target BP Goals (2003 and 2007)

Type of hypertension	BP goal (mmHg)
Uncomplicated	<140/90
Complicated	
Diabetes mellitus	<130/80
Kidney disease	<130/80
Other high risk (stroke, myocardial infarction)	<130/80

Task Force of ESH–ESC. J Hypertens 2007;25:1105–87
Chobanian et al. JAMA 2003;289:2560–72

Table 6. Guideline Comparisons of Goal BP and Initial Drug Therapy for Adults With Hypertension

Guideline	Population	Goal BP, mm Hg	Initial Drug Treatment Options
2014 Hypertension guideline	General ≥60 y	<150/90	Nonblack: thiazide-type diuretic, ACEI, ARB, or CCB
	General <60 y	<140/90	Black: thiazide-type diuretic or CCB
	Diabetes	<140/90	Thiazide-type diuretic, ACEI, ARB, or CCB
	CKD	<140/90	ACEI or ARB
ESH/ESC 2013[37]	General nonelderly	<140/90	β-Blocker, diuretic, CCB, ACEI, or ARB
	General elderly <80 y	<150/90	
	General ≥80 y	<150/90	
	Diabetes	<140/85	ACEI or ARB
	CKD no proteinuria	<140/90	ACEI or ARB
	CKD + proteinuria	<130/90	

A Randomized Trial of Intensive versus Standard Blood-Pressure Control

The SPRINT Research Group*

This article was published on November 9, 2015, and updated on September 1, 2017, at NEJM.org.

BACKGROUND

The most appropriate targets for systolic blood pressure to reduce cardiovascular morbidity and mortality among persons without diabetes remain uncertain.

METHODS

We randomly assigned 9361 persons with a systolic blood pressure of 130 mm Hg 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.

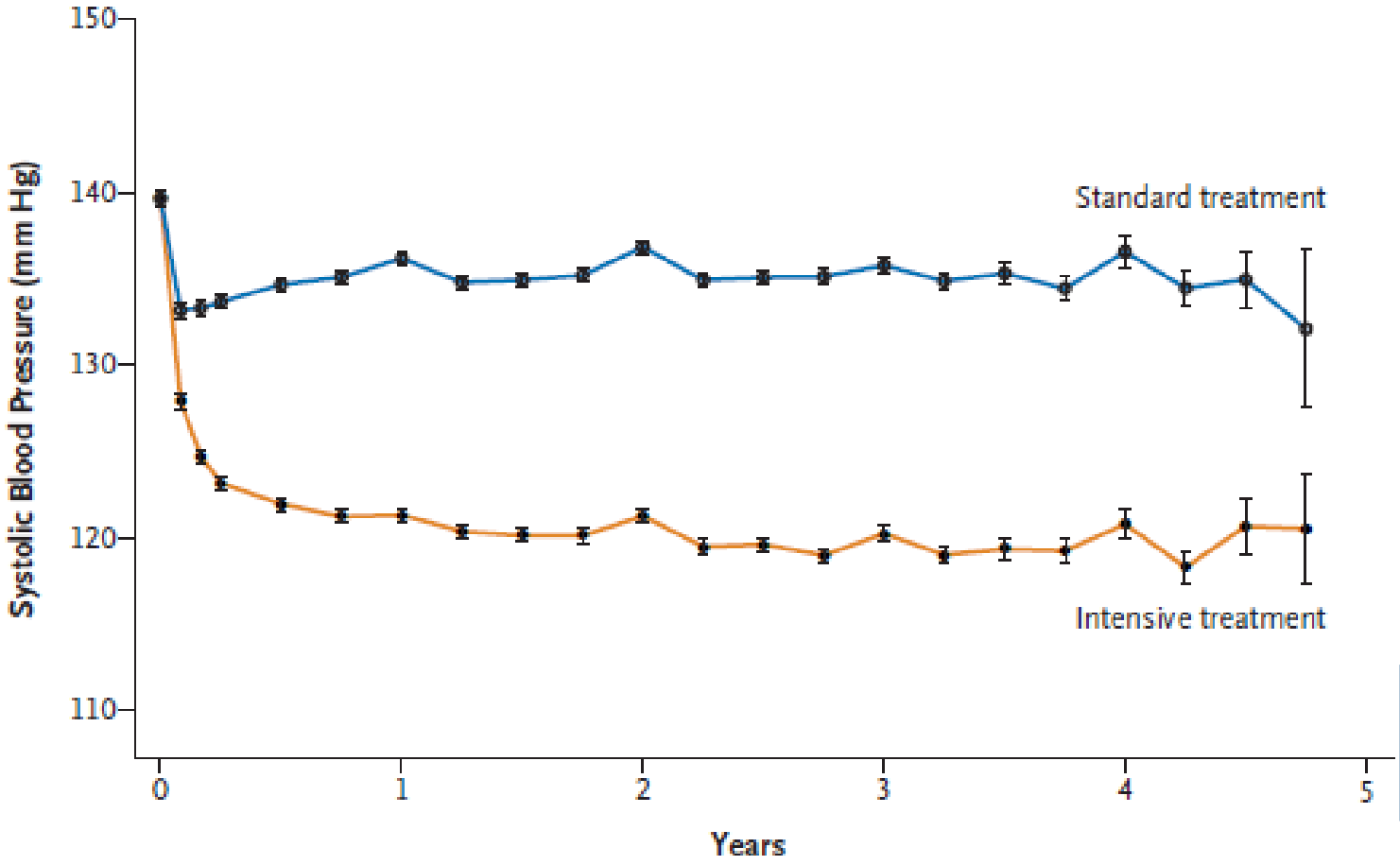
SPRINT
Pas de placebo
PA à initiation 140/78
Différence PA en fin étude 15/8 mmHg

Table 1. Baseline Characteristics of the Study Participants.*

Characteristic	Intensive Treatment (N = 4678)	Standard Treatment (N = 4683)
Criterion for increased cardiovascular risk — no. (%)†		
Age ≥75 yr	1317 (28.2)	1319 (28.2)
Chronic kidney disease‡	1330 (28.4)	1316 (28.1)
Cardiovascular disease	940 (20.1)	937 (20.0)
Clinical	779 (16.7)	783 (16.7)
Subclinical	247 (5.3)	246 (5.3)
Framingham 10-yr cardiovascular disease risk score ≥15%	3556 (76.0)	3547 (75.7)
Female sex — no. (%)	1684 (36.0)	1648 (35.2)
Age — yr		
Overall	67.9±9.4	67.9±9.5
Among those ≥75 yr of age	79.8±3.9	79.9±4.1

Baseline blood pressure — mm Hg		
Systolic	139.7±15.8	139.7±15.4
Diastolic	78.2±11.9	78.0±12.0
Distribution of systolic blood pressure — no. (%)		
≤132 mm Hg	1583 (33.8)	1553 (33.2)
>132 mm Hg to <145 mm Hg	1489 (31.8)	1549 (33.1)
≥145 mm Hg	1606 (34.3)	1581 (33.8)
Serum creatinine — mg/dl	1.07±0.34	1.08±0.34
Estimated GFR — ml/min/1.73 m^2		
Among all participants	71.8±20.7	71.7±20.5

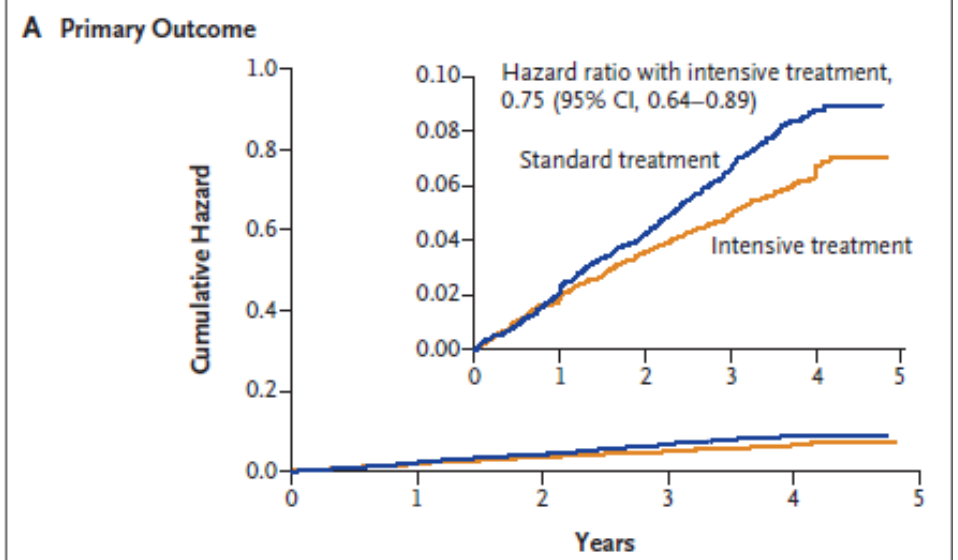
SPRINT 2015



SPRINT 2015

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

Figure 2. Systolic Blood Pressure in the Two Treatment Groups over the Course of the Trial.



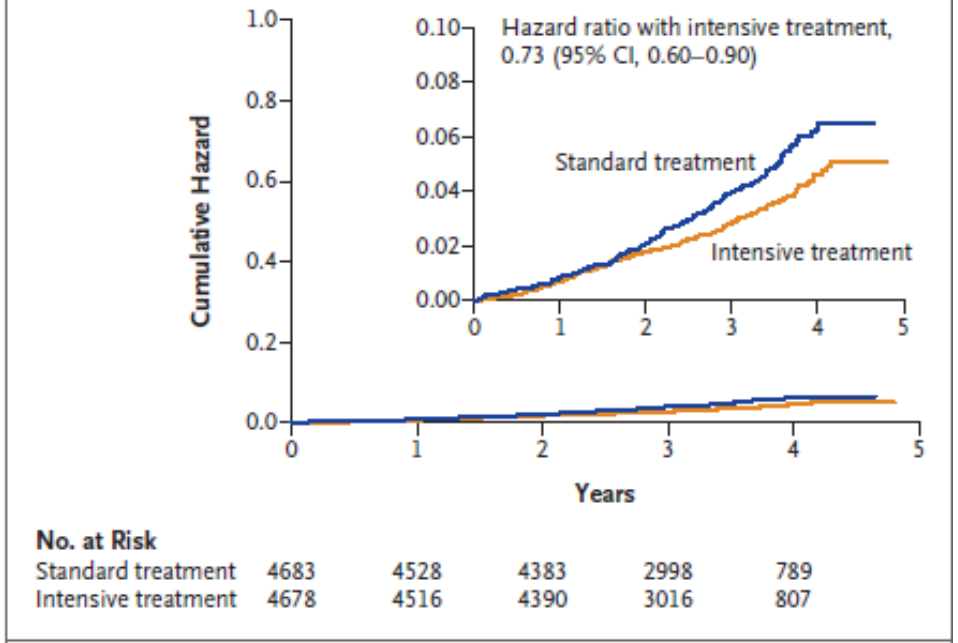


Figure 3. Primary Outcome and Death from Any Cause.

Différence CVD en fin étude

SPRINT 2015

Table 3. Serious Adverse Events, Conditions of Interest, and Monitored Clinical Events.

Variable	Intensive Treatment (N=4678)	Standard Treatment (N=4683)	Hazard Ratio	P Value
	no. of patients (%)			
Serious adverse event*	1793 (38.3)	1736 (37.1)	1.04	0.25
Conditions of interest				
Serious adverse event only				
Hypotension	110 (2.4)	66 (1.4)	1.67	0.001
Syncope	107 (2.3)	80 (1.7)	1.33	0.05
Bradycardia	87 (1.9)	73 (1.6)	1.19	0.28
Electrolyte abnormality	144 (3.1)	107 (2.3)	1.35	0.02
Injurious fall†	105 (2.2)	110 (2.3)	0.95	0.71
Acute kidney injury or acute renal failure‡	193 (4.1)	117 (2.5)	1.66	<0.001
Emergency department visit or serious adverse event				
Hypotension	158 (3.4)	93 (2.0)	1.70	<0.001
Syncope	163 (3.5)	113 (2.4)	1.44	0.003
Bradycardia	104 (2.2)	83 (1.8)	1.25	0.13
Electrolyte abnormality	177 (3.8)	129 (2.8)	1.38	0.006
Injurious fall†	334 (7.1)	332 (7.1)	1.00	0.97
Acute kidney injury or acute renal failure‡	204 (4.4)	120 (2.6)	1.71	<0.001
Monitored clinical events				
Adverse laboratory measure§				
Serum sodium <130 mmol/liter	180 (3.8)	100 (2.1)	1.76	<0.001
Serum sodium >150 mmol/liter	6 (0.1)	0		0.02
Serum potassium <3.0 mmol/liter	114 (2.4)	74 (1.6)	1.50	0.006
Serum potassium >5.5 mmol/liter	176 (3.8)	171 (3.7)	1.00	0.97

SPRINT 2015

Blood-Pressure Lowering in Intermediate-Risk Persons without Cardiovascular Disease

N Engl J Med 2016;374:2009-20.

BACKGROUND

Antihypertensive therapy reduces the risk of cardiovascular events among high-risk persons and among those with a systolic blood pressure of 160 mm Hg or higher, but its role in persons at intermediate risk and with lower blood pressure is unclear.

METHODS

In one comparison from a 2-by-2 factorial trial, we randomly assigned 12,705 participants at intermediate risk who did not have cardiovascular disease to receive either candesartan at a dose of 16 mg per day plus hydrochlorothiazide at a dose of 12.5 mg per day or placebo. The first coprimary outcome was the composite of death from cardiovascular causes, nonfatal myocardial infarction, or nonfatal stroke; the second coprimary outcome additionally included resuscitated cardiac arrest, heart failure, and revascularization. The median follow-up was 5.6 years.

HOPE3
Contre placebo
PA à inclusion 138/82
Différence de PA en fin étude 6/3 mmHg

RESULTS

The mean blood pressure of the participants at baseline was 138.1/81.9 mm Hg; the decrease in blood pressure was 6.0/3.0 mm Hg greater in the active-treatment group than in the placebo group. The first coprimary outcome occurred in 260 participants (4.1%) in the active-treatment group and in 279 (4.4%) in the placebo group (hazard ratio, 0.93; 95% confidence interval [CI], 0.79 to 1.10; P=0.40); the second coprimary outcome occurred in 312 participants (4.9%) and 328 participants (5.2%), respectively (hazard ratio, 0.95; 95% CI, 0.81 to 1.11; P=0.51). In one of the three prespecified hypothesis-based subgroups, participants in the subgroup for the upper third of systolic blood pressure (>143.5 mm Hg) who were in the active-treatment group had significantly lower rates of the first and second coprimary outcomes than those in the placebo group; effects were neutral in the middle and lower thirds (P=0.02 and P=0.009, respectively, for trend in the two outcomes).

N Engl J Med 2016;374:2009-20.

Pas de différence CVD

A First Coprimary Outcome

Subgroup	Mean Systolic Blood Pressure	Difference in Blood Pressure	Candesartan+ Hydrochlorothiazide	Placebo	Hazard Ratio (95% CI)	P Value for Trend
	mm Hg		*no. of events/total no. of participants (%)*			
Overall	138.1	6.0/3.0	260/6356 (4.1)	279/6349 (4.4)	0.93 (0.79–1.10)	—
Systolic blood pressure						0.02
≤131.5 mm Hg	122.2	6.1/3.1	70/2080 (3.4)	62/2122 (2.9)	1.16 (0.82–1.63)	
131.6–143.5 mm Hg	137.6	5.6/2.7	87/2120 (4.1)	81/2141 (3.8)	1.08 (0.80–1.46)	
>143.5 mm Hg	154.1	5.8/3.0	103/2156 (4.8)	136/2084 (6.5)	0.73 (0.56–0.94)	

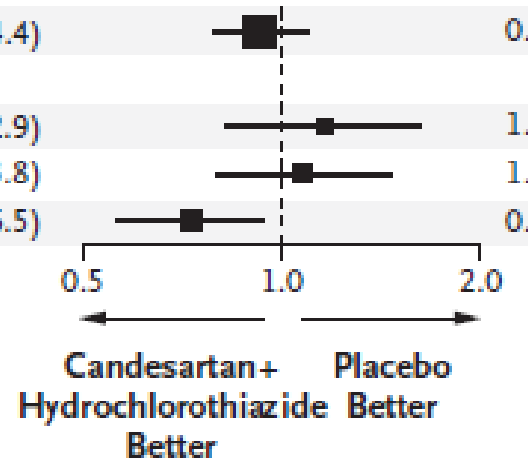


Table. Characteristics in the SPRINT and HOPE-3 Blood Pressure Trial

Characteristic	SPRINT	HOPE-3
Study participants, No.	9361	12705
Source countries	United States and Puerto Rico	21 countries (6)
Race/ethnicity, No. (%)		
White	5399 (58)	2546 (20)
African American	2802 (30)	225 (2)
Hispanic	984 (10)	3496 (27)
Chinese	NA	3691 (29)
South/other Asian	NA	2550 (20)
Other	176 (2)	197 (1)
Baseline BP medications, No. (%)	8479 (91)	2783 (22)
CKD, No. (%)	2646 (28)	Excluded
CVD, No. (%)	1877 (20)	Excluded
CVD risk, events/y, %	2.2	0.8
Run-in	No	Yes
Design	2-Arm parallel trial	Factorial
Study treatment	Stepped-care; intensive treatment goal of SBP <120 mm Hg; standard treatment goal of SBP <140 mm Hg	Fixed-dose combination; once-daily candesartan (16 mg) plus hydrochlorothiazide (12.5 mg)
Median follow-up, y	2.9	5.6
Taking study medications at end of trial, No. (%)	8689 (93)	9687 (76)
BP measurements	3 readings; mean (Omron 907XL)	2 readings; mean (Omron HEM-711DLXCAN)
BP differences between randomized groups	Average achieved SBP; intensive: 121.5 mm Hg; standard: 134.6 mm Hg	Baseline SBP/DBP, 138.1/81.9 mm Hg; average achieved reduction in SBP/DBP; active treatment, 10.0/5.7 mm Hg; placebo, 4.0/2.7 mm Hg
Blinding	Open label (adjudication panel blinded)	Double-blind
Primary outcome	CVD composite, MI, non-MI ACS, stroke, HF, CVD death	CVD composite, first coprimary: MI, stroke, and CVD death; second coprimary: above plus resuscitated cardiac arrest, HF, and revascularization
Principal funder	National Institutes of Health	AstraZeneca and the Canadian Institutes of Health Research

Intensive SBP 121 mmHg
Standard 135 mmHg

Intensive SBP 128 mmHg
Placebo 134 mmHg

Donc Sprint chez les patients à haut risque est bénéfique si cible PA <130 mmHg

- Si patients à risque faible à modéré (HOPE3), bénéfice pour une cible < 140 mmHg

New US guidelines Nov 2017

8.1.6.1. Choice of Initial Monotherapy Versus Initial Combination Drug Therapy

Recommendations for Choice of Initial Monotherapy Versus Initial Combination Drug Therapy*		
COR	**LOE**	**Recommendation**
I	C-EO	1. 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	2. 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.

Cible PA<130/80 mmHg

New US guidelines Nov 2017

8.1.3. Follow-Up After Initial BP Evaluation

Recommendations for Follow-Up After Initial BP Elevation References that support recommendations are summarized in Online Data Supplement 24.		
COR	**LOE**	**Recommendations**
I	B-R	1. Adults with an elevated BP or stage 1 hypertension who have an estimated 10-year ASCVD risk less than 10% should be managed with nonpharmacological therapy and have a repeat BP evaluation within 3 to 6 months (1, 2).
I	B-R	2. Adults with stage 1 hypertension who have an estimated 10-year ASCVD risk of 10% or higher should be managed initially with a combination of nonpharmacological and antihypertensive drug therapy and have a repeat BP evaluation in 1 month (1, 2).
I	B-R	3. Adults with stage 2 hypertension should be evaluated by or referred to a primary care provider within 1 month of the initial diagnosis, have a combination of nonpharmacological and antihypertensive drug therapy (with 2 agents of different classes) initiated, and have a repeat BP evaluation in 1 month (1, 2).
I	B-R	4. For adults with a very high average BP (e.g., SBP ≥180 mm Hg or DBP ≥110 mm Hg), evaluation followed by prompt antihypertensive drug treatment is recommended (1, 2).
IIa	C-EO	5. For adults with a normal BP, repeat evaluation every year is reasonable.

PA entre 120 et 139/ 80 et 90 mmHg et risque CV à 10 ans <10%: règles H-D

PA entre 130-139/80-89 et risque CV 10 ans > 10%: règles H-D et 1 médicament

PA >140/90 mmHg: règles H-D et 2 médicaments

New US guidelines Nov 2017

Recommendations for Nonpharmacological Interventions

References that support recommendations are summarized in Online Data Supplements 9-21.

COR	LOE	Recommendations
I	A	1. Weight loss is recommended to reduce BP in adults with elevated BP or hypertension who are overweight or obese (1-4).
I	A	2. A heart-healthy diet, such as the DASH (Dietary Approaches to Stop Hypertension) diet, that facilitates achieving a desirable weight is recommended for adults with elevated BP or hypertension (5-7).
I	A	3. Sodium reduction is recommended for adults with elevated BP or hypertension (8-12).
I	A	4. Potassium supplementation, preferably in dietary modification, is recommended for adults with elevated BP or hypertension, unless contraindicated by the presence of CKD or use of drugs that reduce potassium excretion (13-17).
I	A	5. Increased physical activity with a structured exercise program is recommended for adults with elevated BP or hypertension (3, 4, 12, 18-22).
I	A	6. Adult men and women with elevated BP or hypertension who currently consume alcohol should be advised to drink no more than 2 and 1 standard drinks* per day, respectively (23-28).

ESH-ESC 2013 recommendations (IA)

2013 ESH/ESC Guidelines for the management of arterial hypertension

Université de Liège

- Restrict Salt (5-6g/d)
- Moderate your alcohol intake
- Eat more vegetables, fruits, low fat dairy products
- Practice exercise (5-7 d/ w)
- Reduce your weight if BMI > 25 Kg/m²
- Quit smoking
- (Manage your Stress)

Effects of Different Dietary Interventions on Blood Pressure

Systematic Review and Meta-Analysis of Randomized Controlled Trials

Hypertension. 2016;67:733-739.

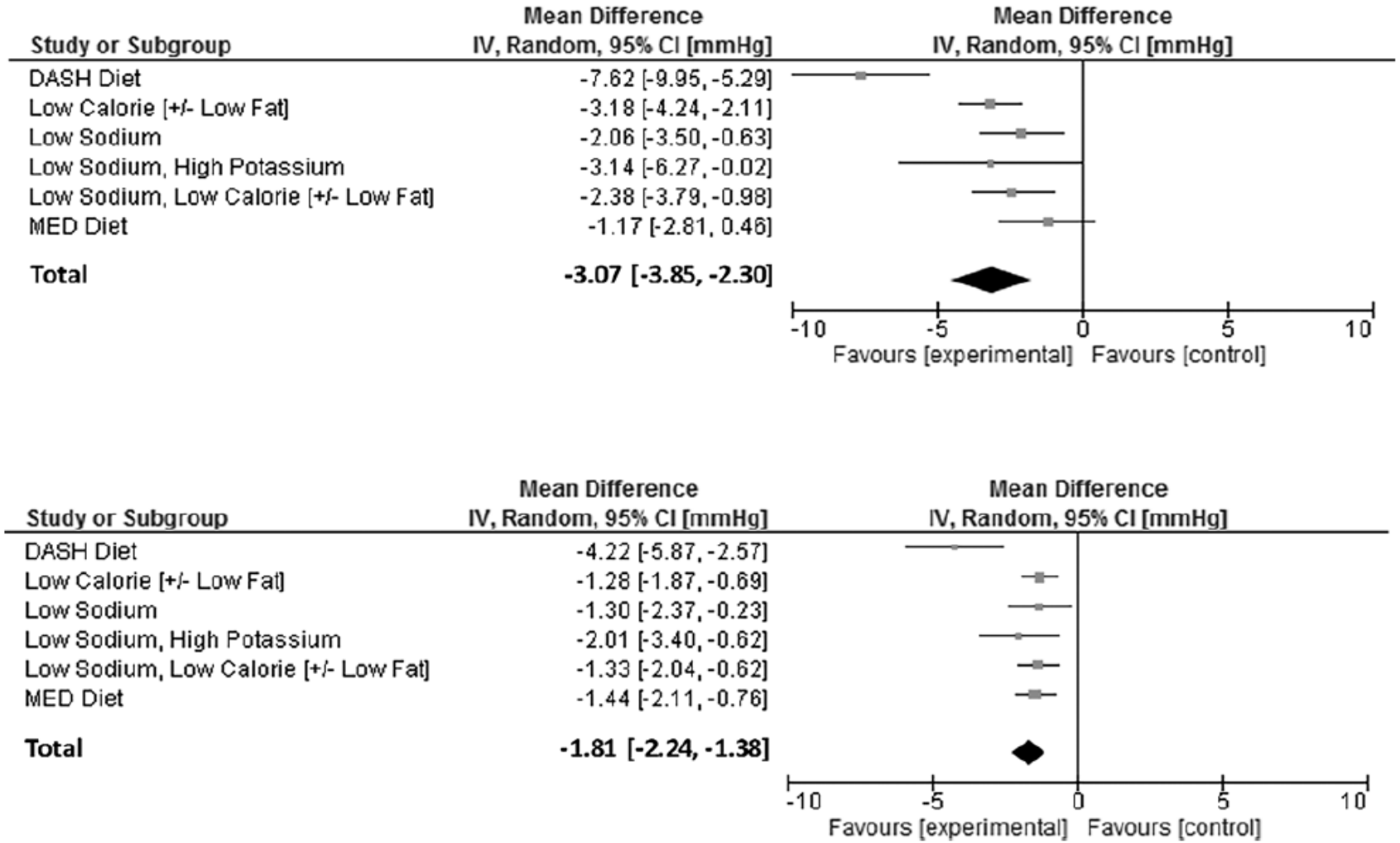
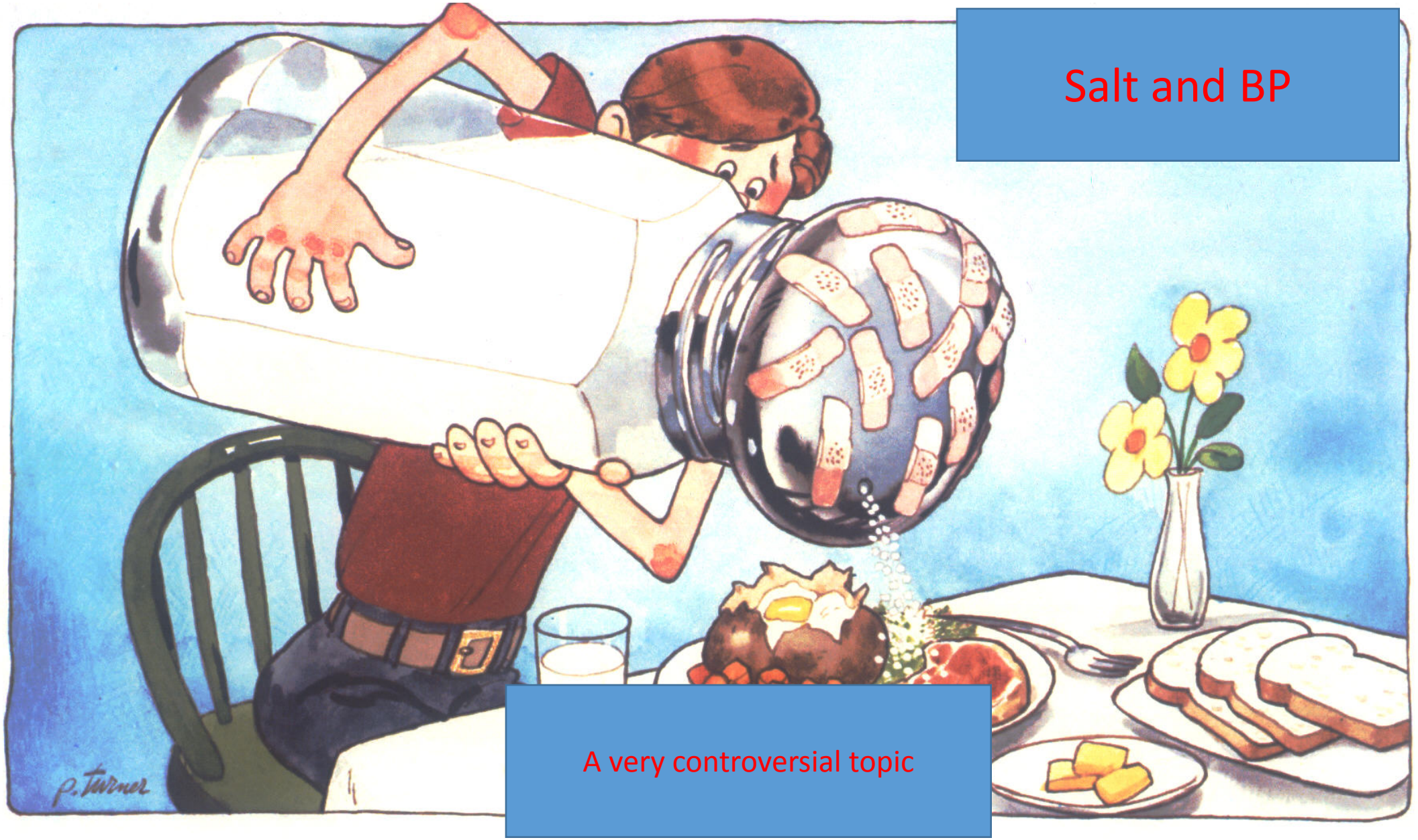


Figure 3. Average net effect for (**A**) systolic blood pressure and (**B**) diastolic blood pressure, and corresponding 95% confidence intervals (CIs), summarized by diet type. Average net BP effect is calculated as the net incremental change in the diet group versus the control group. Horizontal lines indicate 95% CIs of the estimate. All results are reported in mm Hg.

Salt and BP



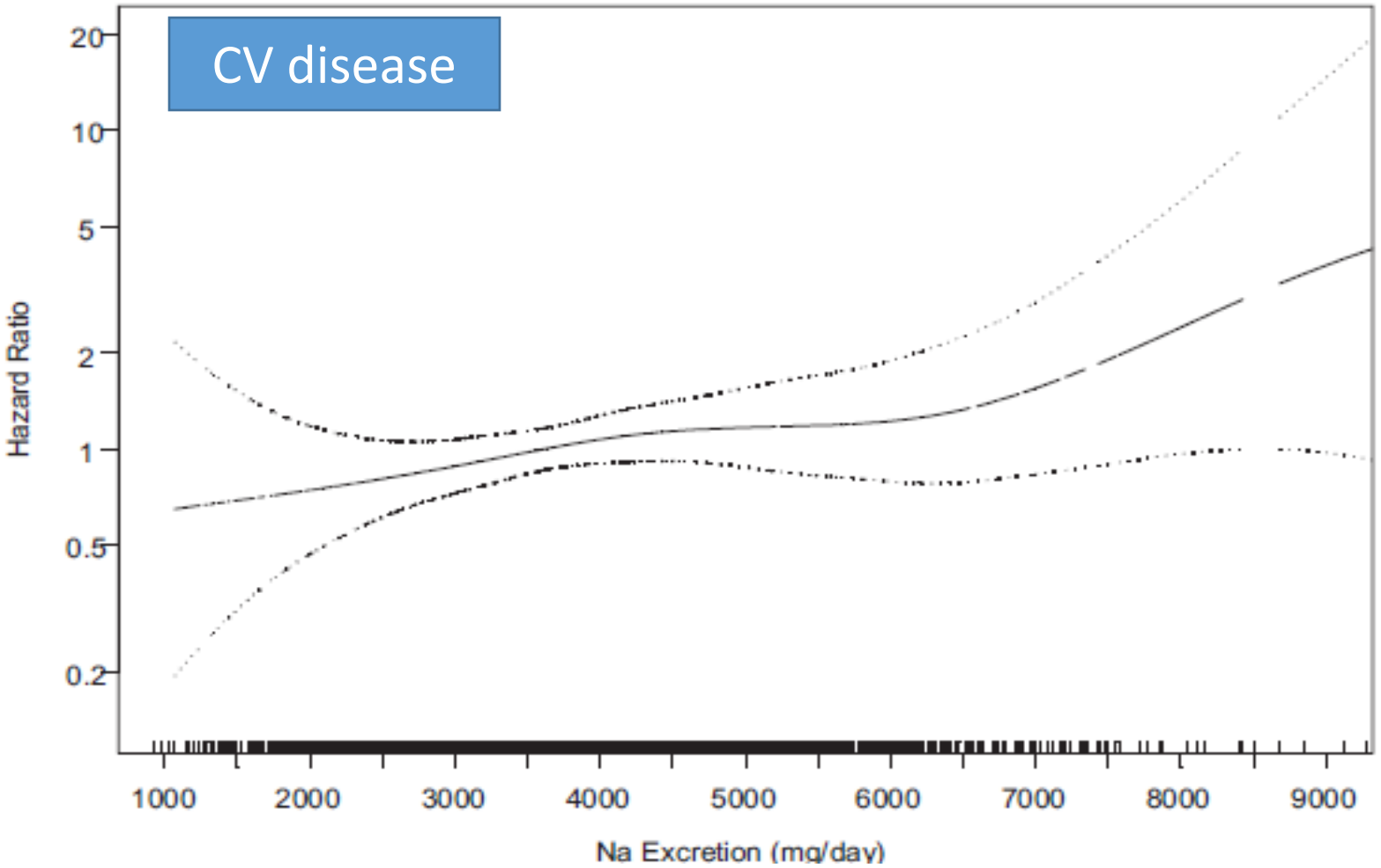
A very controversial topic

Reduce your sodium intake, and you'll soon find you crave less salt.

Lower Levels of Sodium Intake and Reduced Cardiovascular Risk

Circulation. 2014;129:981-989.

Nancy R. Cook, ScD; Lawrence J. Appel, MD, MPH; Paul K. Whelton, MB, MD, MSc



Etudes TOHP 1 and 2

Prospective Urban Rural Epidemiology (PURE) study is provided in the Supplementary Appendix, available at NEJM.org.

N Engl J Med 2014;371:601-11.

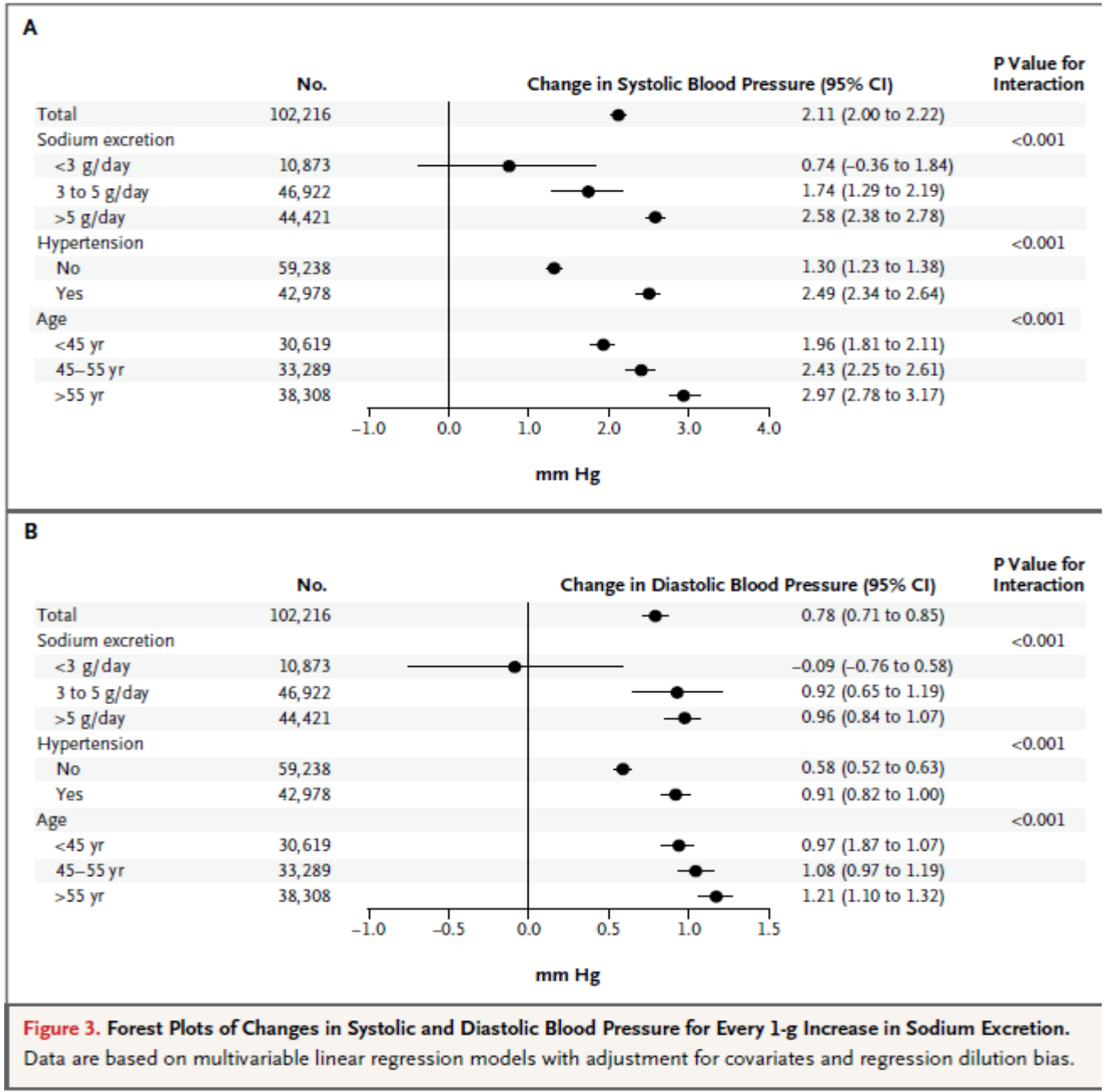
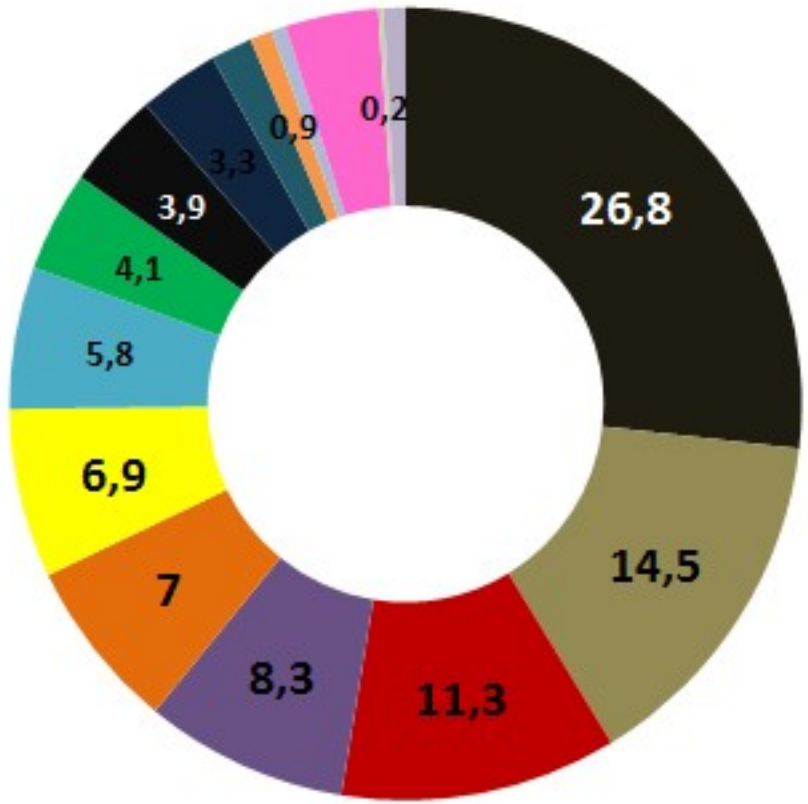


Figure 3. Forest Plots of Changes in Systolic and Diastolic Blood Pressure for Every 1-g Increase in Sodium Excretion. Data are based on multivariable linear regression models with adjustment for covariates and regression dilution bias.

Contributions moyennes des groupes d'aliments (en %) aux apports en sodium chez les adultes

Quoidansmonassiette.fr
Etude INCA2



- Pain, céréales
- Condiments sauces, soupes, bouillons
- Charcuteries
- Plats composés
- Pizza, quiches, sandwichs
- Fromages
- Viennoiseries, biscuits, pâtisseries
- Légumes et légumes secs
- Viande, vollaille, abat, œufs
- Lait, produits laitiers, crèmes desserts
- Boissons, eau
- Chocolat, sucre, café, glace
- Matières grasses
- Poissons, crustacés

Wenguang Feng,* Louis J. Dell'Italia,*† and Paul W. Sanders*†‡

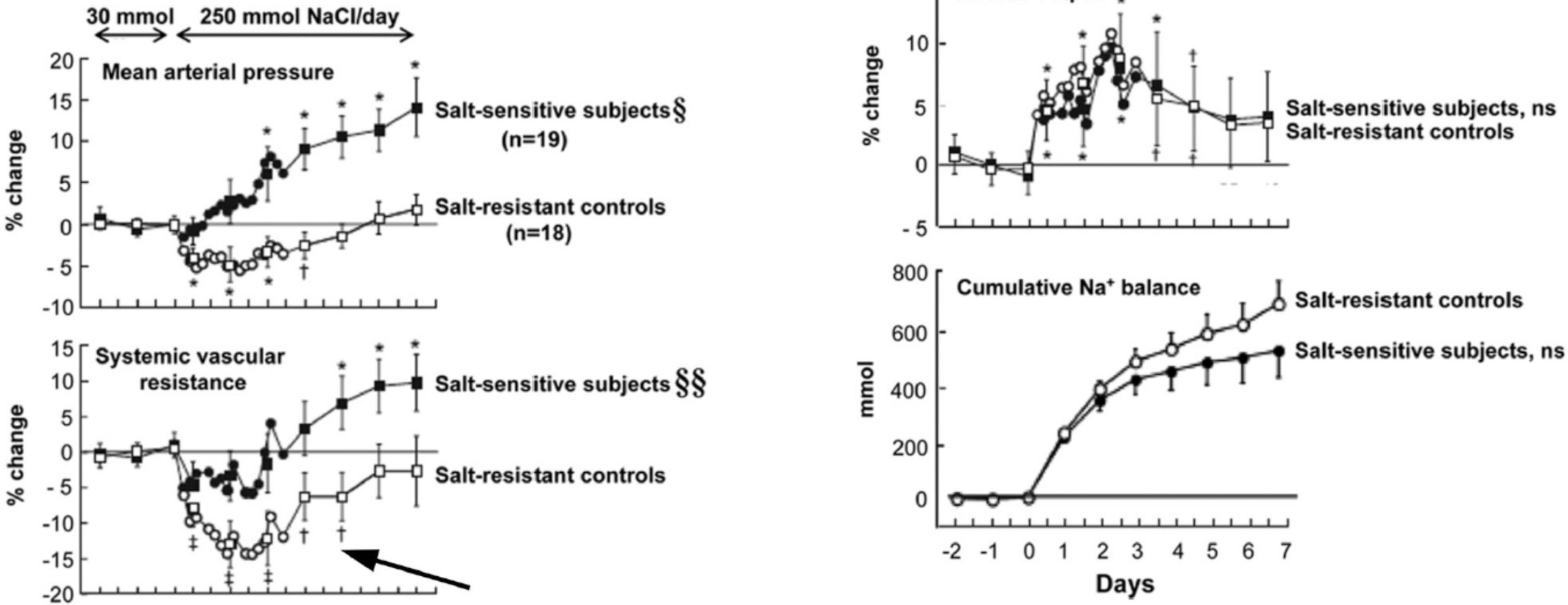


Figure 3. The hemodynamic effects of chronic high salt intake differed between SS and SR volunteers. Despite similar increases in CO (row 3) and cumulative sodium balance (row 4), SS but not SR patients manifested salt-induced increases in mean arterial pressure (row 1). The SR volunteers showed rapid reductions in calculated systemic vascular resistance (SVR; row 2), whereas SVR did not decline and actually increased over time in the SS patients. It is worth noting that SVR also increased with continued high salt ingestion in SR patients (arrow). *$P<0.01$; †$P<0.05$; §§$P<0.001$, compared with period of low salt intake. ns, not

- The "Volume-Loading" Theory of NaCl-Induced Hypertension -

A - Mechanism of salt-resistance -

Common pathway yielding a non-pressor response to NaCl loading in normal controls

- ↑ Intake of salt
- ↓
- Minimal ↑ in renal salt reabsorption
- ↓
- Minimal ↑ in renal salt retention
- ↓
- Na^+ output ~ Na^+ intake
- ↓
- Minimal ↑ in the intravascular volume
- ↓
- Minimal ↑ in volume delivery to heart
- ↓
- Minimal ↑ in cardiac output
- +
- Minimal ↓ in systemic vascular resistance
- ↓
- Little or no increase in blood pressure

B - Mechanism of salt-sensitivity -

"A final common pathway" yielding a pressor response to NaCl loading in affected subjects

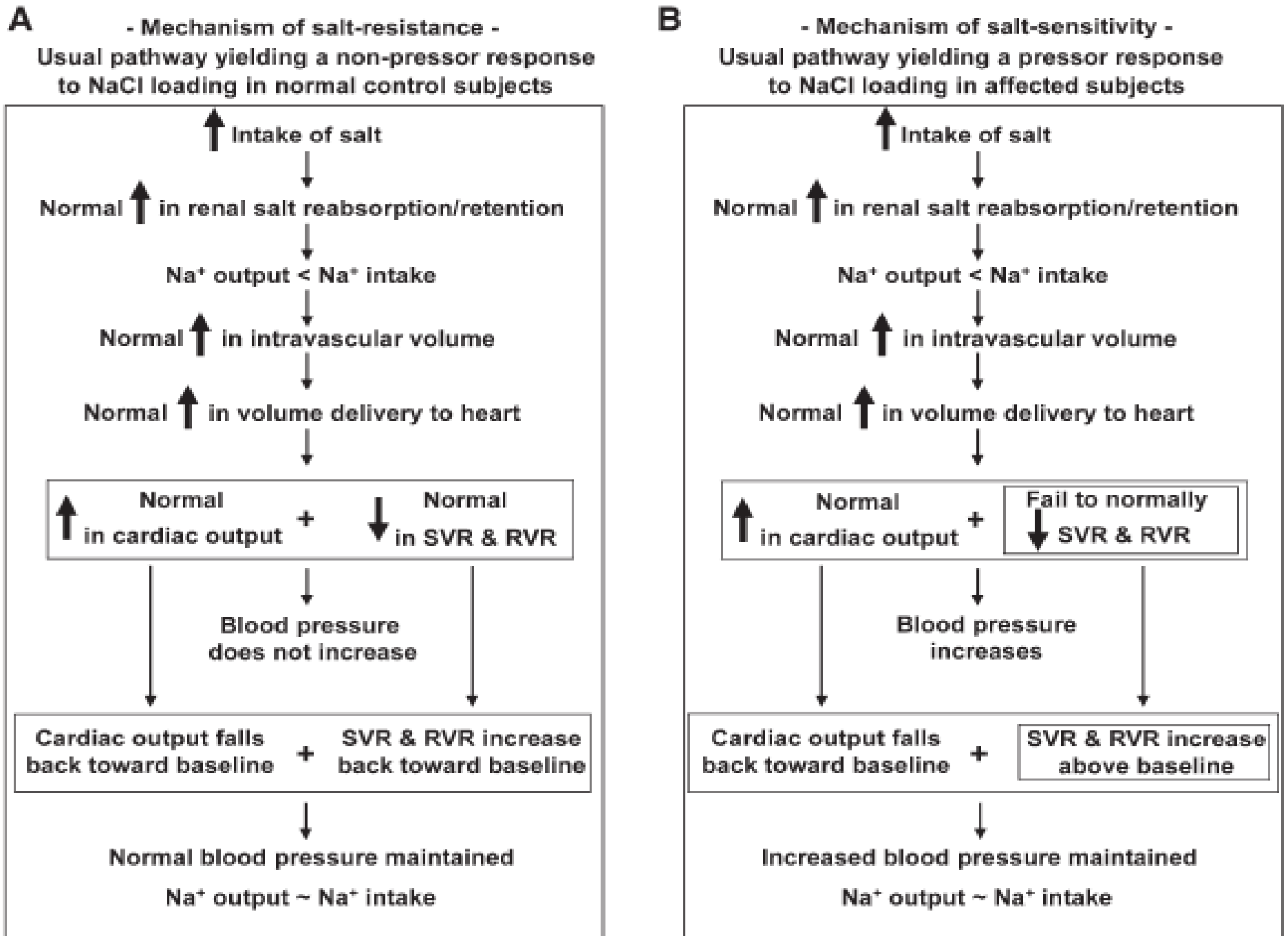
- ↑ Intake of salt
- ↓
- ↑ Renal salt reabsorption
- ↓
- ↑ Renal salt retention
- ↓
- Na^+ output < Na^+ intake
- ↓
- ↑ Intravascular volume
- ↓
- ↑ Volume delivery to heart
- ↓
- ↑ Cardiac output
- +
- Normal systemic vascular resistance
- ↓
- ↑ Blood pressure

Autoregulation of blood flow →

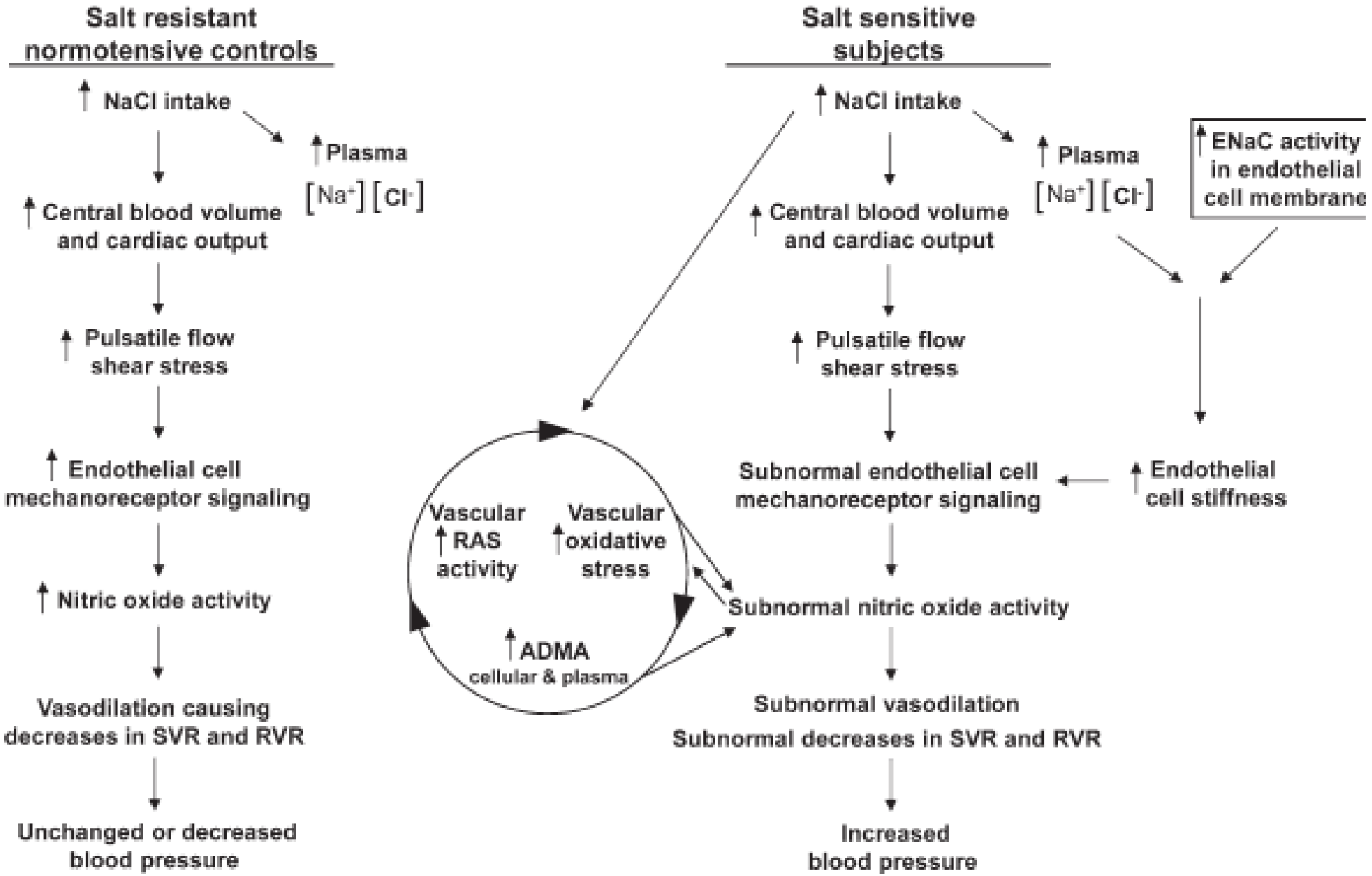
- Normal cardiac output
- +
- ↑ Systemic vascular resistance
- ↓
- ↑ Blood pressure (sustained)
- Na^+ output ~ Na^+ intake

Théorie de Guyton

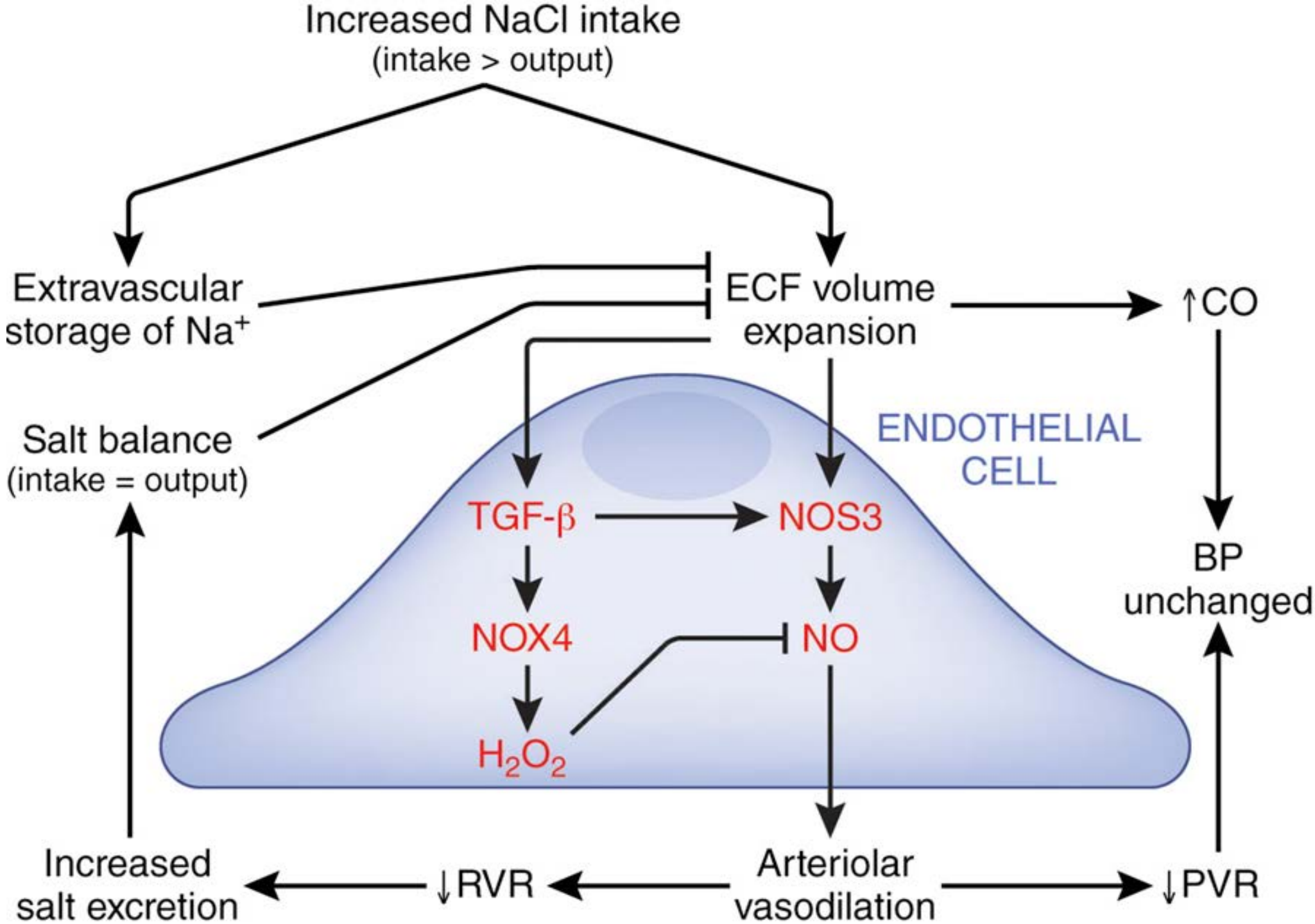
The "Vasodysfunction" Theory of NaCl-Induced Hypertension



Nouvelle théorie



. Nitric oxide–related mechanisms mediating vascular resistance responses to initiation of increased salt intake.


Increased NaCl intake
(intake > output)
Extravascular storage of Na+
ECF volume expansion
↑CO
Salt balance
(intake = output)
ENDOTHELIAL CELL
TGF-β
NOS3
NOX4
NO
H2O2
BP unchanged
Increased salt excretion
↓RVR
Arteriolar vasodilation
↓PVR

The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 AUGUST 14, 2014 VOL. 371 NO. 7

Association of Urinary Sodium and Potassium Excretion with Blood Pressure

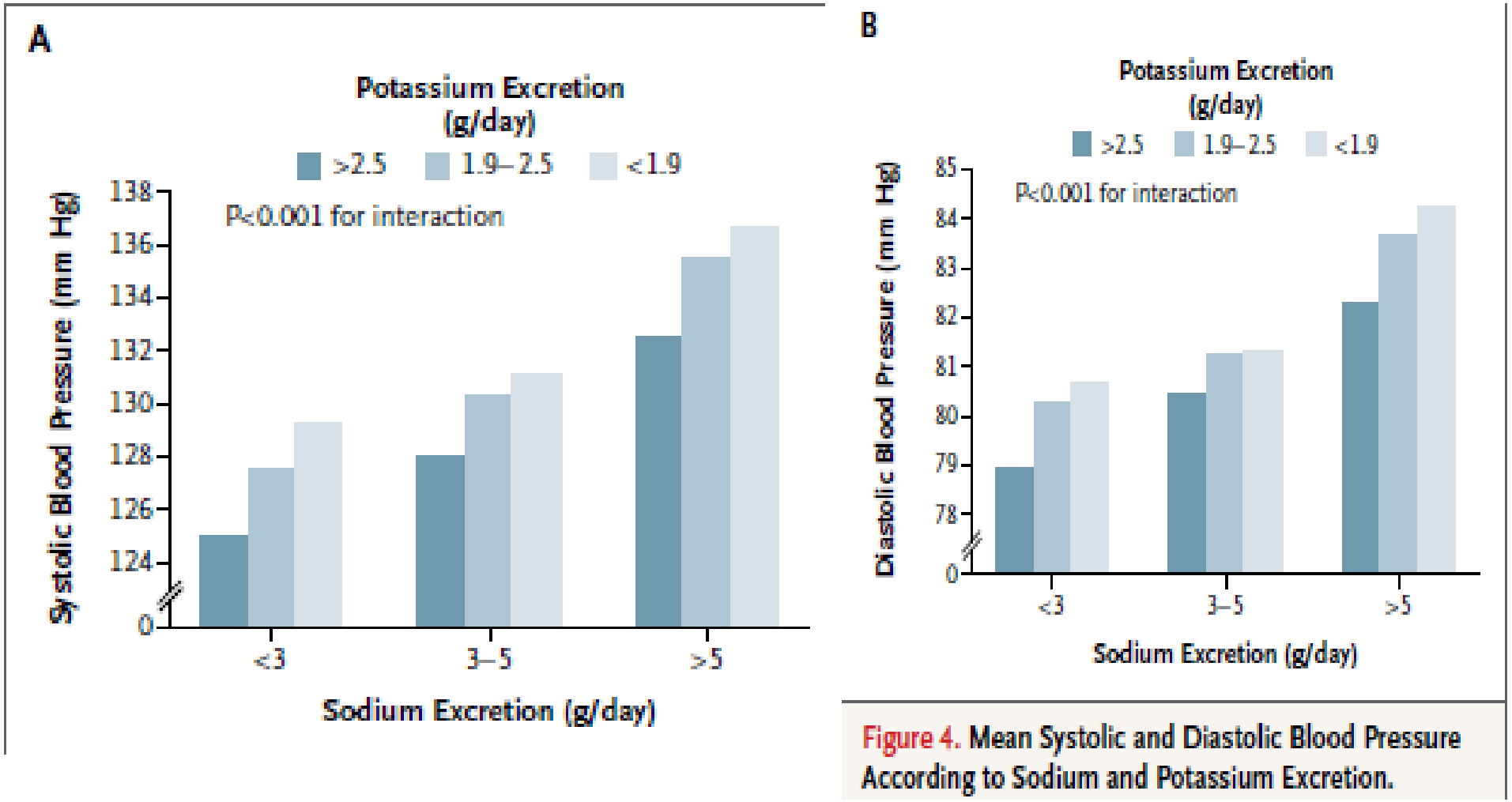


Figure 4. Mean Systolic and Diastolic Blood Pressure According to Sodium and Potassium Excretion.

European Heart Journal (2017) **38**, 104–112
doi:10.1093/eurheartj/ehw129

Short-term mortality risk of serum potassium levels in hypertension: a retrospective analysis of nationwide registry data

Potassium	Hazard ratio	Low 95%	High 95%	*P*
K: 2.9–3.4 mmol/L	3.11	2.41	4.00	<0.01
K: 3.5–3.7 mmol/L	1.83	1.47	2.29	<0.01
K: 3.8–4.0 mmol/L	1.21	0.99	1.46	0.06
K: 4.1–4.4 mmol/L	1	Reference		
K: 4.5–4.7 mmol/L	1.16	0.94	1.42	0.17
K: 4.8–5.0 mmol/L	1.83	1.41	2.36	<0.01
K: 5.1–5.8 mmol/L	2.47	1.75	3.48	<0.01

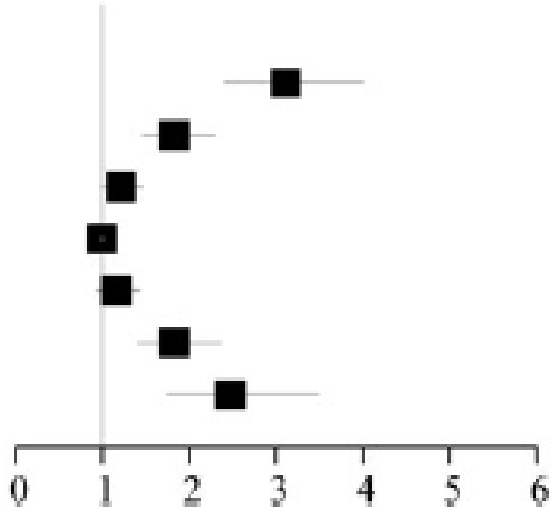


Figure 2 All-cause mortality in hypertensive patients stratified by potassium intervals (90-day follow-up). $n = 44\,799$. Reference interval represented by the interval K: 4.1–4.4 mmol/L.

Traitement pharmacologique de la PA

- En association avec des modifications dues à l'hygiène de vie, le traitement pharmacologique diminue la PA mais diminue surtout par là le risque CV, les AVC et les décès,
- Toutes les molécules sont efficaces mais celles qui diminuent les évènements cliniques doivent être utilisées préférentiellement (thiazides, IEC, sartans et antagonistes calciques)
- Combinaison d'office pour les patients HTA stade 2, avec des molécules de familles différentes
- Combinaisons fixes stimulent l'adhérence au traitement

8.1.4. General Principles of Drug Therapy

Recommendation for General Principle of Drug Therapy References that support recommendations are summarized in Online Data Supplement 25.		
COR	**LOE**	**Recommendation**
III: Harm	**A**	**6. Simultaneous use of an ACE inhibitor, ARB, and/or renin inhibitor is potentially harmful and is not recommended to treat adults with hypertension (1-3).**

Classe thérapeutique	C/I absolues	C/I relatives
Diurétiques (thiazides)	goutte	Syndrome métabolique Intolérance glucidique Grossesse Hypercalcémie Hypokaliémie
Béta-bloqueurs	Asthme BAV ($2^{ème}$,$3^{ème}$ degré)	Syndrome métabolique Intolérance glucidique Athlètes/sportifs BPCO (sauf BB vasodilatateurs)
Antagonistes calciques (dihydropiridines)		Tachyarythmie Insuffisance cardiaque
Antagonistes calciques	BAV ($2^{ème}$,$3^{ème}$ degré) Dysfonction ventricule droit sévère Insuffisance cardiaque	
Inhibiteurs enzyme de conversion	Grossesse Œdème angioneurotique Hyperkaliémie Sténose d'a. rénale bilatérale	Désir de grossesse
Bloqueurs des récepteurs de l'angiotensine II	Grossesse Hyperkaliémie Sténose d'a. rénale bilatérale	Désir de grossesse
Anti-aldostérone	IRA/IRC (eGFR < 30ml/min) Hyperkaliémie	

Que conclure?

- L'HTA est fréquente, continue à causer des dégâts et à tuer
- Le dépistage est important en insistant sur les mesures en dehors de la consultation pour le diagnostic et pour le suivi
- Les règles H-D sont primordiales agissant sur la PA et certains autres FRCV et donc à appliquer chez TOUS
- Toujours calculer le risque CV d'un patient avant de traiter avec un médicament, avec une cible de PA individuelle
- L'encouragement avec un suivi régulier permet d'améliorer l'adhésion au traitement

Finalement quelle cible adopter? Nouveau consensus?

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.

Association of Blood Pressure Lowering With Mortality and Cardiovascular Disease Across Blood Pressure Levels

A Systematic Review and Meta-analysis

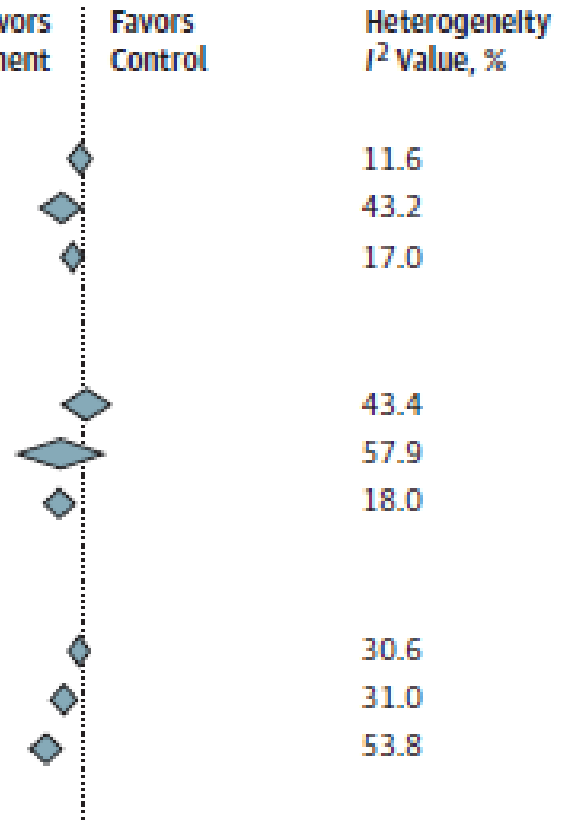
Mattias Brunström, MD; Bo Carlberg, MD, PhD

JAMA Intern Med. 2018;178(1):28-36.

Défenseurs du 140/90 mmHg

Figure 1. Effect of Treatment to Lower Blood Pressure (BP) at Different BP Levels in Primary Prevention

Baseline SBP, mm Hg	No. of Events/ Participants/Trials	RR (95% CI)	Heterogeneity I^2 Value, %
All-cause mortality			
<140	4897/68816/16	0.98 (0.90-1.06)	11.6
140-159	2731/41049/15	0.87 (0.75-1.00)	43.2
≥160	4361/79900/18	0.93 (0.87-1.00)	17.0
SBP Interaction, *P* = .18			
Cardiovascular mortality			
<140	2633/66480/12	1.03 (0.87-1.20)	43.4
140-159	1465/42587/15	0.86 (0.65-1.14)	57.9
≥160	2290/78789/17	0.85 (0.77-0.95)	18.0
SBP Interaction, *P* = .02			
Major cardiovascular events			
<140	7354/67928/13	0.97 (0.90-1.04)	30.6
140-159	3951/43489/16	0.88 (0.80-0.96)	31.0
≥160	4627/77733/16	0.78 (0.70-0.87)	53.8
SBP Interaction, *P* = .004			



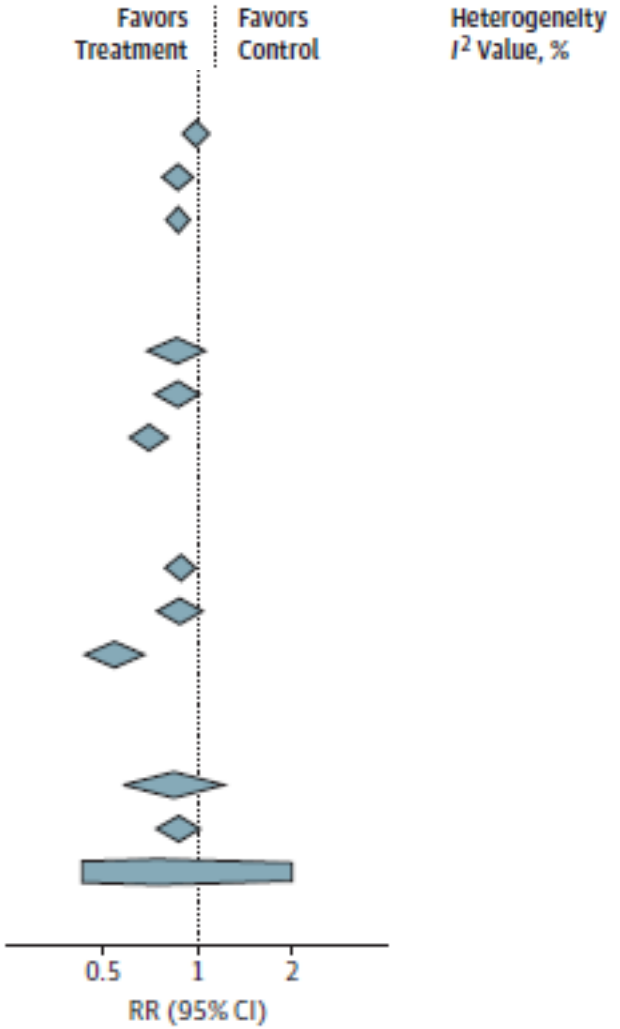
Association of Blood Pressure Lowering With Mortality and Cardiovascular Disease Across Blood Pressure Levels

A Systematic Review and Meta-analysis

Mattias Brunström, MD; Bo Carlberg, MD, PhD

Figure 1. Effect of Treatment to Lower Blood Pressure (BP) at Different BP Levels in Primary Prevention

Baseline SBP, mm Hg	No. of Events/ Participants/Trials	RR (95% CI)
Coronary heart disease		
<140	1618/62617/11	0.98 (0.88-1.09)
140-159	1369/42543/14	0.86 (0.76-0.96)
≥160	2018/78617/17	0.86 (0.78-0.94)
SBP Interaction, *P* = .13		
Stroke		
<140	1775/62751/11	0.85 (0.68-1.06)
140-159	1429/41641/13	0.86 (0.72-1.01)
≥160	1929/79900/18	0.69 (0.60-0.80)
SBP Interaction, *P* = .16		
Heart failure		
<140	2261/60879/9	0.88 (0.78-0.98)
140-159	1113/35254/10	0.87 (0.73-1.04)
≥160	520/23395/10	0.53 (0.42-0.67)
SBP Interaction, *P* = .005		
End-stage renal disease		
<140	488/24512/5	0.84 (0.57-1.24)
140-159	870/32984/7	0.88 (0.74-1.04)
≥160	32/5566/2	0.73 (0.01-6.45)
SBP Interaction, *P* = .32		



JAMA Intern Med. 2018;178(1):28-36.

Cochrane Database Syst Rev. 2017 Oct 11;10:CD010315. doi: 10.1002/14651858.CD010315.pub2.

Blood pressure targets for the treatment of people with hypertension and cardiovascular disease.

No evidence of a difference in total mortality and serious adverse events was found between treating to a lower or to a standard blood pressure target in people with hypertension and cardiovascular disease. This suggests no net health benefit from a lower systolic blood pressure target despite the small absolute reduction in total cardiovascular serious adverse events. There was very limited evidence on adverse events, which lead to high uncertainty. At present there is insufficient evidence to justify lower blood pressure targets (≤ 135/85 mmHg) in people with hypertension and established cardiovascular disease.

Et chez le patient CKD?

ESH 2013
Cible PA <140 mmHg
chez la majorité
<130 si protéinurie

Therapeutic strategies in hypertensive patients with nephropathy

Recommendations	Class[a]	Level[b]	Ref.[c]
Lowering SBP to <140 mmHg should be considered.	IIa	B	303, 313
When overt proteinuria is present, SBP values <130 mmHg may be considered, provided that changes in eGFR are monitored.	IIb	B	307, 308, 313
RAS blockers are more effective in reducing albuminuria than other antihypertensive agents, and are indicated in hypertensive patients in the presence of microalbuminuria or overt proteinuria.	I	A	513, 537
Reaching BP goals usually requires combination therapy, and it is recommended to combine RAS blockers with other antihypertensive agents.	I	A	446

ESH 2013

New US guidelines Nov 2017

9.3. Chronic Kidney Disease

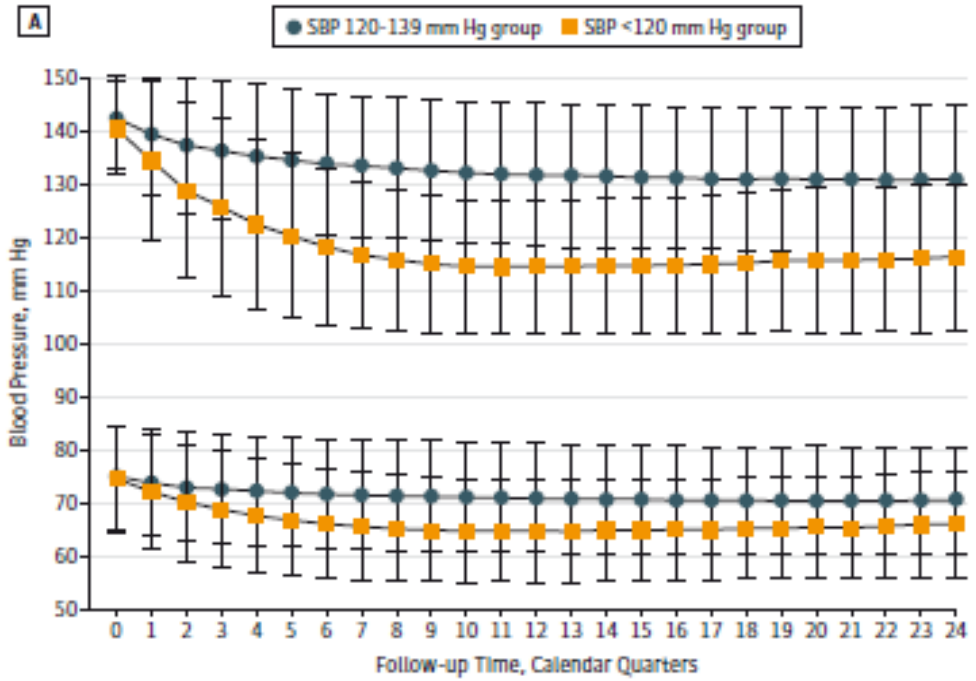
Recommendations for Treatment of Hypertension in Patients With CKD References that support recommendations are summarized in Online Data Supplements 37 and 38 and Systematic Review Report.		
COR	**LOE**	**Recommendations**
I	SBP: B-R[SR] DBP: C-EO	1. Adults with hypertension and CKD should be treated to a BP goal of less than 130/80 mm Hg (1-6).
IIa	B-R	2. 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 (3, 7-12).
IIb	C-EO	3. 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]) (7, 8), treatment with an ARB may be reasonable if an ACE inhibitor is not tolerated.

Observational Modeling of Strict vs Conventional Blood Pressure Control in Patients With Chronic Kidney Disease

JAMA Intern Med. doi:10.1001/jamainternmed.2014.327
Published online August 4, 2014.

Csaba P. Kovesdy, MD; Jun L. Lu, MD; Miklos Z. Molnar, MD, PhD; Jennie Z. Ma, PhD; Robert B. Canada, MD; , MD, MS

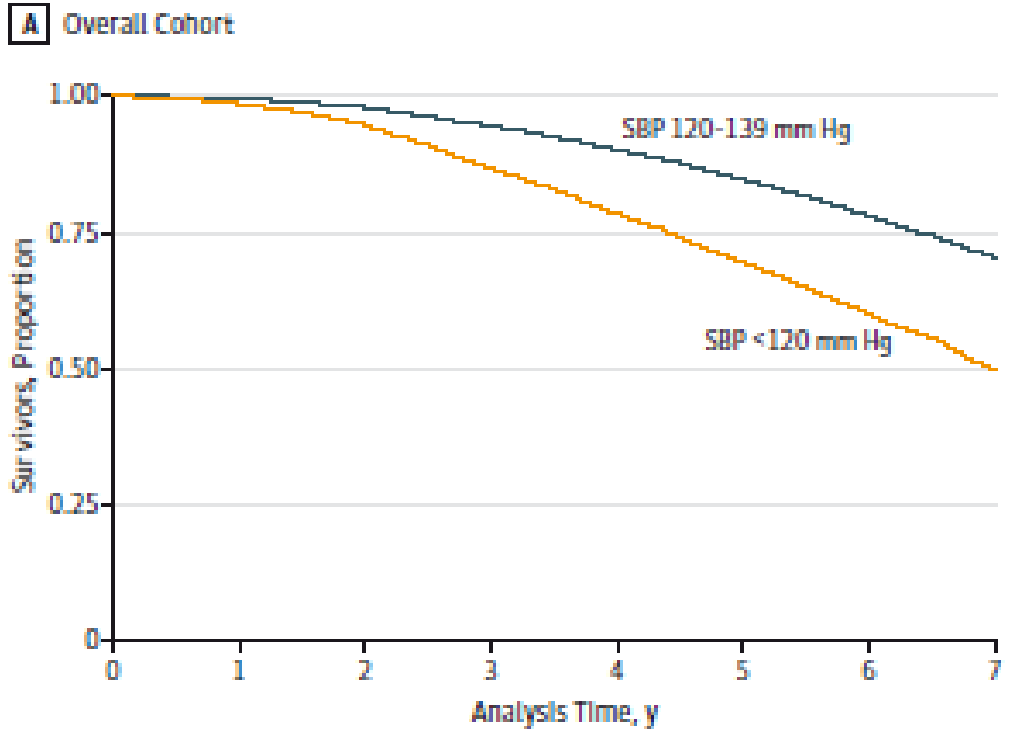
Figure 2. Follow-up Systolic Blood Pressure (SBP) and Diastolic Blood Presure (DBP) in Patients With SBP Less Than 120 vs 120 to 139 mm Hg



OBJECTIVE To compare the outcomes associated with a treated systolic blood pressure (SBP) of less than 120 mm Hg vs those associated with the currently recommended SBP of less than 140 mm Hg in a national CKD database of US veterans.

DESIGN, SETTING, AND PARTICIPANTS Historical cohort study using a nationwide cohort of US veterans with prevalent CKD, estimated glomerular filtration rate less than 60 mL/min/1.73 m^2, and uncontrolled hypertension, who then received 1 or more additional blood pressure medications with evidence of a decrease in SBP. Propensity scores were calculated to reflect each individual's probability for future SBP less than 120 vs 120 to 139 mm Hg.

Kaplan-Meier Survival Curves of Patients With Follow-up

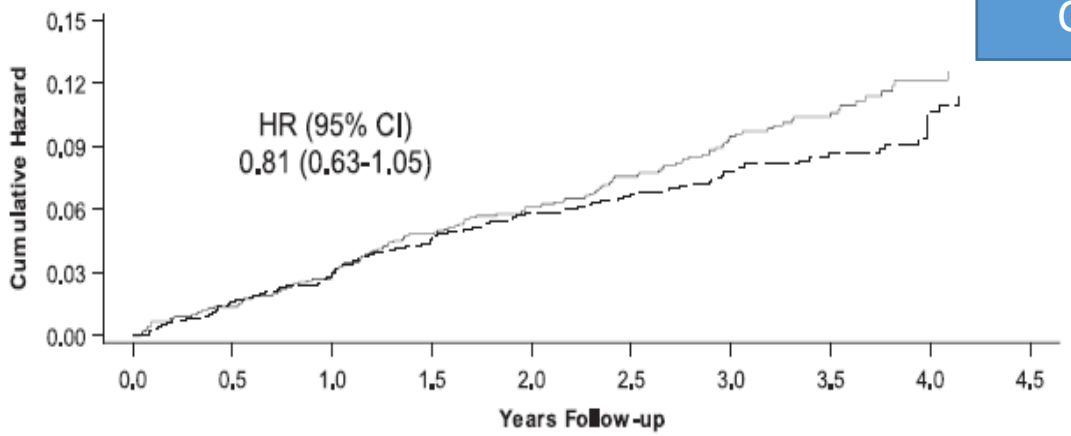


In summary, we have found that in a cohort of patients with CKD and uncontrolled hypertension, lowering of the SBP to less than 120 mm Hg was associated with higher all-cause mortality compared with an SBP of 120 to 139 mm Hg. Such an observational approach to estimate treatment targets for blood pressure lowering in patients with CKD could be a useful complement to clinical trials.

Effects of Intensive BP Control in CKD

SPRINT Research Group

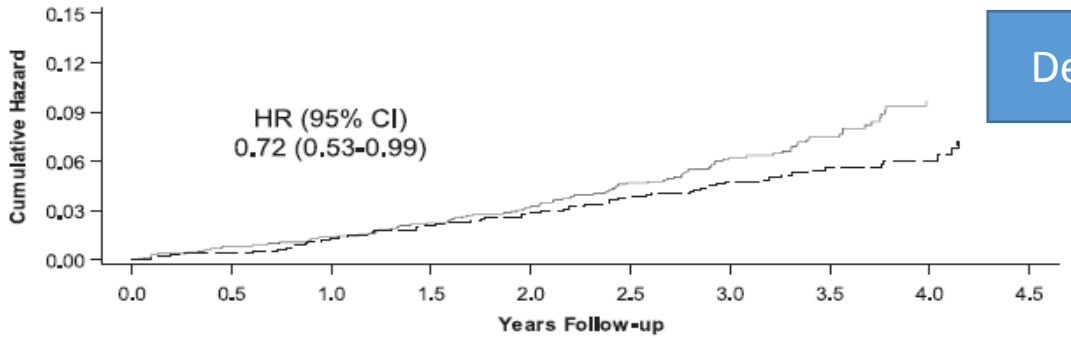
CV



Number at risk

Standard	1316	1241	1164	801	245
Intensive	1330	1243	1181	808	278

Death

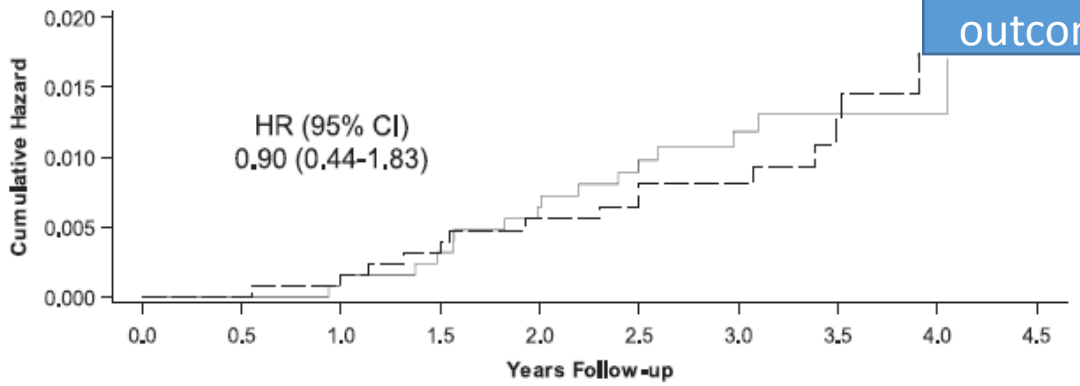


Number at risk

Standard	1316	1277	1227	865	269
Intensive	1330	1279	1244	859	295

C

Kidney outcome



Number at risk

Standard	1316	1265	1214	854	266
Intensive	1330	1268	1230	850	286

<130 vs <140 mmHg

J Am Soc Nephrol 28: 2812–2823, 2017.

Figure 2. 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.

Annals of Internal Medicine

ORIGINAL RESEARCH

Effects of Intensive Systolic Blood Pressure Control on Kidney and Cardiovascular Outcomes in Persons Without Kidney Disease

A Secondary Analysis of a Randomized Trial

Srinivasan Beddhu, MD; Michael V. Rocco, MD, MSCE; Robert Toto, MD; Timothy E. Craven, MSPH; Tom Greene, PhD; Udayan Bhatt, MD, MPH; Alfred K. Cheung, MD; Debbie Cohen, MD; Barry I. Freedman, MD; Amret T. Hawfield, MD; Anthony A. Killeen, MD; Paul L. Kimmel, MD; James Lash, MD; Vasilios Papademetriou, MD; Mahboob R; Anjay Rastogi, MD; Karen Servilla, MD; Raymond R. Townsend, MD; Barry Wall, MD; and Paul K. Whelto; for the SPRINT Research Group*

Participants: 6662 participants with a baseline estimated glomerular filtration rate (eGFR) of at least 60 mL/min/1.73 m^2.

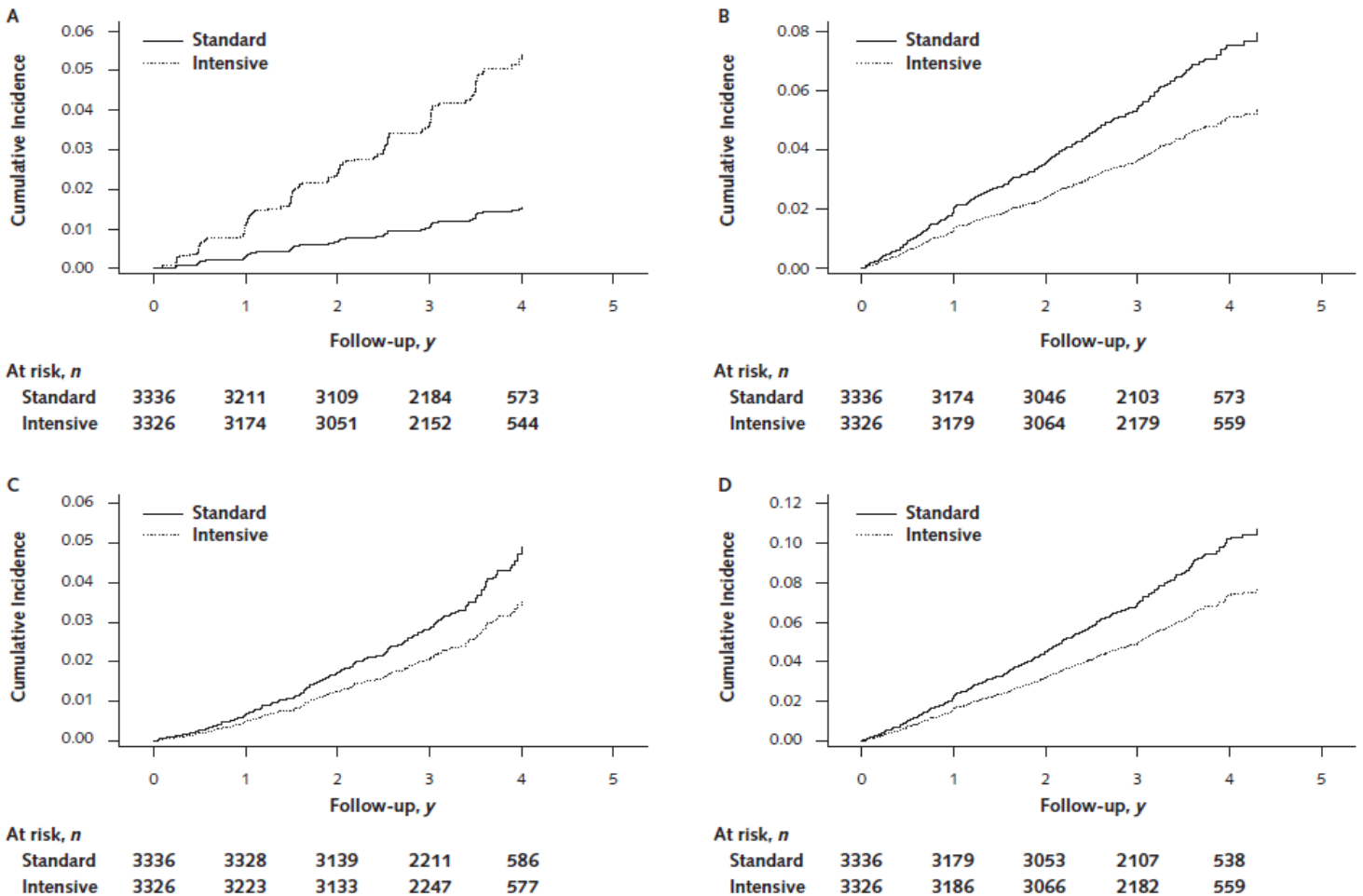
Intervention: Random assignment to an intensive or standard SBP goal (120 or 140 mm Hg, respectively).

Conclusion: Intensive SBP lowering increased risk for incident CKD events, but this was outweighed by cardiovascular and all-cause mortality benefits.

Primary Funding Source: National Institutes of Health.

Ann Intern Med. 2017;167:375-383. doi:10.7326/M16-2966 **Annals.org**

Figure 2. Cumulative incidence plots for incident CKD (*A*), primary CVD outcome (*B*), all-cause death (*C*), and the composite of primary CVD outcome or all-cause death (*D*) in the non-CKD population, by treatment group.



JAMA Internal Medicine | Original Investigation

Association of Intensive Blood Pressure Control and Kidney Disease Progression in Nondiabetic Patients With Chronic Kidney Disease

A Systematic Review and Meta-analysis

Wan-Chuan Tsai, M

JAMA Intern Med. 2017;177(6):792-799.

OBJECTIVE To compare intensive BP control (<130/80 mm Hg) with standard BP control (<140/90 mm Hg) on major renal outcomes in patients with CKD without diabetes.

MAIN OUTCOMES AND MEASURES Differences in annual rate of change in GFR were expressed as mean differences with 95% CIs. Differences in doubling of serum creatinine or 50% reduction in GFR, ESRD, composite renal outcome, and all-cause mortality were expressed as risk ratios (RRs) with 95% CIs.

RESULTS We identified 9 trials with 8127 patients and a median follow-up of 3.3 years. Compared with standard BP control, intensive BP control did not show a significant difference on the annual rate of change in GFR (mean difference, 0.07; 95% CI, −0.16 to 0.29 mL/min/1.73 m^2/y), doubling of serum creatinine level or 50% reduction in GFR (RR, 0.99; 95% CI, 0.76-1.29), ESRD (RR, 0.96; 95% CI, 0.78-1.18), composite renal outcome (RR, 0.99; 95% CI, 0.81-1.21), or all-cause mortality (RR, 0.95; 95% CI, 0.66-1.37). Nonblacks and patients with higher levels of proteinuria showed a trend of lower risk of kidney disease progression with intensive BP control.

JAMA Internal Medicine | Original Investigation

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Wan-Chuan Tsai, M

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Table 1. Baseline Characteristics of Participants in Studies Included in the Systematic Review

Source	Country	Inclusion Criteria	Patient No.	CKD, %	Age, y	Female, %	Race, %
Klahr et al,[15] (MDRD) 1994[a]	USA	Study A: GFR 25-55; study B: GFR 13-24; proteinuria level <10 g/d	A: 585; B: 255	100	52	40	White, 85
Toto et al,[28] 1995	USA	HN; serum Cr 1.6-7.0; GFR ≤70; proteinuria ≤2 g/d	77	100	56	37	Black, 75
Schrier et al,[29] 2002	USA	ADPKD; LVH; CrCl >30; proteinuria ≤3 g/d	75	100	41	45	NA
Wright et al,[16] (AASK) 2002	USA	African Americans; GFR 20-70; proteinuria ≤2.5 g/d	1094	100	55	39	Black, 100
Ruggenenti et al,[17] (REIN-2) 2005	Italy	Proteinuria 1-3 g/d and GFR <45, or proteinuria >3 g/d and GFR <70	338	100	54	26	NA
Hayashi et al,[30] (JATOS) 2010	Japan	Serum Cr <1.5	4418	57	74	64	Asian, 100
Schrier et al,[31] (HALT-PKD) 2014	USA	ADPKD; GFR >60; proteinuria ≤0.5 g/d (Study A)	558	100	37	49	White, 93
Wright et al,[21] (SPRINT) 2015[a]	USA	GFR ≥20; proteinuria <1 g/d	9361	28	68	36	Black vs white, 31/58

CONCLUSIONS AND RELEVANCE Targeting BP below the current standard did not provide additional benefit for renal outcomes compared with standard treatment during a follow-up of 3.3 years in patients with CKD without diabetes. However, nonblack patients or those with higher levels of proteinuria might benefit from the intensive BP-lowering treatments.

JAMA Internal Medicine | Original Investigation

Association Between More Intensive vs Less Intensive Blood Pressure Lowering and Risk of Mortality in Chronic Kidney Disease Stages 3 to 5

A Systematic Review and Meta-analysis

JAMA Intern Med. doi:10.1001/jamainternmed.2017.4377
Published online September 5, 2017.

Rakesh Malhotra, M

132 vs 140 mmHg

RESULTS This study identified 30 RCTs that potentially met the inclusion criteria. The CKD subset mortality data were extracted in 18 trials, among which there were 1293 deaths in 15 924 participants with CKD. The mean (SD) baseline systolic BP (SBP) was 148 (16) mm Hg in both the more intensive and less intensive arms. The mean SBP dropped by 16 mm Hg to 132 mm Hg in the more intensive arm and by 8 mm Hg to 140 mm Hg in the less intensive arm. More intensive vs less intensive BP control resulted in 14.0% lower risk of all-cause mortality (odds ratio, 0.86; 95% CI, 0.76-0.97; *P* = .01), a finding that was without significant heterogeneity and appeared consistent across multiple subgroups.

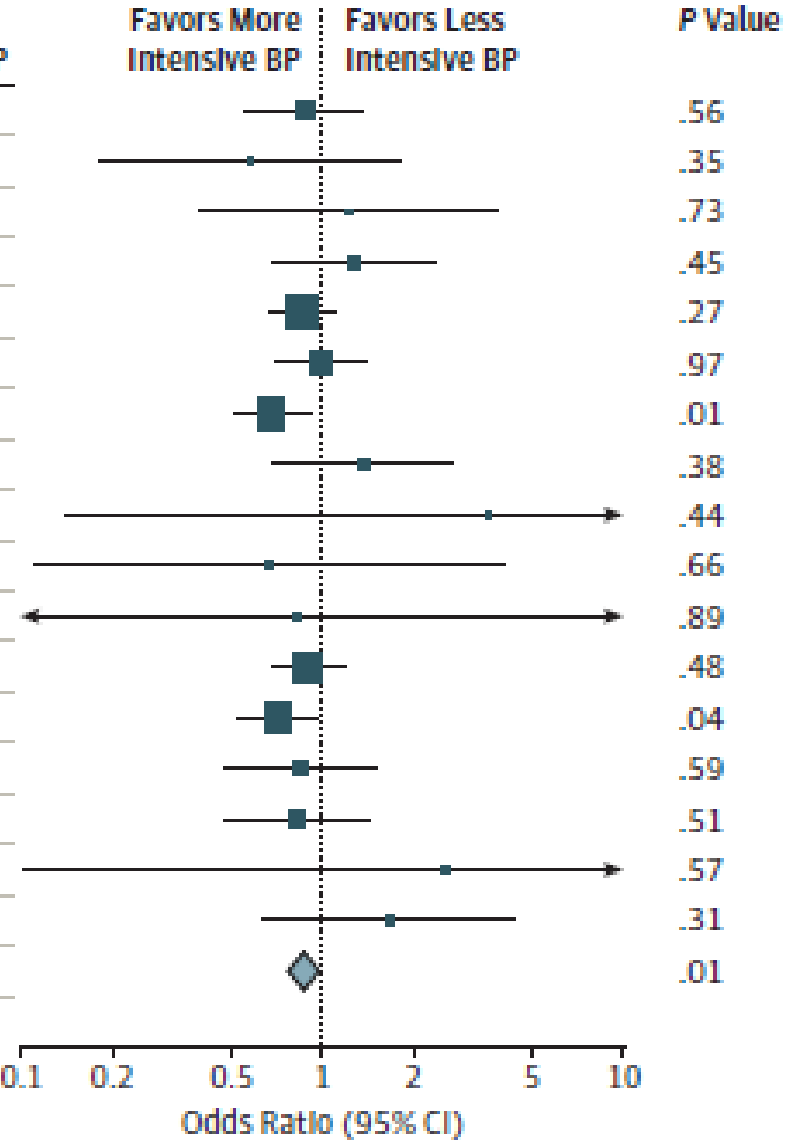
CONCLUSIONS AND RELEVANCE Randomization to more intensive BP control is associated with lower mortality risk among trial participants with hypertension and CKD. Further studies are required to define absolute BP targets for maximal benefit and minimal harm.

JAMA Intern Med. doi:10.1001/jamainternmed.2017.4377
Published online September 5, 2017.

Figure 2. Effect of Intensive Blood Pressure (BP) Lowering on Risk of Mortality in Hypertensive Trial Participants With Chronic Kidney Disease

Source	Odds Ratio (95% CI)	Score	No. of Deaths/Total No.		P Value
			More Intensive BP	Less Intensive BP	
Wright et al,[14] 2002	0.874 (0.554-1.380)	-0.578	37/540	43/554	.56
Estacio et al,[24] 2000	0.575 (0.182-1.820)	-0.941	5/62	9/68	.35
Schrier et al,[26] 2002	1.227 (0.398-3.865)	0.349	6/57	7/80	.73
Cushman et al,[32] 2010	1.271 (0.685-2.360)	0.761	26/208	20/198	.45
Heerspink et al,[27] 2010	0.862 (0.662-1.123)	-1.102	117/1010	135/1023	.27
Lonn et al,[37] 2016	0.993 (0.699-1.410)	-0.039	49/1220	97/2399	.97
Beckett et al,[30] 2008	0.676 (0.502-0.911)	-2.570	83/788	121/816	.01
Klahr et al,[13] 1994	1.366 (0.681-2.742)	0.878	20/432	14/408	.38
Mant et al,[34] 2016	3.588 (0.140-91.945)	0.772	1/26	0/30	.44
Ruggenenti et al,[22] 2005	0.667 (0.110-4.042)	-0.441	2/167	3/168	.66
Schrier et al,[25] 2002	0.825 (0.050-13.701)	-0.134	1/41	1/34	.89
SHEP Cooperative Research Group,[28] 1991	0.900 (0.670-1.209)	-0.700	96/879	103/859	.48
Wright et al,[17] 2015	0.714 (0.519-0.982)	-2.072	70/1330	95/1316	.04
Benavente et al,[33] 2013	0.850 (0.468-1.544)	-0.534	24/216	25/195	.59
Staessen et al,[29] 1997	0.826 (0.470-1.451)	-0.665	26/242	29/228	.51
Toto et al,[23] 1995	2.566 (0.101-64.993)	0.572	1/42	0/35	.57
UK Prospective Diabetes Study Group,[35] 1998	1.667 (0.626-4.435)	1.023	20/68	7/35	.31
Overall	0.859 (0.764-0.965)	-2.560	584/7451	709/8473	.01

Heterogeneity: $\tau^2 = 0\%$; $P = .77$; $I^2 = 0\%$



Que réellement conclure

- Importance de la détection correcte de l'HTA et de son risque associé
- Importance des règles hygiéno-diététiques
- Importance d'un choix individuel d'une cible selon le risque CV et des médicaments selon les comorbidités
- Garder le principe de primum non nocere
- Stimuler l'adhésion au traitement et encourager le patient à persévérer dans son approche thérapeutique
- Cible au moins <140/90 mmHg
- Si on peut aller plus bas sans trop d'effort, probablement y aller mais pas trop bas,

New US guidelines Nov 2017

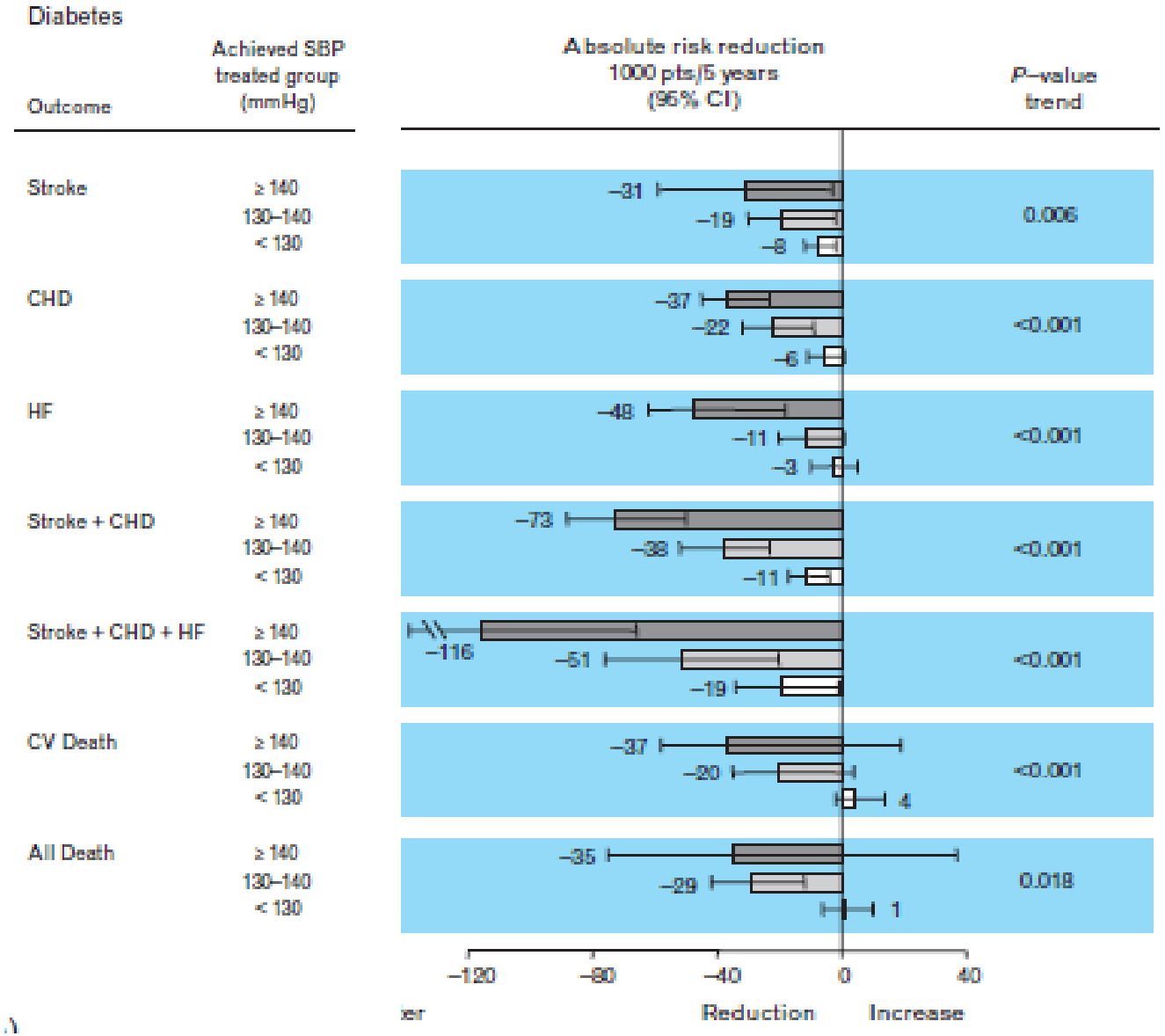
9.6. Diabetes Mellitus

Recommendations for Treatment of Hypertension in Patients With DM References that support recommendations are summarized in Online Data Supplements 46 and 47 and Systematic Review Report.		
COR	**LOE**	**Recommendations**
I	SBP: B-R[SR] DBP: C-EO	1. In adults with DM and hypertension, antihypertensive drug treatment should be initiated at a BP of 130/80 mm Hg or higher with a treatment goal of less than 130/80 mm Hg (1-8).
I	A[SR]	2. In adults with DM and hypertension, all first-line classes of antihypertensive agents (i.e., diuretics, ACE inhibitors, ARBs, and CCBs) are useful and effective (1, 9, 10).
IIb	B-NR	3. In adults with DM and hypertension, ACE inhibitors or ARBs may be considered in the presence of albuminuria (11, 12).

Effects of blood-pressure-lowering treatment on outcome incidence in hypertension: 10 — Should blood pressure management differ in hypertensive patients with and without diabetes mellitus? Overview and meta-analyses of randomized trials

Journal of Hypertension 2017, 35:922–944

Conclusion: BP-lowering treatment significantly and importantly reduces cardiovascular risk both in diabetes mellitus and no diabetes mellitus, but evidence for reduced ESRD risk is available only in diabetes. Contrary to past recommendations, in diabetes mellitus there is little or no further benefit in lowering SBP below 130 mmHg, whereas continuing benefit is seen in no diabetes mellitus also at SBP below 130 mmHg. Although all BP-lowering drugs can beneficially be prescribed in hypertensive patients with diabetes mellitus, the current recommendation to initiate or include a renin–angiotensin system blocker is supported by the evidence here presented.



New US guidelines Nov 2017

Recommendations for Treatment of Hypertension in Older Persons

References that support recommendations are summarized in Online Data Supplement 54.

COR	LOE	Recommendations
I	A	1. 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 (1).
IIa	C-EO	2. 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.

Intensive vs Standard Blood Pressure Control and Cardiovascular Disease Outcomes in Adults Aged ≥75 Years

A Randomized Clinical Trial

JAMA June 28, 2016 Volume 315, Number 24

OBJECTIVE To evaluate the effects of intensive (<120 mm Hg) compared with standard (<140 mm Hg) SBP targets in persons aged 75 years or older with hypertension but without diabetes.

DESIGN, SETTING, AND PARTICIPANTS A multicenter, randomized clinical trial of patients aged 75 years or older who participated in the Systolic Blood Pressure Intervention Trial (SPRINT). Recruitment began on October 20, 2010, and follow-up ended on August 20, 2015.

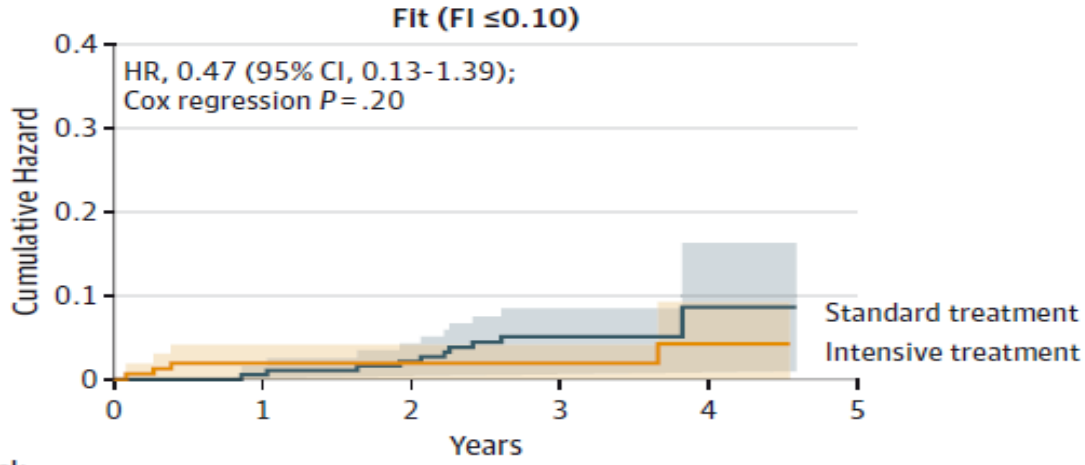
INTERVENTIONS Participants were randomized to an SBP target of less than 120 mm Hg (intensive treatment group, n = 1317) or an SBP target of less than 140 mm Hg (standard treatment group, n = 1319).

CONCLUSIONS AND RELEVANCE Among ambulatory adults aged 75 years or older, treating to an SBP target of less than 120 mm Hg compared with an SBP target of less than 140 mm Hg resulted in significantly lower rates of fatal and nonfatal major cardiovascular events and death from any cause.

Table 1. Baseline Characteristics of Participants Aged 75 Years or Older

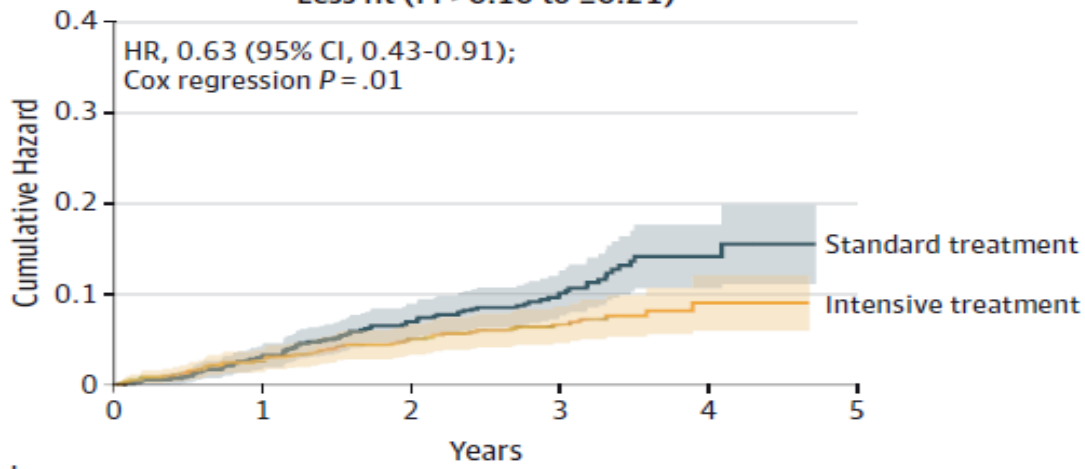
	Intensive Treatment (n = 1317)	Standard Treatment (n = 1319)
Female sex	499 (37.9)	501 (38.0)
Age, mean (SD), y	79.8 (3.9)	79.9 (4.1)
Race/ethnicity, No. (%)		
White	977 (74.2)	987 (74.8)
Seated blood pressure, mean (SD), mm Hg		
Systolic	141.6 (15.7)	141.6 (15.8)
Diastolic	71.5 (11.0)	70.9 (11.0)
Orthostatic hypotension, No. (%)	127 (9.6)	124 (9.4)
Serum creatinine, median (IQR), mg/dL	1.1 (0.9-1.3)	1.1 (0.9-1.3)
Estimated GFR[a]		
Mean (SD), mL/min/1.73 m^2	63.4 (18.2)	63.3 (18.3)
Frailty status, No. (%)		
Fit (frailty index ≤0.10)	159 (12.1)	190 (14.4)
Less fit (frailty index >0.10 to ≤0.21)	711 (54.0)	745 (56.5)
Frail (frailty index >0.21)	440 (33.4)	375 (28.4)

Figure 2. Kaplan-Meier Curves for the Primary Cardiovascular Disease Outcome in Systolic Blood Pressure Intervention Trial (SPRINT) in Participants Aged 75 Years or Older by Baseline Frailty Status



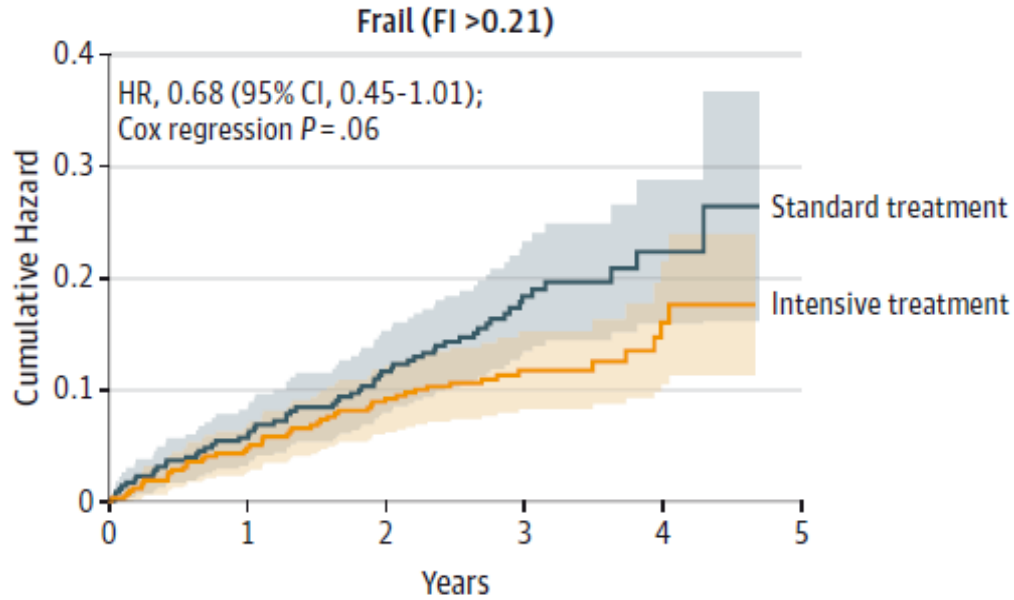
No. at risk

Type of treatment					
Standard	190	186	182	94	19
Intensive	159	151	150	107	16



No. at risk

Type of treatment					
Standard	745	697	653	390	91
Intensive	711	677	644	378	93



No. at risk

Type of treatment					
Standard	375	338	305	177	49
Intensive	440	398	371	223	71

Tinted regions indicate 95% confidence intervals; FI, 37-item frailty index; HR, hazard ratio. The primary cardiovascular disease outcome was a composite of nonfatal myocardial infarction, acute coronary syndrome not resulting in a myocardial infarction, nonfatal stroke, nonfatal acute decompensated heart failure, and death from cardiovascular causes.

Table 3. Dying vs Survivor[a] Estimated Slopes of Change in Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) in Years 10 to 3 Before Death

Age at Death, y	Change in SBP per Year (95% CI), mm Hg		Interaction Term[b]	
	Case	Survivor	Effect Size	*P* Value
SBP				
60-69	−0.18 (−0.26 to −0.09)	−0.05 (−0.13 to 0.03)	0.14	.02
70-79	−0.48 (−0.54 to −0.44)	−0.16 (−0.21 to −0.11)	0.33	<.001
80-89	−0.69 (−0.75 to −0.63)	−0.17 (−0.23 to −0.11)	0.52	<.001
≥90	−0.94 (−1.25 to −0.63)	0.04 (−0.30 to 0.38)	0.96	<.001
DBP				
60-69	−0.50 (−0.55 to −0.46)	−0.36 (−0.41 to −0.32)	0.13	<.001
70-79	−0.64 (−0.66 to −0.61)	−0.50 (−0.53 to −0.48)	0.13	<.001
80-89	−0.63 (−0.66 to −0.60)	−0.47 (−0.50 to −0.44)	0.16	<.001
≥90	−0.49 (−0.65 to −0.34)	−0.38 (−0.56 to −0.22)	0.10	.37

[a] Survived at least 9 more years, with matching for initial (10 y) SBP.

Table 2. Annual Changes in Systolic Blood Pressure (SBP) by Diagnosis, From 10 to 3 Years Prior to Death

Diagnosis	Change in SBP per Year, mm Hg (95% CI)		Interaction Term Effect Size[a]
	Diagnosis Present	Diagnosis Absent	
Cardiovascular disease	−1.57 (−1.53 to −1.62)	−1.44 (−1.42 to −1.47)	0.12
Hypertension	−1.58 (−1.56 to −1.60)	−0.70 (−0.65 to −0.76)	0.87
Heart failure	−1.66 (−1.62 to −1.69)	−1.37 (−1.34 to −1.39)	0.29
Atrial fibrillation	−1.66 (−1.63 to −1.69)	−1.36 (−1.33 to −1.39)	0.30
Stroke or transient ischemic attack	−1.58 (−1.54 to −1.62)	−1.44 (−1.41 to −1.46)	0.14
Dementia	−1.81 (−1.77 to −1.87)	−1.41 (−1.38 to −1.43)	0.41

Antihypertensive treatment strategies in the elderly

2013 ESH/ESC Guidelines for the management of arterial hypertension

Recommendations	Class[a]	Level[b]
In elderly hypertensives with SBP ≥160 mmHg there is solid evidence to recommend reducing SBP to between 150 and 140 mmHg.	I	A
In fit elderly patients <80 years old antihypertensive treatment may be considered at SBP values ≥140 mmHg with a target SBP <140 mmHg if treatment is well tolerated.	IIb	C
In individuals older than 80 years with an initial SBP ≥160 mmHg it is recommended to reduce SBP to between 150 and 140 mmHg, provided they are in good physical and mental conditions.	I	B
In frail elderly patients, it is recommended to leave decisions on antihypertensive therapy to the treating physician, and based on monitoring of the clinical effects of treatment.	I	C
Continuation of well-tolerated antihypertensive treatment should be considered when a treated individual becomes octogenarian.	IIa	C
All hypertensive agents are recommended and can be used in the elderly, although diuretics and calcium antagonists may be preferred in isolated systolic hypertension.	I	A

Direct evidence of the effect of antihypertensive treatment in elderly hypertensives (older than 80 years) was still missing at the time the 2007 ESH/ESC Guidelines were prepared. The subsequent publication of the HYpertension in the Very Elderly Trial (HYVET) results [287], comparing active treatment (the diuretic indapamide supplemented, if necessary, by the ACE inhibitor perindopril) with placebo in octogenarians with entry SBP >160 mmHg, reported a significant reduction in major CV events and all-cause deaths by aiming at SBP values <150 mmHg (mean achieved SBP: 144 mmHg). HYVET deliberately recruited patients in good physical and mental conditions and excluded ill and frail individuals, who are so commonplace among octogenarians, and also excluded patients with clinically relevant orthostatic hypotension. The duration of follow-up was also rather short (mean: 1.5 years) because the trial was interrupted prematurely by the safety monitoring board.

N Engl J Med 2008; 358:1887–1898.

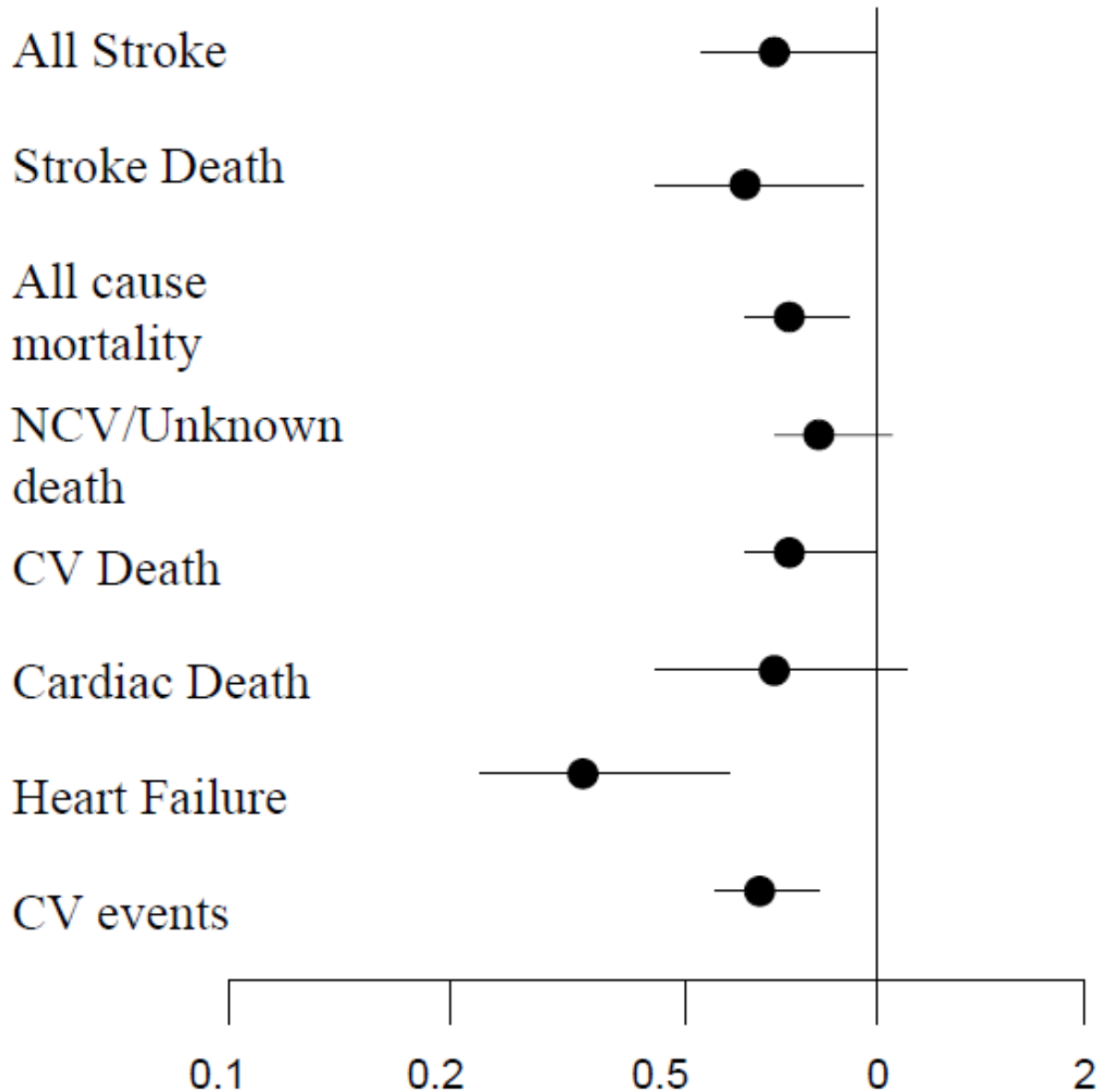
HYVET study

Beckett NS et al, N Engl J Med 2008 ; 358 : 1887-98

	Design	Etude 1933 + 1912 patients
Age	≥ 80 ans	83,5 ans (60 % F)
TA inclusion	≥ 160 mm Hg	173/91 mm Hg
TA objectif	≤ 150 mm Hg	144/78 mm Hg vs. 161/84 mm Hg
Médicaments (vs. placebo)	Indapamide XL ± Perindopril	Indapamide 26 % Combo 74 %

Étude HYVET

Réduction de mortalité et événements CV



	HR	95% CI
All Stroke	0.70	(0.49, 1.01)
Stroke Death	0.61	(0.38, 0.99)
All cause mortality	0.79	(0.65, 0.95)
NCV/Unknown death	0.81	(0.62, 1.06)
CV Death	0.77	(0.60, 1.01)
Cardiac Death	0.71	(0.42, 1.19)
Heart Failure	0.36	(0.22, 0.58)
CV events	0.66	(0.53, 0.82)

An Expert Opinion From the European Society of Hypertension–European Union Geriatric Medicine Society Working Group on the Management of Hypertension in Very Old, Frail Subjects

Athanase Benetos,* Christopher J. Bulpitt,* Mirko Petrovic, Andrea Ungar, Enrico Agabiti Rosei, Antonio Cherubini, Josep Redon, Tomasz Grodzicki, Anna Dominiczak, Timo Strandberg, Giuseppe Mancia

(*Hypertension*. 2016;67:820-825.

Treatment Initiation

The 2013 ESH/ESC guidelines state that in individuals aged ≥80 years with an initial SBP≥160 mm Hg, SBP should be reduced by drug treatment provided that patients are in good physical and mental conditions.

A rapid (<10 minutes) assessment of frailty is feasible. The most frequently used is the Fried frailty phenotype[39] in which frailty is defined by the presence of at least 3 of the following: weight loss, exhaustion, weakness, decreased gait speed, and diminished physical activity. Other scales used in different countries[40–42] may also be referred to.

The 2013 ESH/ESC guidelines recommend treatment to lowe SBP to <150 mm Hg in octogenarians in good physical and mental conditions We believe that this might be usefully complemented by mentioning that, while keeping <150 mm Hg SBP as the evidence-based target, for safety reasons antihypertensive drugs should be reduced or even stopped if SBP is lowered to <130 mm Hg, thus keeping the 150 to 130 mm Hg on-treatment SBP values as a safety range. Self-assessment of BP at home and if necessary 24-hour ambulatory BP measurements can contribute to identify treated patients with too low BP levels.