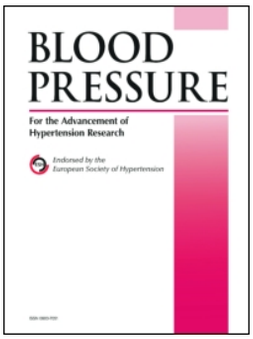

Blood Pressure

ISSN: 0803-7051 (Print) 1651-1999 (Online) Journal homepage: www.tandfonline.com/journals/iblo20

2024 European Society of Hypertension MASTERplan for the management of arterial hypertension

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To cite this article: Reinhold Kreutz, Michel Burnier, Rosa de Pinho, Christian Delles, Andrzej Januszewicz, Giuseppe Mancia & Thomas WeberOn behalf of the Scientific Council of the European Society of Hypertension (ESH) (2025) 2024 European Society of Hypertension MASTERplan for the management of arterial hypertension, Blood Pressure, 34:1, 2584089, DOI: 10.1080/08037051.2025.2584089

To link to this article: https://doi.org/10.1080/08037051.2025.2584089

Published online: 27 Nov 2025.

BLOOD PRESSURE
2025, VOL. 34, NO. 1, 2584089
https://doi.org/10.1080/08037051.2025.2584089

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2024 European Society of Hypertension MASTERplan for the management of arterial hypertension

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Introduction

In the context of the 2024 Clinical Practice Guidelines for the management of arterial hypertension, the European Society of Hypertension (ESH) has developed the **MASTERplan** for hypertension management [1]. The **MASTERplan** builds upon the 2023 ESH Guidelines for the management of arterial hypertension [2].

Its primary aim is to present a concise and practical framework that facilitates the translation of guideline recommendations into routine clinical practice. By focusing on the most essential and immediately applicable aspects of the 2023 guidelines, the **MASTERplan** supports healthcare professionals in an effective day-to-day management of hypertension.

The **MASTERplan** is structured around four pillars, which summarise the key steps of an optimal hypertension care: measurement of blood pressure (BP) and diagnosis (pillar 1), patient assessment (pillar 2), selection of therapy (pillar 3), and evaluation of the response and follow-up (pillar 4) (Figure 1**).**

For each pillar, the key information is presented in concise infographics, complemented by additional figures and tables that provide further details (all items are available at https://www.eshonline.org). This approach ensures a clear, visually accessible, and actionable pathway for implementing evidence-based hypertension management in clinical practice. For detailed and in-depth reviews of the evidence supporting the recommendations in each pillar, we refer the reader to the full text of the 2023 ESH Guidelines for the Management of Arterial Hypertension [2].

Pillar 1: Measure blood pressure – diagnose

Accurate measurement of BP is critical to establishing the diagnosis of hypertension. Figure 2 shows the important steps of BP measurements in office or out of office.

Additional information with clinical indications that support the use of home BP monitoring (HBPM) or ambulatory BP monitorin (ABPM) are summarised in Table 1.

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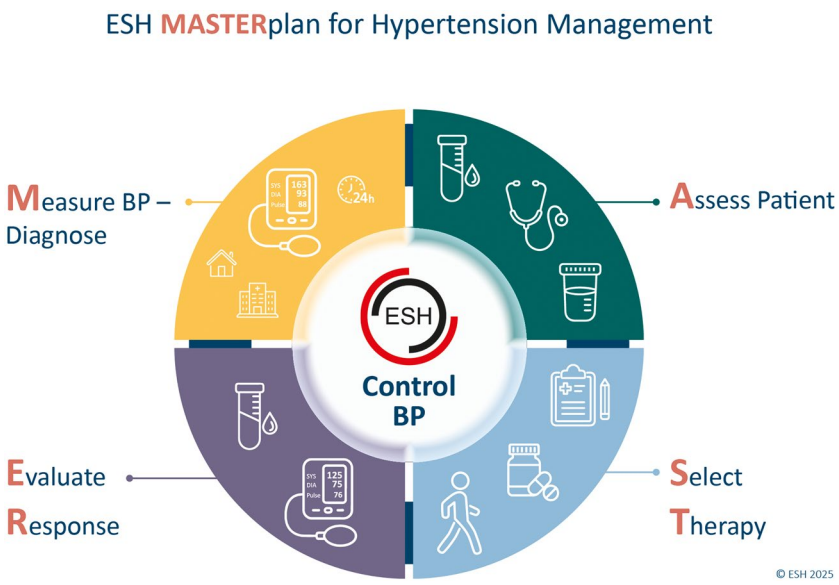

Figure 1. Illustration of the 4 pillars of the ESH MASTERplan.

Pillar 2: Assess patient

Every patient with hypertension needs to have a basic assessment before any therapeutic intervention. This assessment can be extended when necessary and if available by physicians.

Figure 3 presents the elements to be assessed and Table 2 presents the extended list of factors to be considered in the evaluation of patient's history.

Moreover, an extended list of factors that influence cardiovascular (CV) risk in patients with hypertension is shown in Table 3, and Table 4 presents further details for a comprehensive physical examination for patients with hypertension.

Assessment of older patients with hypertension

The specific assessment of patients older than 80 years should include the analysis of their functional/autonomy status as shown in Table 5.

Laboratory investigations

Selected laboratory tests for work-up in hypertensive patients are summarised in Table 6.

Extended assessment

The extended assessment of hypertension mediated organ damage (HMOD) can be executed as deemed necessary and available to physicians (Figure 3).

When to refer a patient?

Basic and extended patient assessments should support decision-making regarding when to refer a patient to a hypertension specialist or hospital, including the potential need for inpatient treatment. Additional information on the age-specific incidence of selected forms of secondary hypertension, which can guide decisions about further evaluation and referral for suspected secondary hypertension, is shown in Figure 4.

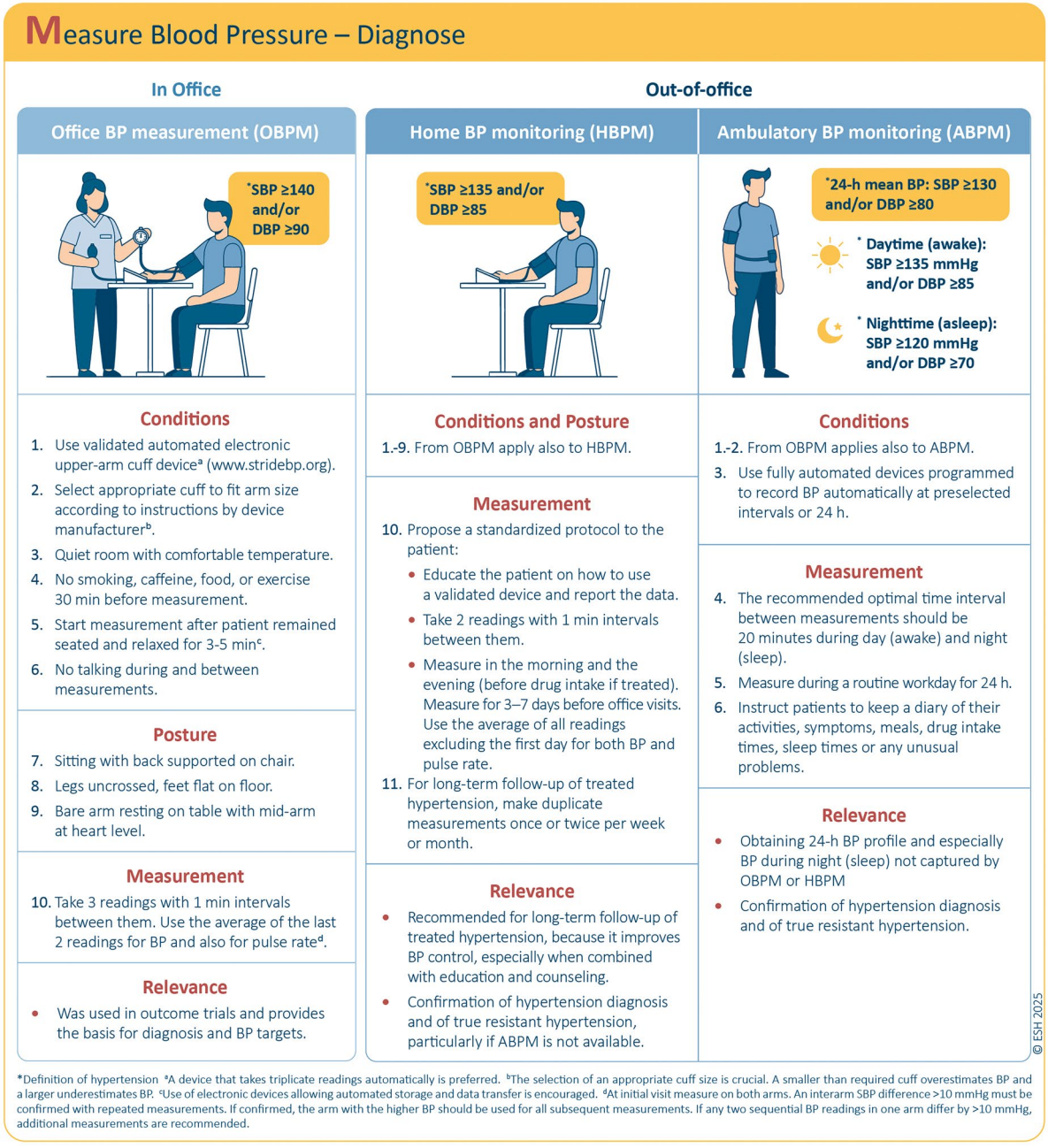

Figure 2. Measure blood pressure – Diagnose.

Pillar 3: Select Therapy

The initial management as well as follow-up strategies should be executed according to the risk of patients. Accordingly, the recommended risk stratification is summarised in Figure 5.

The strategy of the initial management of hypertension with the aim to control BP within 3 months according to the risk of patients is illustrated in Figure 6.

The selection of therapy comprises lifestyle interventions and pharmacotherapy as summarised in Figures 7 and 8.

Table 1. Clinical indications for home and ambulatory BP monitoring*.

Clinical Context	Examples
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 suggestive of 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 • Evaluation of patients considered for renal denervation • Children • 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

*Using validated devices as listed at https://www.stridebp.org

In addition to pharmacotherapy, renal denervation may be considered for patients with true-resistant hypertension, for those with uncontrolled blood pressure despite combination antihypertensive therapy, or when drug treatment causes serious side effects and impairs quality of life (if estimated glomerular filtration rate [eGFR]> 40 ml/min/1.73 m^2).

The general pharmacological treatment strategy applies to most patients, including those with diabetes, a history of stroke, or peripheral artery disease.

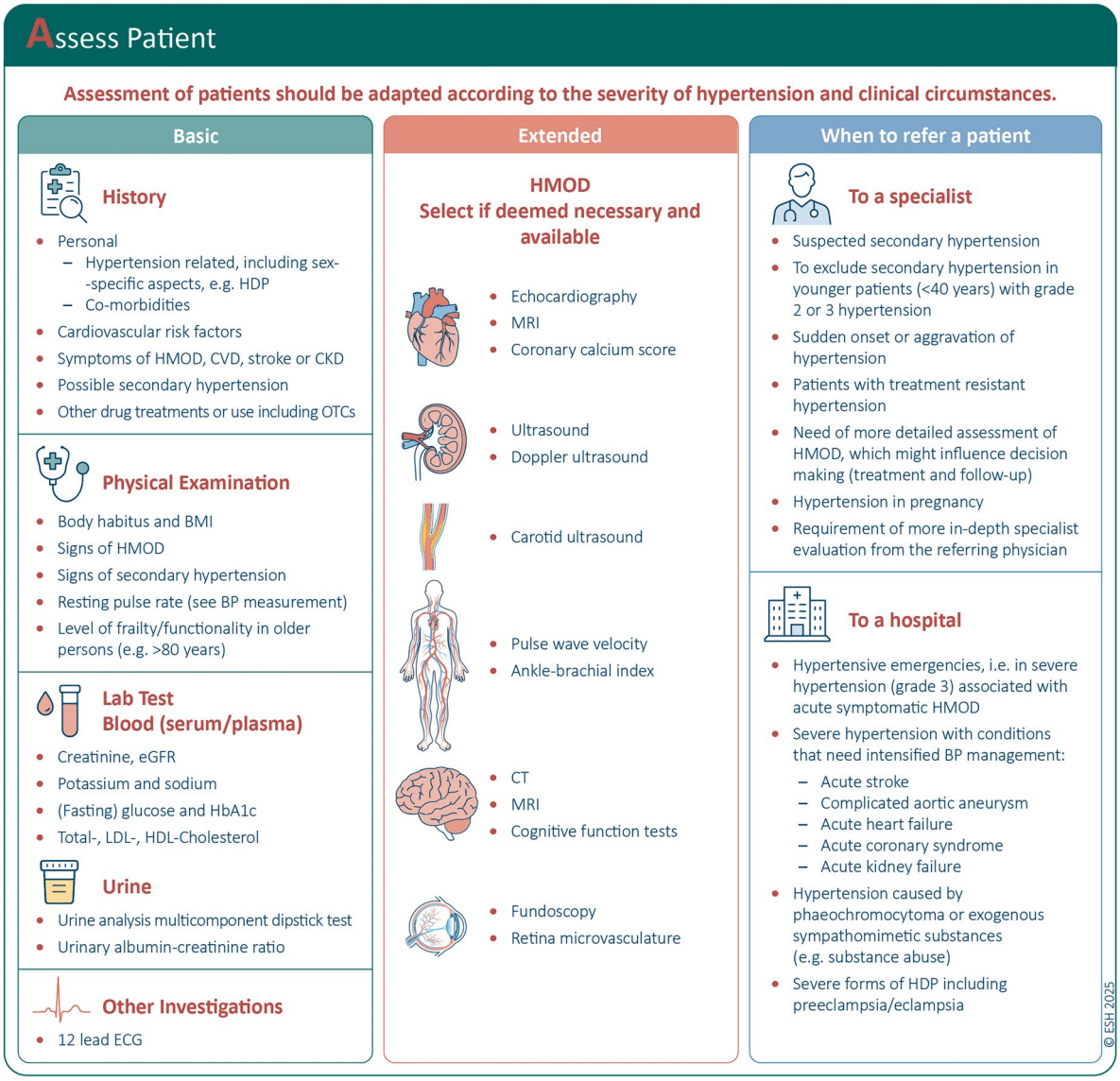

Figure 3. How to assess patients.

Specific treatment algorithms for true-resistant hypertension and major comorbidities—such as coronary heart disease, heart failure with preserved ejection fraction, atrial fibrillation, and chronic kidney disease—are provided in Supplementary Figures S1–S5 (available at https://www.eshonline.org).

The recommended strategy in older people according to their functional capacities/autonomy status is summarised in Figure 9.

Table 2. Medical and family history*.

Category	Details
Personal history	• Time of the first diagnosis of hypertension, including records of any previous medicalscreening, hospitalization • Stable or rapidly increasing BP • Recordings of current and past HBPM values • 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 • High volume of sedentary behavior and lack of physical activity • Weight gain or loss in the past • History of erectile dysfunction • Sleep history, snoring, sleep apnea (information also from partner) • Stress • Long-term cancer survivor
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 decongestants
History, signs 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
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

*Additional factors to be considered are listed in Table 3.

Pillar 4: Evaluate Response

Once treatment has been initiated it is crucial to assess the BP response and the tolerability of prescribed medications to ensure that patients achieve the defined BP targets and that medications are well tolerated with no safety issues such as changes in renal function or electrolyte disturbances (Figure 10). Supporting drug adherence is an important step at each follow-up visit.

Table 3. Factors that influence CV risk in patients with hypertension.

Risk factors	Details
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 • Dyslipidemia • Lp(a) • Uric acid • Adverse outcomes of pregnancy (recurrent pregnancy loss, preterm delivery, hypertensive disorders, gestational diabetes) • Early-onset menopause • Frailty, functional capacities and autonomy status • Psychosocial and socioeconomic factors • Migration • Environmental exposure to air pollution or noise • Additional clinical conditions or comorbidities • True resistant hypertension • Sleep disorders (including OSA) • COPD • Gout • Chronic inflammatory diseases • Metabolic dysfunction-associated sclerotic liver disease (MASLD) • Chronic infections (including long COVID-19) • Migraine • Depressive syndromes • Erectile dysfunction
Hypertension-mediated organ damage (HMOD)	• Increased large artery stiffness • Pulse pressure (in older people) ≥60 mmHg • Carotid–femoral PWV >10 m/s in middle-aged people • 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 UACR (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
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 • Peripheral artery disease • Atrial fibrillation • Severe albuminuria > 300 mg/24 h or UACR (preferably in morning spot urine) >300 mg/g • CKD stage 4 and 5, eGFR < 30 mL/min/1.73m^2

[a]DBP is not included in the SCORE2/SCORE2-OP tool to estimate CV risk.

Table 4. Comprehensive physical examination for hypertension*.

Category	Assessment
Body habitus	• Weight and height measured on a calibrated scale, with calculation of BMI • Waist circumference
Signs of hypertension-mediated organ damage	• Neurological examination and cognitive status • Fundoscopic examination for hypertensive retinopathy in emergencies • Auscultation of heart and carotid arteries • Palpation of carotid and peripheral arteries • Ankle–brachial index
Signs of secondary hypertension	• Skin inspection: cafe-au-lait patches of neurofibromatosis (pheochromocytoma) • Kidney palpation for signs of renal enlargement in polycystic kidney disease • Auscultation of heart and renal arteries for murmurs or bruits indicative of aortic coarctation, or renovascular hypertension • Signs of Cushing's disease or acromegaly • Signs of thyroid disease

*Can be adapted according to the clinical circumstance.

Table 5. Assessment of functional/autonomy status in hypertensive patients older than 80 years.

	Group 1	Group 2	Group 3
Characteristics	Fit	Slowed but autonomous for most activities	Severely dependent
Diagnosis	• ADL (Katz) ≥5 *and* • absence of clinically significant dementia (MMSE >20) *and* • routine walking activities	Profile between groups 1 and 3	• ADL (Katz): ≤2 *or* • severe dementia (MMSE ≤10) *or* • chronic bedridden *or* • end of life

ADL: Activities of Daily Living (Katz Index) scaled rated from 0 (completely dependent) to 6 (completely autonomous).
This scale comprises 6 ADL: Bathing, Dressing, Toileting, Transferring, Feeding and Continence.
For each ADL '0' means that the person is unable to do it without assistance, 0.5 need of some assistance, 1 no need of any assistance.
MMSE: Mini mental state examination. Score 0-30, 30 best, 0-10 severe dementia, 11-20 moderate dementia, 21-30 absence of clinically significant dementia. The assessment is used to guide treatment as shown in pillar 3.

Conclusions

The ESH hopes that this **MASTERplan** will make a meaningful contribution to the advancement and optimisation of hypertension care across diverse healthcare settings. It aims to support clinicians in both primary and specialised care in making informed and timely decisions. Through continuous evaluation and updates, as well as the development of even shorter and more concise versions - including translations into other languages - this initiative aspires to serve as a practical framework for the ongoing improvement of hypertension care in Europe and beyond.

Table 6. Selected standard laboratory tests for work-up of hypertensive patients*.

Sample	Laboratory tests
Blood (serum/ plasma)	• Hemoglobin and/or hematocrit • Fasting blood glucose and HbA1c • Lipids: total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides • Potassium and sodium • Uric acid • Creatinine (and/or cystatin C) for estimating GFR with eGFR formulas • Calcium
Urine	Urine analysis (first voided urine in the morning), multicomponent dipstick test in all patients, UACR, microscopic examination in selected patients

*Can be adapted according to the clinical circumstance.

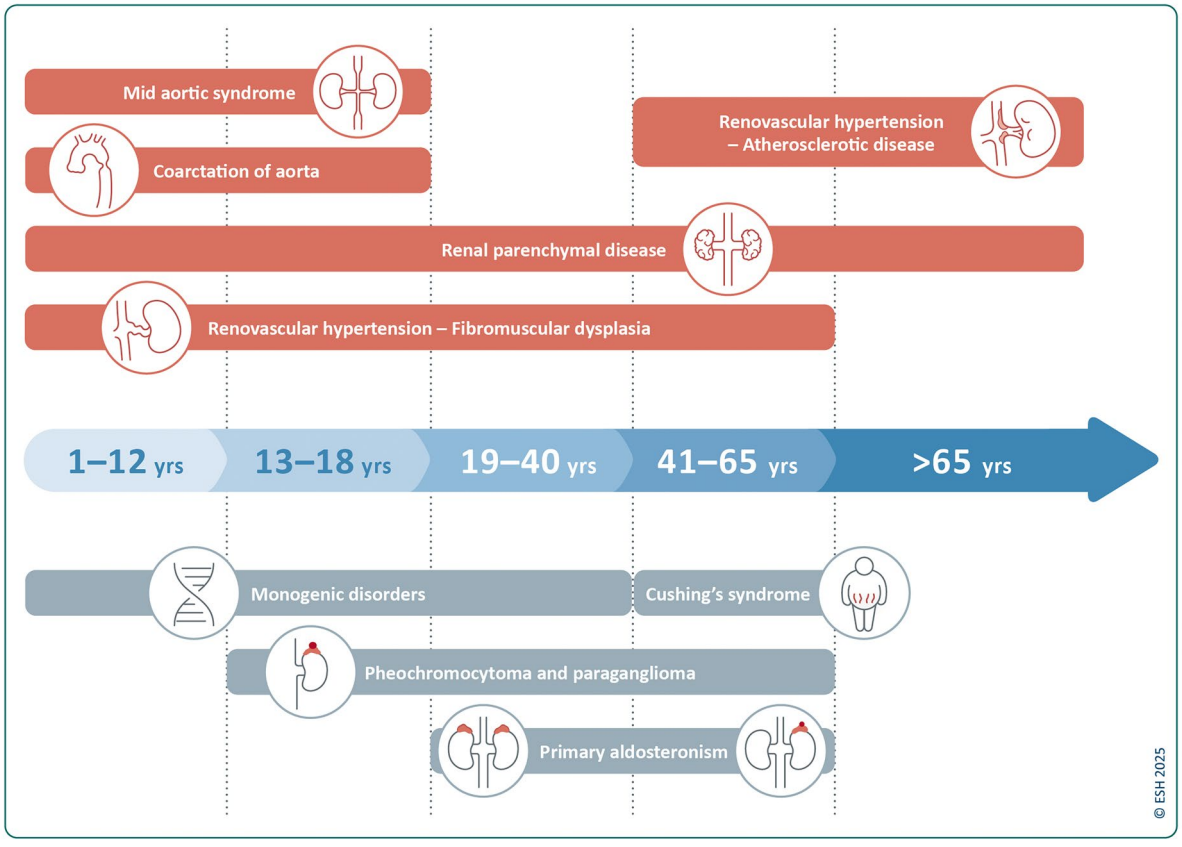

Figure 4. Typical incidences of selected forms of secondary hypertension according to age*.
* Clinical manifestations may also be observed at other ages.

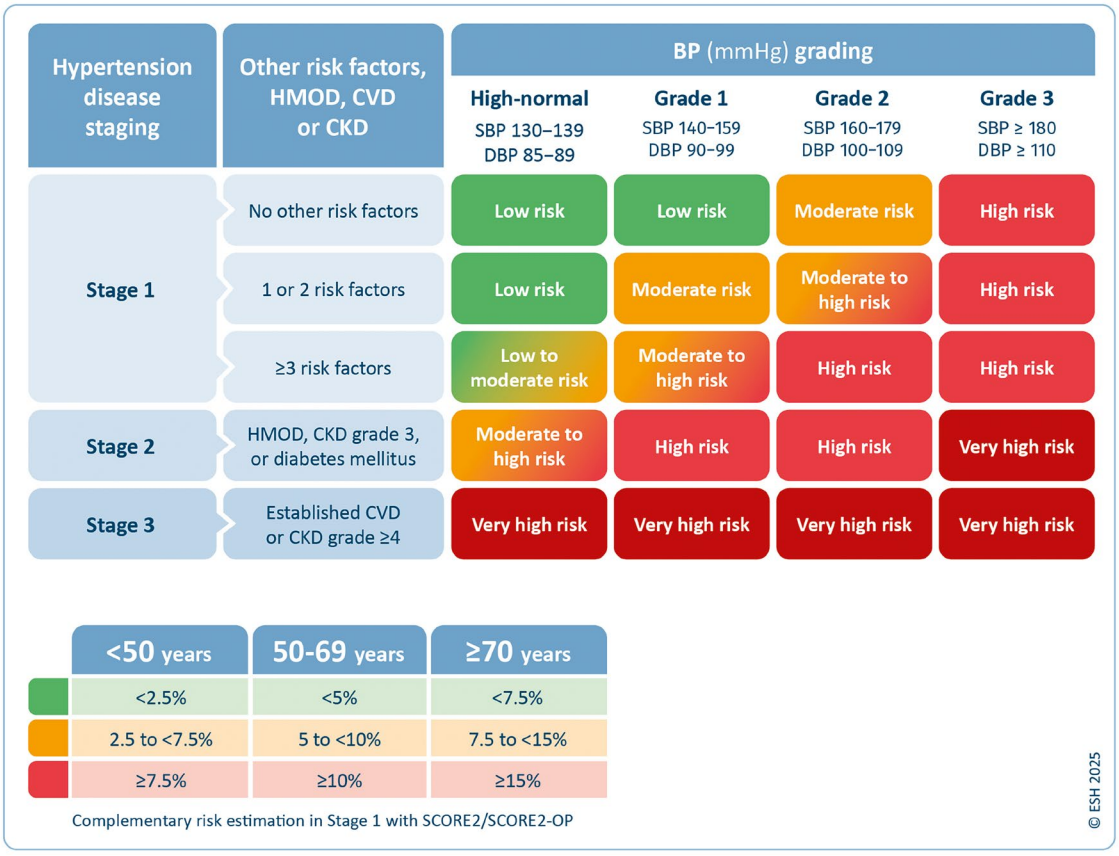

Figure 5. Risk stratification according to grade and stage of hypertension.

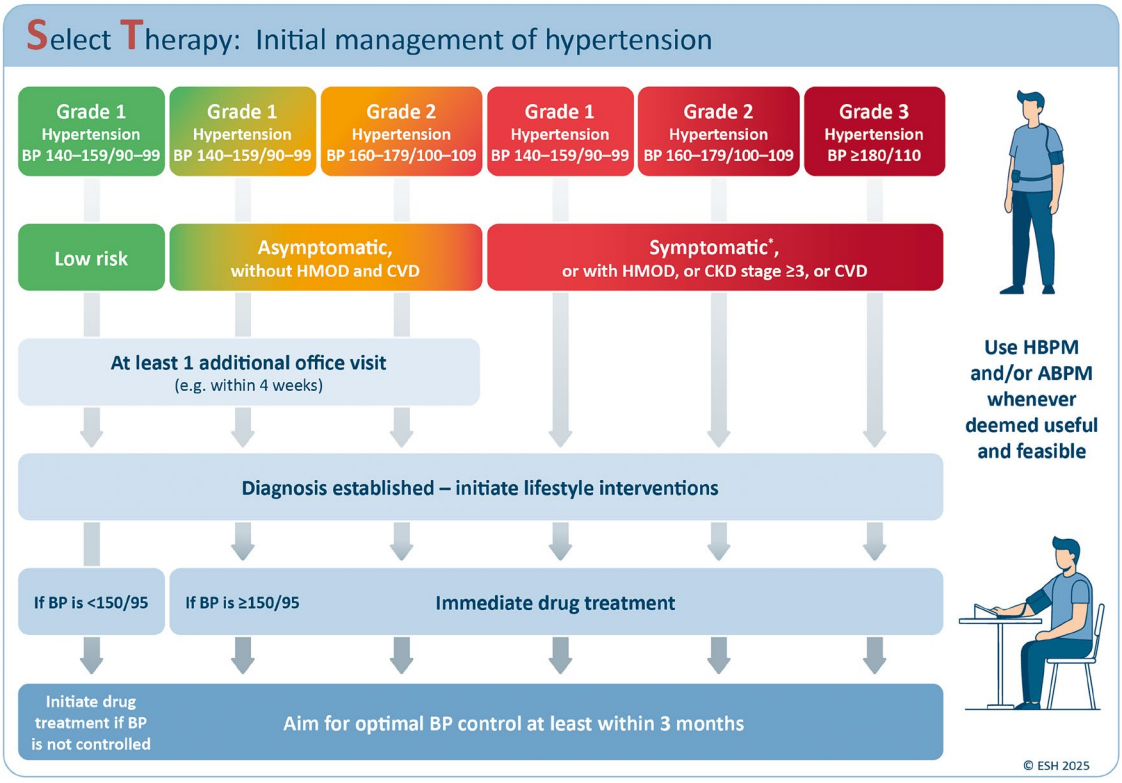

Figure 6. Select Therapy: Initial management of hypertension.
*In addition to the symptoms that are linked to HMOD as listed in Table 2, further symptoms that are associated with hypertension such as headache, dyspnoea, dizziness, or palpitations can be considered.

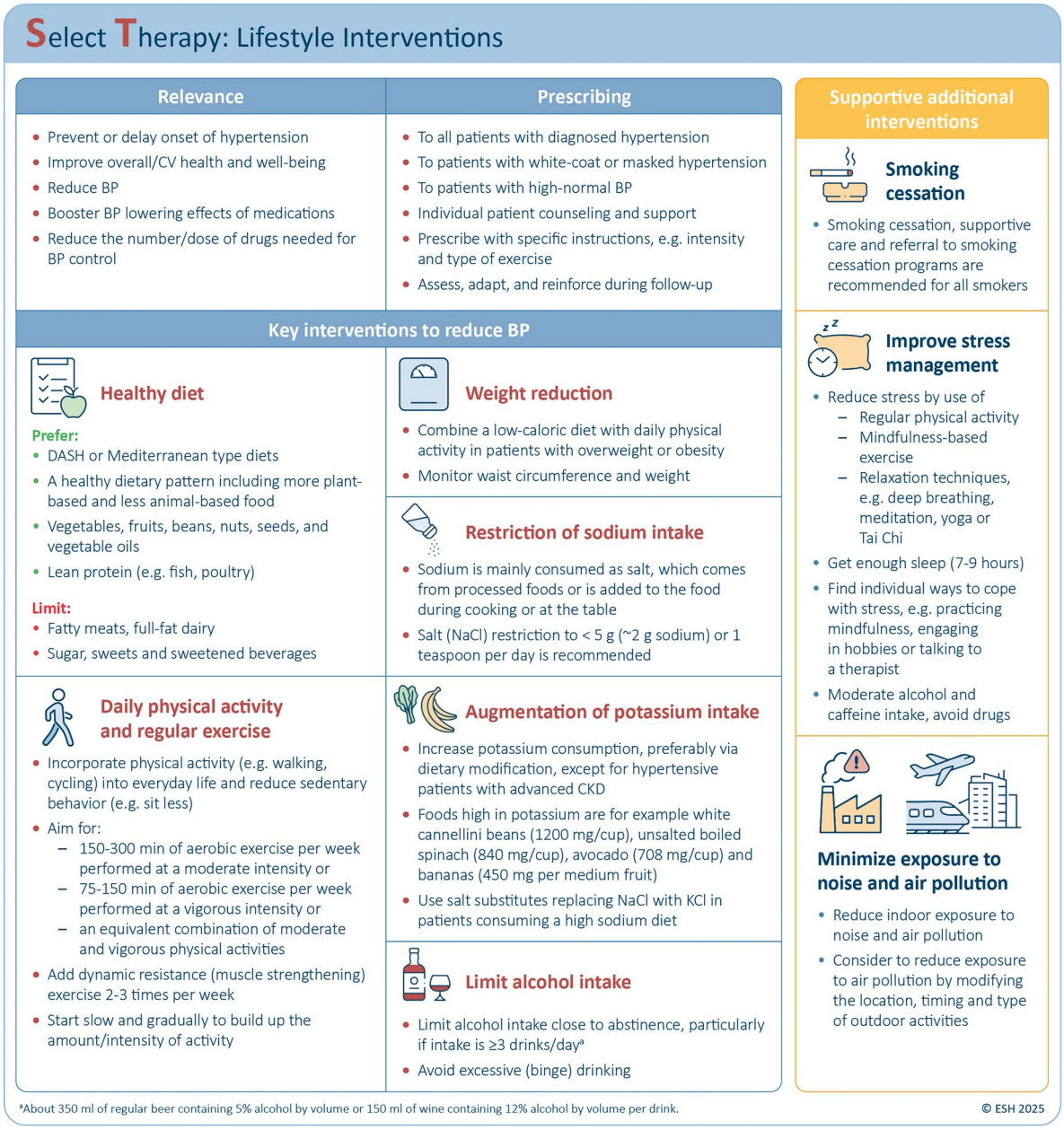

Figure 7. Select therapy: Lifestyle interventions.

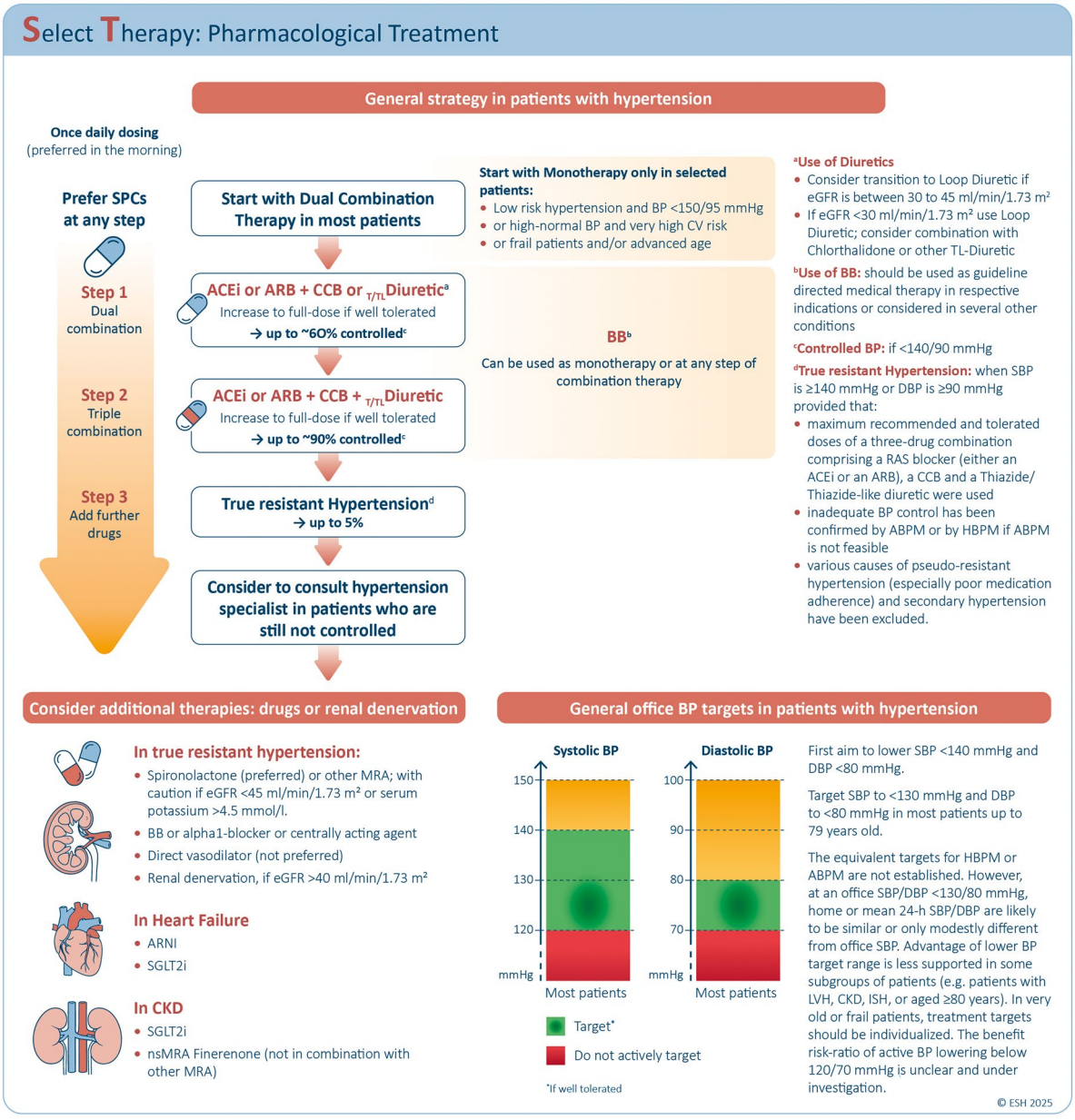

Figure 8. Select therapy: Pharmacological treatment.

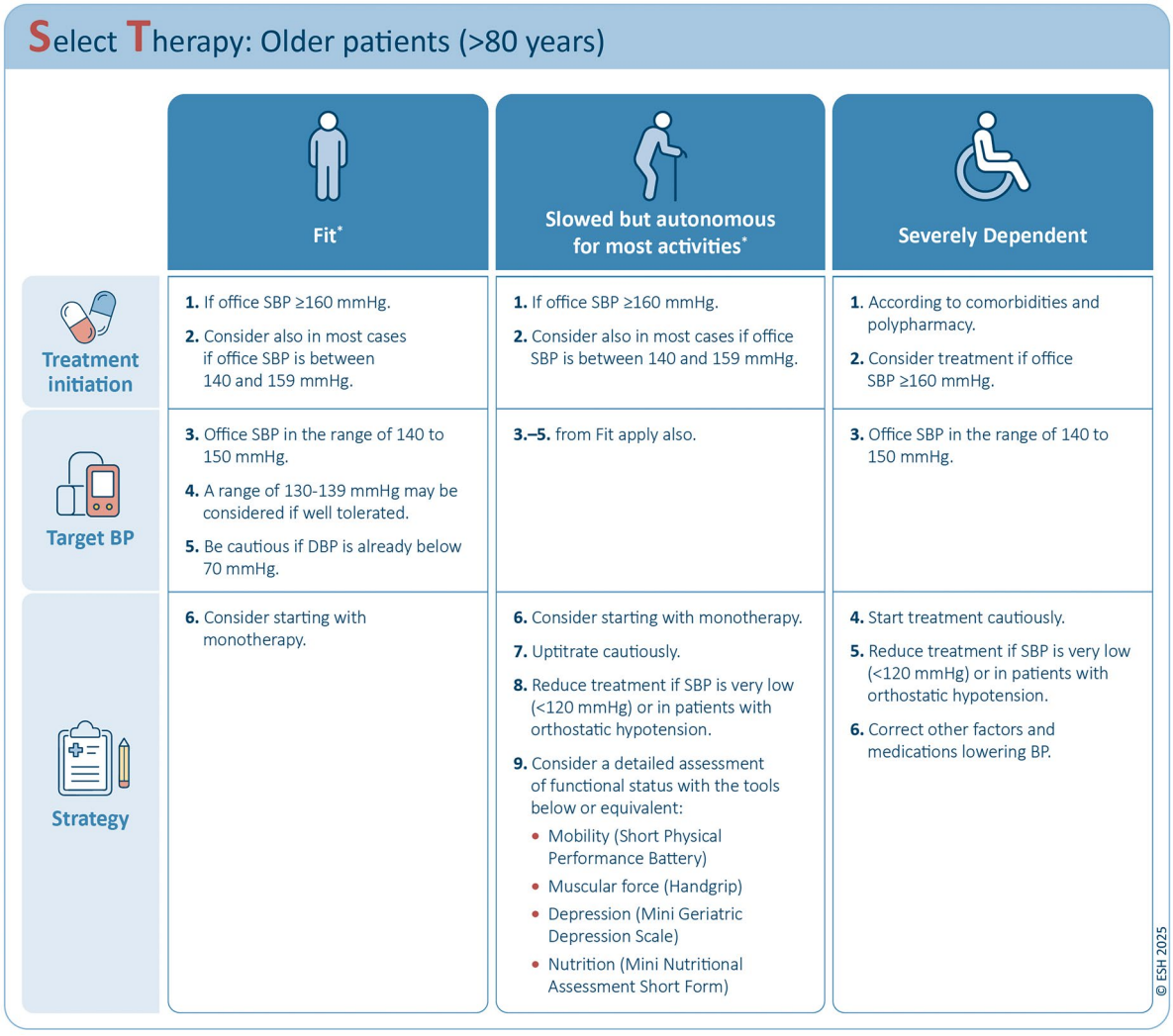

Figure 9. Select therapy: Older patients (> 80 years).

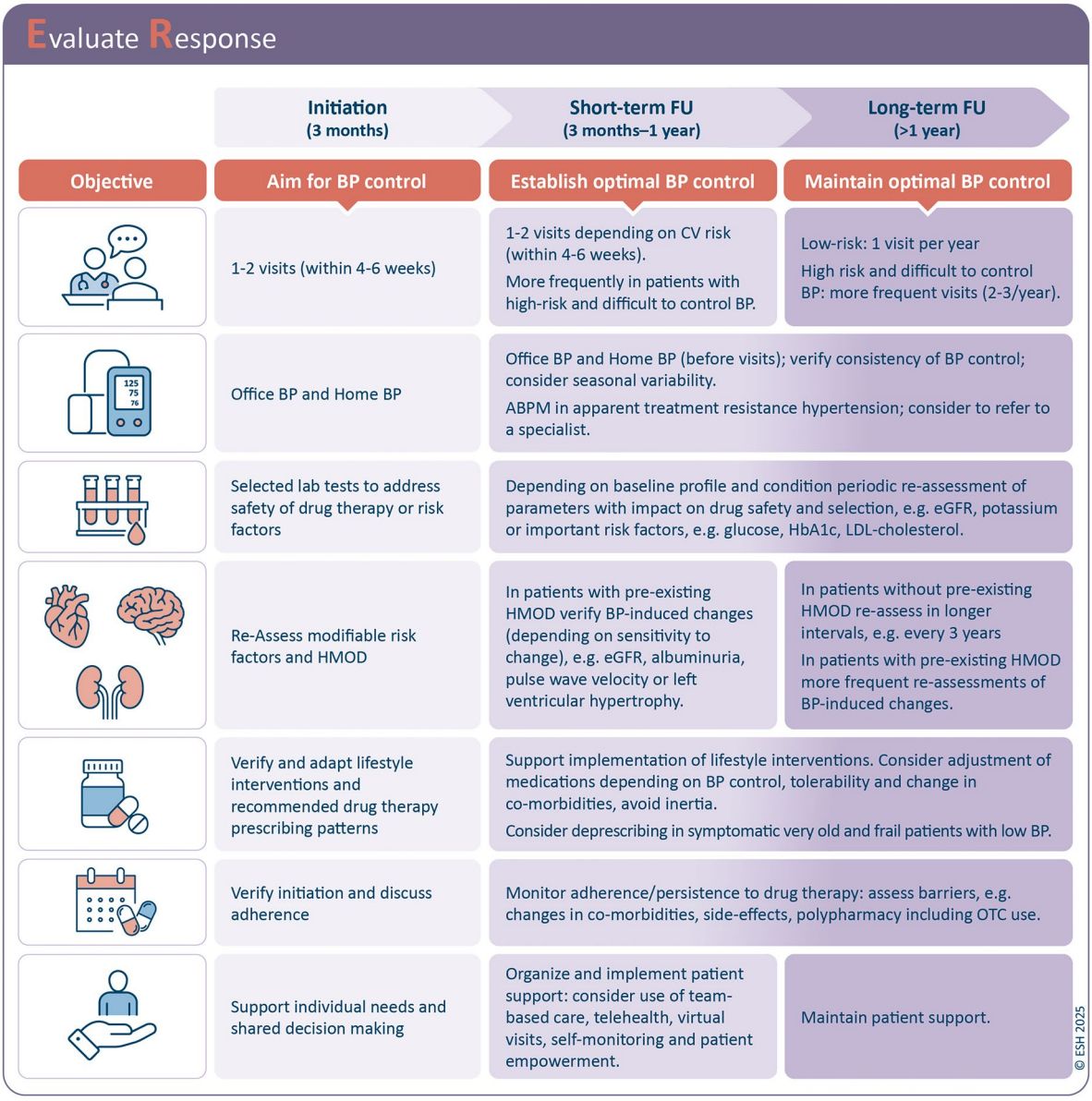

Figure 10. How to evaluate short-term and long-term responses to therapy.

Acknowledgements

ESH wishes to thank ITEM Publishing Sp. z o.o., Warsaw (Poland) for the support in the preparation of Figures and Tables.

Conflict of interest disclosure for speaker or consulting honoraria

Reinhold Kreutz: Bayer AstraZeneca, Bayer, Krka, Menarini Group, Merck, ProMed, PolPharma, Recor, Servier, and Zentiva.

Michel Burnier: Servier, Menarini, Cincor, Bayer, Boehringer Ingelheim.

Christian Delles: none.

Andrzej Januszewicz: Servier; Gedeon-Richter; Medtronic; KRKA; Novartis; AstraZeneca; Adamed; Bausch; Polfarma; Novartis; Berlin Chemie; Termedia; ViaMedica; Medycyna Praktyczna.

Rosa Maria de Pinho: Servier, Tecnimede, Merck.

Giuseppe Mancia: AstraZeneca, Berlin Chemie, Boehringer Ingelheim, Gedeon Richter, Medtronic Vascular Inc, Menarini Int, Merck Healthcare KGaA, Medtronic Inc USA, Neopharmed-Gentili, Novartis Pharma, Recordati, Sandoz, Sanofi, Servier.

Thomas Weber: Medtronic, Boehringer Ingelheim, Merck, Servier, Novartis, Bristol-Myers Squibb, AstraZeneca, Pfizer.

Funding

The author(s) reported there is no funding associated with the work featured in this article.

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[2] Mancia G, Kreutz R, Brunström M, et al. 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 (ISH) and the European Renal Association (ERA). J Hypertens. 2023;41(12):1874–2071. doi: 10.1097/HJH.0000000000003480.