Αρτηριακή Υπέρταση:

Διάγνωση –Εργαστηριακός έλεγχος

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Hypertension Excellence Centre of ESH

2023 ESH Guidelines for the management of arterial hypertension. The Task Force for the management of arterial hypertension of the European Society of Hypertension Endorsed by the International Society of Hypertension and the European Renal Association

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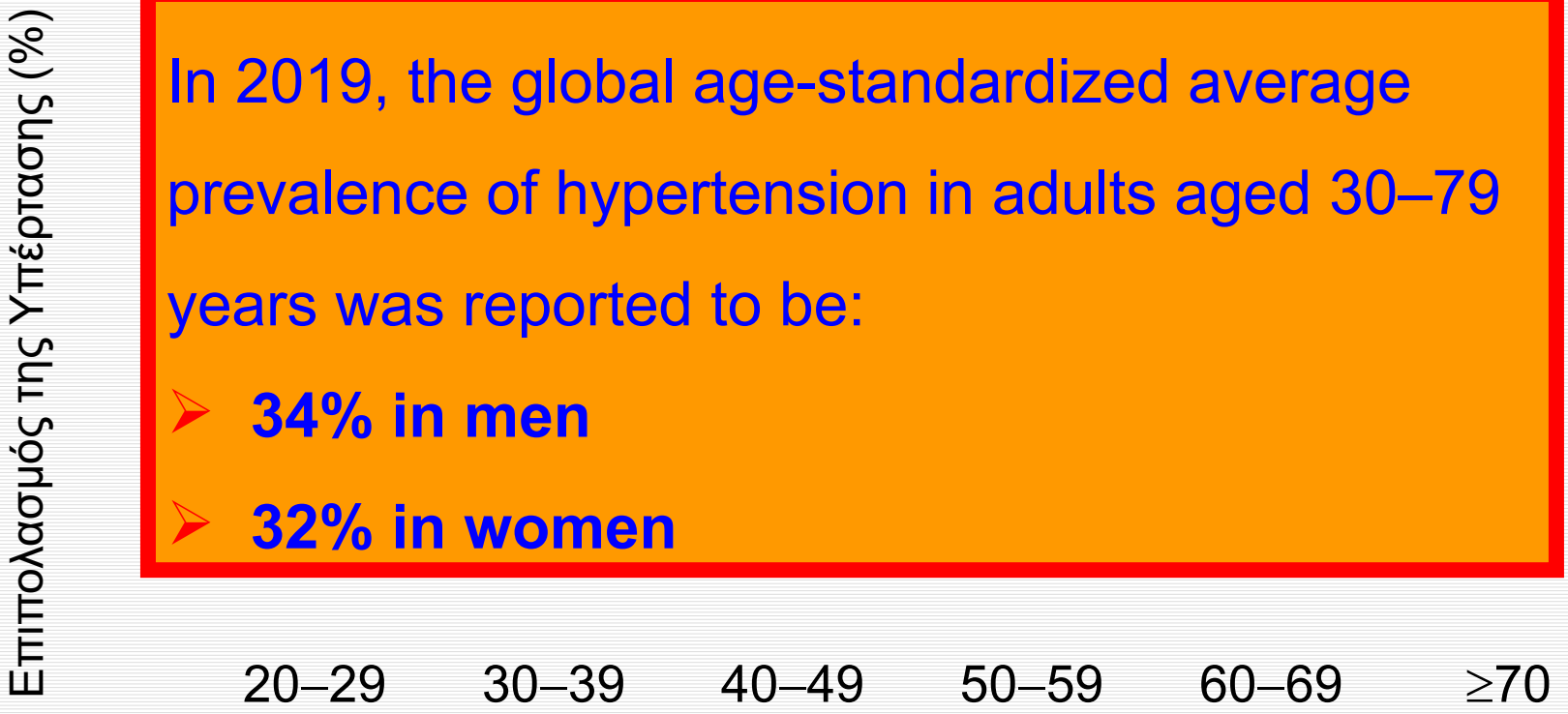
Επιπολασμός της Υπέρτασης ανά Ηλικία και Φύλο

In 2019, the global age-standardized average prevalence of hypertension in adults aged 30–79 years was reported to be:

- **34% in men**
- **32% in women**



Στοιχεία από έγκυρες οικονομικές πηγές (ΗΠΑ, Καναδάς, Ισπανία, Αγγλία, Γερμανία, Ελλάδα, Ιταλία, Σουηδία, Αυστραλία, Ιαπωνία)

Kearney et al. *Lancet* 2005;365:217–23

Ορισμός Υπέρτασης

ΣΑΠ ≥ 140

και / ή

ΔΑΠ ≥ 90 mmHg

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Classification of office BP and definitions of hypertension grade

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	120–129	and	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[a]	≥140	and	<90
Isolated diastolic hypertension[a]	<140	and	≥90

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Definition of BP categories, hypertension grades and stages according to office BP

Recommendations and statements	CoR	LoE
It is recommended that BP is classified as optimal, normal, high normal, or grade 1, 2 or 3 hypertension, according to office BP.	I	C
In addition to grades of hypertension, which are based on BP values, it is recommended to distinguish stage 1, 2, and 3 hypertension. Stage 1: Uncomplicated hypertension without HMOD, diabetes, CVD and without CKD ≥ stage 3. Stage 2: Presence of HMOD, diabetes, or CKD stage 3. Stage 3: Presence of CVD or CKD stage 4 or 5.	I	C

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Factors that influence CV risk in patients with hypertension

Parameter for risk stratification, which are included in SCORE2 and SCORE2-OP
Sex (men >women)
Age
Level of SBP[a]
Smoking – current or past history
Non-HDL cholesterol
Established and suggested novel factors
Family or parental history of early onset hypertension
Personal history of malignant hypertension
Family history of premature CVD (men aged <55 years; women aged <65 years)
Heart rate (resting values >80 bpm)
Low birth weight
Sedentary lifestyle
Overweight or Obesity
Diabetes
Uric acid
Lp(a)
Adverse outcomes of pregnancy (recurrent pregnancy loss, preterm delivery, hypertensive disorders, gestational diabetes)
Early-onset menopause
Frailty
Psychosocial and socioeconomic factors
Migration
Environmental exposure to air pollution or noise

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Factors that influence CV risk in patients with hypertension

Additional dinical conditions or comorbidities

- True resistant hypertension
- Sleep disorders (including OSA)
- COPD
- Gout
- Chronic inflammatory diseases
- Nonalcoholic fatty liver disease (NASH)
- Chronic infections (including long COVID-19)
- Migraine
- Depressive syndromes
- Erectile dysfunction

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Factors that influence CV risk in patients with hypertension

Hypertension-mediated organ damage (HMOD)

Increased large artery stiffness:

Pulse pressure (in older people) ≥60 mmHg

Carotid–femoral PWV >10 m/s (if available)

Presence of non-hemodynamically significant atheromatous plaque (stenosis) on imaging

ECG LVH (Sokolow–Lyon index >35 mm, or R in aVL ≥11 mm; Cornell voltage-duration product (+6 mm in women) >2440 mm*ms, or Cornell voltage >28 mm in men or >20 mm in women)

Echocardiographic LVH (LV mass index: men >50 g/m$^{2.7}$; women >47 g/m$^{2.7}$ (m = height in meters); indexation for BSA may be used in normal-weight patients: >115 g/m^2 in men and >95/m^2 in women

Moderate increase of albuminuria 30–300 mg/24 h or elevated ACR (preferably in morning spot urine) 30–300 mg/g

CKD stage 3 with eGFR 30–59 ml/min/1.73 m^2

Ankle–brachial index <0.9

Advanced retinopathy: hemorrhages or exudates, papilledema

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Factors that influence CV risk in patients with hypertension

Established cardiovascular and kidney disease

- Cerebrovascular disease: ischemic stroke, cerebral hemorrhage, TIA
- Coronary artery disease: myocardial infarction, angina, myocardial revascularization
- Presence of hemodynamically significant atheromatous plaque (stenosis) on imaging
- Heart failure, including heart failure with preserved ejection fraction
- Peripheral artery disease
- Atrial fibrillation
- Severe albuminuria > 300 mg/24 h or ACR (preferably in morning urine) >300 mg/g
- CKD stage 4 and 5, eGFR < 30 mL/min/1.73m^2

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Cardiovascular risk according to grade and stage of hypertension

Hypertension disease staging	Other risk factors, HMOD, CVD or CKD	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 DBP ≥ 110
Stage 1	No other risk factors[a]	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	HMOD, CKD grade 3, or diabetes mellitus	Moderate to high risk	High risk	High risk	Very high risk
Stage 3	Established CVD or CKD grade ≥4	Very high risk	Very high risk	Very high risk	Very high risk

	<50 years	60–69 years	≥70 years
	<2.5%	<5%	<7.5%
	2.5 to <7.5%	5 to <10%	7.5 to <15%
	≥7.5%	≥10%	≥15%

Complementary risk estimation in Stage 1 with SCORE2/SCOR2-OP

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Risk assessment in hypertension with SCORE2 and SCORE2-OP

Recommendations and statements	CoR	LoE
CV risk assessment with the SCORE2 and SCOR2-OP system is recommended for hypertensive patients who are not already at high or very high risk due to established CVD or CKD, long-lasting or complicated diabetes, severe HMOD (e.g. LVH) or a markedly elevated single risk factor (e.g. cholesterol, albuminuria).	I	B

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Screening for hypertension

Recommendations and statements	CoR	LoE
Case finding or opportunistic screening for hypertension is recommended in all adults.	I	C
Regular BP measurements are recommended in adults from the age of 40 years or earlier in patients at high-risk.	I	C
In individuals without hypertension, intervals for repeated BP measurement should be scheduled depending on the BP level, the risk of hypertension and CV risk. In patients with high risk, annual follow-up is recommended.	I	C

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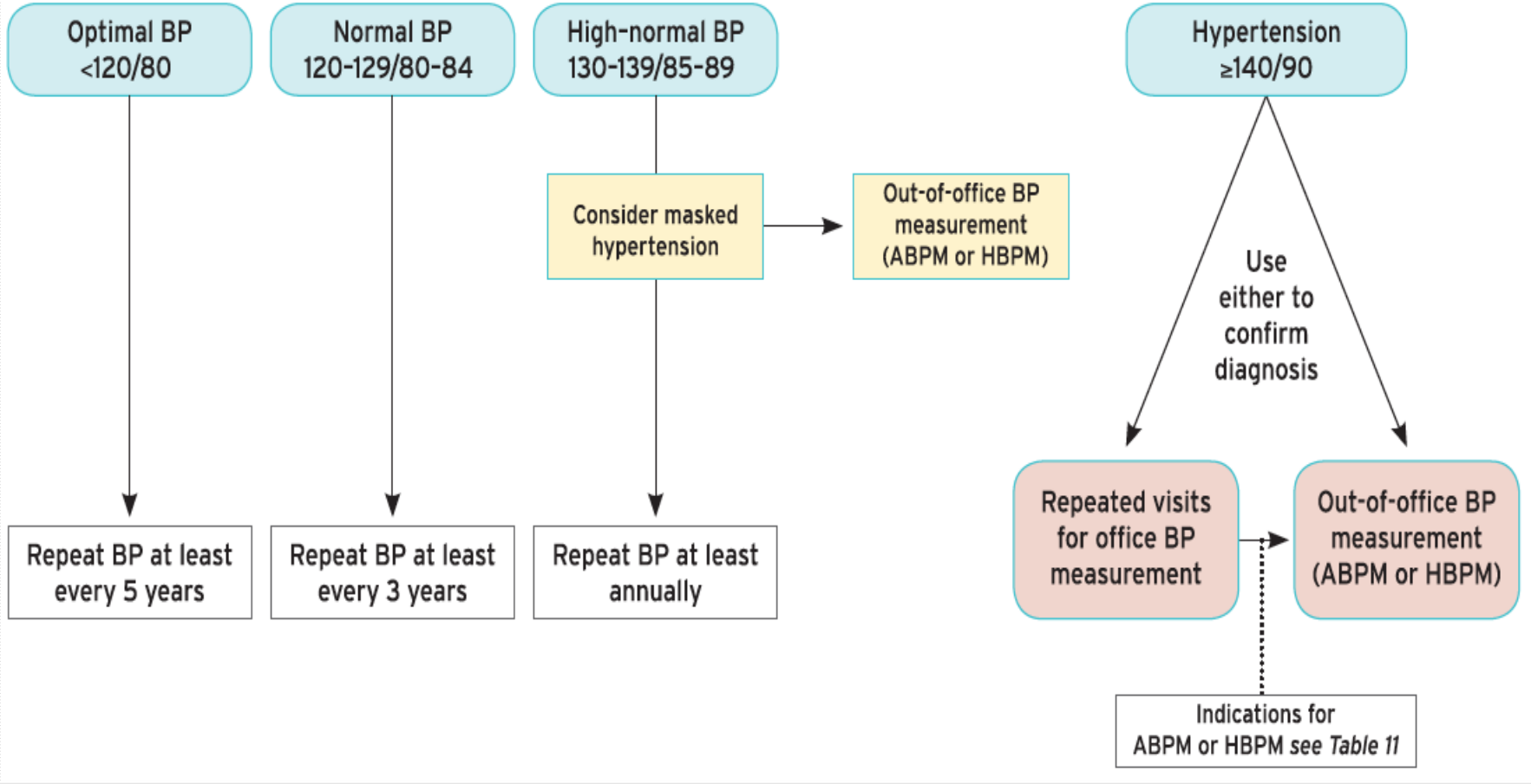
Screening and diagnosis of hypertension



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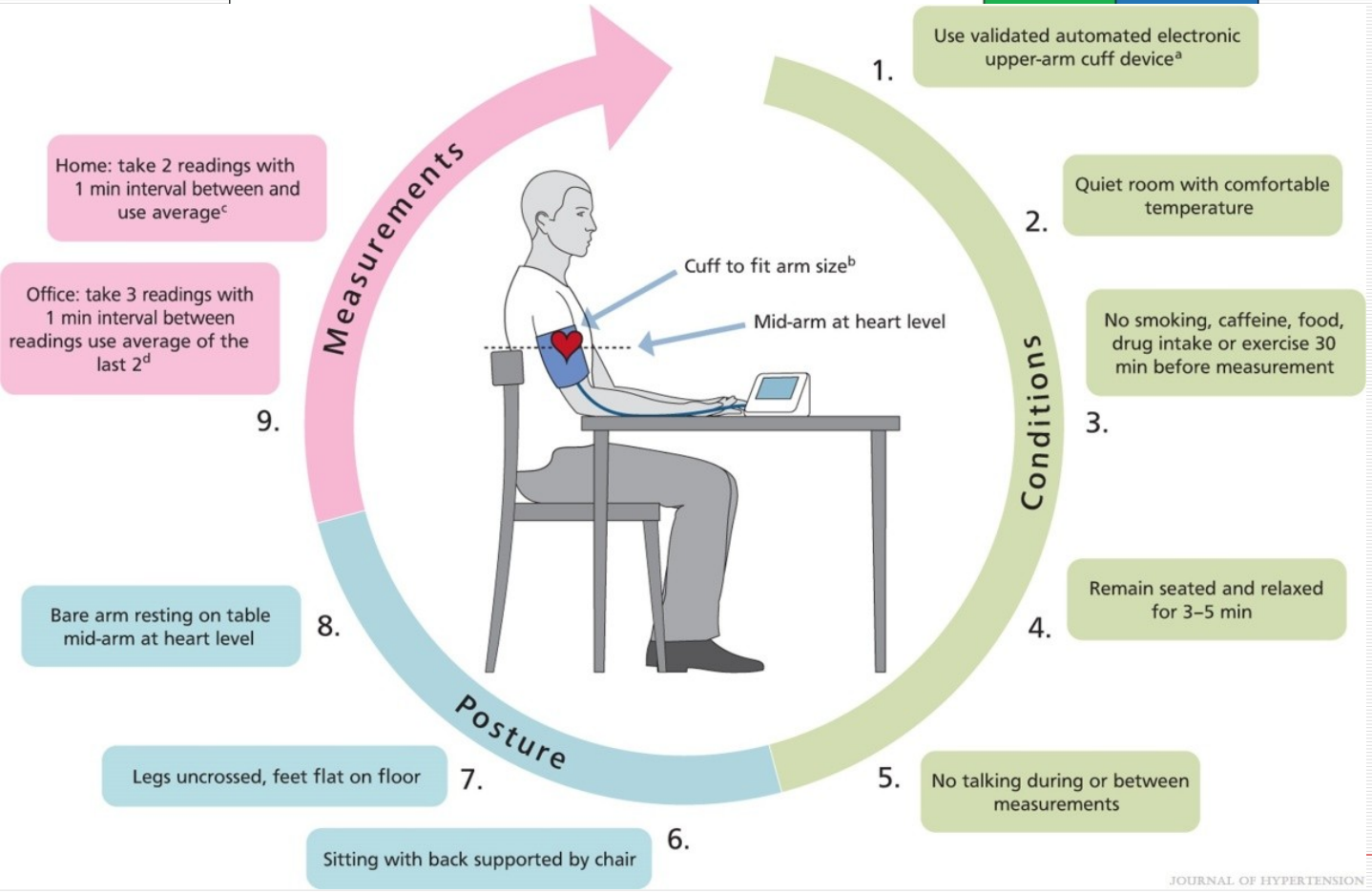
Office BP measurements

Recommendations and statements	CoR	LoE
Office BP is recommended for diagnosis of hypertension, because it is the one method by which hypertension-related risk, benefits of antihypertensive treatment, and treatment-related BP thresholds and goals are based.	I	A



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Office BP measurements

Recommendations and statements	CoR	LoE
Office BP is recommended for diagnosis of hypertension, because it is the one method by which hypertension-related risk, benefits of antihypertensive treatment, and treatment-related BP thresholds and goals are based.	I	A
Office BP measurements should be performed in standardized conditions, using a standard measurement protocol. Triplicate measurements should be taken and the average of the last two should be referred to as the representative value.	I	C
It is recommended to diagnose hypertension during at least 2 separate office visits (within 4 weeks) unless office BP indicates grade 3 hypertension (≥180/110 mmHg) or patients presents with hypertension related symptoms or there is evidence of HMOD or CVD.	I	C
At the first office visit, BP should be measured in both arms. A consistent between-arm SBP difference >15-20 mmHg suggests atheromatous disease and is associated with increased CV risk. All subsequent measurements should be made on the arm with the highest BP readings	I	C
Out-of-office BP is a source of multiple BP-related information before and during treatment. It is therefore recommended to obtain additional information on BP values by ABPM or HBPM or both if available.	I	C

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Devices for BP measurement

Recommendations and statements	CoR	LoE
Automatic electronic, upper-arm cuff devices are recommended for office and out-of-office BP measurement (home and ambulatory).	I	B
Hybrid manual auscultatory devices with LCD or LED display, or digital countdown, or shock-resistant aneroid devices can be used for office BP measurement if automated devices are not available.	I	B
Only properly validated devices should be used. www.stridebp.org	I	B
Cuffless BP devices should not be used for the evaluation or management of hypertension in clinical practice.	III	C

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Home BP monitoring (HBPM)

Recommendations and statements	CoR	LoE
HBPM can be considered in addition to OBPM to improve CV risk prediction due to better reproducibility and prognostic value than OBPM	IIa	B
HBPM is recommended to identify white-coat hypertension or masked hypertension.	I	B
HBPM is recommended for long-term follow-up of treated hypertension because it improves BP control, especially when combined with education and counselling.	I	B
HBPM should be performed using automated upper arm-cuff BP monitors validated according to an established protocol. www.stridebp.org	I	C
Home BP should be monitored for 7 (not fewer than 3) days with duplicate morning (with 1 minute between them) and evening measurements before office visits. Average home BP should be calculated after discarding readings of the first day.	I	C

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Ambulatory BP monitoring (ABPM)

Recommendations and statements	CoR	LoE
ABPM can be considered in addition to OBPM to improve CV risk prediction due to better reproducibility and prognostic value than OBPM	II	B
ABPM is recommended to identify white-coat hypertension, masked hypertension and nocturnal BP phenotypes. Repeated ABPM may be necessary because these phenotypes have a limited reproducibility.	I	B
ABPM should be used to diagnose true resistant hypertension.	I	B
ABPM should be measured using upper arm-cuff automated BP monitors validated according to an established protocol. www.stridebp.org	I	C
The recommended time interval between measurements should be 20 minutes during day and night to minimize the risk of missing day or night periods.	I	C

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Clinical indications for home and ambulatory BP monitoring

Conditions in which white-coat hypertension is more common, e.g.:
- Grade I hypertension on office BP measurement
- Marked office BP elevation without HMOD

Conditions in which masked hypertension is more common, e.g.:
- High-normal office BP
- Normal office BP in individuals with HMOD or at high total CV risk

In treated individuals:
- Confirmation of uncontrolled and true resistant hypertension
- Evaluation of 24 h BP control (especially in high-risk patients)
- Evaluating symptoms indicating hypotension (especially in older patients)

Suspected postural or postprandial hypotension in treated patients

Exaggerated BP response to exercise

Considerable variability in office BP measurements

Specific indications for ABPM rather than HBPM:
- Assessment of nocturnal BP and dipping status (e.g. sleep apnea, CKD, diabetes, endocrine hypertension, or autonomic dysfunction)
- Patients incapable or unwilling to perform reliable HBPM, or anxious with self-measurement
- Pregnancy

Specific indications for HBPM rather than ABPM:
- Long-term follow-up of treated individuals to improve adherence with treatment and hypertension control
- Patients unwilling to perform ABPM, or with considerable discomfort during the recording

Indications for repeat out-of-office BP evaluation (same or alternative method – HBPM/ABPM)
- Confirmation of white-coat hypertension or masked hypertension in untreated or treated individuals

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Definitions of hypertension according to the correspondence of home and ambulatory BP values with office BP

Method	SBP (mmHg)		DBP (mmHg)
Office BP[a]	≥140	and/or	≥90
Ambulatory BP			
Awake mean	≥135	and/or	≥85
Asleep mean	≥120	and/or	≥70
24 h mean	≥130	and/or	≥80
Home BP mean	≥135	and/or	≥85

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Medical and Family History

Medical and Family History

Personal history

- Time of the first diagnosis of hypertension, including records of any previous medical screening, hospitalization
- Stable or rapidly increasing BP
- Recordings of current and past BP values by self BP measurements
- Current/past antihypertensive medications including their effectiveness and intolerance
- Adherence to therapy
- Previous hypertension in pregnancy/preeclampsia

Risk factors[a]

- Family history of hypertension, CVD, stroke or kidney disease
- Smoking history
- Dietary history, alcohol consumption
- Lack of physical exercise/sedentary lifestyle
- Weight gain or loss in the past
- History of erectile dysfunction
- Sleep history, snoring, sleep apnea (information also from partner)
- Distress or eustress with job or at home (subjective stress level)
- Long-term cancer survivor

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Medical and Family History

History and symptoms of HMOD, CVD, stroke and kidney disease

- Brain and eyes: headache, vertigo, syncope, impaired vision, TIA, sensory or motor deficit, stroke, carotid revascularization, cognitive impairment, memory loss, dementia (in older people)
- Heart: chest pain, shortness of breath, edema, myocardial infarction, coronary revascularization, syncope, history of palpitations, arrhythmias (especially AF), heart failure
- Kidney: thirst, polyuria, nocturia, hematuria, urinary tract infections
- Peripheral arteries: cold extremities, intermittent claudication, pain-free walking distance, pain at rest, ulcer or necrosis, peripheral revascularization
- Patient or family history of CKD (e.g. polycystic kidney disease)

History of possible secondary hypertension

- Young onset of grade 2 or 3 hypertension (<40 years), or sudden development of hypertension or rapidly worsening BP in older patients
- History of repetitive renal/urinary tract disease
- Repetitive episodes of sweating, headache, anxiety or palpitations, suggestive of pheochromocytoma
- History of spontaneous or diuretic-provoked hypokalemia, episodes of muscle weakness and tetany (hyperaldosteronism)
- Symptoms suggestive of thyroid disease or hyperparathyroidism
- History of or current pregnancy, postmenopausal status and oral contraceptive use or hormonal substitution

Drug treatments or use (other than antihypertensive drugs)

- Recreational drug/substance abuse, concurrent therapies including nonprescription drugs, e.g. glucocorticoids, NSAIDs/COX-2 inhibitors, paracetamol (acetaminophen), immunosuppressive drugs, anticancer drugs, nasal vasoconstrictors

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Comprehensive Physical Examination for Hypertension

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Comprehensive Physical Examination for Hypertension

Εκτίμηση παχυσαρκίας

Δείκτης Μάζας Σώματος (BMI: Body Mass Index)
BMI= Βάρος Σώματος (kg) / Ύψος^2 (m^2)

Περίμετρος Μέσης : (Η μέτρηση της περιφέρειας μέσης καθορίζει την διάγνωση της κεντρικής ή κοιλιακής παχυσαρκίας).

Περίμετρος μέσης / περίμετρος ισχίων
(WHR: Waist to Hip Ratio). Υψηλό WHR> 0.83 γυναίκες και >0.9 άνδρες.

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Δείκτης Μάζας Σώματος (BMI: Body Mass Index)

ΚΑΤΗΓΟΡΙΑ ΒΑΡΟΥΣ		BMI
Ελλειποβαρής		< 18,5
Φυσιολογικός		18,5-24,9
Υπέρβαρος		25,0-29,9
Παχύσαρκος	I II	30-34,9 35-39,9
Νοσηρά παχύσαρκος	III	>40,0

Περίμετρος μέσης

Αυξημένος κίνδυνος

Γυναίκες : > 80 εκ

Άνδρες : > 94 εκ

Πολύ Αυξημένος κίνδυνος

Γυναίκες : > 88 εκ

Άνδρες : > 102 εκ

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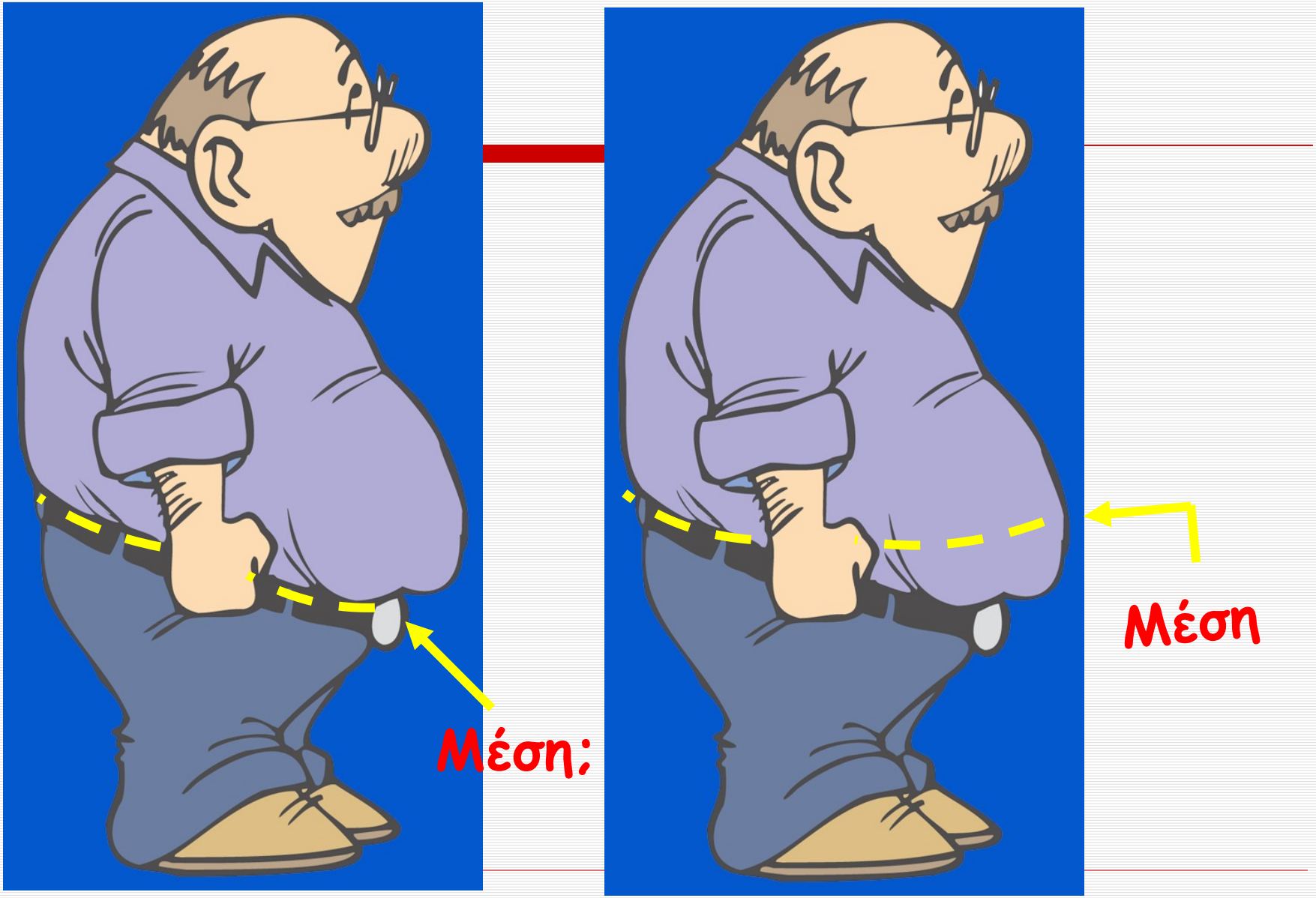
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Comprehensive Physical Examination for Hypertension

Signs of hyper
- Neurological e
- Fundoscopic e
- Auscultation o
- Palpation of ca
- Ankle–brachia

Signs of second
- Skin inspection
- Kidney palpati
- Auscultation o
- Signs of Cushing's disease or acromegaly
- Signs of thyroid disease

Examination of eye grounds is recommended in hypertensive with severe disease, only.

This is because the mildest retinal changes (grade 1: arteriolar narrowing; grade 2: arterio venous nipping) appear to be largely non-specific alterations except in young patients

In contrast grade 3 (haemorrhages and exudates) and 4 (papilloedema), only present in severe hypertension, are associated with an increased risk of cardiovascular events

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Selected standard laboratory tests for work-up of hypertensive patients

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Selected standard laboratory tests for work-up of hypertensive patients

- Hemoglobin and/or hematocrit
- Fasting blood glucose and HbA1c
- Blood lipids: total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides
- Blood potassium and sodium
- Blood uric acid
- Blood creatinine (and/or cystatin C) for estimating GFR with eGFR[a] formulas
- Blood calcium
- Urine analysis (first voided urine in the morning), multicomponent dipstick test in all patients, urinary albumin/creatinine ratio, microscopic examination in selected patients

Παράμετρος	Φ.Τ	Μικρολευκωματινουρία	Λευκωματινουρία
Urine AER (μg/min)	< 20	20 - 200	>200
Urine AER (mg/24h)	< 30	30 - 300	>300
Urine albumin/ Cr# ratio (mg/gm)	< 30	30 - 300	>300

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Assessment of hypertension-mediated organ damage (HMOD)

Basic screening tests for HMOD recommended for all hypertensive patients	Aim
12 lead ECG	Measure HR and AV conduction, detect cardiac arrhythmias, myocardial ischemia and infarction, screen for LVH
Urine albumin : creatinine ratio (UACR)	Detect and classify CKD
Serum creatinine and eGFR	Detect and classify CKD
Extended screening for HMOD	
Echocardiography	Evaluate structure and function of the ventricles and left atrium, detect valvular disease, aortic root diameter and ascending aortic aneurysm
cfPWV or baPWV	Evaluate aortic/large artery stiffness
Carotid artery ultrasound	Determine carotid intima-media thickness, plaque and stenosis
Coronary artery calcium scan	Determine the presence and extent of coronary calcium to predict CAD events
Abdominal aorta ultrasound	Screen for aortic aneurysm
Kidney ultrasound	Evaluate size and structure of kidney, detect renovascular disease, determine RRI (by spectral doppler ultrasonography)
Spectral doppler ultrasonography	Diagnosis of renovascular disease and determination of RRI
ABI	Screen for LEAD
Retina microvasculature	Detect microvascular changes
Cognitive function testing (MMSE, MoCA)	Screen for early stages of dementia
Brain imaging (CT, MRI)	Detect structural brain damage

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When to refer a hypertensive patient to a specialist or to hospital

- Patients in whom secondary hypertension is suspected
- Young patients (<40 years) with grade 2 or 3 hypertension in whom secondary hypertension should be excluded
- Patients with sudden onset or aggravation of hypertension when BP was previously normal
- Patients with treatment-resistant hypertension
- Need of more detailed assessment of HMOD, which might influence treatment decision
- Requirement of more in-depth specialist evaluation from the referring doctor
- Hypertensive emergencies (inpatient care will usually be needed)

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Patient characteristics that should raise the suspicion of secondary hypertension

Younger patients (<40 years) with grade 2 or 3 hypertension or hypertension of any grade in childhood
Sudden onset of hypertension in individuals with previously documented normotension
Acute worsening of BP control in patients with previously well controlled by treatment
True resistant hypertension hypertension
Hypertensive emergency
Severe (grade 3) or malignant hypertension
Severe and/or extensive HMOD, particularly if disproportionate for the duration and severity of the BP elevation
Clinical or biochemical features suggestive of endocrine causes of hypertension
Clinical features suggestive of atherosclerotic renovascular disease or fibromuscular dysplasia
Clinical features suggestive of obstructive sleep apnea
Severe hypertension in pregnancy (>160/110 mmHg) or acute worsening of BP control in pregnant women with preexisting hypertension

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