



Ιατρικό Τμήμα Σχολής Επιστημών Υγείας  
Εθνικό & Καποδιστριακό Πανεπιστήμιο Αθήνας

**Μονάδα Καρδιαγγειακής Πρόληψης & Έρευνας**  
Κλινική & Εργαστήριο Παθολογικής Φυσιολογίας

*Καθηγητής Αθανάσιος Πρωτογέρου*



6ο έτος / Παθολογία / Βασικές αρχές διάγνωσης & θεραπείας της αρτηριακής υπέρτασης



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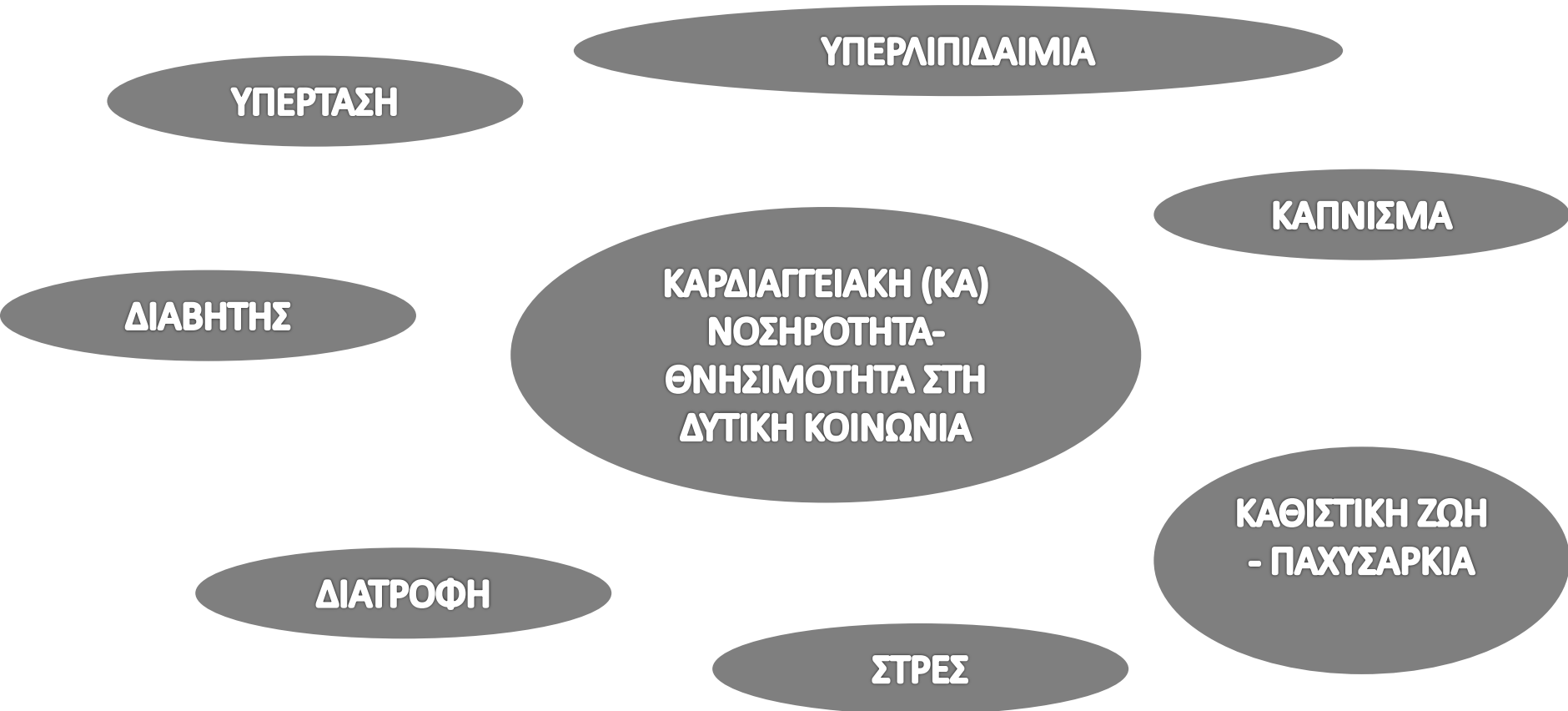
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# Global Health Risks: Selected figures and tables

Health Statistics and Informatics Department



World Health  
Organization



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## Leading causes of attributable global mortality and burden of disease, 2004

### Attributable Mortality

|                                   | %    |
|-----------------------------------|------|
| 1. High blood pressure            | 12.8 |
| 2. Tobacco use                    | 8.7  |
| 3. High blood glucose             | 5.8  |
| 4. Physical inactivity            | 5.5  |
| 5. Overweight and obesity         | 4.8  |
| 6. High cholesterol               | 4.5  |
| 7. Unsafe sex                     | 4.0  |
| 8. Alcohol use                    | 3.8  |
| 9. Childhood underweight          | 3.8  |
| 10. Indoor smoke from solid fuels | 3.3  |

**59 million total global deaths in 2004**

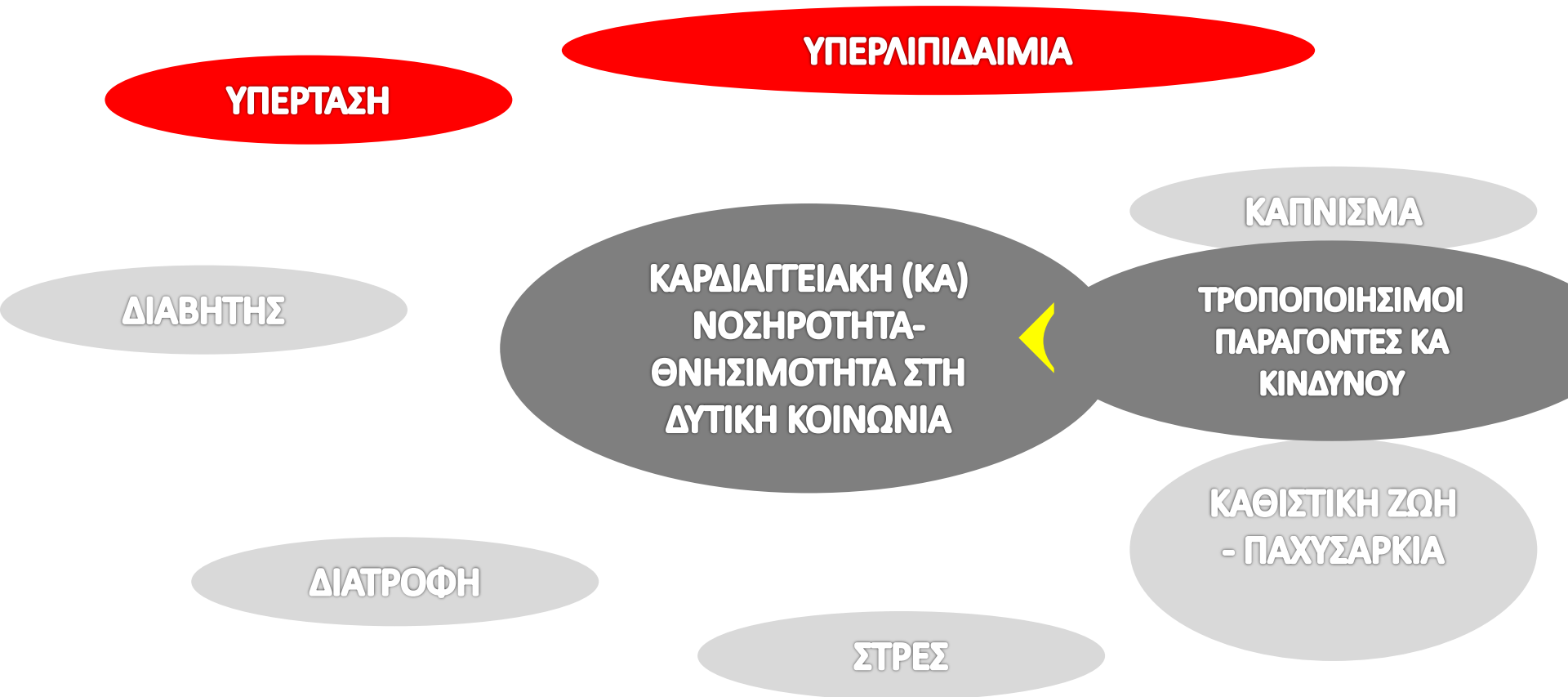
### Attributable DALYs

|                                      | %   |
|--------------------------------------|-----|
| 1. Childhood underweight             | 5.9 |
| 2. Unsafe sex                        | 4.6 |
| 3. Alcohol use                       | 4.5 |
| 4. Unsafe water, sanitation, hygiene | 4.2 |
| 5. High blood pressure               | 3.7 |
| 6. Tobacco use                       | 3.7 |
| 7. Suboptimal breastfeeding          | 2.9 |
| 8. High blood glucose                | 2.7 |
| 9. Indoor smoke from solid fuels     | 2.7 |
| 10. Overweight and obesity           | 2.3 |

**1.5 billion total global DALYs in 2004**



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## ESH Guidelines

2023 ESH Guidelines for the management of  
arterial hypertension  
*The Task Force for the management of arterial hypertension  
of the European Society of Hy*

Endorsed by the International Society of  
Renal Association (ERA)



ESC

European Society  
of Cardiology

European Heart Journal (2024) 00, 1–107  
<https://doi.org/10.1093/eurheartj/ehae178>

ESC GUIDELINES

## 2024 ESC Guidelines for the management of elevated blood pressure and hypertension

Developed by the task force on the management of elevated blood pressure and  
hypertension of the European Society of Cardiology (ESC) and endorsed by the  
European Society of Endocrinology (ESE) and the European Stroke Organisation (ESO)

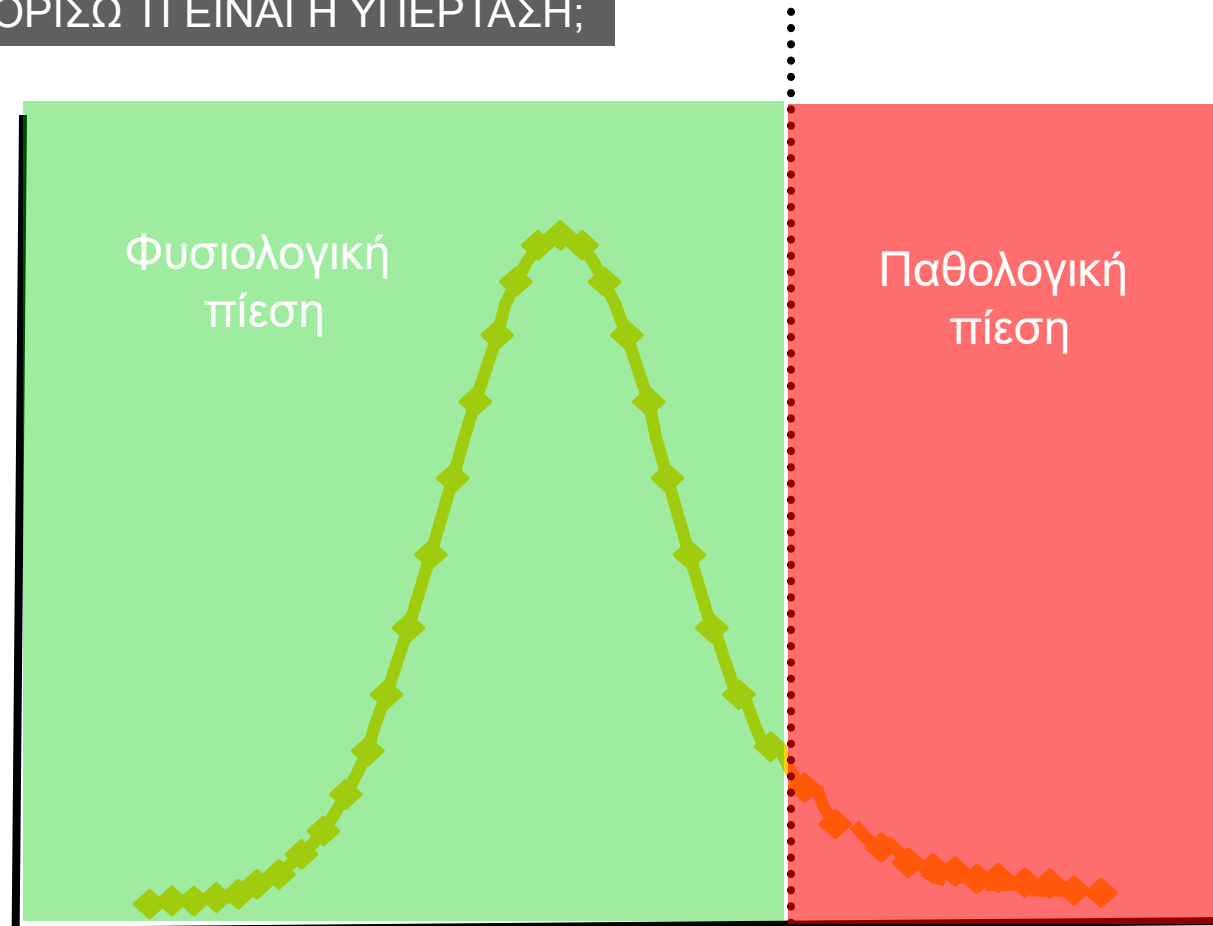


- Μέτρηση / επιβεβαίωση διάγνωσης
- Εκτίμηση συνολικού καρδιαγγειακού κινδύνου
- Βασικές αρχές θεραπείας



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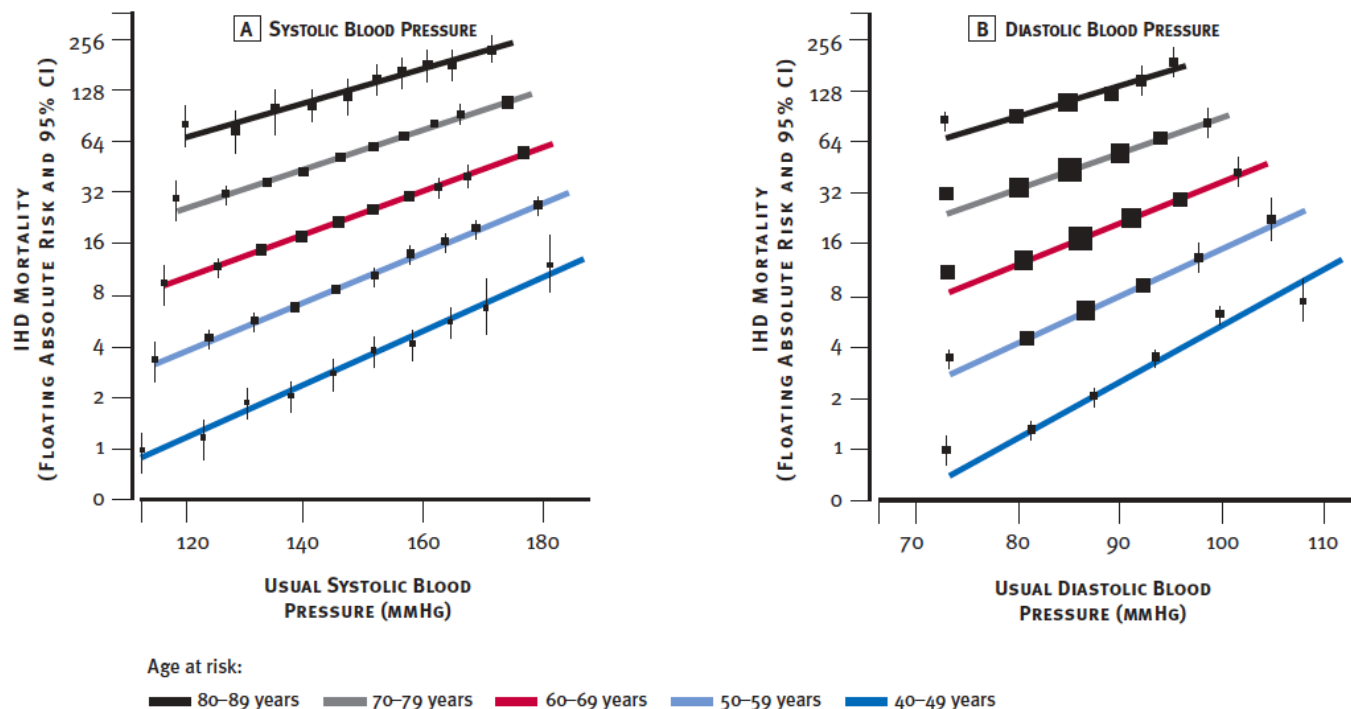
Διαστολική ή Συστολική Πίεση



Lewington S et al. Lancet 2002

## Αρτηριακή υπέρταση / επιδημιολογία & καρδιαγγειακός κίνδυνος

**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).



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|                 | ΟΦΕΛΟΣ                                                                                                                                                                             | ΚΟΣΤΟΣ                                                                                                                                                                             |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ΔΡΑΣΗ</b>    | <ul style="list-style-type: none"><li>- ΚΑ νοσηρότητα</li><li>- Οικονομική επιβάρυνση</li></ul>                                                                                    | <ul style="list-style-type: none"><li>- Ψυχολογική επιβάρυνση «ασθενούς»</li><li>- Αλλαγή ποιότητας ζωής</li><li>- Κίνδυνοι από θεραπεία</li><li>- Οικονομική επιβάρυνση</li></ul> |
| <b>ΜΗ ΔΡΑΣΗ</b> | <ul style="list-style-type: none"><li>- Ψυχολογική επιβάρυνση «ασθενούς»</li><li>- Αλλαγή ποιότητας ζωής</li><li>- Κίνδυνοι από θεραπεία</li><li>- Οικονομική επιβάρυνση</li></ul> | <ul style="list-style-type: none"><li>- ΚΑ νοσηρότητα</li><li>- Οικονομικής επιβάρυνση</li></ul>                                                                                   |



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| Other risk factors,<br>asymptomatic organ damage<br>or disease | Blood pressure (mmHg)                      |                                           |                                             |                                       |
|----------------------------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------|---------------------------------------|
|                                                                | High normal<br>SBP 130–139<br>or DBP 85–89 | Grade 1 HT<br>SBP 140–159<br>or DBP 90–99 | Grade 2 HT<br>SBP 160–179<br>or DBP 100–109 | Grade 3 HT<br>SBP ≥180<br>or DBP ≥110 |

In conclusion, it might be appropriate to use a classification of blood pressure without the term “hypertension”. However, this has been retained in Table 1 for practical reasons and with the reservation that the real threshold for hypertension must be considered as flexible, being higher or lower based on the total cardiovascular risk of each

BP = blood pressure; CKD = chronic kidney disease; CV = cardiovascular; CVD = cardiovascular disease; DBP = diastolic blood pressure; HT = hypertension; OD = organ damage; RF = risk factor; SBP = systolic blood pressure.

**FIGURE 1** Stratification of total CV risk in categories of low, moderate, high and very high risk according to SBP and DBP and prevalence of RFs, asymptomatic OD, diabetes, CKD stage or symptomatic CVD. Subjects with a high normal office but a raised out-of-office BP (masked hypertension) have a CV risk in the hypertension range. Subjects with a high office BP but normal out-of-office BP (white-coat hypertension), particularly if there is no diabetes, OD, CVD or CKD, have lower risk than sustained



## Αρτηριακή υπέρταση / ορισμός / κόστος - όφελος

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

Geoffrey Rose, 1971



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Whelton PK, et al.

2017 High Blood Pressure Clinical Practice Guideline

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

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  $\geq 2$  careful readings obtained on  $\geq 2$  occasions, as detailed in Section 4); DBP, diastolic blood pressure; and SBP systolic blood pressure.



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**Table 2. Changes in blood pressure classification**

| JNC 6 CATEGORY |                 | JNC 7 CATEGORY    |
|----------------|-----------------|-------------------|
|                | SBP/DBP         |                   |
| OPTIMAL        | <120/80         | → NORMAL          |
| NORMAL         | 120–129/80–84   | → PREHYPERTENSION |
| BORDERLINE     | 130–139/85–89   | → HYPERTENSION    |
| HYPERTENSION   | ≥140/90         | → STAGE 1         |
| STAGE 1        | 140–159/90–99   | → STAGE 2         |
| STAGE 2        | 160–179/100–109 |                   |
| STAGE 3        | ≥180/110        |                   |

DBP, diastolic blood pressure; JNC, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; SBP, systolic blood pressure

Sources: The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Arch Intern Med 1997;157:2413–46.

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. JAMA 2003;289:2560–71.



## 3.2 Classification of hypertension

The classification of office BP and definition of hypertension grades also remain the same from previous guidelines (Table 1).

**TABLE 1. Classification of office BP and definitions of hypertension grades**

| 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 <sup>a</sup>  | ≥140            | and    | <90              |
| Isolated diastolic hypertension <sup>a</sup> | <140            | and    | ≥90              |

The BP category is defined by the highest level of BP, whether systolic or diastolic.

<sup>a</sup>Isolated systolic or diastolic hypertension is graded 1, 2 or 3 according to SBP and DBP values in the ranges indicated. The same classification is used for adolescents ≥16 years old (see Section 15.1).



ESC: 2024 guidelines on HTN



## Blood pressure classification

| Non-elevated<br>blood pressure                                                                 | Elevated<br>blood pressure                                                                                    | Hypertension                                                                                       |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>Office BP</b><br>SBP <120 mmHg<br>and<br>DBP <70 mmHg                                       | <b>Office BP</b><br>SBP 120–139 mmHg<br>or<br>DBP 70–89 mmHg                                                  | <b>Office BP</b><br>SBP ≥140 mmHg<br>or<br>DBP ≥90 mmHg                                            |
| <b>HBPM</b><br>SBP <120 mmHg<br>and<br>DBP <70 mmHg                                            | <b>HBPM</b><br>SBP 120–134 mmHg<br>or<br>DBP 70–84 mmHg                                                       | <b>HBPM</b><br>SBP ≥135 mmHg<br>or<br>DBP ≥85 mmHg                                                 |
| <b>ABPM</b><br>Daytime SBP <120 mmHg<br>and<br>Daytime DBP <70 mmHg                            | <b>ABPM</b><br>Daytime SBP 120–134 mmHg<br>or<br>Daytime DBP 70–84 mmHg                                       | <b>ABPM</b><br>Daytime SBP ≥135 mmHg<br>or<br>Daytime DBP ≥85 mmHg                                 |
| Insufficient evidence confirming<br>the efficacy and safety of BP<br>pharmacological treatment | Risk stratify to identify<br>individuals with high<br>cardiovascular risk for BP<br>pharmacological treatment | Cardiovascular risk is<br>sufficiently high to merit<br>BP pharmacological<br>treatment initiation |

The diagnosis of hypertension and elevated BP requires confirmation using out-of-office measurements (HBPM or ABPM) or at least one additional subsequent office measurement



### 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.<br><br>Stage 1: Uncomplicated hypertension without HMOD, diabetes, CVD and without CKD $\geq$ stage 3.<br><br>Stage 2: Presence of HMOD, diabetes, or CKD stage 3.<br><br>Stage 3: Presence of CVD or CKD stage 4 or 5. | I   | C   |



*ESH: 2023 practice guidelines on HTN*

Office BP

VS

out of office  
BP

## 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 ( $\geq 180/110$ 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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**Table 3** New recommendations

| Recommendations                                                                                                                                                                                                                                                                                                                                                                                    | Class <sup>a</sup> | Level <sup>b</sup> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| <b>5. Measuring blood pressure</b>                                                                                                                                                                                                                                                                                                                                                                 |                    |                    |
| It is recommended to measure BP using a validated and calibrated device, to enforce the correct measurement technique, and to apply a consistent approach to BP measurement for each patient                                                                                                                                                                                                       | I                  | B                  |
| Out-of-office BP measurement is recommended for diagnostic purposes, particularly because it can detect both white-coat hypertension and masked hypertension. Where out-of-office measurements are not logistically and/or economically feasible, then it is recommended that the diagnosis be confirmed with a repeat office BP measurement using the correct standardized measurement technique. | I                  | B                  |
| Most automated oscillometric monitors have not been validated for BP measurement in AF; BP measurement should be considered using a manual auscultatory method in these circumstances, where possible.                                                                                                                                                                                             | IIa                | C                  |
| An assessment for orthostatic hypotension ( $\geq 20$ systolic BP and/or $\geq 10$ diastolic BP mmHg drop at 1 and/or 3 min after standing) should be considered at least at the initial diagnosis of elevated BP or hypertension and thereafter if suggestive symptoms arise. This should be performed after the patient is first lying or sitting for 5 min.                                     | IIa                | C                  |



*ESC: 2024 guidelines on HTN*

*ESH: 2023 practice guidelines on HTN*

Office BP

Office BP

VS

VS

out of office  
BP

out of office  
BP



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Είναι αξιόπιστα τα ηλεκτρονικά πιεσόμετρα του καρπού;

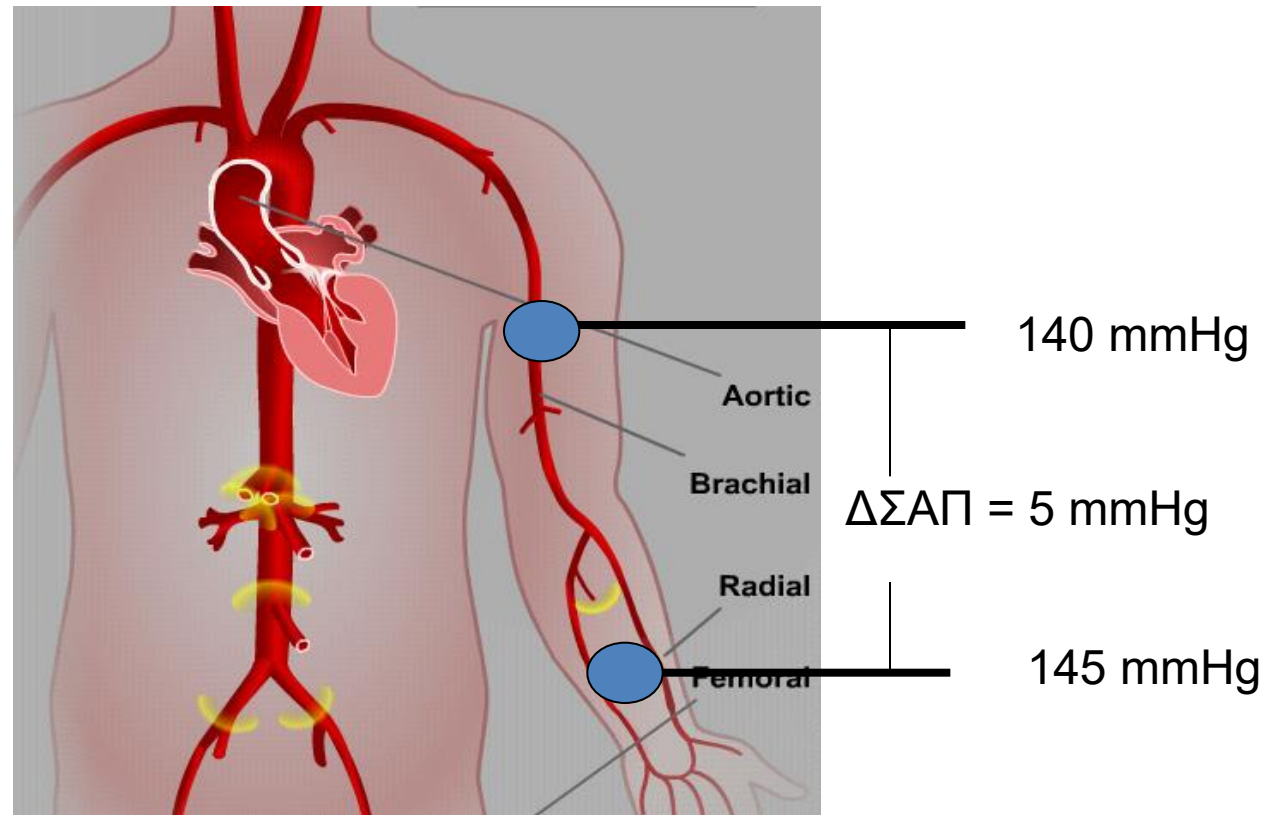


30% των ατόμων είχαν διαφορά  
>10 mmHg ανάμεσα στη πίεση  
που μετρήθηκε στον βραχίονα  
και στον καρπό



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Blood Pressure Monitors - Validations, Papers and Reviews



[http://www.dableducational.org/sphygmomanometers/devices\\_2\\_sbpm.html#ArmTable](http://www.dableducational.org/sphygmomanometers/devices_2_sbpm.html#ArmTable)

**STRIDE BP**

<https://www.stridebp.org>



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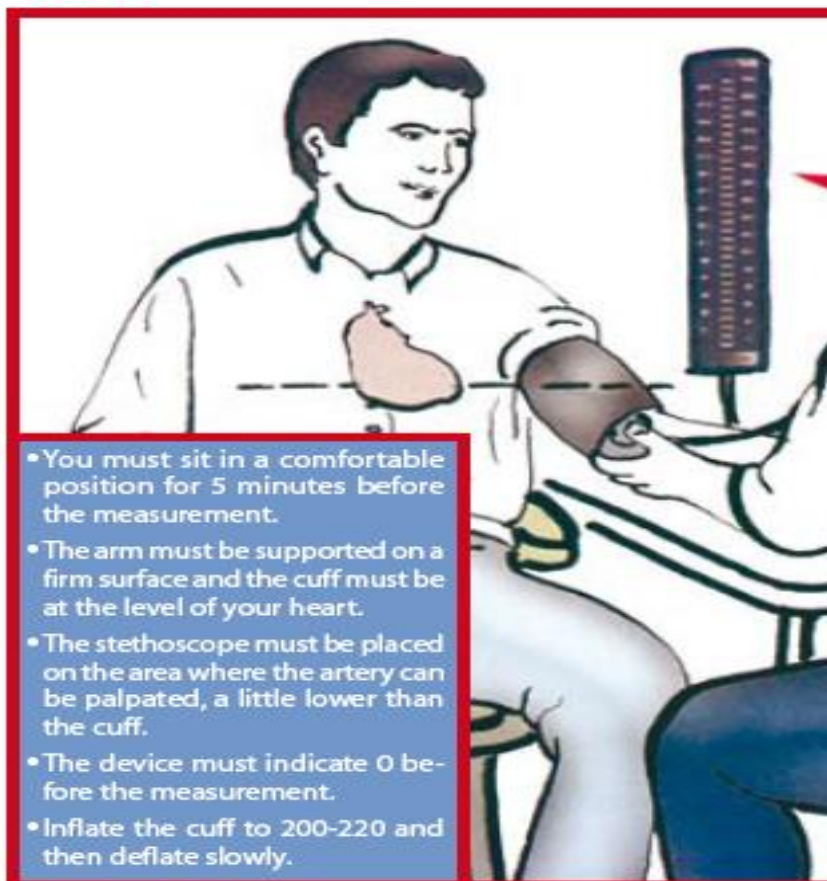




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**Figure 1.** Technique of blood pressure measurement using a stethoscope.



- You must sit in a comfortable position for 5 minutes before the measurement.
- The arm must be supported on a firm surface and the cuff must be at the level of your heart.
- The stethoscope must be placed on the area where the artery can be palpated, a little lower than the cuff.
- The device must indicate 0 before the measurement.
- Inflate the cuff to 200-220 and then deflate slowly.

Σε καθιστή θέση  
τουλάχιστον για 5 λεπτά

Ήσυχο περιβάλλον

Αποφυγή καπνίσματος,  
καφέ για 30 λεπτά

Το χέρι (ο βραχίονας) στο  
ύψος της καρδιάς

2-3 μετρήσεις με  
μεσοδιάστημα 1 λεπτού

ΣΠ: εμφάνιση ρυθμικού  
ήχου/ ΔΠ: εξαφάνιση  
ρυθμικού ήχου

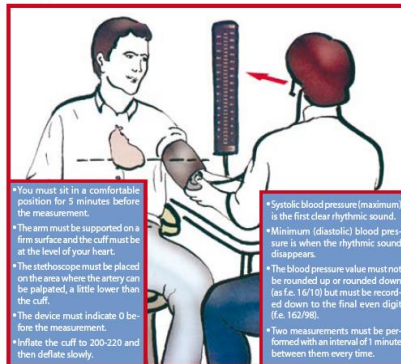


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ΕΙΝΑΙ «ΑΞΙΟΠΙΣΤΕΣ» ΟΙ ΜΕΤΡΗΣΕΙΣ ΤΗΣ ΠΙΕΣΗΣ ΣΤΟ ΙΑΤΡΕΙΟ;

## “USUAL” blood pressure

Figure 1. Technique of blood pressure measurement using a stethoscope.



ΙΑΤΡΕΙΟ



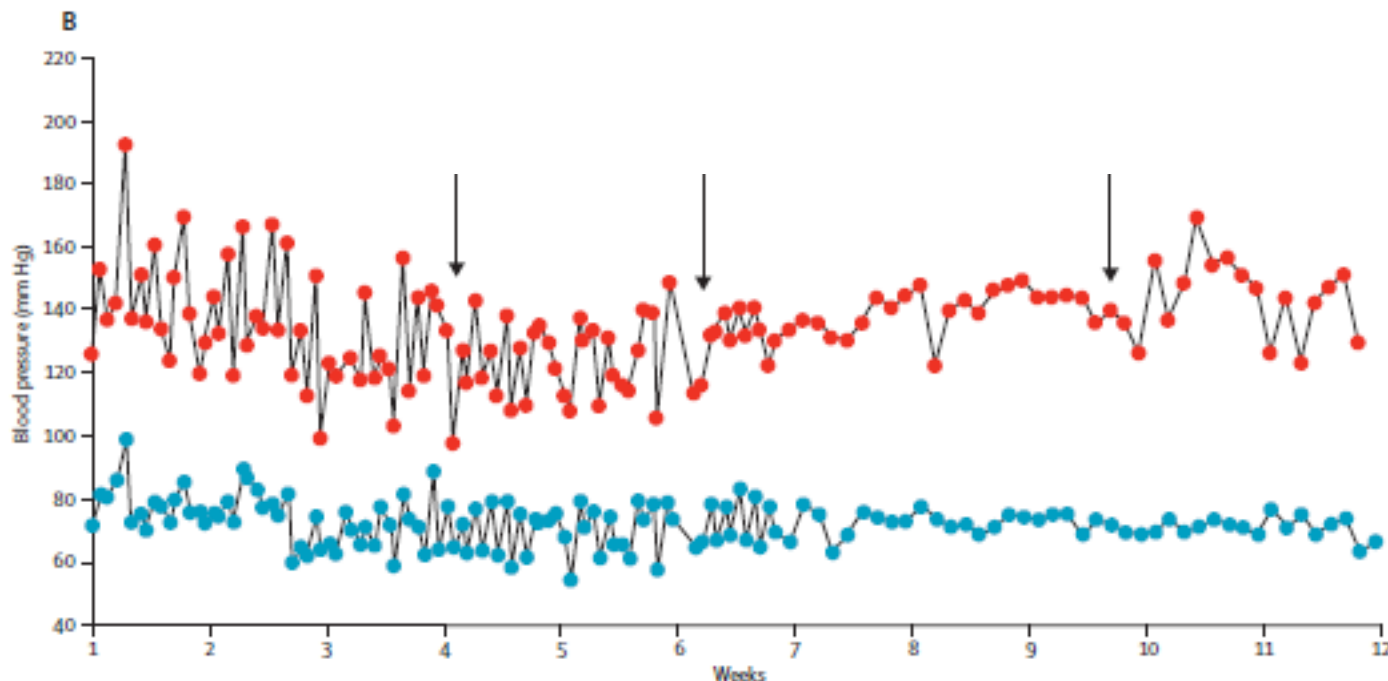
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ΜΕΤΑΒΛΗΤΟΤΗΤΑ ΤΗΣ ΠΙΕΣΗΣ: ΠΑΡΑΓΟΝΤΑΣ ΚΙΝΔΥΝΟΥ Ή ΑΠΛΩΣ ΠΑΡΑΓΟΝΤΑΣ ΠΟΥ ΔΥΣΚΟΛΕΥΕΙ ΤΗ ΣΩΣΤΗ ΔΙΑΓΝΩΣΗ ΤΗΣ ΥΠΕΡΤΑΣΗΣ;

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

Peter M Rothwell

Oxford Vascular Study



Lancet 2010

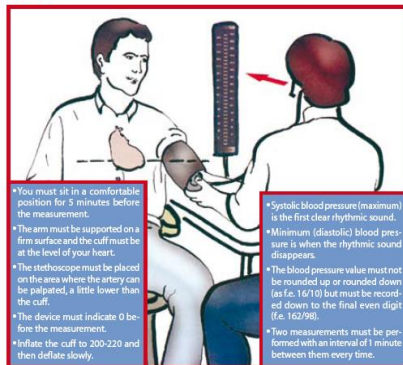


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ΕΙΝΑΙ «ΑΞΙΟΠΙΣΤΕΣ» ΟΙ ΜΕΤΡΗΣΕΙΣ ΤΗΣ ΠΙΕΣΗΣ ΣΤΟ ΙΑΤΡΕΙΟ;

## “USUAL” blood pressure

Figure 1. Technique of blood pressure measurement using a stethoscope.



ΙΑΤΡΕΙΟ



24ΩΡΗ ΚΑΤΑΓΡΑΦΗ  
ABPM



ΚΑΤΑΓΡΑΦΗ ΣΤΟ ΣΠΙΤΙ  
HBPM



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ΠΩΣ ΜΠΟΡΩ ΝΑ ΒΟΗΘΗΣΩ ΣΤΗ ΣΩΣΤΗ ΔΙΑΓΝΩΣΗ ΤΗΣ ΥΠΕΡΤΑΣΗΣ;

Προτεινόμενο από την ESH πρόγραμμα μετρήσεων της πίεσης στο σπίτι

Table 2 Home blood pressure monitoring schedule in outcome studies

Home blood pressure monitoring schedule

Number of patients

Days

Morning readings

Evening readings

Total readings

OPTIMAL

7

2

2

28

Figure 2. A form for reporting blood pressure at home (from the Hypertension Center, Third Department of Medicine, University of Athens, Sotiria Hospital, Athens, Greece)

**HYPERTENSION CENTER – STRIDE HELLAS-7**  
Third Department of Medicine, University of Athens, "Sotiria" Hospital,  
133 Mesogeion Ave., 11527 Athens, Greece. Tel: +30 2107703117, Fax: +30 2107719981

**BLOOD PRESSURE MONITORING AT HOME**

NAME: \_\_\_\_\_ DATE OF BIRTH: \_\_\_\_/\_\_\_\_/\_\_\_\_ DEVICE: \_\_\_\_\_

| 1 <sup>ST</sup> DAY | TIME                    | SYSTOLIC-DIASTOLIC (PULSE) |
|---------------------|-------------------------|----------------------------|
| ____/____/2000      | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
| 2 <sup>ND</sup> DAY | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
| 3 <sup>RD</sup> DAY | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
| 4 <sup>TH</sup> DAY | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
| 5 <sup>TH</sup> DAY | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
| 6 <sup>TH</sup> DAY | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
| 7 <sup>TH</sup> DAY | MORNING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |
|                     | EVENING 1 <sup>st</sup> | ____/____ (____)           |
|                     | 2 <sup>nd</sup>         | ____/____ (____)           |

**BEFORE MEASURING READ CAREFULLY THESE INSTRUCTIONS**

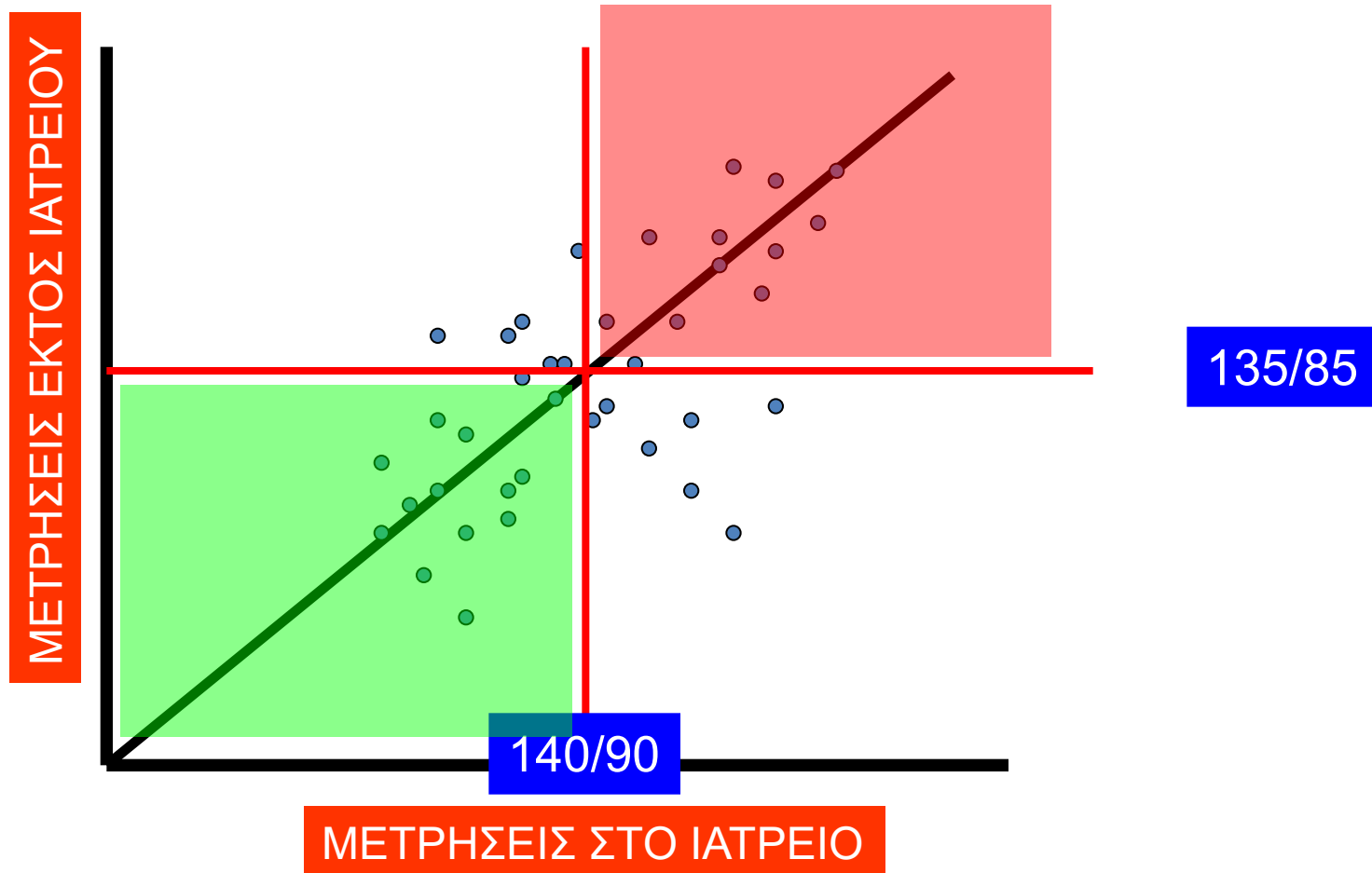
- Measurements for 7 routine work days.
- Morning 6-9 a.m. (before pill taking) and evening 6-9 p.m.
- After 5 minutes sitting rest.
- 2 measurements each time with an interval of 1 minute.
- Exclude the first day and calculate the average of all measurements.

Μέσος όρος ΣΑΠ/ΔΑΠ



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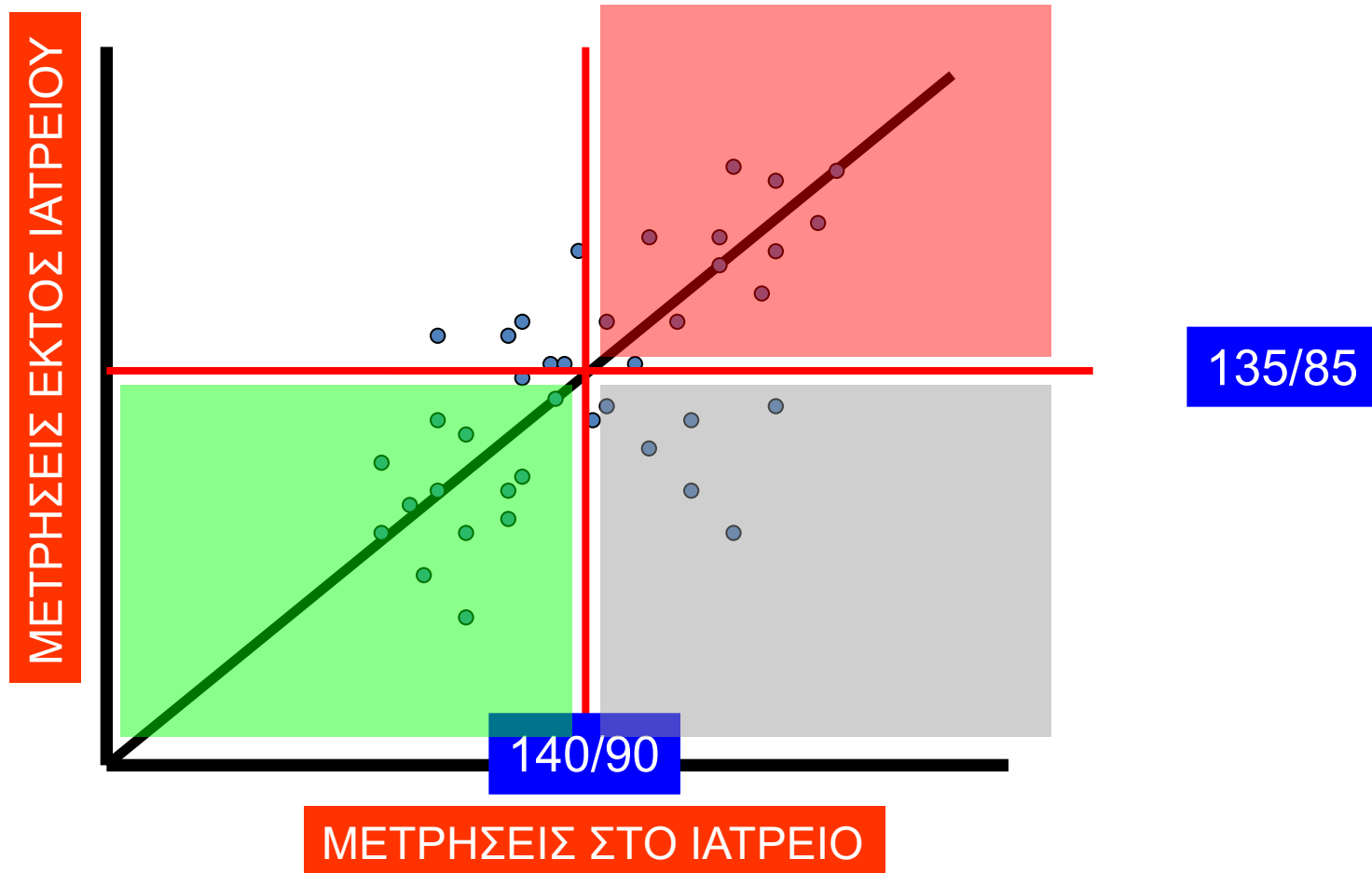
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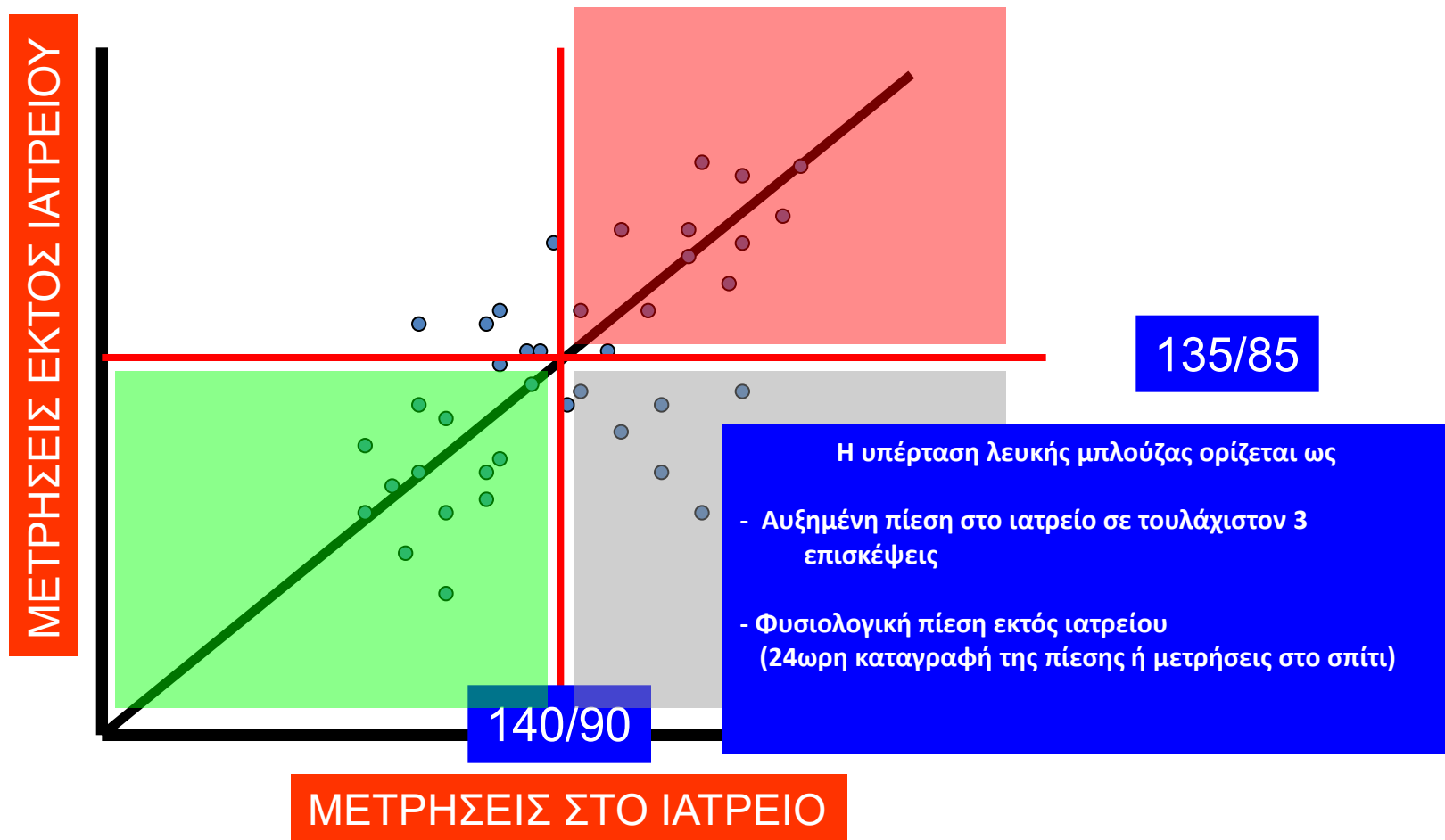
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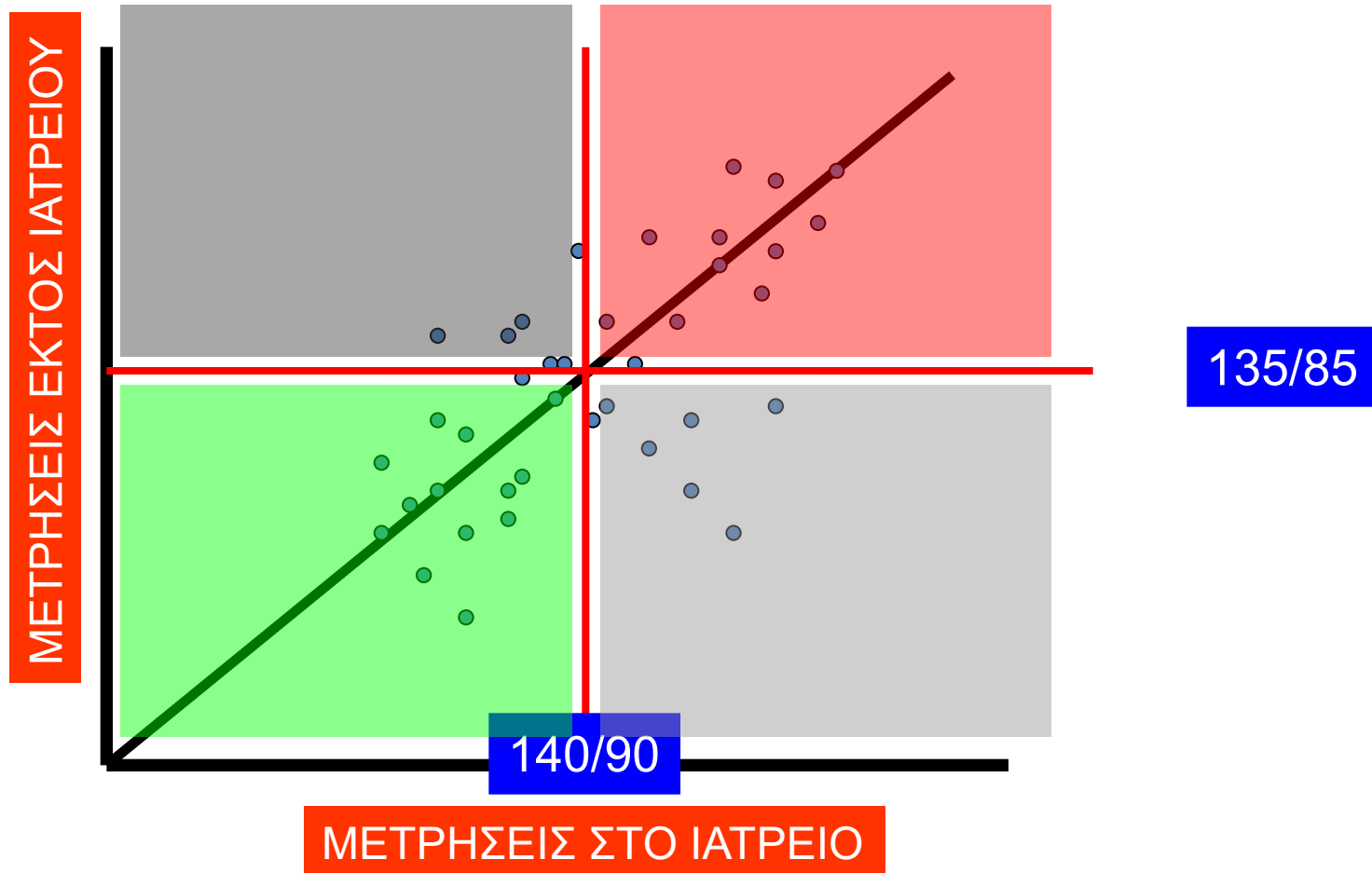
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## ΔΙΑΓΝΩΣΤΙΚΟΙ ΦΑΙΝΟΤΥΠΟΙ ΣΤΗΝ ΥΠΕΡΤΑΣΗ

Συγκαλυμμένη υπέρταση ορίζεται ως

- Αυξημένη πίεση εκτός ιατρείου  
(24ωρη καταγραφή της πίεσης ή μετρήσεις στο σπίτι)
- Φυσιολογική πίεση στο ιατρείο

Σε ειδικές ομάδες  
ασθενών μέχρι και  
1 στους 3  
με διάγνωση  
φυσιολογικής ΑΥ

Επιπολασμός 10-  
17%

135/85

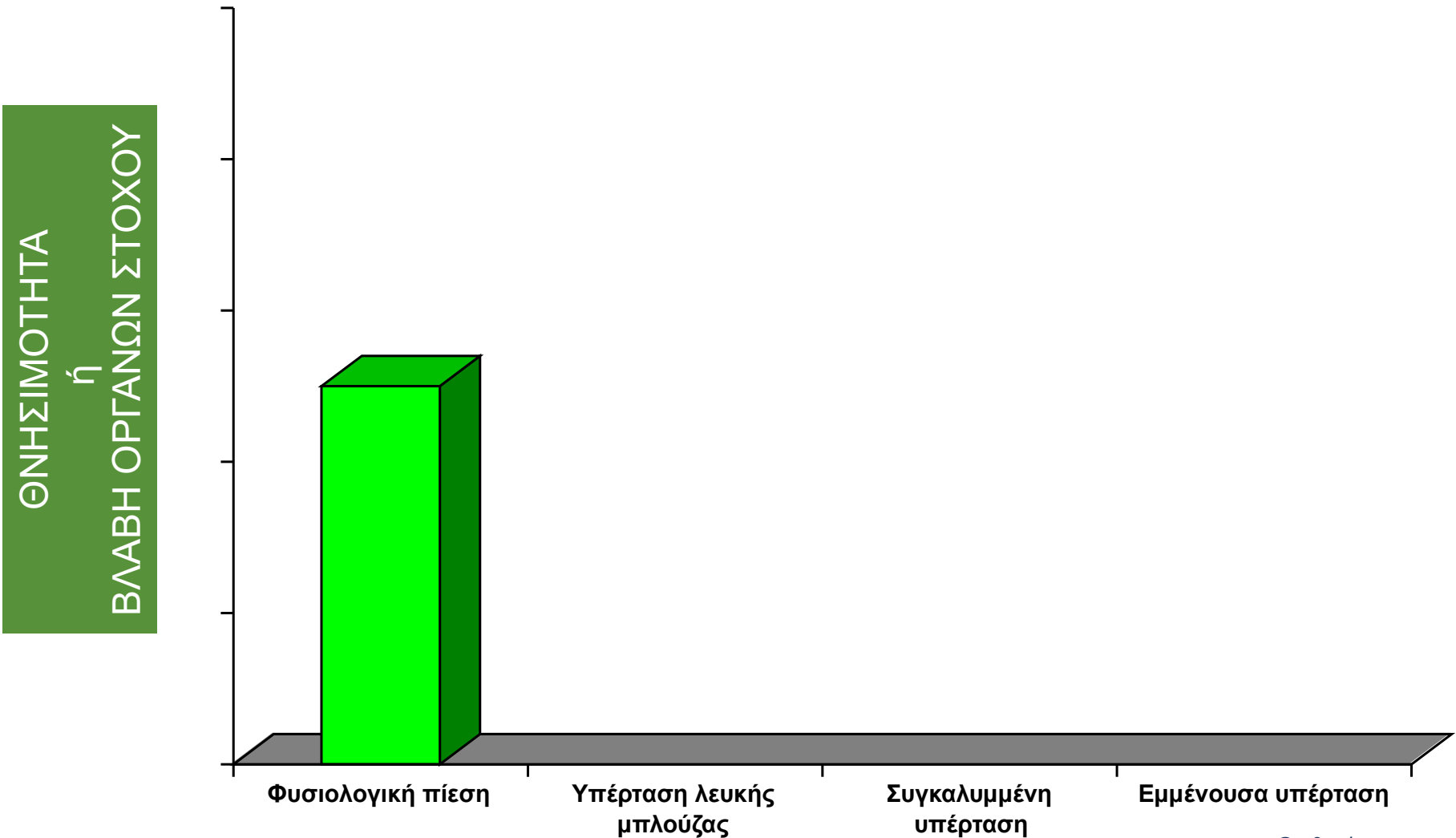
140/90

ΜΕΤΡΗΣΕΙΣ ΣΤΟ ΙΑΤΡΕΙΟ



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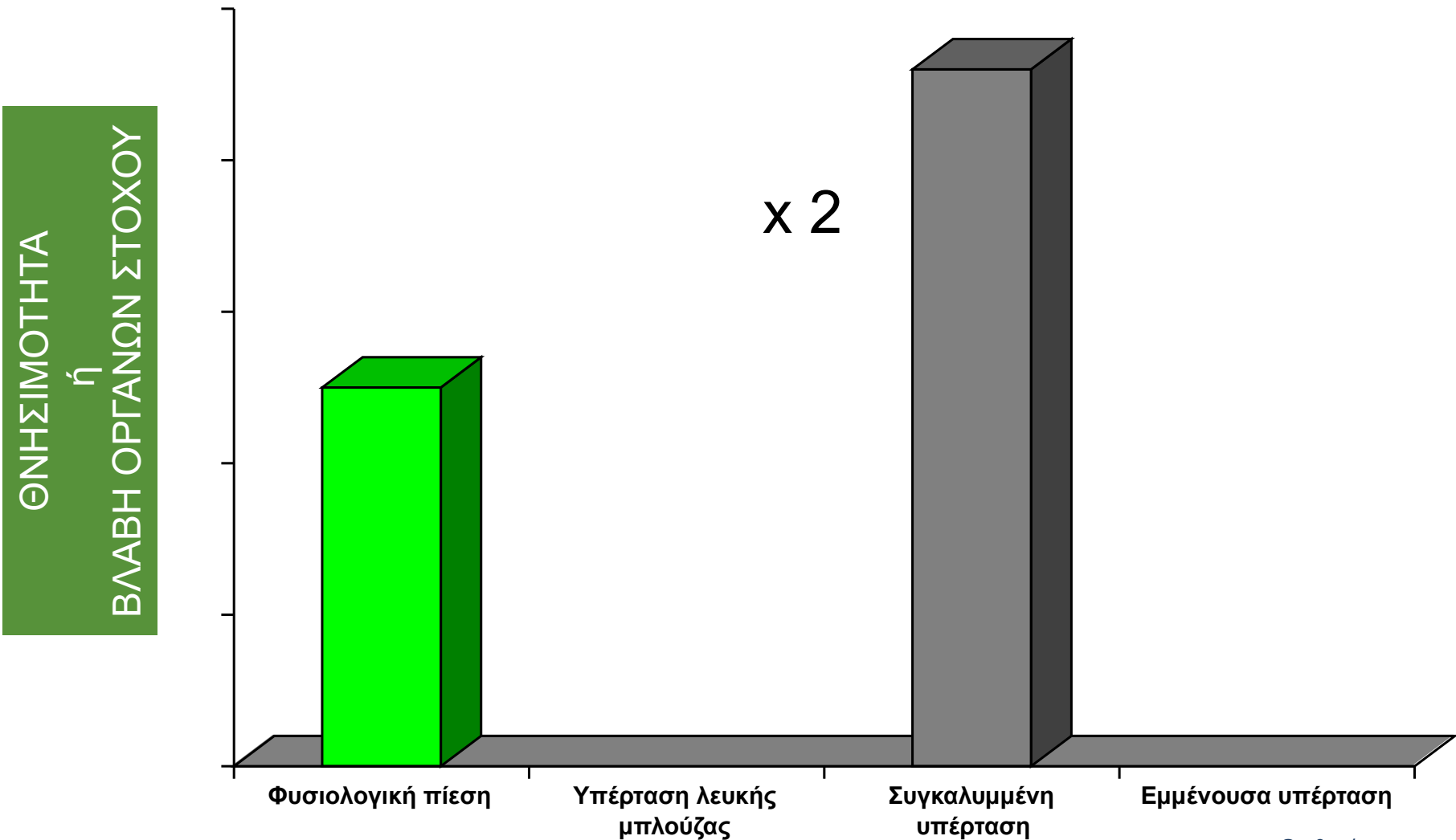
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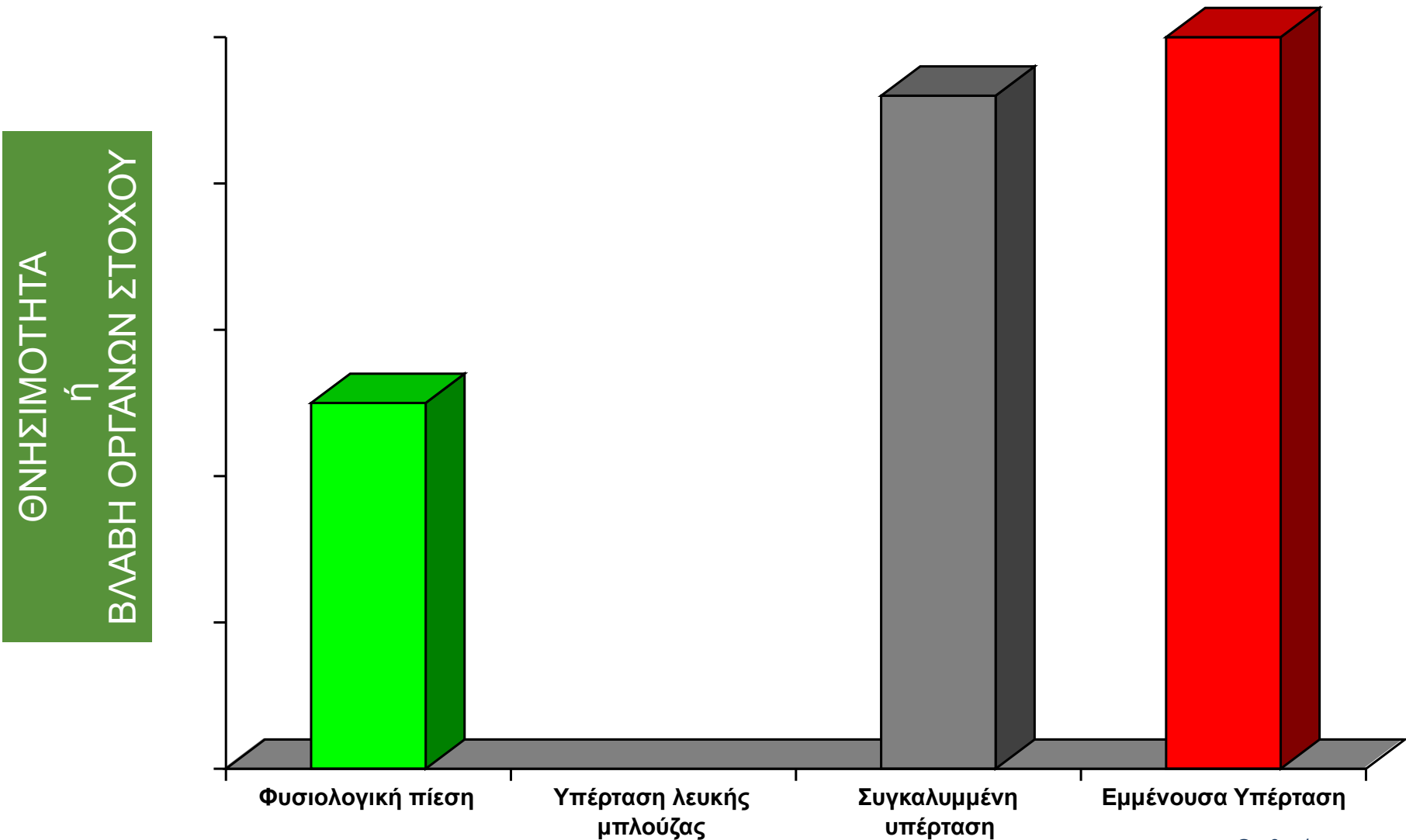
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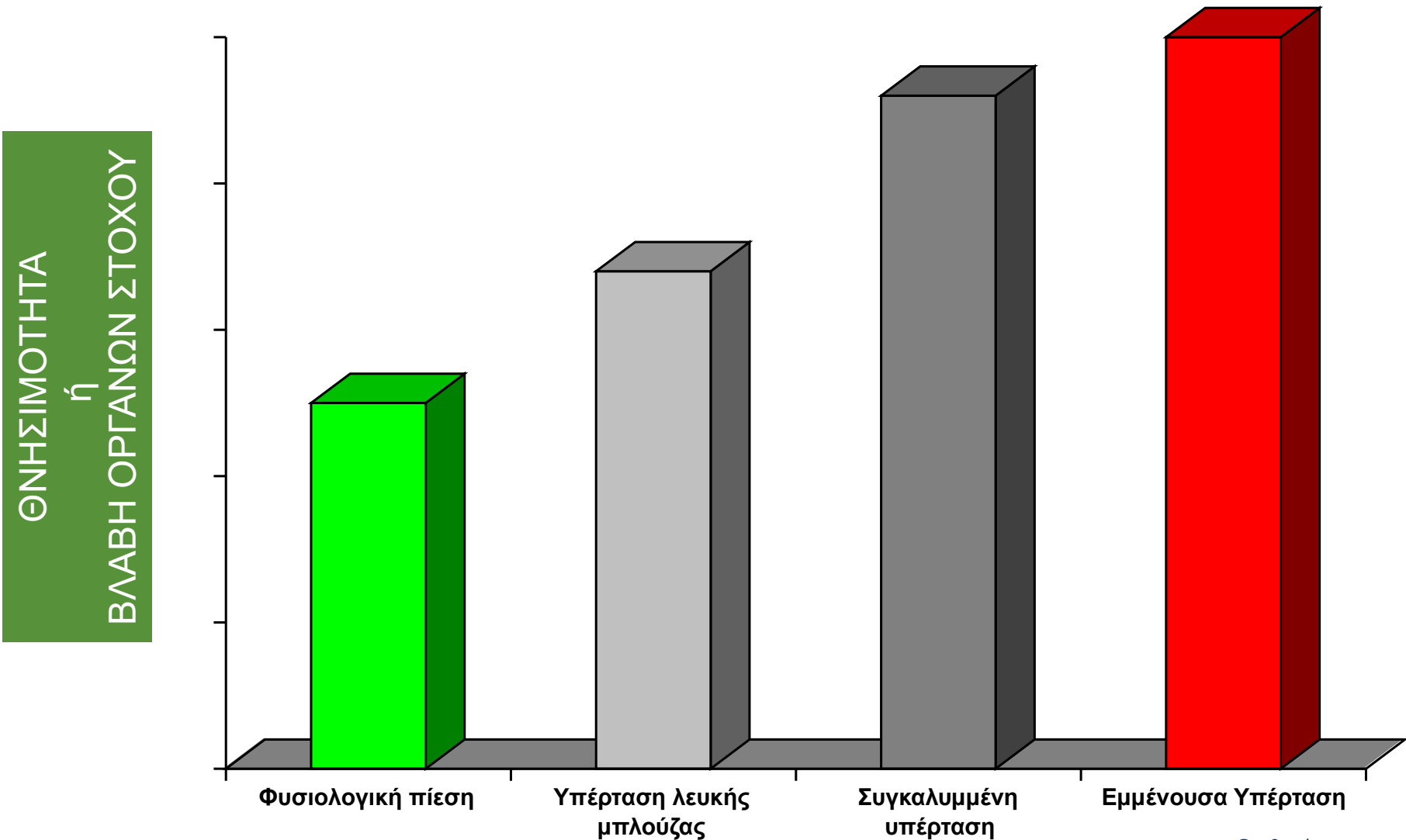
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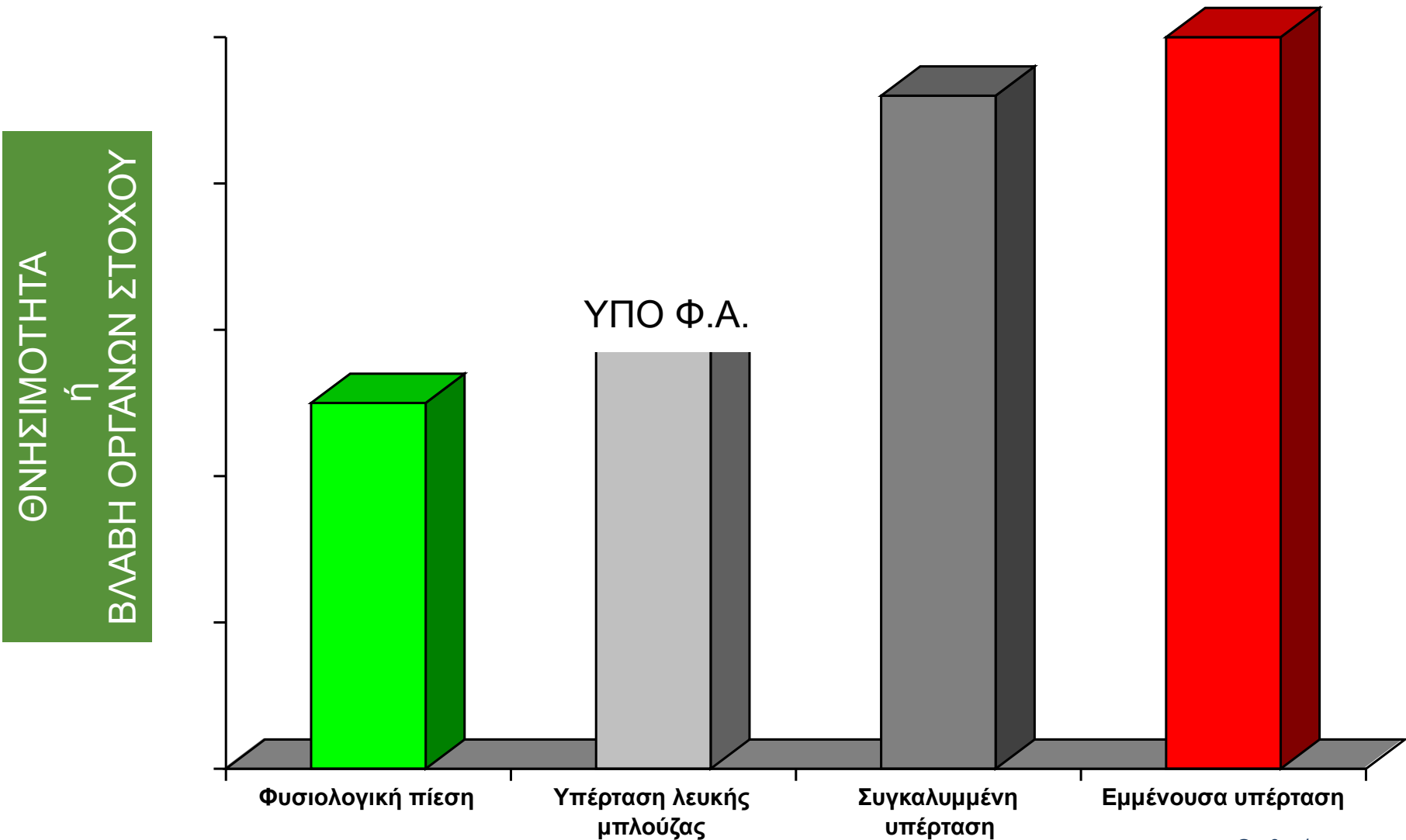
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ESC: 2024 guidelines on HTN

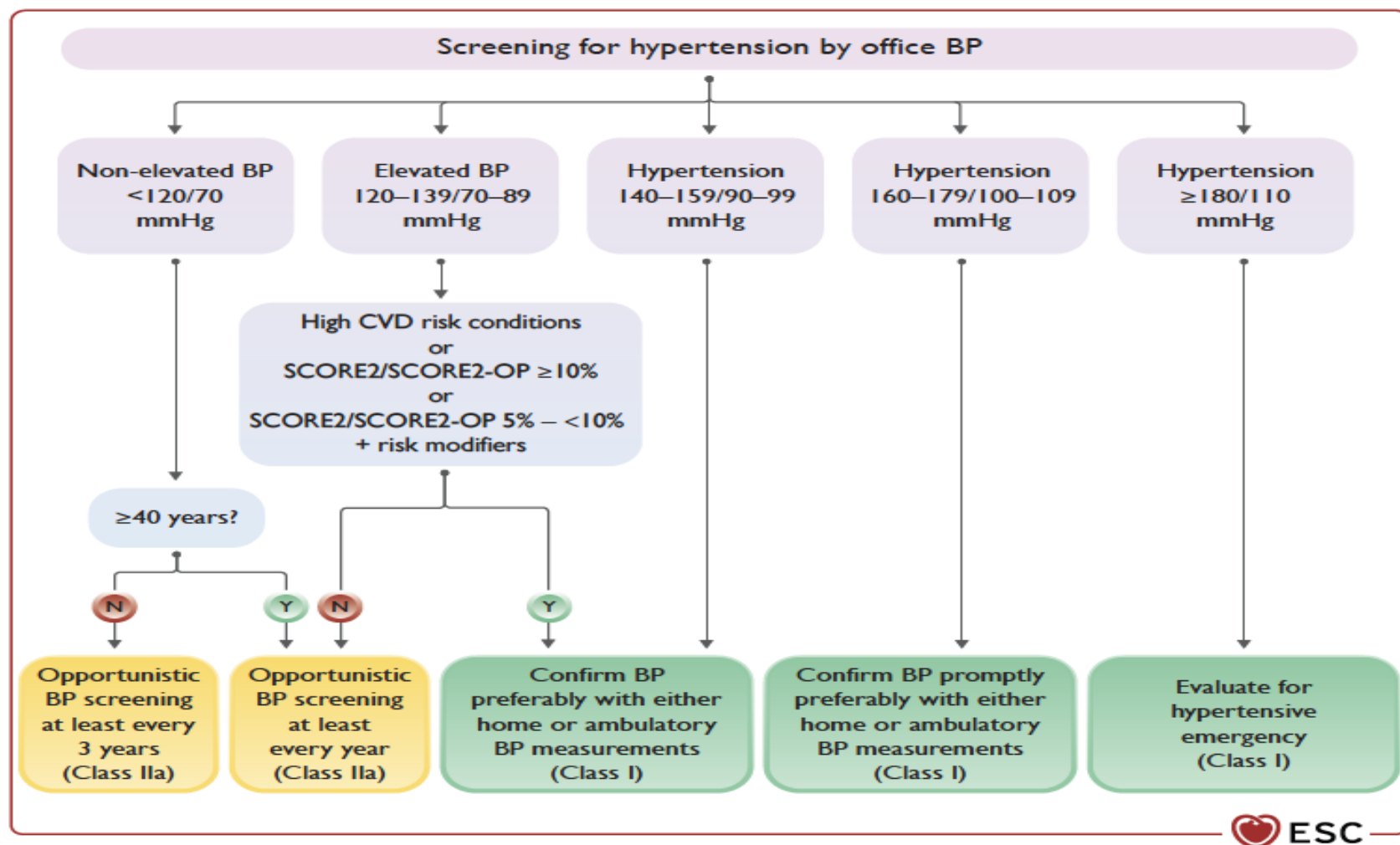


**Figure 10** Protocol for confirming hypertension diagnosis. BP, blood pressure; CVD, cardiovascular disease; SCORE2, Systematic COronary Risk Evaluation 2; SCORE2-OP, Systematic COronary Risk Evaluation 2–Older Persons.



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**TABLE 7. Clinical indications for out-of-office blood pressure measurement for diagnostic purposes**

| Clinical indications for HBPM or ABPM                                                                                |
|----------------------------------------------------------------------------------------------------------------------|
| • Suspicion of white-coat hypertension                                                                               |
| - Grade I hypertension in the office                                                                                 |
| - High office BP in individuals without asymptomatic organ damage and at low total CV risk                           |
| • Suspicion of masked hypertension                                                                                   |
| - High normal BP in the office                                                                                       |
| - Normal office BP in individuals with asymptomatic organ damage or at high total CV risk                            |
| • Identification of white-coat effect in hypertensive patients                                                       |
| • Considerable variability of office BP over the same or different visits                                            |
| • Autonomic, postural, post-prandial, siesta- and drug-induced hypotension                                           |
| • Elevated office BP or suspected pre-eclampsia in pregnant women                                                    |
| • Identification of true and false resistant hypertension                                                            |
| Specific indications for ABPM                                                                                        |
| • Marked discordance between office BP and home BP                                                                   |
| • Assessment of dipping status                                                                                       |
| • Suspicion of nocturnal hypertension or absence of dipping, such as in patients with sleep apnoea, CKD, or diabetes |
| • Assessment of BP variability                                                                                       |



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## ΕΙΝΑΙ ΑΧΡΗΣΤΗ Η ΜΕΤΡΗΣΗ ΤΗΣ ΠΙΕΣΗΣ ΣΤΟ ΙΑΤΡΕΙΟ;

**TABLE 5. Office blood pressure measurement**

| When measuring BP in the office, care should be taken:                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • To allow the patients to sit for 3–5 minutes before beginning BP measurements.                                                                                                                                    |
| • To take at least two BP measurements, in the sitting position, spaced 1–2 min apart, and additional measurements if the first two are quite different. Consider the average BP if deemed appropriate.             |
| • To take repeated measurements of BP to improve accuracy in patients with arrhythmias, such as atrial fibrillation.                                                                                                |
| • To use a standard bladder (12–13 cm wide and 35 cm long), but have a larger and a smaller bladder available for large (arm circumference >32 cm) and thin arms, respectively.                                     |
| • To have the cuff at the heart level, whatever the position of the patient.                                                                                                                                        |
| • When adopting the auscultatory method, use phase I and V (disappearance) Korotkoff sounds to identify systolic and diastolic BP, respectively.                                                                    |
| • To measure BP in both arms at first visit to detect possible differences. In this instance, take the arm with the higher value as the reference.                                                                  |
| • To measure at first visit BP 1 and 3 min after assumption of the standing position in elderly subjects, diabetic patients, and in other conditions in which orthostatic hypotension may be frequent or suspected. |
| • To measure, in case of conventional BP measurement, heart rate by pulse palpation (at least 30 s) after the second measurement in the sitting position.                                                           |

Εκτίμηση πίεσης και στα 2 χέρια

Εκτίμηση ορθοστατικής υπότασης



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ΕΙΝΑΙ «ΑΞΙΟΠΙΣΤΗ»;

ΕΙΝΑΙ ΧΡΗΣΙΜΗ;

Ίσως ο καλύτερος τρόπος «screening»

.....



**Σχήμα 1.** Ποσοστά διάγνωσης, θεραπείας και ρύθμισης της υπέρτασης σε μελέτες στην Ελλάδα.



ΕΙΝΑΙ «ΑΞΙΟΠΙΣΤΕΣ» ΟΙ ΜΕΤΡΗΣΕΙΣ ΤΗΣ ΠΙΕΣΗΣ ΣΤΟ ΦΑΡΜΑΚΕΙΟ;



ΠΟΙΟΣ ΜΠΟΡΕΙ ΝΑ ΕΙΝΑΙ Ο ΡΟΛΟΣ ΤΗΣ ΜΕΤΡΗΣΗΣ ΤΗΣ ΠΙΕΣΗΣ ΣΤΟ ΦΑΡΜΑΚΕΙΟ;

Ίσως ο καλύτερος τρόπος «screening»

.....

....δεν έχει όμως θέση στην οριστική  
διάγνωση της υπέρτασης.....



ΠΟΙΟΣ ΜΠΟΡΕΙ ΝΑ ΕΙΝΑΙ Ο ΡΟΛΟΣ ΤΗΣ ΜΕΤΡΗΣΗΣ ΤΗΣ ΠΙΕΣΗΣ ΣΤΟ ΦΑΡΜΑΚΕΙΟ;

Ίσως ο καλύτερος τρόπος «screening»

.....

....δεν έχει όμως θέση στην οριστική  
διάγνωση της υπέρτασης.....

....βοηθάει στην παρακολούθηση της  
φαρμακευτικής ανταπόκρισης των  
υπερτασικών....(υπό προϋποθέσεις)....

....βοηθάει στη διαχείριση της  
«επείγουσας» υπέρτασης....(υπό  
προϋποθέσεις)....



## ΥΠΕΡΤΑΣΗ

- Μέτρηση / επιβεβαίωση διάγνωσης
- Εκτίμηση συνολικού καρδιαγγειακού κινδύνου
- Βασικές αρχές θεραπείας



## ΠΩΣ ΕΚΤΙΜΑΤΑΙ Ο ΚΑΡΔΙΑΓΓΕΙΑΚΟΣ ΚΙΝΔΥΝΟΣ ΣΕ ΑΤΟΜΑ ΜΕ ΥΠΕΡΤΑΣΗ;

**Table 3** Classification of office blood pressure<sup>a</sup> and definitions of hypertension grade<sup>b</sup>

| 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 <sup>b</sup> | ≥140            | and    | <90              |



## ΠΩΣ ΕΚΤΙΜΑΤΑΙ Ο ΚΑΡΔΙΑΓΓΕΙΑΚΟΣ ΚΙΝΔΥΝΟΣ ΣΕ ΑΤΟΜΑ ΜΕ ΥΠΕΡΤΑΣΗ;

| Hypertension disease staging      | Other risk factors, HMOD, or disease                                  | BP (mmHg) grading                       |                                     |                                       |                                    |
|-----------------------------------|-----------------------------------------------------------------------|-----------------------------------------|-------------------------------------|---------------------------------------|------------------------------------|
|                                   |                                                                       | High normal<br>SBP 130-139<br>DBP 85-89 | Grade 1<br>SBP 140-159<br>DBP 90-99 | Grade 2<br>SBP 160-179<br>DBP 100-109 | Grade 3<br>SBP ≥180<br>or DBP ≥110 |
| Stage 1<br>(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<br>(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<br>(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.



ΠΟΙΟΙ ΕΙΝΑΙ ΟΙ ΠΑΡΑΓΟΝΤΕΣ ΚΙΝΔΥΝΟΥ ΠΟΥ ΠΡΕΠΕΙ ΝΑ ΣΥΝΕΚΤΙΜΗΘΟΥΝ;

| Risk factors                                                                                                 |
|--------------------------------------------------------------------------------------------------------------|
| Male sex                                                                                                     |
| Age (men $\geq 55$ years; women $\geq 65$ years)                                                             |
| Smoking                                                                                                      |
| Dyslipidaemia                                                                                                |
| Total cholesterol $> 4.9$ mmol/L (190 mg/dL), and/or                                                         |
| Low-density lipoprotein cholesterol $> 3.0$ mmol/L (115 mg/dL), and/or                                       |
| High-density lipoprotein cholesterol: men $< 1.0$ mmol/L (40 mg/dL), women $< 1.2$ mmol/L (46 mg/dL), and/or |
| Triglycerides $> 1.7$ mmol/L (150 mg/dL)                                                                     |
| Fasting plasma glucose 5.6–6.9 mmol/L (102–125 mg/dL)                                                        |
| Abnormal glucose tolerance test                                                                              |
| Obesity [BMI $\geq 30$ kg/m <sup>2</sup> (height <sup>2</sup> )]                                             |
| Abdominal obesity (waist circumference: men $\geq 102$ cm; women $\geq 88$ cm) (in Caucasians)               |
| Family history of premature CVD (men aged $< 55$ years; women aged $< 65$ years)                             |

- ΦΥΛΟ
- ΗΛΙΚΙΑ
- ΚΑΠΝΙΣΜΑ
- ΛΙΠΙΔΙΑ
- ΓΛΥΚΟΖΗ
- ΠΑΧΥΣΑΡΚΙΑ
- ΚΛΗΡΟΝΟΜΙΚΟΤΗΤΑ



## ΠΩΣ ΕΚΤΙΜΑΤΑΙ Ο ΚΑΡΔΙΑΓΓΕΙΑΚΟΣ ΚΙΝΔΥΝΟΣ ΣΕ ΑΤΟΜΑ ΜΕ ΥΠΕΡΤΑΣΗ;

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very high risk | People with any of the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                | <p><b>Documented CVD, either clinical or unequivocal on imaging.</b></p> <ul style="list-style-type: none"> <li>• <b>Clinical CVD</b> includes acute myocardial infarction, acute coronary syndrome, coronary or other arterial revascularization, stroke, TIA, aortic aneurysm, and PAD</li> <li>• <b>Unequivocal documented CVD on imaging</b> includes significant plaque (i.e. <math>\geq 50\%</math> stenosis) on angiography or ultrasound; it does not include increase in carotid intima-media thickness</li> <li>• <b>Diabetes mellitus with target organ damage</b>, e.g. proteinuria or a with a major risk factor such as grade 3 hypertension or hypercholesterolaemia</li> <li>• <b>Severe CKD</b> (eGFR <math>&lt; 30</math> mL/min/1.73 m<sup>2</sup>)</li> <li>• <b>A calculated 10 year SCORE of <math>\geq 10\%</math></b></li> </ul> |
| High risk      | People with any of the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                | <ul style="list-style-type: none"> <li>• <b>Marked elevation of a single risk factor</b>, particularly cholesterol <math>&gt; 8</math> mmol/L (<math>&gt; 310</math> mg/dL), e.g. familial hypercholesterolaemia or grade 3 hypertension (BP <math>\geq 180/110</math> mmHg)</li> <li>• <b>Most other people with diabetes mellitus</b> (except some young people with type 1 diabetes mellitus and without major risk factors, who may be at moderate-risk)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  |
|                | Hypertensive LVH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                | Moderate CKD eGFR 30-59 mL/min/1.73 m <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                | A calculated 10 year SCORE of 5-10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Moderate risk  | <p>People with:</p> <ul style="list-style-type: none"> <li>• A calculated 10 year SCORE of <math>\geq 1</math> to <math>&lt; 5\%</math></li> <li>• Grade 2 hypertension</li> <li>• Many middle-aged people belong to this category</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Low risk       | <p>People with:</p> <ul style="list-style-type: none"> <li>• A calculated 10 year SCORE of <math>&lt; 1\%</math></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



ΟΙ ΕΞΕΤΑΣΕΙΣ «ΡΟΥΤΙΝΑΣ» Σ' ΕΝΑ ΑΤΟΜΟ ΜΕ ΥΠΕΡΤΑΣΗ ΕΙΝΑΙ ΠΟΛΥΠΛΟΚΕΣ;

| Routine laboratory tests                                                                                        |
|-----------------------------------------------------------------------------------------------------------------|
| Haemoglobin and/or haematocrit                                                                                  |
| Fasting blood glucose and glycated HbA <sub>1c</sub>                                                            |
| 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                                                                                                     |

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- ΑΙΜΑΤΟΚΡΙΤΗΣ
- ΓΛΥΚΟΖΗ, HbA<sub>1c</sub>
- ΛΙΠΙΔΙΑ
- ΚΑΛΙΟ
- ΝΑΤΡΙΟ
- ΟΥΡΙΚΟ ΟΞΥ
- ΚΡΕΑΤΙΝΙΝΗ/ eGFR
- ΓΕΝΙΚΗ ΟΥΡΩΝ/ ACR
- ΚΑΡΔΙΟΓΡΑΦΗΜΑ



ΠΡΕΠΕΙ ΝΑ ΓΙΝΟΥΝ ΕΞΕΤΑΣΕΙΣ ΓΙΑ ΝΑ ΒΡΕΘΕΙ Η «ΑΙΤΙΑ» ΤΗΣ ΥΠΕΡΤΑΣΗΣ;

**ΤΟ 95% ΤΩΝ ΑΤΟΜΩΝ ΜΕ ΥΠΕΡΤΑΣΗ ΕΧΟΥΝ «ΙΔΙΟΠΑΘΗ» ΥΠΕΡΤΑΣΗ**



ΥΠΑΡΧΟΥΝ ΠΙΟ ΕΙΔΙΚΕΣ ΕΞΕΤΑΣΕΙΣ ΠΟΥ ΒΟΗΘΟΥΝ ΣΤΗ ΔΙΑΣΤΡΩΜΑΤΩΣΗ ΤΟΥ ΚΑΡΔΙΑΓΓΕΙΑΚΟΥ ΚΙΝΔΥΝΟΥ ΣΕ ΑΤΟΜΑ ΜΕ ΥΠΕΡΤΑΣΗ;

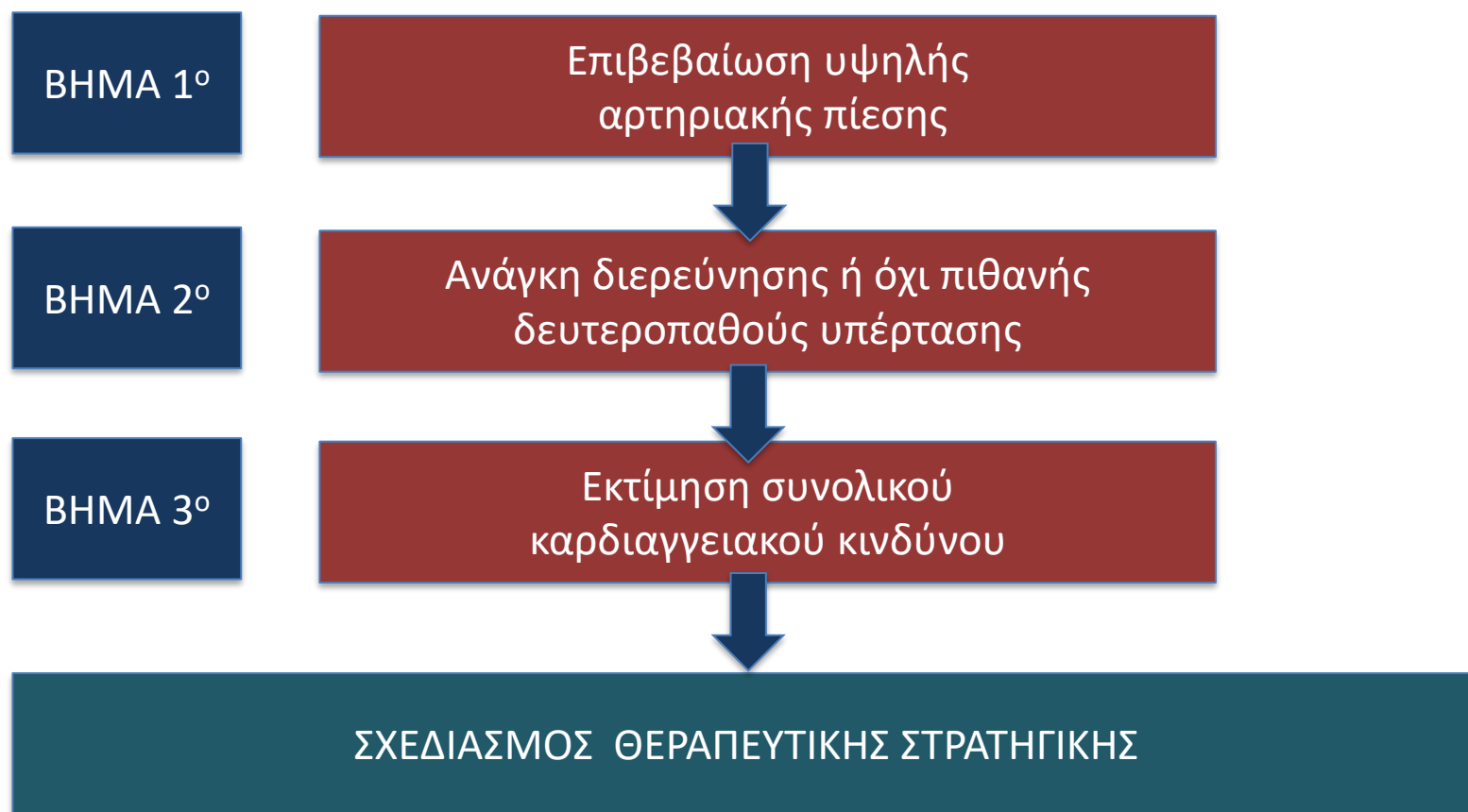
| Asymptomatic organ damage                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|
| Pulse pressure (in the elderly) $\geq 60$ mmHg                                                                                      |
| Electrocardiographic LVH (Sokolow-Lyon index $> 3.5$ mV; RaVL $> 1.1$ mV; Cornell voltage duration product $> 244$ mV*ms), or       |
| Echocardiographic LVH [LVM index: men $> 115$ g/m <sup>2</sup> ; women $> 95$ g/m <sup>2</sup> (BSA)] <sup>a</sup>                  |
| Carotid wall thickening (IMT $> 0.9$ mm) or plaque                                                                                  |
| Carotid-femoral PWV $> 10$ m/s                                                                                                      |
| Ankle-brachial index $< 0.9$                                                                                                        |
| CKD with eGFR 30–60 ml/min/1.73 m <sup>2</sup> (BSA)                                                                                |
| Microalbuminuria (30–300 mg/24 h), or albumin-creatinine ratio (30–300 mg/g; 3.4–34 mg/mmol) (preferentially on morning spot urine) |

## ΑΝΙΧΝΕΥΣΗ ΒΛΑΒΗΣ ΣΤΑ ΟΡΓΑΝΑ ΣΤΟΧΟΥΣ

- ΚΑΡΔΙΑ – υπερηχογράφημα (υπερτροφία)
- ΚΑΡΩΤΙΔΕΣ – υπερηχογράφημα (υπερτροφία/πλάκες)
- ΑΟΡΤΗ – τονομετρία (αρτηριοσκλήρυνση)
- ΜΑΤΙΑ - βυθοσκόπηση
- ΝΕΦΡΑ - λεύκωμα/μικροαλβουμινουρία
- ΑΡΤΗΡΙΕΣ ΤΩΝ ΚΑΤΩ ΑΚΡΩΝ



## Αρτηριακή υπέρταση / διάγνωση / διαγνωστικός αλγόριθμος





## ΥΠΕΡΤΑΣΗ

- Μέτρηση / επιβεβαίωση διάγνωσης
- Εκτίμηση συνολικού καρδιαγγειακού κινδύνου
- Βασικές αρχές θεραπείας



## ΠΡΕΠΕΙ Η ΦΑΡΜΑΚΕΥΤΙΚΗ ΑΓΩΓΗ ΝΑ ΑΡΧΙΖΕΙ ΑΜΕΣΑ;

Αρτηριακή υπέρταση / θεραπεία / θεραπευτικός στόχος / εξατομικευμένη θεραπεία/ μη φαρμακευτικά μέσα

Lifestyle interventions for patients with hypertension or high-normal BP

| Recommendations                                                                                                                                                                                                                                                                                                               | Class <sup>a</sup> | Level <sup>b</sup> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| Salt restriction to <5 g per day is recommended. <sup>248,250,255,258</sup>                                                                                                                                                                                                                                                   | I                  | A                  |
| It is recommended to restrict alcohol consumption to:<br>● Less than 14 units per week for men.<br>● Less than 8 units per week for women. <sup>35</sup>                                                                                                                                                                      | I                  | A                  |
| It is recommended to avoid binge drinking.                                                                                                                                                                                                                                                                                    | III                | C                  |
| Increased consumption of vegetables, fresh fruits, fish, nuts, and unsaturated fatty acids (olive oil); low consumption of red meat; and consumption of low-fat dairy products are recommended. <sup>262,265</sup>                                                                                                            | I                  | A                  |
| Body-weight control is indicated to avoid obesity (BMI >30 kg/m <sup>2</sup> or waist circumference >102 cm in men and >88 cm in women), as is aiming at healthy BMI (about 20–25 kg/m <sup>2</sup> ) and waist circumference values (<94 cm in men and <80 cm in women) to reduce BP and CV risk. <sup>262,271,273,290</sup> | I                  | A                  |
| Regular aerobic exercise (e.g. at least 30 min of moderate dynamic exercise on 5–7 days per week) is recommended. <sup>262,278,279</sup>                                                                                                                                                                                      | I                  | A                  |
| Smoking cessation, supportive care, and referral to smoking cessation programs are recommended. <sup>286,288,291</sup>                                                                                                                                                                                                        | I                  | B                  |

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- Αλάτι <5gr ημερησίως
- Περιορισμός αλκοόλ
- Δίαιτα DASH
- Σωματικό βάρος
- Άσκηση
- Διακοπή καπνίσματος



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**Table 14** Initiation of blood pressure-lowering treatment based on confirmed blood pressure category and cardiovascular disease risk

| Blood pressure (mmHg) | Non-elevated BP (<120/70)                                                     | Elevated BP (120/70 to 139/89)                                                                                                                                        |                                                                                                                                                                                                                                                                              | Hypertension ( $\geq 140/90$ )                                                                                          |
|-----------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Risk</b>           |                                                                               | (a) All adults with SBP 120–129 mmHg<br>(b) SBP 130–139 AND 10-year estimated CVD risk <10% AND no high-risk conditions or risk modifiers or abnormal risk tool tests | (a) SBP 130–139 AND high-risk conditions (e.g. established CVD, diabetes mellitus, CKD, FH or HMOD)<br>(b) SBP 130–139 AND 10-year estimated CVD risk $\geq 10\%$<br>(c) SBP 130–139 AND 10-year estimated CVD risk 5% - <10% AND risk modifiers or abnormal risk tool tests | Assumed all at sufficiently high risk to benefit from pharmacological treatment                                         |
| <b>Treatment</b>      | Lifestyle measures for prevention<br>Screen BP and CVD risk opportunistically | Lifestyle measures for treatment<br>Monitor BP and CVD risk yearly                                                                                                    | Lifestyle measures and pharmacological treatment (after 3-month delay).<br>Monitor BP yearly once treatment control is established                                                                                                                                           | Lifestyle measures and pharmacological treatment (immediate)<br>Monitor BP yearly once treatment control is established |
| <b>Target (mmHg)</b>  | <b>Maintain BP &lt;120/70</b>                                                 | <b>Aim BP 120–129/70–79 mmHg<sup>a</sup></b>                                                                                                                          |                                                                                                                                                                                                                                                                              |                                                                                                                         |

BP, blood pressure; CKD, chronic kidney disease; CVD, cardiovascular disease; DBP, diastolic blood pressure; FH, familial hypercholesterolaemia; HMOD, hypertension-mediated organ damage; SBP, systolic blood pressure.

<sup>a</sup>Caution in adults with orthostatic hypotension, moderate-to-severe frailty, limited life expectancy, and older patients (aged  $\geq 85$  years).



## ΠΟΙΕΣ ΕΙΝΑΙ ΟΙ ΒΑΣΙΚΕΣ ΘΕΡΑΠΕΥΤΙΚΕΣ ΑΡΧΕΣ ΣΤΗΝ ΥΠΕΡΤΑΣΗ;

- ❑ Καθορισμός πίεσης-στόχου



# Αρτηριακή υπέρταση / θεραπεία / θεραπευτικός στόχος / εξατομικευμένη θεραπεία / συνολικός καρδιαγγειακός κίνδυνος

## The New York Times

*Lower Blood Pressure  
Guidelines Could Be  
'Lifesaving,' Federal  
Study Says  
Sept. 2015*

THE NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Randomized Trial of Intensive versus  
Standard Blood-Pressure Control

The SPRINT Research Group\*

Nov. 2015

# Pharmacological blood pressure lowering for primary and secondary prevention of cardiovascular disease across different levels of blood pressure: an individual participant-level data meta-analysis

*The Blood Pressure Lowering Treatment Trialists' Collaboration\**

2021

**Findings** Data for 344716 participants from 48 randomised clinical trials were available for this analysis. Pre-randomisation mean systolic/diastolic blood pressures were 146/84 mm Hg in participants with previous cardiovascular disease (n=157728) and 157/89 mm Hg in participants without previous cardiovascular disease (n=186988). There was substantial spread in participants' blood pressure at baseline, with 31239 (19·8%) of participants with previous cardiovascular disease and 14928 (8·0%) of individuals without previous cardiovascular disease having a systolic blood pressure of less than 130 mm Hg. The relative effects of blood pressure-lowering



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ΠΟΙΑ ΕΙΝΑΙ ΤΑ ΕΠΙΠΕΔΑ ΠΙΕΣΗΣ ΠΟΥ ΠΡΕΠΕΙ ΝΑ ΕΠΙΤΕΥΧΘΟΥΝ ΜΕ ΤΗ ΘΕΡΑΠΕΙΑ;

**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                                 | + CAD                                              | + Stroke <sup>a</sup> /TIA                         |                                          |
| 18-65 years                              | Target to 130<br>or lower if tolerated<br>Not <120 | Target to 130<br>or lower if tolerated<br>Not <120 | Target to <140 to<br>130 if tolerated | Target to 130<br>or lower if tolerated<br>Not <120 | Target to 130<br>or lower if tolerated<br>Not <120 | 70-79                                    |
| 65-79 years <sup>b</sup>                 | Target to 130-139<br>if tolerated                  | Target to 130-139<br>if tolerated                  | Target to 130-139<br>if tolerated     | Target to 130-139<br>if tolerated                  | Target to 130-139<br>if tolerated                  | 70-79                                    |
| ≥80 years <sup>b</sup>                   | Target to 130-139<br>if tolerated                  | Target to 130-139<br>if tolerated                  | Target to 130-139<br>if tolerated     | Target to 130-139<br>if tolerated                  | Target to 130-139<br>if tolerated                  | 70-79                                    |
| Office DBP treatment target range (mmHg) | 70-79                                              | 70-79                                              | 70-79                                 | 70-79                                              | 70-79                                              |                                          |

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#### **8.3.1. Treatment strategy to reduce adverse cardiovascular disease outcomes**

The main goal of reducing BP is to prevent adverse CVD outcomes. The relative risk reduction afforded by a fixed degree of BP reduction is largely independent of pre-treatment BP.<sup>116</sup> There is a clear relationship between the intensity of BP lowering and the relative and absolute reduction in risk of CVD events for all adults, regardless of age (at least up to 85 years), sex, prior CVD, diabetes, or AF.<sup>116,131,443–445</sup> With this strong evidence for the 'the lower the better, but within reason' paradigm, decision rules are required for selecting patients most likely to benefit from treatment.<sup>172</sup> In this section, a summary of evidence for BP-lowering drug treatment is provided, followed by strategies for their use for preventing CVD.

Main GOAL: to reduce BP !!! No matter the drug !!

A fixed degree of BP reduction is associated with the same relative CVD risk reduction  
Independent of baseline (pre-treatment) BP level

The intensity of BP reduction is associated with relative or absolute CVD risk reduction for  
any age, sex, prior presence of CVD or diabetes or AF



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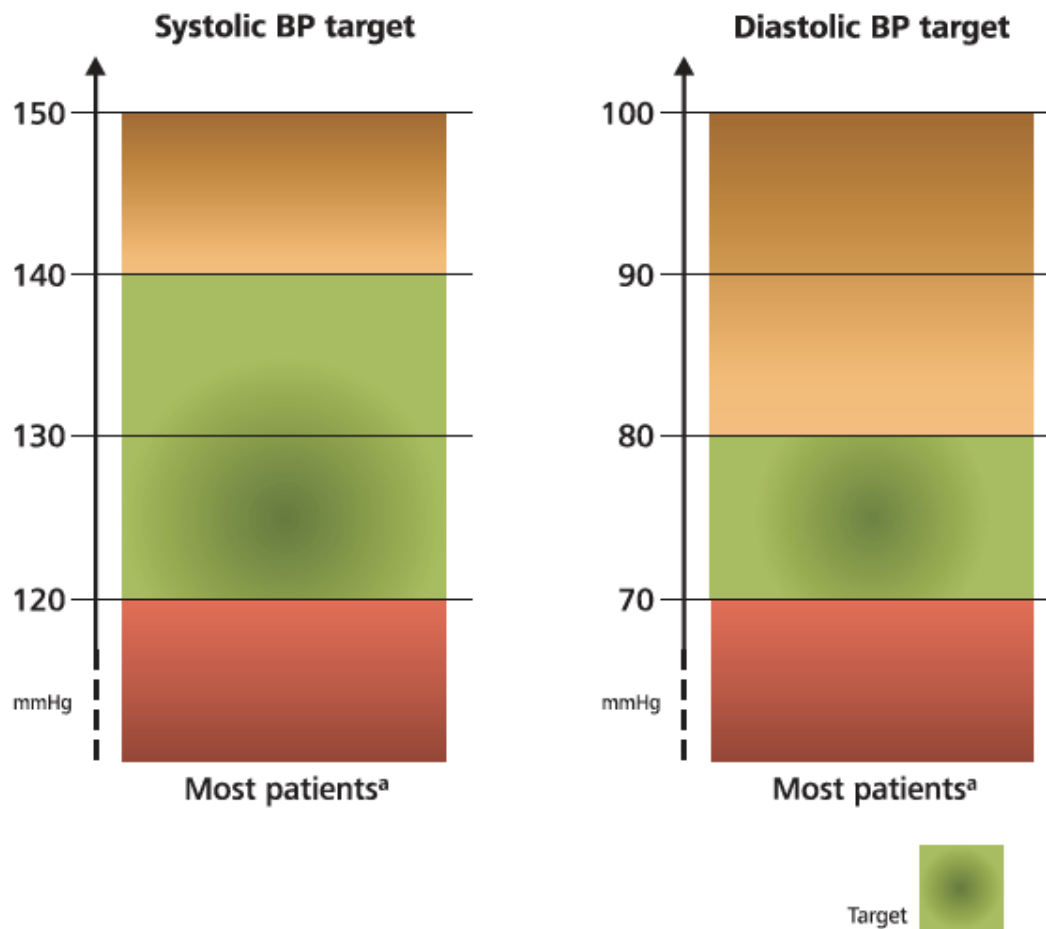
Main GOAL: to reduce BP !!! No matter the drug !!

A fixed degree of BP reduction is associated with the same relative CVD risk reduction  
Independent of baseline (pre-treatment) BP level

The intensity of BP reduction is associated with relative or absolute CVD risk reduction for  
any age, sex, prior presence of CVD or diabetes or AF.



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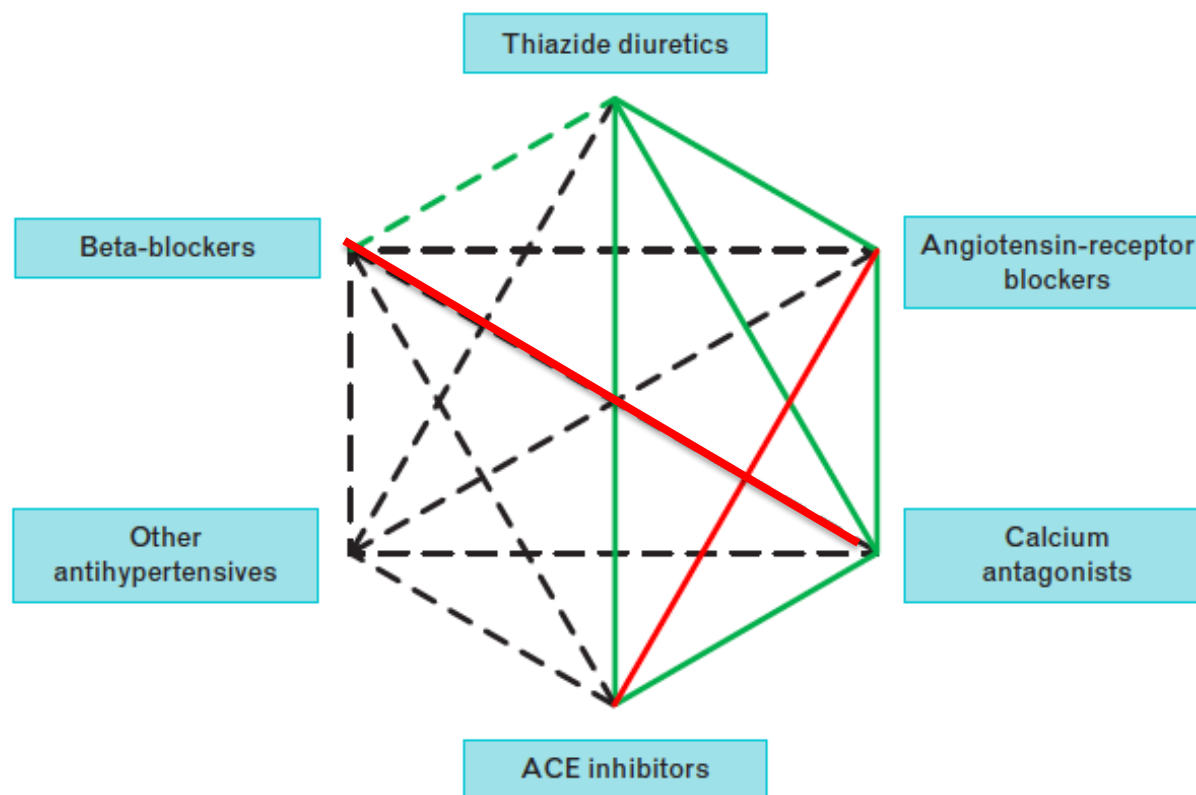
## ΠΟΙΕΣ ΕΙΝΑΙ ΟΙ ΒΑΣΙΚΕΣ ΘΕΡΑΠΕΥΤΙΚΕΣ ΑΡΧΕΣ ΣΤΗΝ ΥΠΕΡΤΑΣΗ;

- ☐ Καθορισμός πίεσης-στόχου
- ☐ Έναρξη φαρμακευτικής αγωγής



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ΥΠΑΡΧΟΥΝ ΣΥΝΔΥΑΣΜΟΙ ΑΝΤΙΥΠΕΡΤΑΣΙΚΩΝ ΦΑΡΜΑΚΩΝ ΠΟΥ ΔΕΝ ΕΠΙΤΡΕΠΟΝΤΑΙ;



ACE = angiotensin-converting enzyme.

**FIGURE 4** Possible combinations of classes of antihypertensive drugs. Green continuous lines: preferred combinations; green dashed line: useful combination (with some limitations); black dashed lines: possible but less well tested combinations; red continuous line: not recommended combination. Although verapamil and diltiazem are sometimes used with a beta-blocker to improve ventricular rate control in permanent atrial fibrillation, only dihydropyridine calcium antagonists should normally be combined with beta-blockers.



cause-specific outcomes (lesser stroke prevention with BBs and ACE-inhibitors, lesser HF prevention with CCBs and greater HF prevention with Thiazide diuretics) [539]. Additional considerations were that (iv) the reduction of events is due

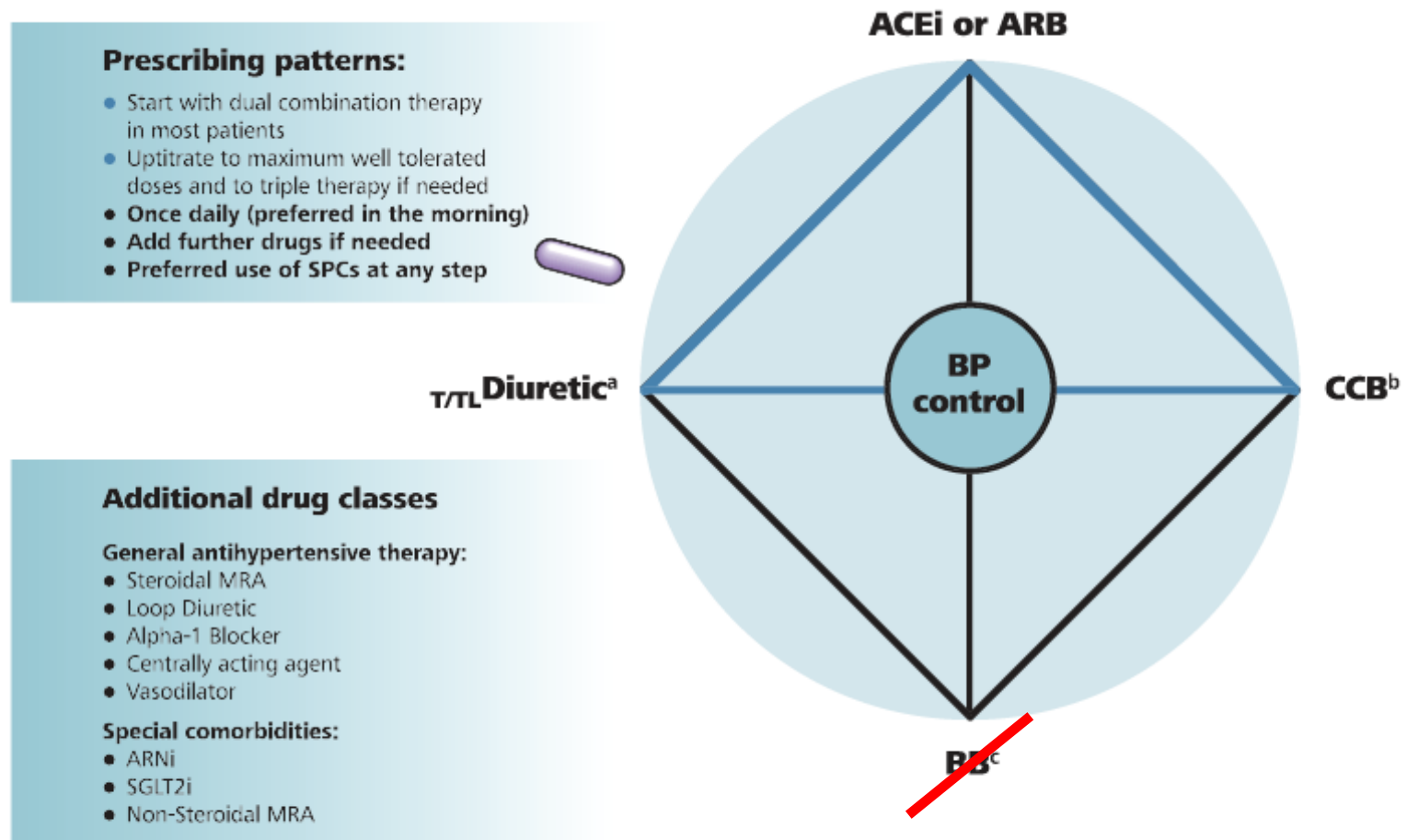
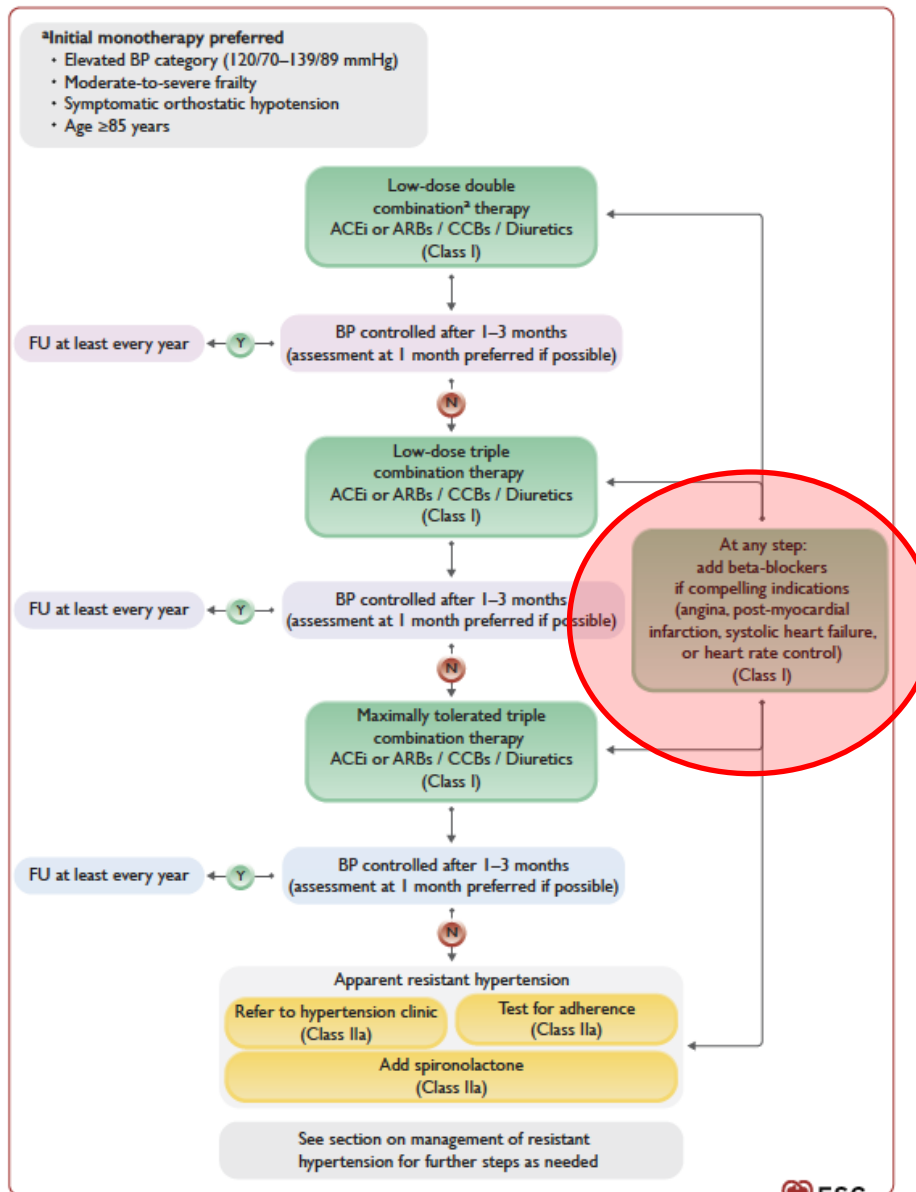


**FIGURE 11** Drug classes for BP-lowering therapy. (a) Use of Diuretics: Consider transition to Loop Diuretic if eGFR is between 30 to 45 mL/min/1.73 m<sup>2</sup>. If eGFR <30 mL/min/1.73 m<sup>2</sup> use Loop Diuretic. (b) Non-DHP CCB should not be combined with BB. (c) BB should be used as guideline directed medical therapy in respective indications or considered in several other conditions (Table 16). Start with dual combination therapy including a RAS-blocker (either ACEi or ARB) plus a T/TL Diuretic or a CCB is recommended (thick blue lines). Triple therapy includes a combination of the three classes as indicated by the blue lines.

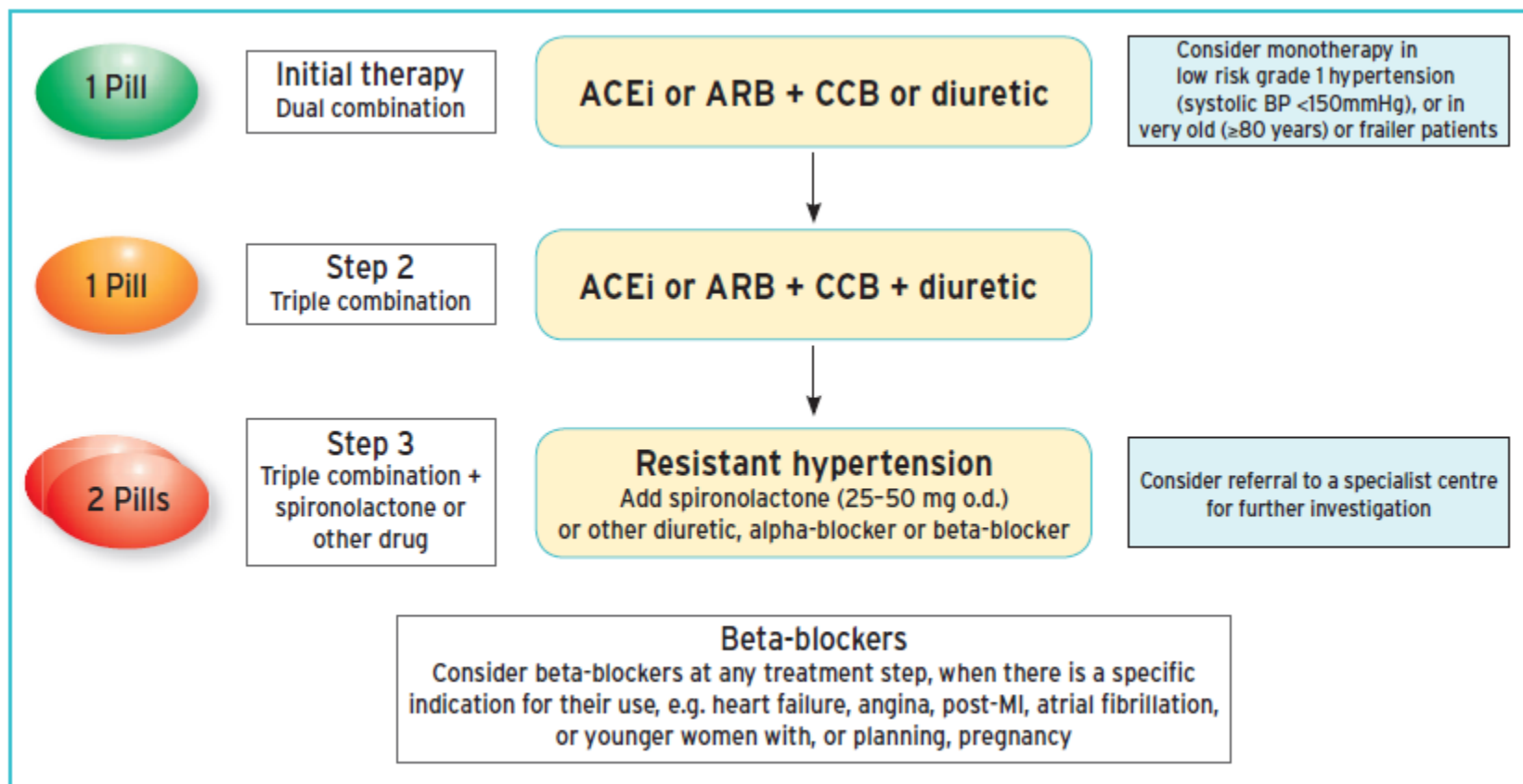


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## About beta-blockade:

Less effective than RAAS, CCB, T/TL diuretics to reduce **stroke** !!!!

Less effective than RAAS, CCB to prevent **HMOD progression**

Higher rate of discontinuation than other classes

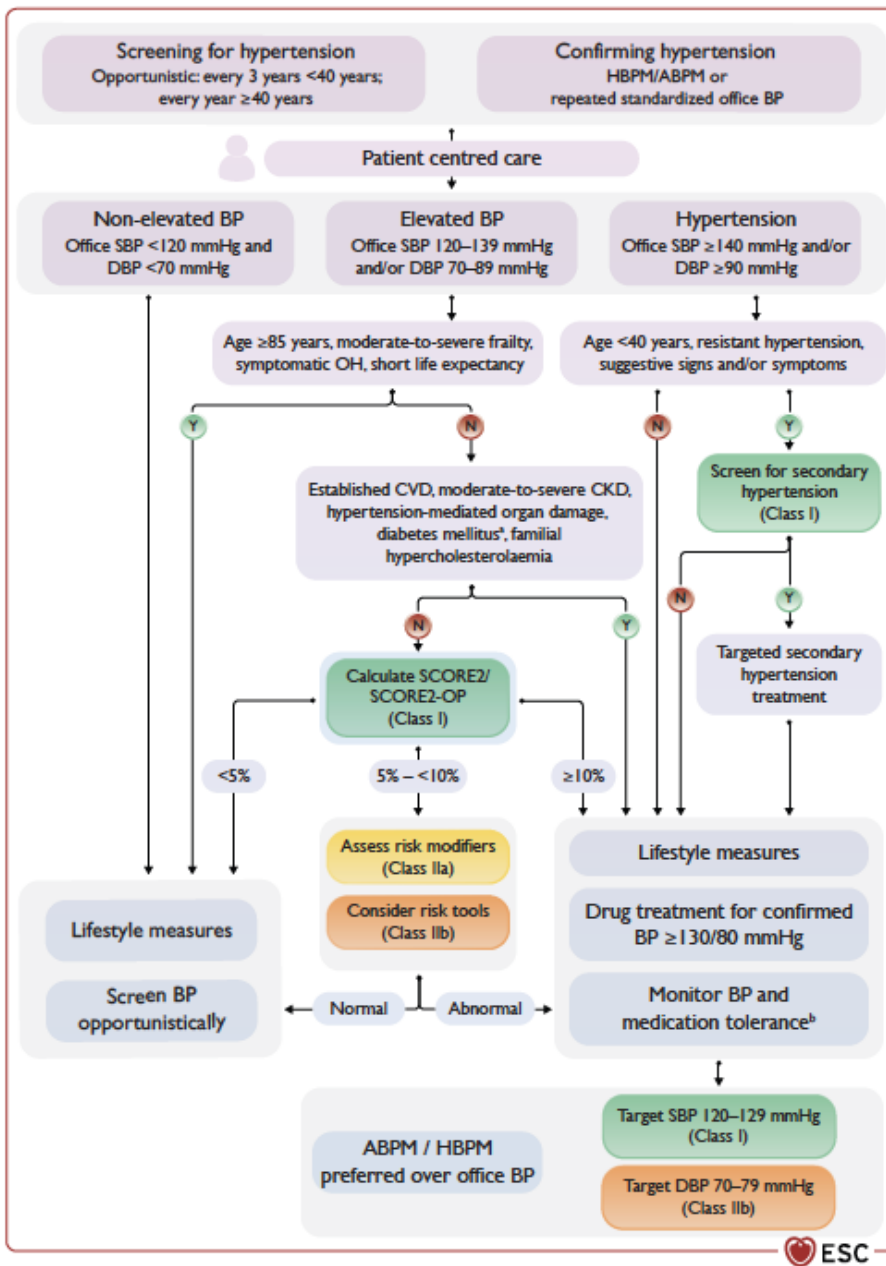
Increase risk for DM onset (especially co-administrated with diuretics)

To be avoided in isolated systolic hypertension

population. Beta-blockers can be added preferentially in circumstances such as in the presence of angina or heart failure, after myocardial infarction, or for controlling heart rate, where they are the cornerstone of therapy.<sup>122,448,449</sup> In such settings, second-generation (cardioselective) and, specifically, third-generation (vasodilating) beta-blockers are preferred.<sup>450</sup> However, beta-blockers are less effective than ACE inhibitors, ARBs, CCBs, or diuretics at preventing stroke, and have a higher discontinuation rate due to side effects.<sup>451,452</sup> Beta-blockers and diuretics, especially when combined, are associated with an increased risk of new-onset diabetes in predisposed patients.<sup>453,454</sup> The effect of RAS blockers and CCBs on preventing progression of HMOD also appears to be superior to beta-blockers.<sup>455–458</sup> Beta-blockers should also be avoided in patients with isolated systolic hypertension or more generally with arterial stiffness, as they increase stroke volume (given the lower heart rate).<sup>218</sup>



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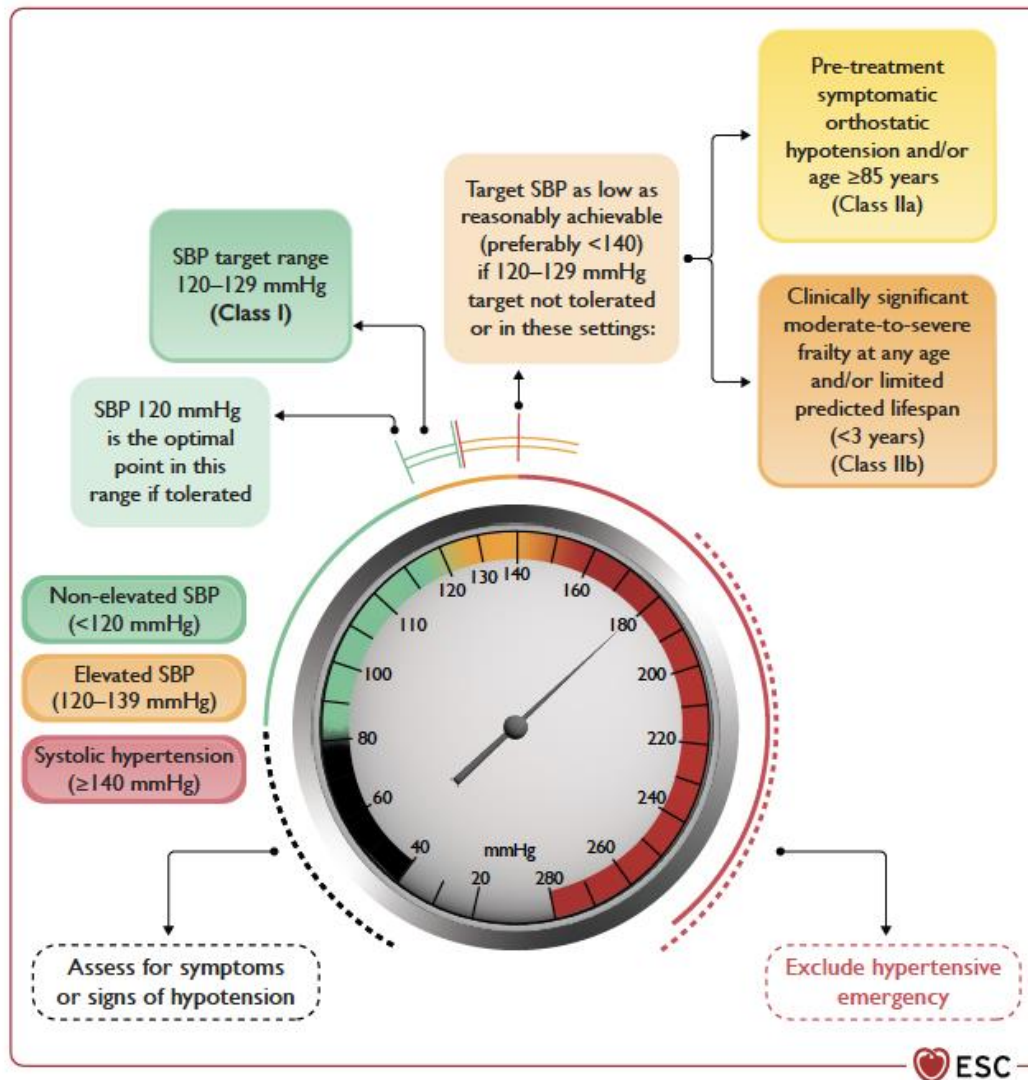


**Figure 20** Systolic blood pressure categories and treatment target range. BP, blood pressure; SBP, systolic blood pressure.



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**Table 14** Initiation of blood pressure-lowering treatment based on confirmed blood pressure category and cardiovascular disease risk

| Blood pressure (mmHg) | Non-elevated BP (<120/70)                                                     | Elevated BP (120/70 to 139/89)                                                                                                                                        |                                                                                                                                                                                                                                                                       | Hypertension (≥140/90)                                                                                                  |
|-----------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Risk                  |                                                                               | (a) All adults with SBP 120–129 mmHg<br>(b) SBP 130–139 AND 10-year estimated CVD risk <10% AND no high-risk conditions or risk modifiers or abnormal risk tool tests | (a) SBP 130–139 AND high-risk conditions (e.g. established CVD, diabetes mellitus, CKD, FH or HMOD)<br>(b) SBP 130–139 AND 10-year estimated CVD risk ≥10%<br>(c) SBP 130–139 AND 10-year estimated CVD risk 5% - <10% AND risk modifiers or abnormal risk tool tests | Assumed all at sufficiently high risk to benefit from pharmacological treatment                                         |
| Treatment             | Lifestyle measures for prevention<br>Screen BP and CVD risk opportunistically | Lifestyle measures for treatment<br>Monitor BP and CVD risk yearly                                                                                                    | Lifestyle measures and pharmacological treatment (after 3-month delay).<br>Monitor BP yearly once treatment control is established                                                                                                                                    | Lifestyle measures and pharmacological treatment (immediate)<br>Monitor BP yearly once treatment control is established |
| Target (mmHg)         | Maintain BP <120/70                                                           | Aim BP 120–129/70–79 mmHg <sup>a</sup>                                                                                                                                |                                                                                                                                                                                                                                                                       |                                                                                                                         |

damage; SBP, systolic blood pressure.

<sup>a</sup>Caution in adults with orthostatic hypotension, moderate-to-severe frailty, limited life expectancy, and older patients (aged ≥85 years).



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