Department of Medicine . School of Health Sciences
National & Kapodistrian University of Athens

Cardiovascular Prevention & Research Unit
Clinic & Laboratory of Pathophysiology

Prof. Athanase D Protogerou

Conflict of Interest

ΣΥΓΧΡΟΝΗ ΣΤΡΑΤΗΓΙΚΗ ΑΝΤΙΜΕΤΩΠΙΣΗΣ ΠΑΡΑΓΟΝΤΩΝ ΚΑΡΔΙΑΓΓΕΙΑΚΟΥ ΚΙΝΔΥΝΟΥ

Υπέρταση

Farida B.A. et al. JAMA. 2021

Table. Number of Deaths for Leading Causes of Death, US, 2015-2020[a]

	No. of deaths by year					
Cause of death	2015	2016	2017	2018	2019	2020
Total deaths	2 712 630	2 744 248	2 813 503	2 839 205	2 854 838	3 358 814
Heart disease	633 842	635 260	647 457	655 381	659 041	690 882
Cancer	595 930	598 038	599 108	599 274	599 601	598 932
COVID-19[b]						345 323
Unintentional injuries	146 571	161 374	169 936	167 127	173 040	192 176
Stroke	140 323	142 142	146 383	147 810	150 005	159 050
Chronic lower respiratory diseases	155 041	154 596	160 201	159 486	156 979	151 637
Alzheimer disease	110 561	116 103	121 404	122 019	121 499	133 382
Diabetes	79 535	80 058	83 564	84 946	87 647	101 106
Influenza and pneumonia	57 062	51 537	55 672	59 120	49 783	53 495
Kidney disease	49 959	50 046	50 633	51 386	51 565	52 260
Suicide	44 193	44 965	47 173	48 344	47 511	44 834

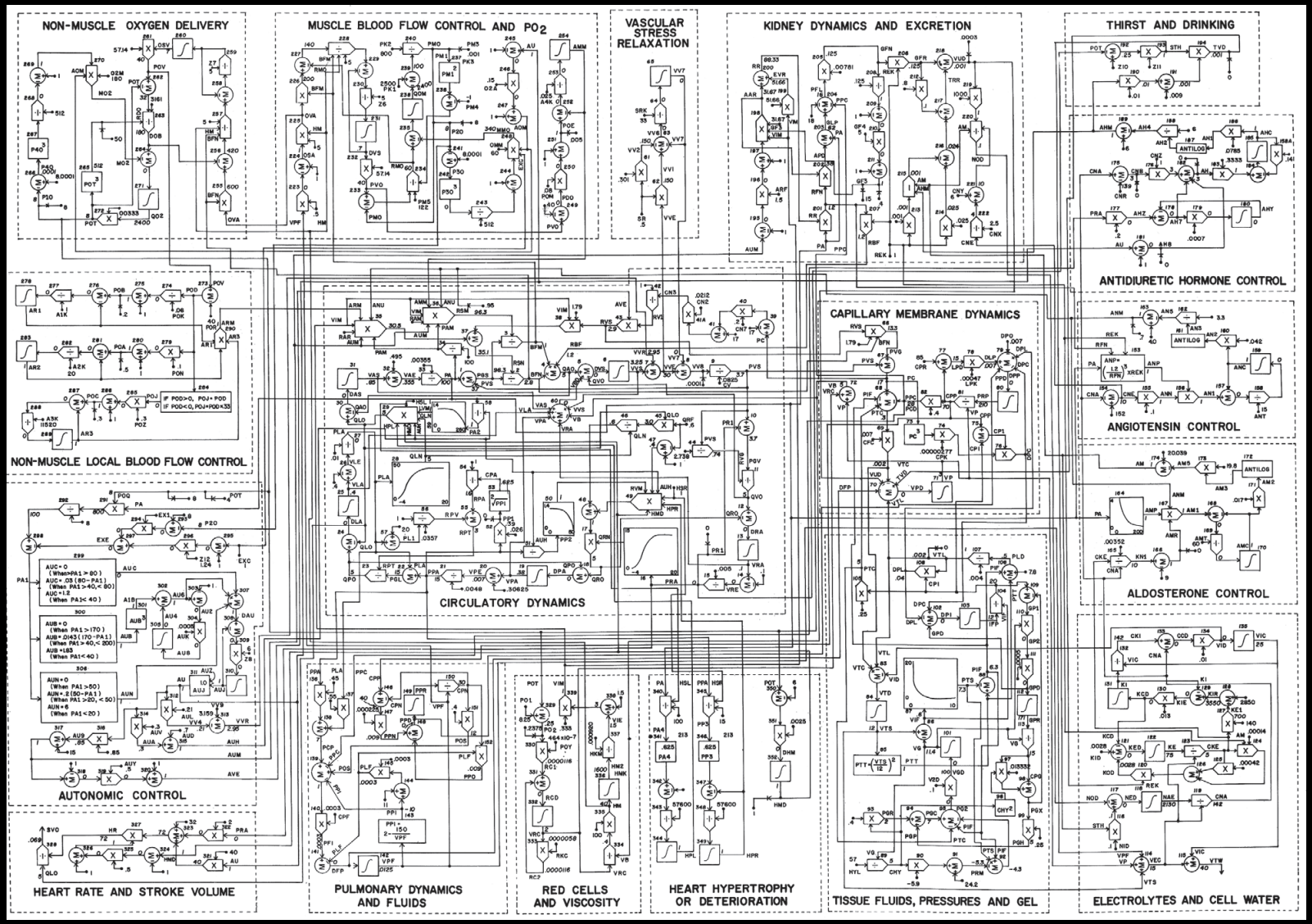
[a] Leading causes are classified according to underlying cause and presented according to the number of deaths among US residents. For more information, see the article by Heron.[4] Source: National Center for Health Statistics. National Vital Statistics System: mortality statistics (http://www.cdc.gov/nchs/deaths.htm). Data for 2015-2019 are final; data for 2020 are provisional.

[b] Deaths with confirmed or presumed COVID-19, coded to *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* code U07.1 as the underlying cause of death.

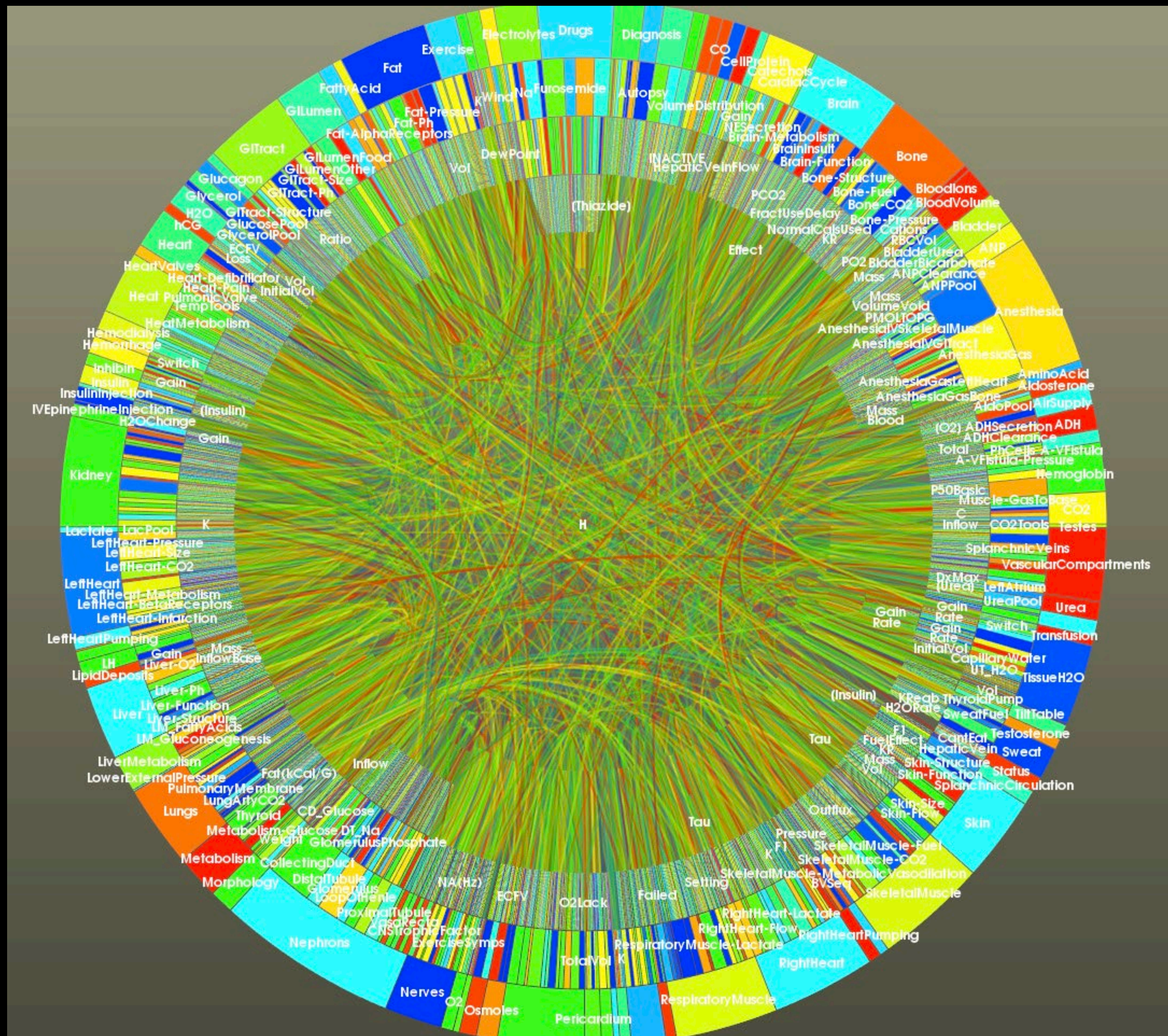
"Ashes to ashes, dust to dust, if the cancer don't get us, the arteriosclerosis must"

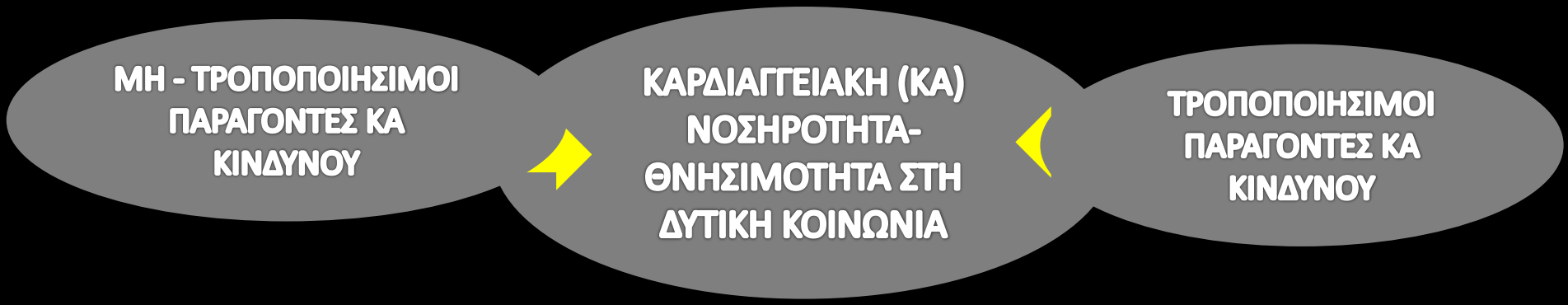
Richard Gordon
in The Alarming History of Medicine, 1993

Guyton A. & Coleman T.: Cardiovascular Model, 1972 (~450 variables)



Coleman T. & Hester R. and collaborators: current -2021- model of the human cardiovascular system > 10,000 variables

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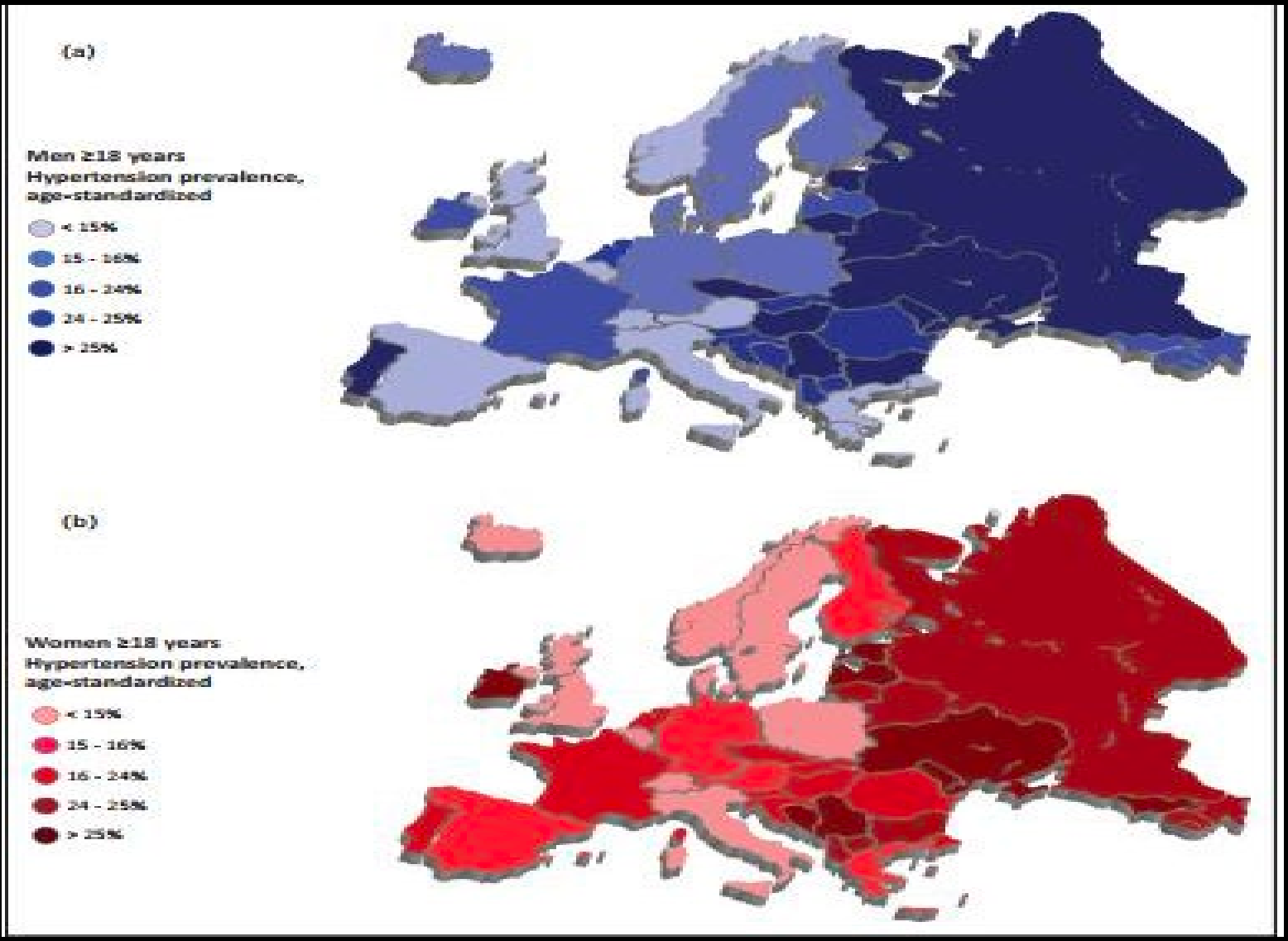
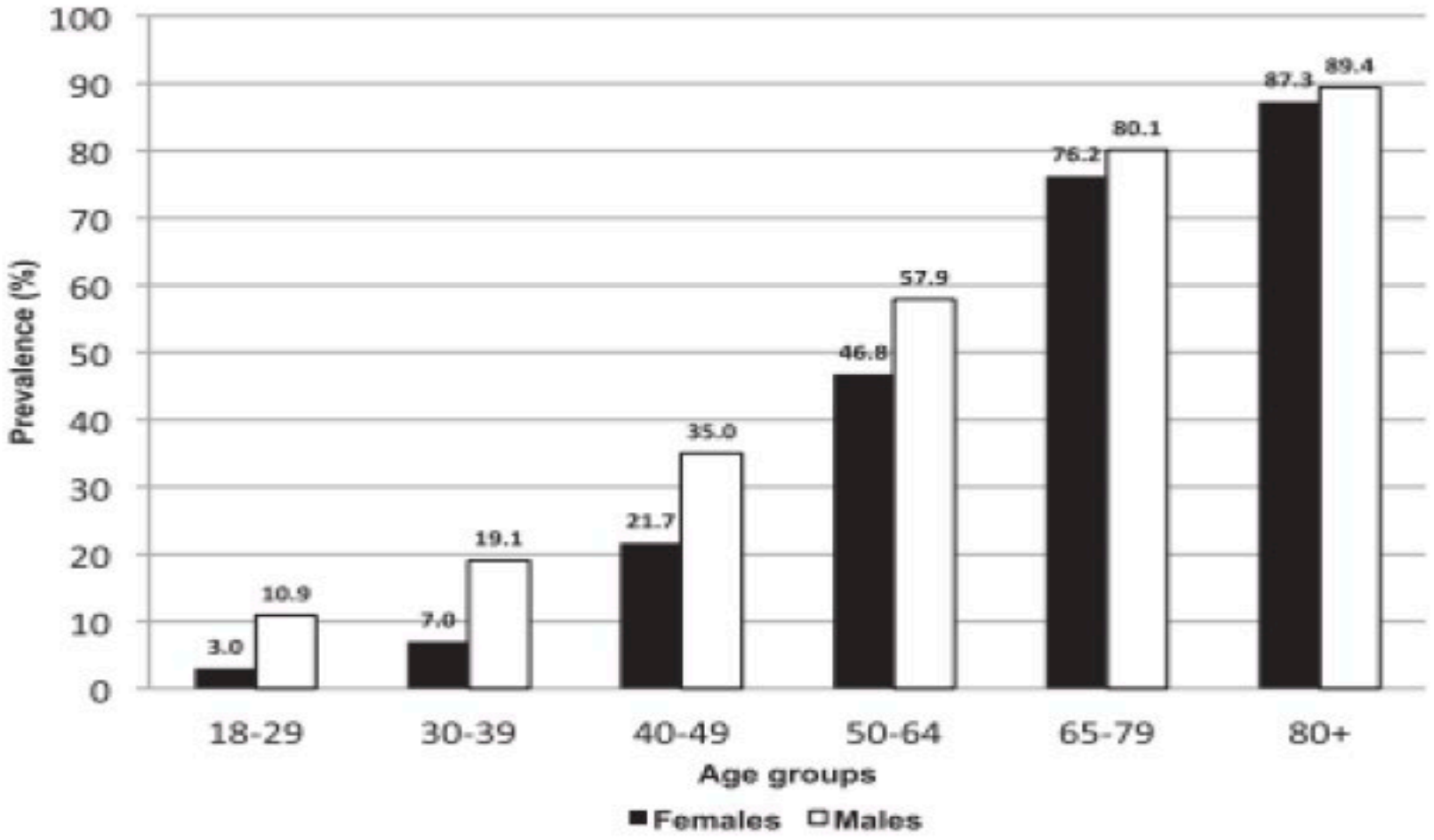
ΔΙΑΤΡΟΦΗ

ΣΤΡΕΣ

Reuter H. et al. .Status of hypertension in Europe. Curr Opin Cardiol. 2019



Stergiou G. et al. EMENO study. J Hypertens. 2020



NCD risk factors collaboration. Lancet 2021

Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants

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

NCD risk factors collaboration. Lancet 2021

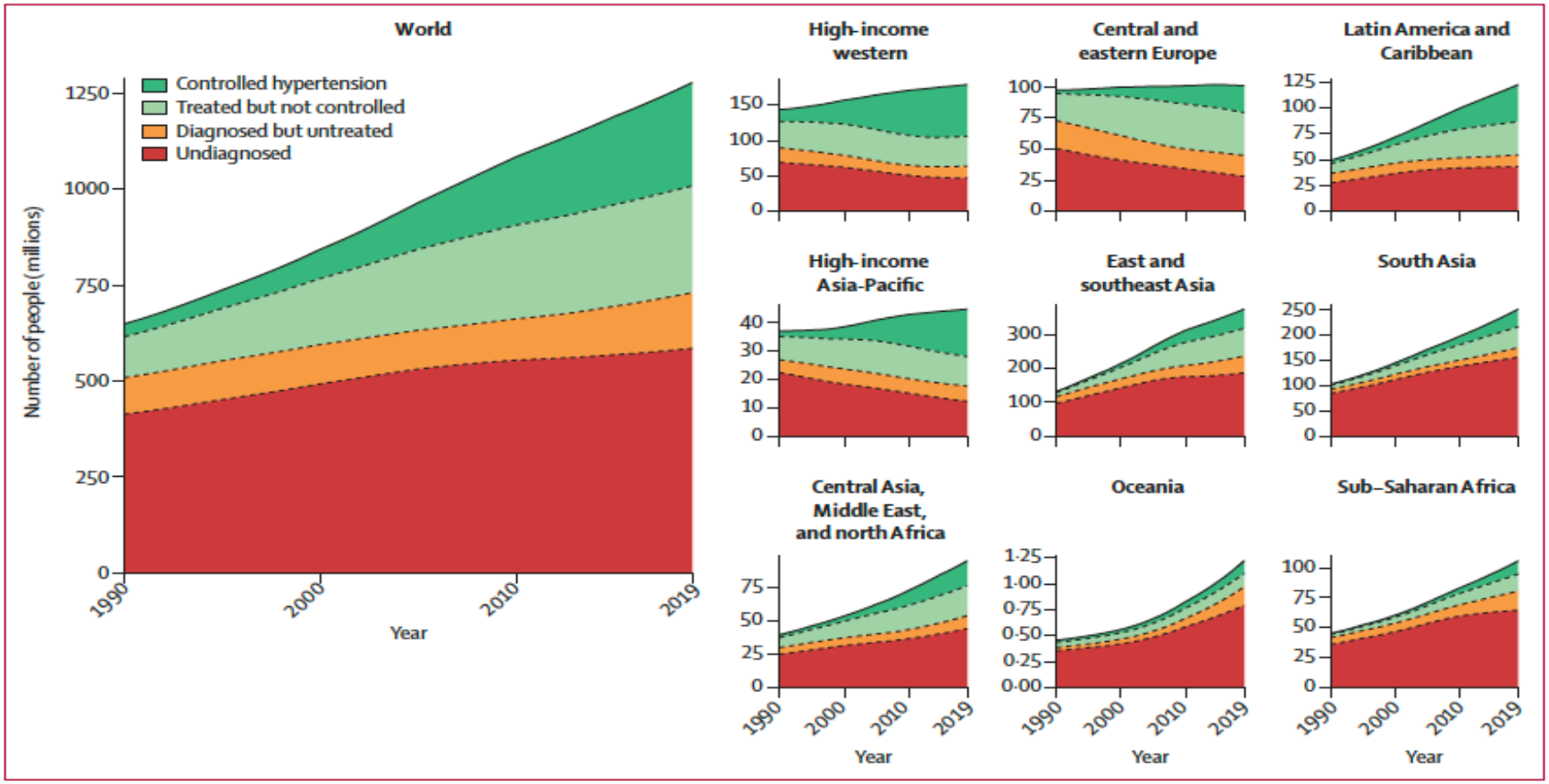


Figure 6: **Trends in the number of people with hypertension who reported a diagnosis, who used treatment, and whose blood pressure was effectively controlled, globally and by region, 1990–2019**

See the appendix (pp 58–60) for trends in the percentage of people with hypertension who reported a diagnosis, who had treatment, and whose blood pressure was effectively controlled, globally and by region.

Stergiou G. et al. EMENO study. J Hypertens. 2020

TABLE 2. Prevalence, awareness, treatment and control of hypertension according to age and sex (% weighted)

Age (years)	*N* (%)	Hypertension prevalence	Untreated unaware	Untreated aware	Treated uncontrolled	Treated controlled
18–29	449 (17.7)	30 (7.1)	27 (88.9)	0 (0.0)	1 (4.2)	2 (6.9)
30–39	640 (18.3)	74 (13.1)	60 (85.1)	5 (5.5)	4 (4.3)	5 (5.1)
40–49	834 (17.7)	223 (28.3)	123 (57.2)	12 (6.3)	32 (14.7)	56 (21.8)
50–64	1,378 (22.3)	728 (52.2)	237 (35.1)	21 (3.0)	228 (29.8)	242 (32.1)
65–79	1,096 (18.4)	860 (77.9)	126 (14.3)	8 (0.8)	417 (47.4)	309 (37.5)
≥80	302 (5.6)	269 (88.2)	24 (8.4)	10 (3.1)	145 (55.0)	90 (33.5)
P[a]		<0.001	<0.001	<0.001	<0.001	<0.001
Sex						
Men	2006 (48.6)	1033 (42.7)	337 (39.2)	30 (2.9)	377 (32.1)	289 (25.8)
Women	2693 (51.4)	1151 (36.5)	260 (23.6)	26 (2.5)	450 (38.3)	415 (35.6)
P[a]		<0.001	<0.001	NS	<0.01	<0.001
Total	4699 (100%)	2184 (39.6)	597 (31.8)	56 (2.7)	827 (35.1)	704 (30.5)

[a]*P*-values for among age-groups and sex comparison in each column.

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- Θεραπεία

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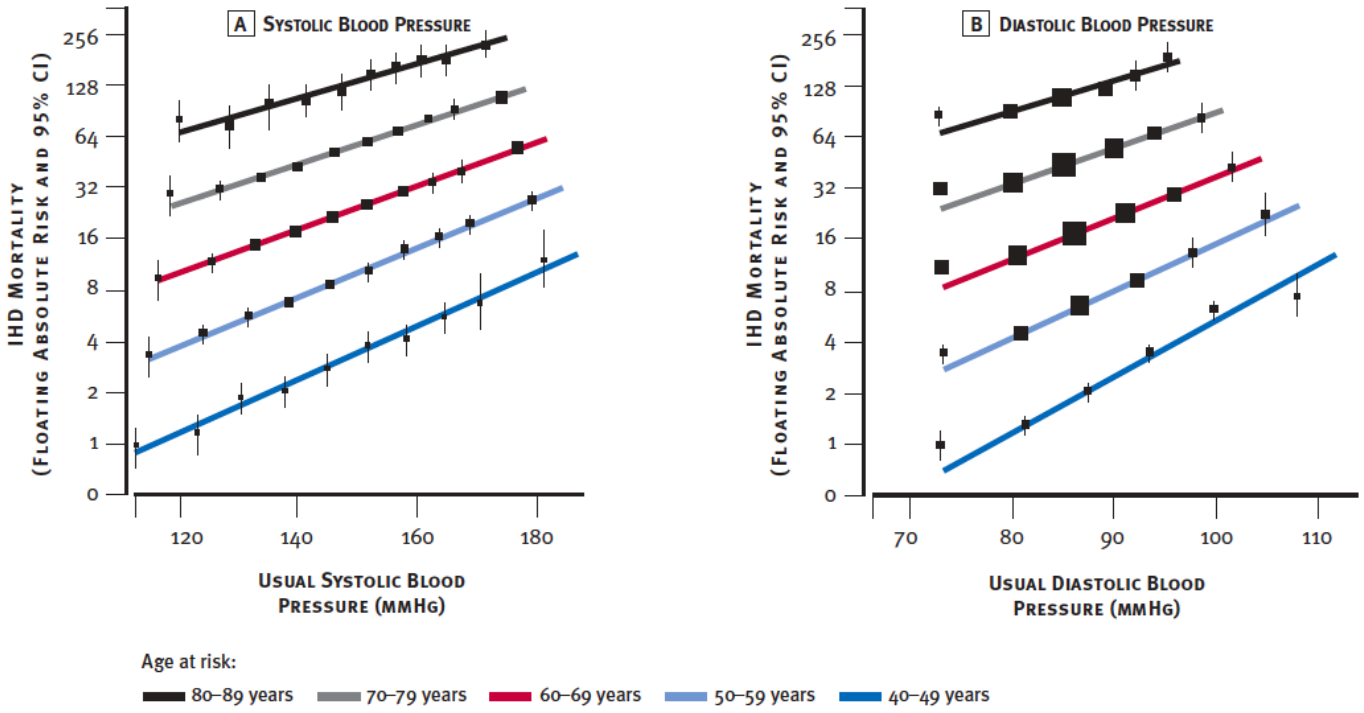
- Θεραπεία

Lewington S et al. Lancet 2002

Figure 9. **Ischemic heart disease mortality rate in each decade of age versus usual blood pressure at the start of that decade**



IHD, ischemic heart disease

Source: Reprinted with permission from Elsevier. Lewington S, et al. Age-specific relevance of usual blood pressure to vascular mortality: A meta-analysis of individual data for one million adults in 61 prospective studies. (The Lancet *2002:360:1903–13).*

"Hypertension is that blood pressure level above which detection and treatment does more good than harm"

Geoffrey Rose, 1971

ESH & ESC: 2018 guidelines on HTN

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

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

BP = blood pressure; SBP = systolic blood pressure.
[a]BP category is defined according to seated clinic BP and by the highest level of BP, whether systolic or diastolic.
[b]Isolated systolic hypertension is graded 1, 2, or 3 according to SBP values in the ranges indicated.
The same classification is used for all ages from 16 years.

ACC/AHA: 2017 BP guidelines

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 Section 4); DBP, diastolic blood pressure; and SBP, systolic blood pressure.

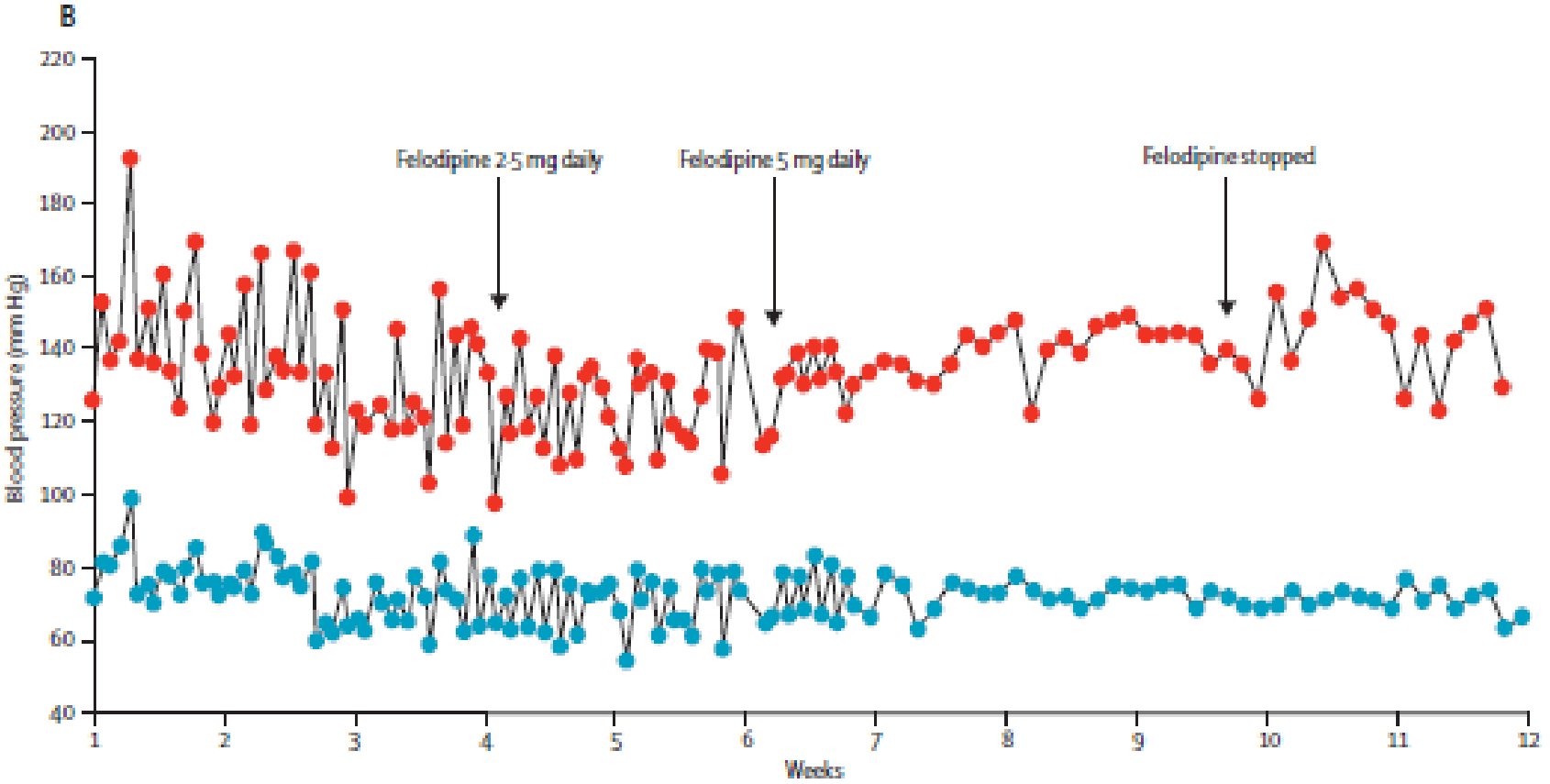
Stergiou G. et al. EMENO study. J Hypertens. 2020

TABLE 3. Prevalence and control of hypertension by using a lower BP threshold (≥130/80 mmHg) according to age (% weighted)

Age (years)	Hypertension prevalence *N* (%)	Treated controlled *N* (%)
18–29	106 (24.4)	1 (1.0)
30–39	222 (36.6)	2 (0.4)
40–49	421 (53.4)	30 (5.9)
50–64	1041 (75.6)	93 (8.4)
65–79	980 (88.9)	148 (15.8)
≥80	281 (92.4)	51 (18.9)
P	<0.001	<0.001
Total	3051 (58.8)	325 (9.5)

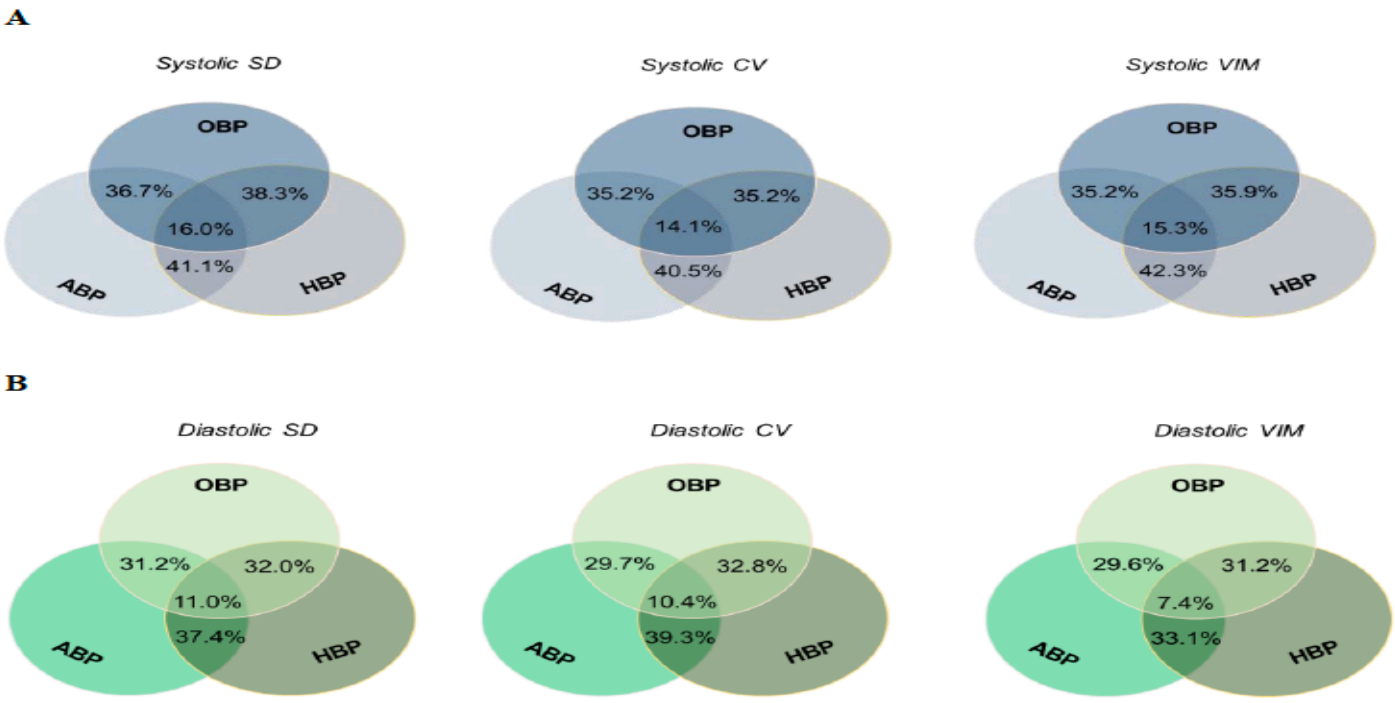
Rothwell P.M. Oxford Vascular Study. Lancet 2004

Limitations of the usual blood-pressure hypothesis and importance of variability, instability, and episodic hypertension



Boubouchairopoulou N. et al. Hypertens Res. 2021

Agreement between different measurement methods in diagnosing higher systolic (A) or diastolic blood pressure variability (B) assessed using different indices (expressed as % of participants).



SD, standard deviation (mmHg); CV, coefficient of variation (%); VIM, variability independent of mean; OBP, office blood pressure; HBP, home blood pressure; ABP, ambulatory blood pressure.

ESH & ESC: 2018 guidelines on HTN

3.2 Classification of blood pressure

Classification of BP

Recommendation	Class[a]	Level[b]
It is recommended that BP be classified as optimal, normal, high–normal, or grades 1–3 hypertension, according to office BP.	I	C

BP = blood pressure.
[a]Class of recommendation
[b]Level of evidence.

ESH: 2021 practice guidelines on HTN

Hypertension (diagnostic) phenotypes

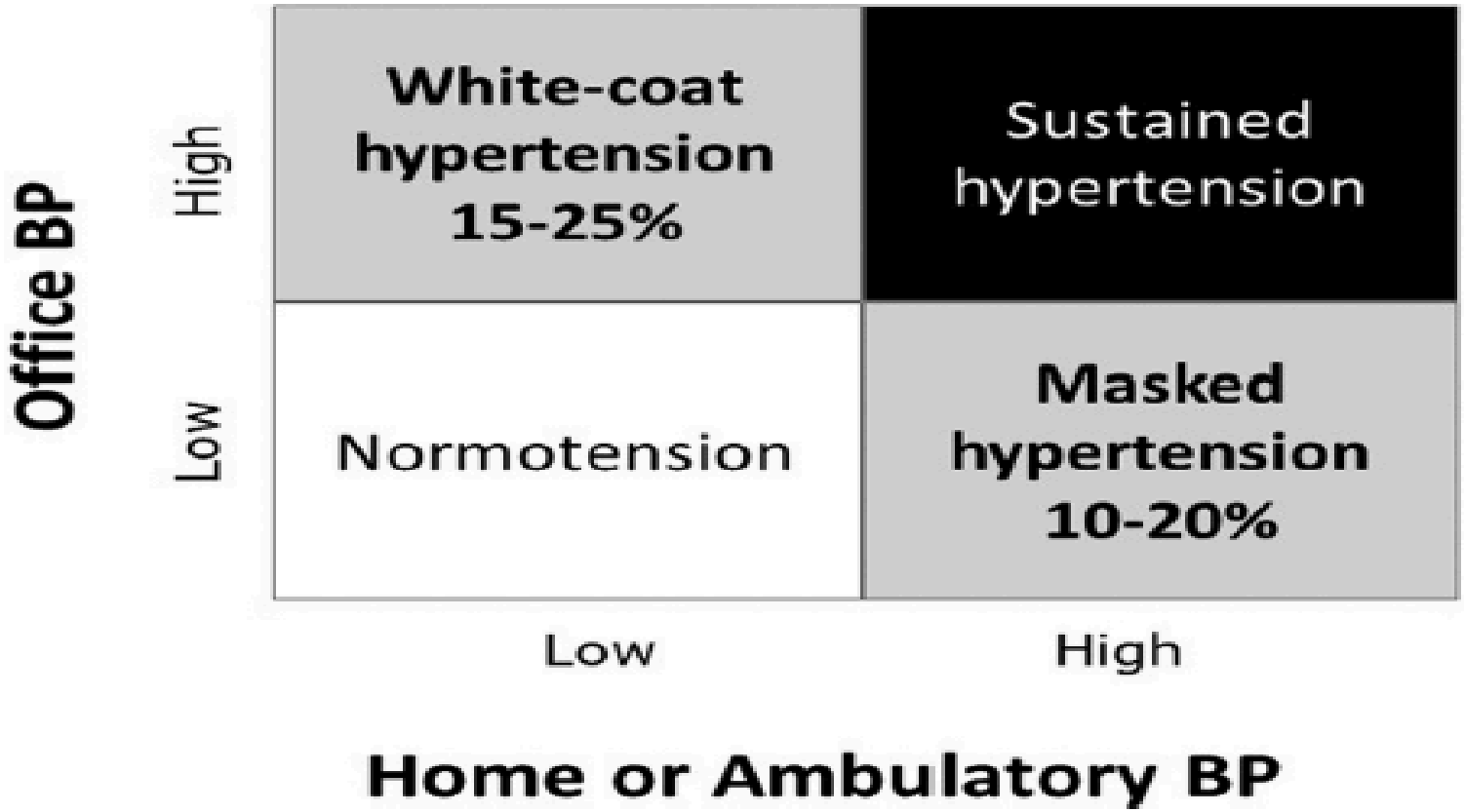
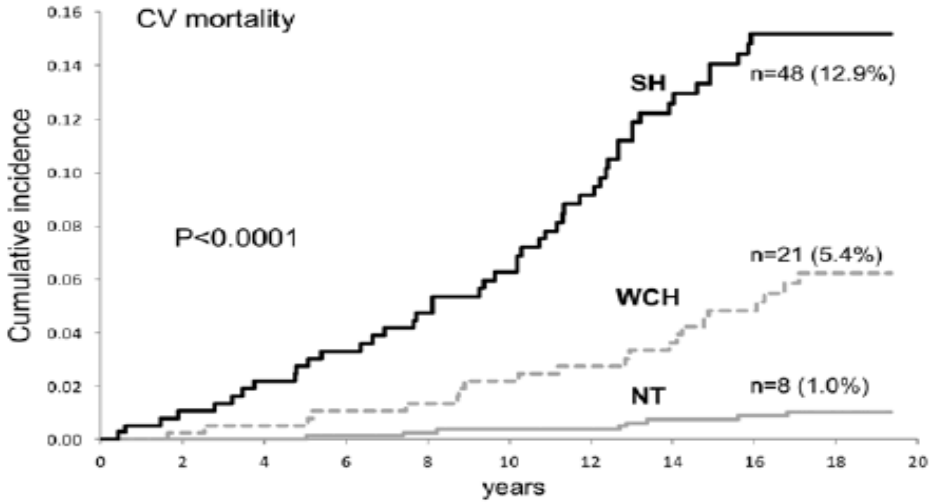
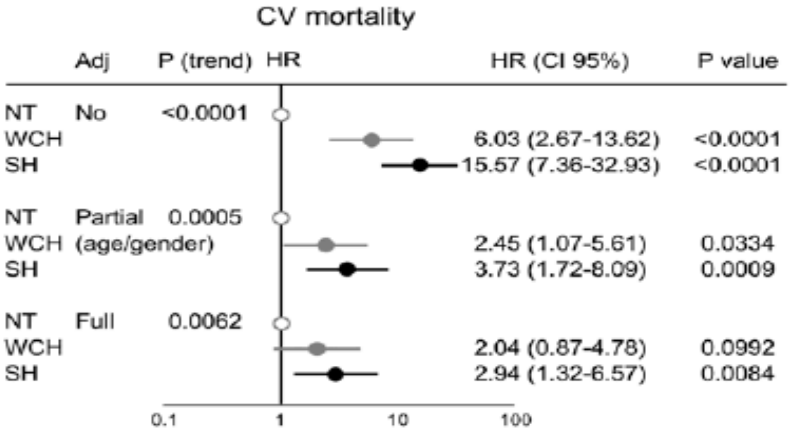
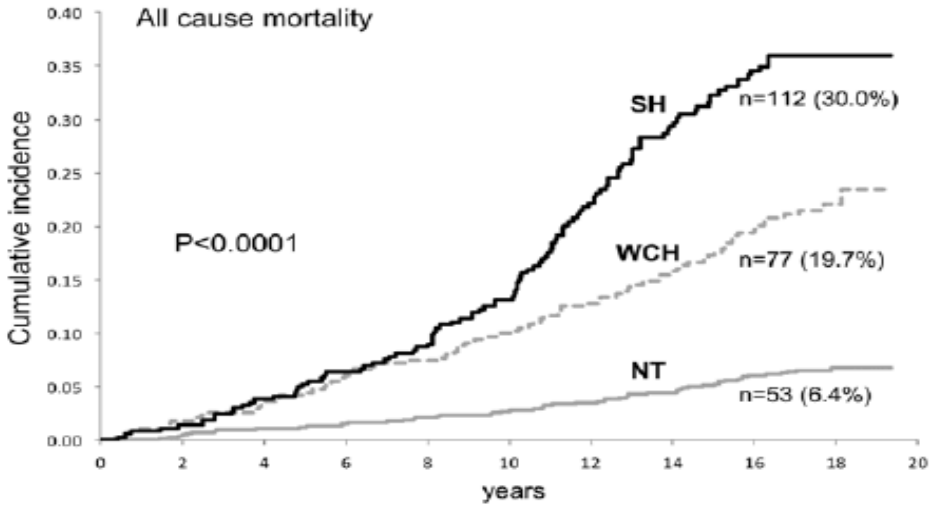


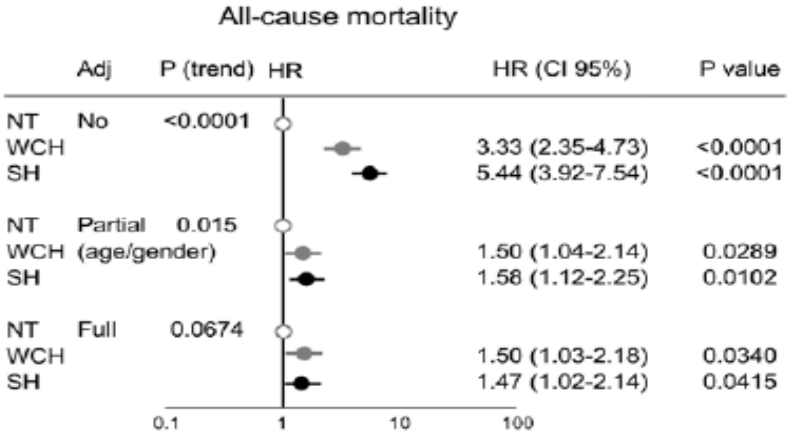
FIGURE 1 Classification of patients attending BP clinics according to their office and out-of-office BP measurements.

Mancia G. et al. Review. Hypertension 2021









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Management of white-coat hypertension		
Recommendations	**Class[a]**	**Level[b]**
In white-coat hypertensive patients, it is recommended to implement lifestyle changes aimed at reducing CV risk as well as regular follow-up with periodic out-of-office BP monitoring.	I	C
In patients with white-coat hypertension: • Drug treatment may be considered in people with evidence of HMOD or in whom CV risk is high or very high.	IIb	C
• Routine drug treatment is not indicated.	III	C

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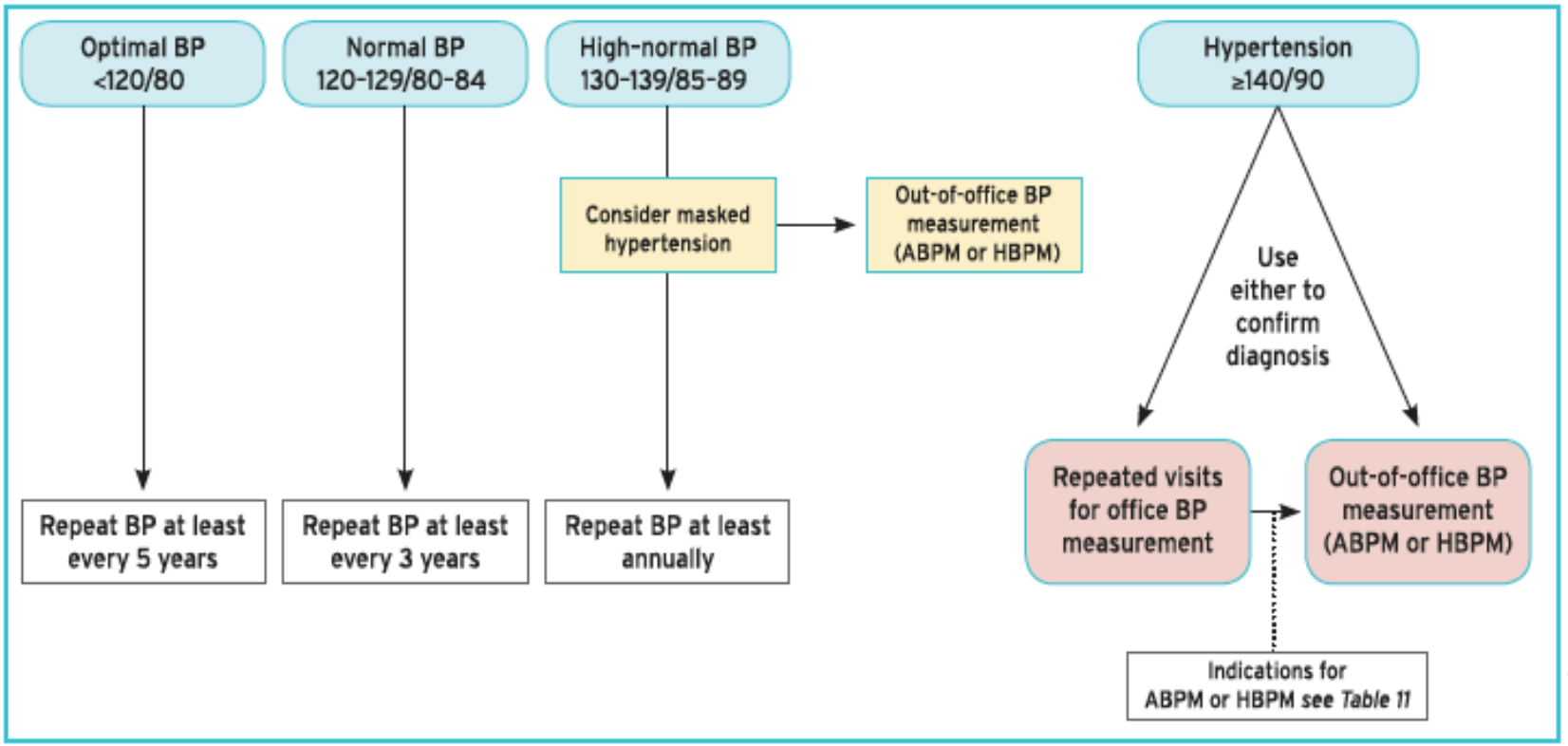

Figure 2 Screening and diagnosis of hypertension. ABPM = ambulatory blood pressure monitoring; BP = blood pressure; HBPM = home blood pressure monitoring.

ESH & ESC: 2018 guidelines on HTN

IDACO data

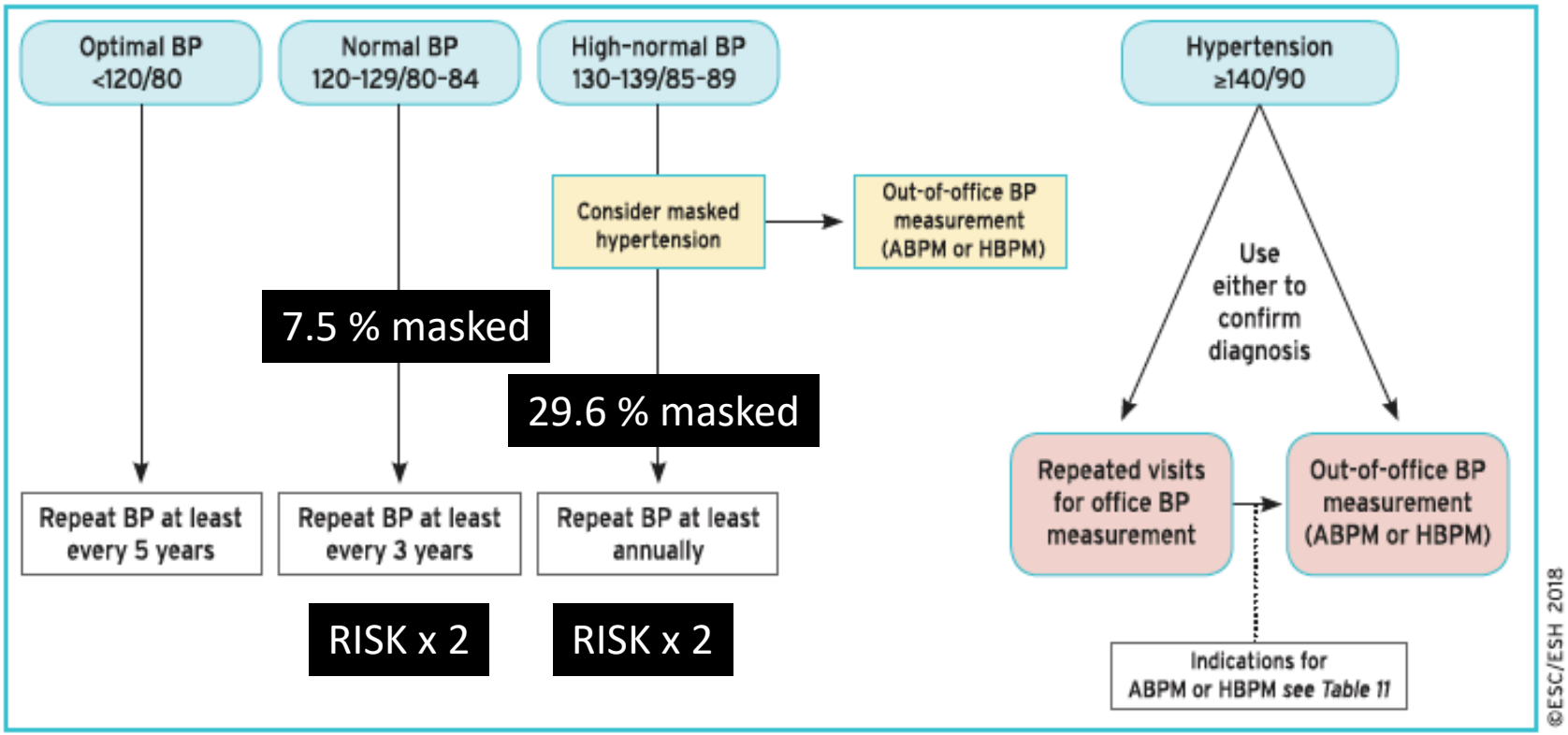

Figure 2 Screening and diagnosis of hypertension. ABPM = ambulatory blood pressure monitoring; BP = blood pressure; HBPM = home blood pressure monitoring.

Franklin S. et al. IDACO. Hypertension 2012

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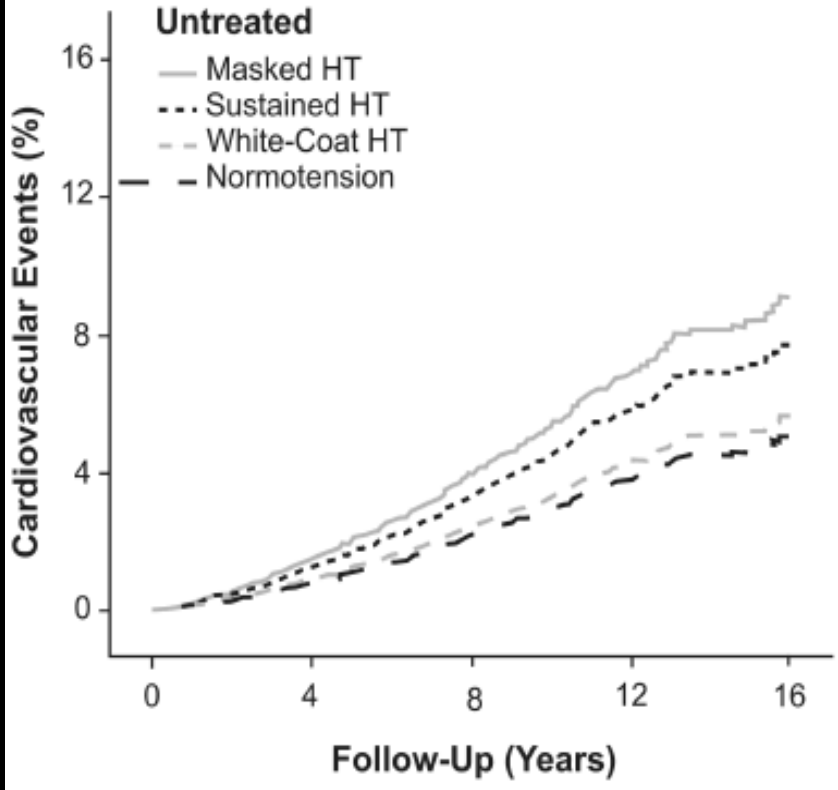

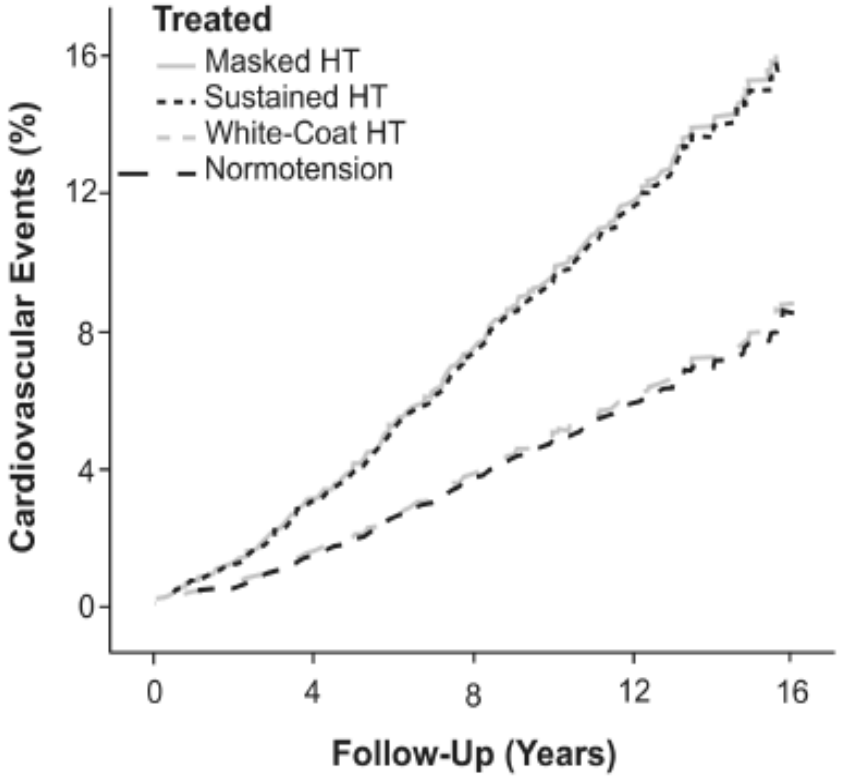

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Management of masked hypertension		
Recommendations		
In masked hypertension, lifestyle changes are recommended to reduce CV risk, with regular follow-up, including periodic out-of-office BP monitoring.	I	C
Antihypertensive drug treatment should be considered in masked hypertension to normalize the out-of-office BP, based on the prognostic importance of out-of-office BP elevation.	IIa	C
Antihypertensive drug uptitration should be considered in treated patients whose out-of-office BP is not controlled (i.e. masked uncontrolled hypertension), because of the high CV risk of these patients.	IIa	C

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Table 14 Routine workup for evaluation of hypertensive patients

Routine laboratory tests
Haemoglobin and/or haematocrit
Fasting blood glucose and glycated HbA_{1c}
Blood lipids: total cholesterol, LDL cholesterol, HDL cholesterol
Blood triglycerides
Blood potassium and sodium
Blood uric acid
Blood creatinine and eGFR
Blood liver function tests
Urine analysis: microscopic examination; urinary protein by dipstick test or, ideally, albumin:creatinine ratio
12-lead ECG

eGFR = estimated glomerular filtration rate; ECG = electrocardiogram; HbA_{1c} = haemoglobin A1c.

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Table 5 Ten year cardiovascular risk categories (Systematic COronary Risk Evaluation system)

Very high risk	**People with any of the following:**
	Documented CVD, either clinical or unequivocal on imaging. • **Clinical CVD** includes acute myocardial infarction, acute coronary syndrome, coronary or other arterial revascularization, stroke, TIA, aortic aneurysm, and PAD • **Unequivocal documented CVD on imaging** includes significant plaque (i.e. ≥50% stenosis) on angiography or ultrasound; it does not include increase in carotid intima-media thickness • **Diabetes mellitus with target organ damage**, e.g. proteinuria or a with a major risk factor such as grade 3 hypertension or hypercholesterolaemia • **Severe CKD** (eGFR <30 mL/min/1.73 m^2) • **A calculated 10 year SCORE of ≥10%**
High risk	**People with any of the following:** • **Marked elevation of a single risk factor**, particularly cholesterol >8 mmol/L (>310 mg/dL), e.g. familial hypercholesterolaemia or grade 3 hypertension (BP ≥180/110 mmHg) • **Most other people with diabetes mellitus** (except some young people with type 1 diabetes mellitus and without major risk factors, who may be at moderate-risk)
	Hypertensive LVH
	Moderate CKD eGFR 30-59 mL/min/1.73 m^2)
	A calculated 10 year SCORE of 5-10%
Moderate risk	**People with:** • **A calculated 10 year SCORE of ≥1 to <5%** • **Grade 2 hypertension** • **Many middle-aged people belong to this category**
Low risk	**People with:** • **A calculated 10 year SCORE of <1%**

BP = blood pressure; CKD = chronic kidney disease; CVD = cardiovascular disease; eGFR = estimated glomerular filtration rate; LVH = left ventricular hypertrophy; TIA = transient ischaemic attack; PAD = peripheral artery disease; SCORE = Systematic COronary Risk Evaluation.

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Hypertension disease staging	Other risk factors, HMOD, or disease	BP (mmHg) grading			
		High normal SBP 130–139 DBP 85–89	Grade 1 SBP 140–159 DBP 90–99	Grade 2 SBP 160–179 DBP 100–109	Grade 3 SBP ≥180 or DBP ≥110
Stage 1 (uncomplicated)	No other risk factors	Low risk	Low risk	Moderate risk	High risk
	1 or 2 risk factors	Low risk	Moderate risk	Moderate to high risk	High risk
	≥3 risk factors	Low to Moderate risk	Moderate to high risk	High Risk	High risk
Stage 2 (asymptomatic disease)	HMOD, CKD grade 3, or diabetes mellitus without organ damage	Moderate to high risk	High risk	High risk	High to very high risk
Stage 3 (established disease)	Established CVD, CKD grade ≥4, or diabetes mellitus with organ damage	Very high risk	Very high risk	Very high risk	Very high risk

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Figure 1 Classification of hypertension stages according to blood pressure levels, presence of cardiovascular risk factors, hypertension-mediated organ damage, or comorbidities. CV risk is illustrated for a middle-aged male. The CV risk does not necessarily correspond to the actual risk at different ages. The use of the SCORE system is recommended for formal estimation of CV risk for treatment decisions. BP = blood pressure; CKD = chronic kidney disease; CV = cardiovascular; DBP = diastolic blood pressure; HMOD = hypertension-mediated organ damage; SBP = systolic blood pressure; SCORE = Systematic COronary Risk Evaluation.

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Table 6 Risk modifiers increasing cardiovascular risk estimated by the Systemic COronary Risk Evaluation (SCORE) system[35]

Social deprivation, the origin of many causes of CVD
Obesity (measured by BMI) and central obesity (measured by waist circumference)
Physical inactivity
Psychosocial stress, including vital exhaustion
Family history of premature CVD (occurring at age <55 years in men and <60 years in women)
Autoimmune and other inflammatory disorders
Major psychiatric disorders
Treatment for infection with human immunodeficiency virus
Atrial fibrillation
LV hypertrophy
CKD
Obstructive sleep apnoea syndrome

BMI = body mass index; CKD = chronic kidney disease; CVD = cardiovascular disease; LV = left ventricular.

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Basic screening tests for HMOD	**Indication and interpretation**
12-lead ECG	Screen for LVH and other possible cardiac abnormalities, and to document heart rate and cardiac rhythm
Urine albumin:creatinine ratio	To detect elevations in albumin excretion indicative of possible renal disease
Blood creatinine and eGFR	To detect possible renal disease
Fundoscopy	To detect hypertensive retinopathy, especially in patients with grade 2 or 3 hypertension
More detailed screening for HMOD	
Echocardiography	To evaluate cardiac structure and function, when this information will influence treatment decisions
Carotid ultrasound	To determine the presence of carotid plaque or stenosis, particularly in patients with cerebrovascular disease or vascular disease elsewhere
Abdominal ultrasound and Doppler studies	• To evaluate renal size and structure (e.g. scarring) and exclude renal tract obstruction as possible underlying causes of CKD and hypertension • Evaluate abdominal aorta for evidence of aneurysmal dilatation and vascular disease • Examine adrenal glands for evidence of adenoma or phaeochromocytoma (CT or MRI preferred for detailed examination); see section 8.2 regarding screening for secondary hypertension • Renal artery Doppler studies to screen for the presence of renovascular disease, especially in the presence of asymmetric renal size
PWV	An index of aortic stiffness and underlying arteriosclerosis
ABI	Screen for evidence of LEAD
Cognitive function testing	To evaluate cognition in patients with symptoms suggestive of cognitive impairment
Brain imaging	To evaluate the presence of ischaemic or haemorrhagic brain injury, especially in patients with a history of cerebrovascular disease or cognitive decline

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Table 19 Summary of office blood pressure thresholds for treatment

Age group	Office SBP treatment threshold (mmHg)					Office DBP treatment threshold (mmHg)
	Hypertension	+ Diabetes	+ CKD	+ CAD	+ Stroke/TIA	
18-65 years	≥140	≥140	≥140	≥140[a]	≥140[a]	≥90
65-79 years	≥140	≥140	≥140	≥140[a]	≥140[a]	≥90
≥80 years	≥160	≥160	≥160	≥160	≥160	≥90
Office DBP treatment threshold (mmHg)	≥90	≥90	≥90	≥90	≥90	

BP = blood pressure; CAD = coronary artery disease; CKD = chronic kidney disease; DBP = diastolic blood pressure; SBP = systolic blood pressure; TIA = transient ischaemic attack.

[a]Treatment may be considered in these very high-risk patients with high–normal SBP (i.e. SBP 130–140 mmHg).

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ACC/AHA: 2017 BP guidelines

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

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

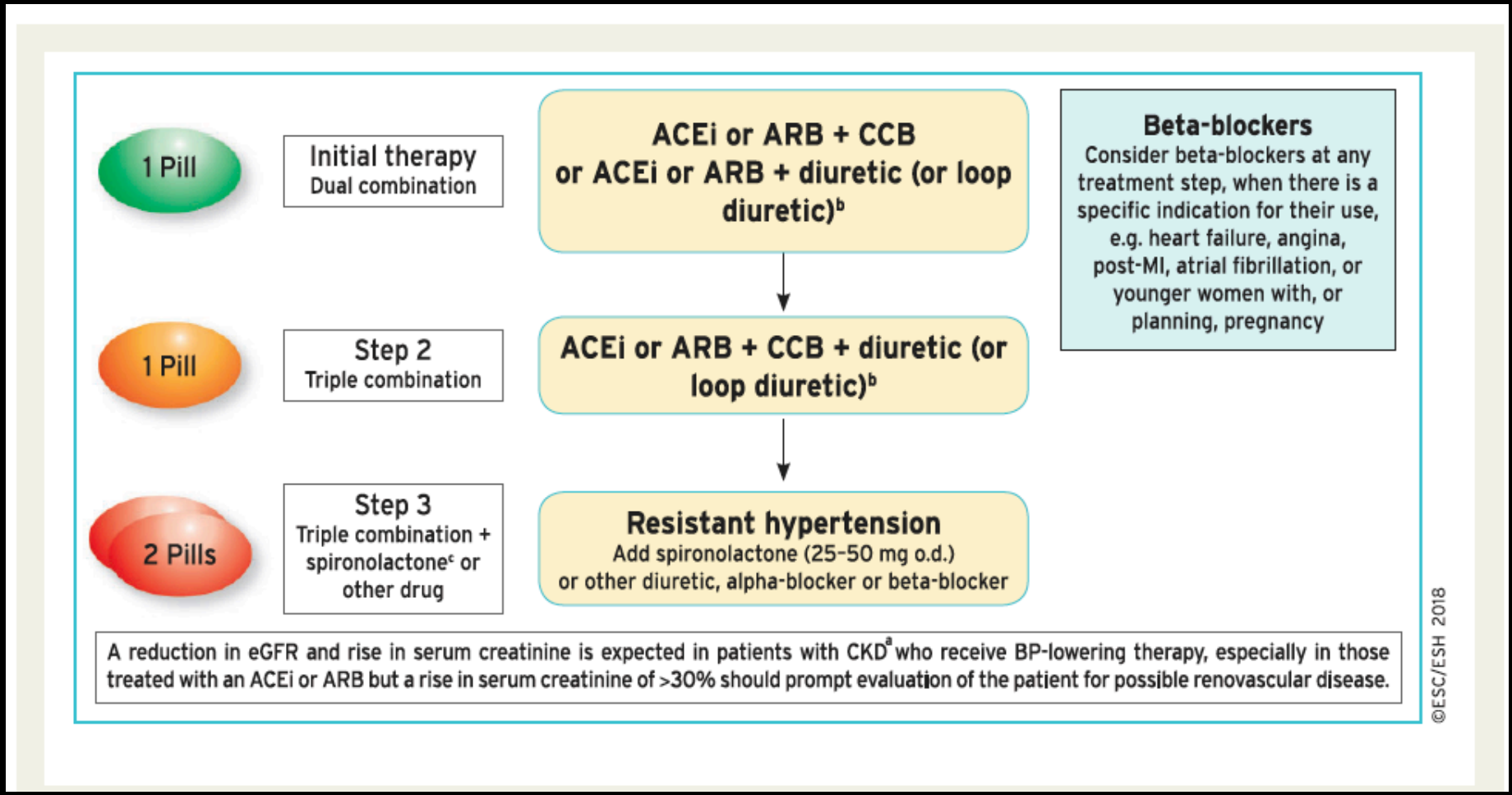
ESH & ESC: 2018 guidelines on HTN

Table 23 **Office blood pressure treatment target range**

Age group	Office SBP treatment target ranges (mmHg)					Office DBP treatment target range (mmHg)
	Hypertension	+ Diabetes	+ CKD		+ Stroke[a]/TIA	
18 - 65 years	**Target to 130** *or lower if tolerated* Not <120	**Target to 130** *or lower if tolerated* Not <120	**Target to 130** *or lower if tolerated* Not <120		**Target to 130** *or lower if tolerated* Not <120	70–79
65 - 79 years[b]	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*		**Target to 130-139** *if tolerated*	70–79
≥80 years[b]	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*		**Target to 130-139** *if tolerated*	70–79
Office DBP treatment target range (mmHg)	70–79	70–79	70–79		70–79	

CAD = coronary artery disease; CKD = chronic kidney disease (includes diabetic and non-diabetic CKD); DBP = diastolic blood pressure; SBP = systolic blood pressure; TIA = transient ischaemic attack.
[a]Refers to patients with previous stroke and does not refer to blood pressure targets immediately after acute stroke.
[b]Treatment decisions and blood pressure targets may need to be modified in older patients who are frail and independent.

ESH & ESC: 2018 guidelines on HTN



of treated hypertension patients remain uncontrolled.[1,2]

Nearly 50% of patients become non-adherent to therapy within one year.[3]

Non-adherence levels double when patients move from two to three drugs.[4-6]

References

[1] Vital Signs: Awareness and Treatment of Uncontrolled Hypertension Among Adults – United States, 2003-2010. Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6135a3.htm. Accessed October 29, 2021.
[2] Berra E, et al. *Hypertension*. 2016;68:297-306.
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ΣΥΓΧΡΟΝΗ ΣΤΡΑΤΗΓΙΚΗ ΑΝΤΙΜΕΤΩΠΙΣΗΣ ΠΑΡΑΓΟΝΤΩΝ ΚΑΡΔΙΑΓΓΕΙΑΚΟΥ ΚΙΝΔΥΝΟΥ

Υπέρταση

- Μέτρηση / επιβεβαίωση διάγνωσης

  Άριστη & συμπληρωματική χρήση
  HBPM & ABPM

- Εκτίμηση συνολικού καρδιαγγειακού κινδύνου

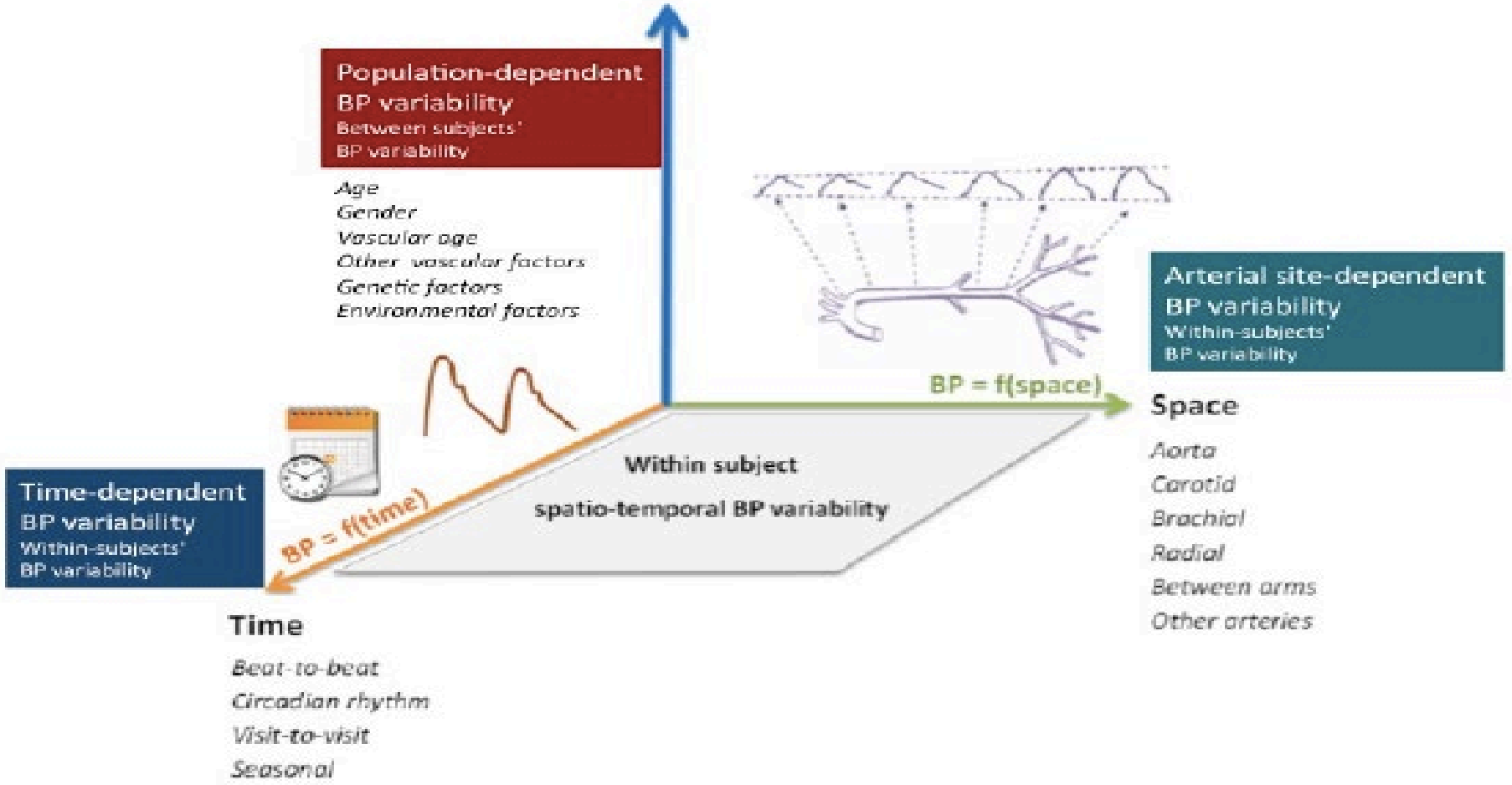
  Χρήση αλλά μόνο εκεί που
  είναι απαραίτητη των
  σύγχρονων εργαλείων
  HMOD

- Θεραπεία

  Έγκαιρη αλλά όχι βιαστική
  έναρξη φαρμακοθεραπείας
  με απλοποιημένα δοσολογικά σχήματα

Papaioannou T.G & Protogerou A.D. Curr Pharm Des 2015

The 3-component model of blood pressure variability (BPV)



Hypertension phenotypes based on BOTH brachial and aortic SBP

HIGH brachial & NORMAL aortic SBP	HIGH brachial & aortic SBP
NORMAL brachial & aortic SBP	NORMAL brachial & HIGH aortic SBP

Protogerou A. et al. J Hypertens. 2016

Phenotypes of office systolic blood pressure according to both brachial and aortic measurements: frequencies and associations with carotid hypertrophy in 1861 adults

Athanase D. Protogerou[a,b], Evaggelia K. Aissopou[a], Antonis Argyris[a], Efthimia G. Nasothimiou[a], George D. Konstantonis[a], Marianna Karamanou[c], Theodoros G. Papaioannou[d], Jacques Blacher[e], Michel E. Safar[e], and Petros P. Sfikakis[a,b]

Protogerou A. et al. J Hypertens. 2016

TABLE 3. Probability [ExpB (95% confidence interval)] of having elevated common carotid cross sectional area (cross-sectional wall area(mm^2); above the median of the population) or in common carotid intimal-medial thickness (intimal-medial wall thickness (mm); >0.9 mm) each office SBP phenotype (II–IV), as defined on the basis of both brachial and aortic SBP, using as reference group the subgroup with 'normal brachial SBP and low–normal aortic SBP' (type Ia)

	CSWA	cIMT
Reference group: the subgroup with normal brachial SBP and low–normal aortic SBP (type Ia)	**ExpB (95% confidence interval)**	
Type Ib: [normal brachial SBP and high-normal aortic SBP (75th–89th percentiles)] vs. type Ia	1.37 (0.96–1.95)	1.59 (0.83–3.04)
Type II [high brachial (≥140 mmHg) SBP and normal aortic SBP (<90th percentile)] vs. type Ia	5.85 (0.76–45.1)	3.35 (0.14–80.3)
Type III [normal brachial SBP and high aortic SBP (≥90th percentile)] vs. type Ia	**3.37 (2.10–5.39)**	1.04 (0.11–9.49)
Type IV [high brachial SBP (≥140 mmHg) and high aortic SBP (≥90th percentile)] vs. type Ia	**4.18 (2.56–6.80)**	**3.52 (1.90–6.51)**
Type Ib: [normal brachial SBP and high–normal aortic SBP (110–129 mmHg)] vs. type Ia	**1.91 (1.33–2.73)**	**3.51 (1.53–8.07)**
Type II [high brachial (≥140 mmHg) SBP and normal aortic SBP (<130 mmHg)] vs. type Ia	**3.29 (1.20–9.06)**	**4.36 (1.38–13.76)**
Type III [normal brachial SBP and high aortic SBP (≥130 mmHg)] vs. type Ia	**6.25 (2.95–13.23)**	**5.97 (1.43–24.86)**
Type IV [high brachial SBP (≥140 mmHg) and high aortic SBP (≥130 mmHg)] vs. type Ia	**6.31 (3.50–11.34)**	**8.36 (3.12–22.39)**
Type Ib: [normal brachial SBP and high–normal aortic SBP (110–132.3 mmHg)] vs. type Ia	**1.89 (1.31–2.65)**	1.85 (0.97–3.51)
Type II [high brachial (≥140 mmHg) SBP and normal aortic SBP (<132.4 mmHg)] vs. type Ia	**2.37 (1.13–5.00)**	1.78 (0.49–6.46)
Type III [normal brachial SBP and high aortic SBP (≥132.4 mmHg)] vs. type Ia	**8.94 (2.43–32.86)**	**3.96 (1.46–10.72)**
Type IV [high brachial SBP (≥140 mmHg) and high aortic SBP (≥132.4 mmHg)] vs. type Ia	**5.86 (3.35–1.31)**	**3.87 (1.73–8.64)**

cIMT, intimal-medial wall thickness; CSWA, cross-sectional wall area. The regression models are adjusted for age, sex, DBP, BMI, and the presence of cardiovascular disease, diabetes, dyslipidaemia, blood pressure lowering drugs, lipid modifying drugs, and smoking.

Cheng Yi-B et al. IDACRS. Hypertension 2022

Hypertension

ORIGINAL ARTICLE

Risk Stratification by Cross-Classification of Central and Brachial Systolic Blood Pressure

Yi-Bang Cheng, Lutgarde Thijs, Lucas S. Aparicio, Qi-Fang Huang, Fang-Fei Wei, Yu-Ling Yu, Jessica Barochiner, Chang-Sheng Sheng, Wen-Yi Yang, Teemu J. Niiranen, José Boggia, Zhen-Yu Zhang, Katarzyna Stolarz-Skrzypek, Natasza Gilis-Malinowska, Valérie Tikhonoff, Wiktoria Wojciechowska, Edoardo Casiglia, Krzysztof Narkiewicz, Jan Filipovský, Kalina Kawecka-Jaszcz, Ji-Guang Wang, Yan Li*, Jan A. Staessen*, the International Database of Central Arterial Properties for Risk Stratification (IDCARS) Investigators†

Cheng Yi-B et al. IDACRS. Hypertension 2022

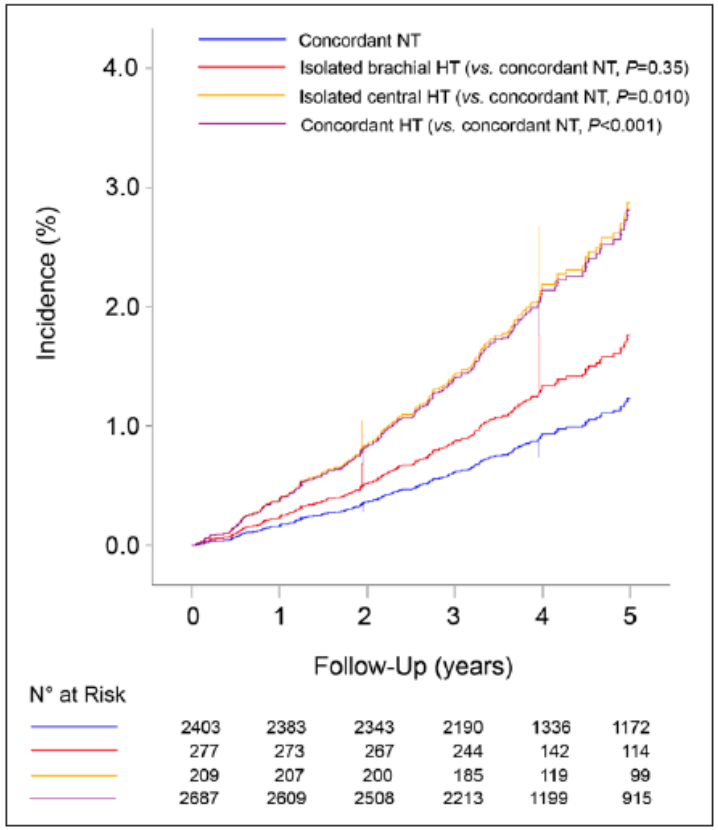
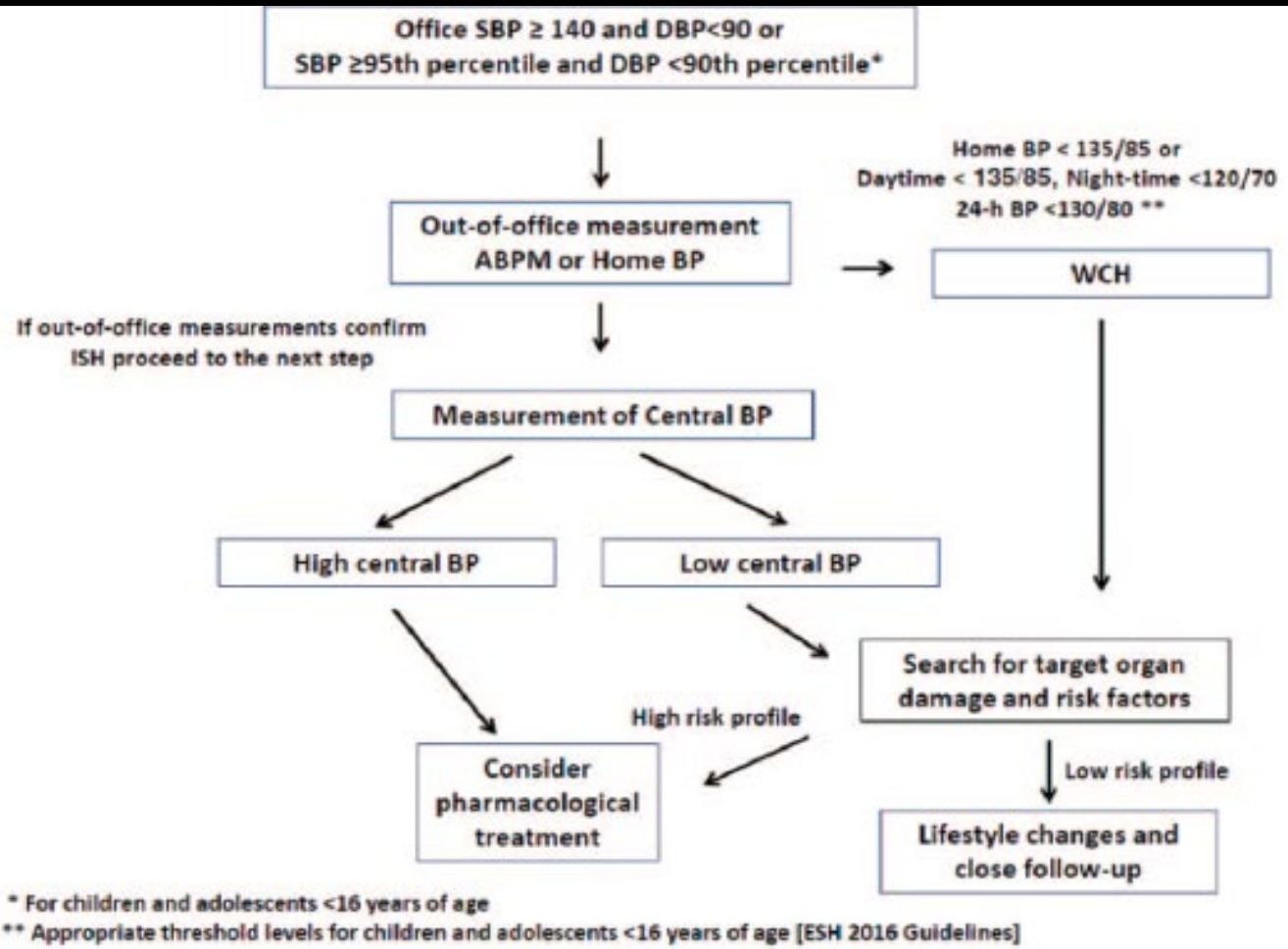


Figure 2. Cumulative incidence of the primary composite cardiovascular end point by the cross-classification of central and brachial blood pressure categories.
Vertical lines denote the SE. Tabulated data are the number of participants at risk by hypertension category at 1-year intervals. The survival functions and *P* were derived by proportional hazard regression with concordant normotension as the reference group and with cumulative adjustment for cohort, sex and age. The systolic BP thresholds delineating the 4 groups are given in Table 3. HT indicates hypertension; and NT, normotension.



roposal for a diagnostic flow-chart for young individuals with isolated systolic hypertension.

What is the optimal blood pressure control ?

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

PUBLISHED BY ELSEVIER

EDITORIAL COMMENT

Time in Therapeutic Range

Redefining "Optimal" Blood Pressure Control*

George Bakris, MD,[a] Hillel Sternlicht, MD[b]

variability. This publication suggests that patients would be well served to ask themselves not only, "What is my blood pressure?" but "What *was* my blood pressure?"

"What was my USUAL blood pressure"

ΣΥΓΧΡΟΝΗ ΣΤΡΑΤΗΓΙΚΗ ΑΝΤΙΜΕΤΩΠΙΣΗΣ ΠΑΡΑΓΟΝΤΩΝ ΚΑΡΔΙΑΓΓΕΙΑΚΟΥ ΚΙΝΔΥΝΟΥ

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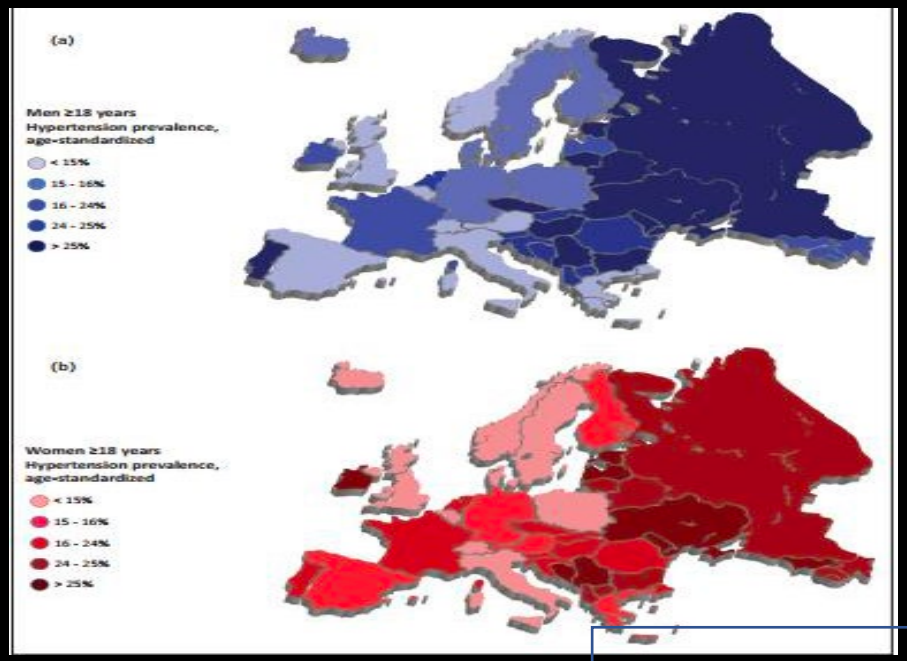
Reuter H. et al. .Status of hypertension in Europe. Curr Opin Cardiol. 2019



POPULATION BP NORMALIZATION STRATEGIES ARE NEEDED