Hypertension & Dyslipidimia in the Spotlight: Bad fellows in CV Health

- Introduction
- Update in Guideline recommendations
- Clinical cases

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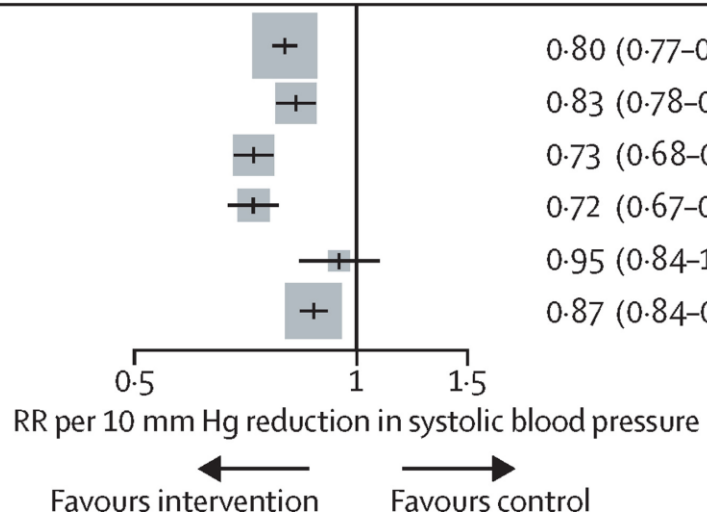
Introduction

- Cardiovascular disease (CVD) accounts for >4 million deaths / year in Europe
- Uncontrolled hypertension is responsible for 9.4 million documented deaths worldwide
- Importance of ASCVD prevention remains undisputed
- More patients are surviving their first CVD event and are at high-risk of recurrences
- Hypertension & Dyslipidemia are important CV risk factors that plays a key role in ASCVD

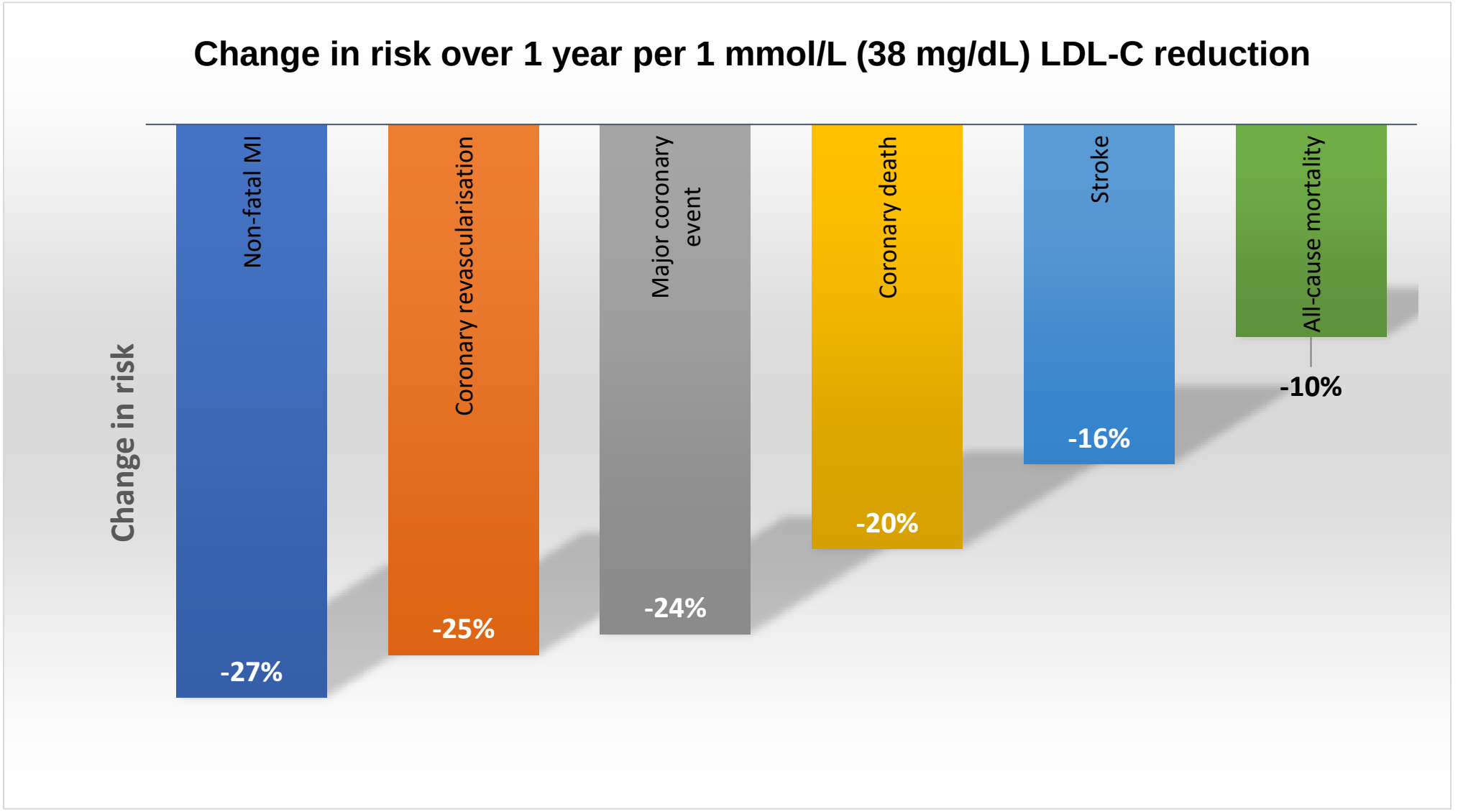
Benefits of Blood Pressure Lowering are well documented

	Studies	Intervention		Control		RR (95% CI) per 10 mm Hg reduction in systolic blood pressure
		Events	Participants	Events	Participants	
Major cardiovascular events	55	13209	137319	14068	128259	0·80 (0·77–0·83)
Coronary heart disease	56	4862	136986	5301	128548	0·83 (0·78–0·88)
Stroke	54	4635	136682	5378	128641	0·73 (0·68–0·77)
Heart failure	43	3284	115411	3760	107440	0·72 (0·67–0·78)
Renal failure	16	890	39888	834	39043	0·95 (0·84–1·07)
All-cause mortality	57	9775	138298	9998	129700	0·87 (0·84–0·91)



Reference: Ettehad, D., et al., Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. *The Lancet*, 387(10022), 957-967. doi:10.1016/S0140-6736(15)01225-8

Benefits of Intensive Lipid Lowering Therapy are well documented



CV, cardiovascular; LDL-C, low-density lipoprotein cholesterol; MI, myocardial infarction.

Adapted from Cholesterol Treatment Trialists' (CTT) Collaboration. *Lancet* 2010;376:1670-81.

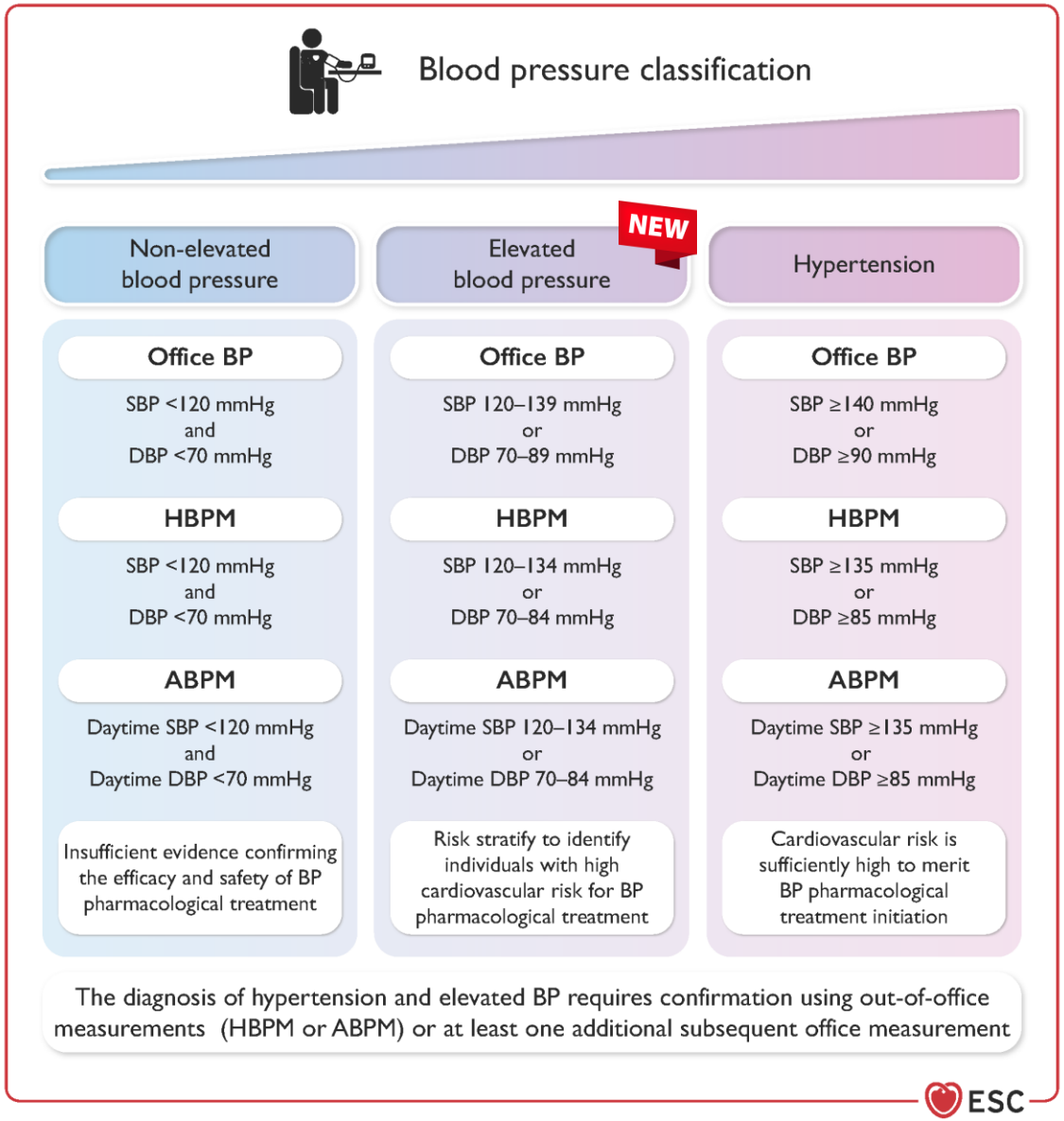
Revised recommendations (1)

2018 Guidelines	Class	Level	2024 Guidelines	Class	Level
Definition and classification of elevated blood pressure and hypertension					
It is recommended that BP be classified as optimal, normal, high–normal, or grades 1–3 hypertension, according to office BP.	I	C	It is recommended that BP be categorized as non-elevated BP, elevated BP, and hypertension to aid treatment decisions.	I	B
CV risk assessment with the SCORE system is recommended for hypertensive patients who are not already at high or very high risk due to established CVD, renal disease, or diabetes, a markedly elevated single risk factor (e.g. cholesterol), or hypertensive LVH.	I	B	SCORE2 is recommended for assessing 10-year risk of fatal and non-fatal CVD among individuals aged 40–69 years with elevated BP who are not already considered at increased risk due to moderate or severe CKD, established CVD, HMOD, diabetes mellitus, or familial hypercholesterolaemia.	I	B

Blood pressure categories

NEW

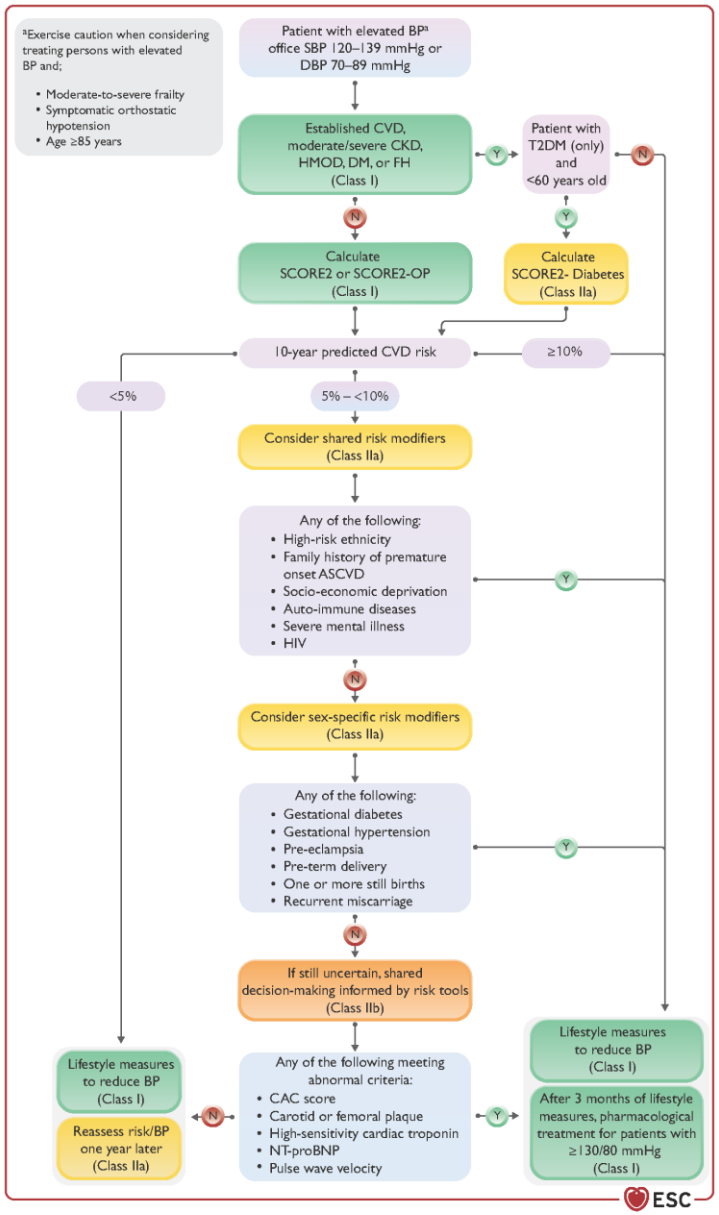
- Simplified Blood pressure categories
- New group of patients with elevated bp
- No hypertension grades defined
- For “Elevated bp”: risk stratify to identify high CV risk for BP pharmacological treatment



2024 ESC Guidelines for the management of elevated blood pressure and hypertension (European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae178)

NEW

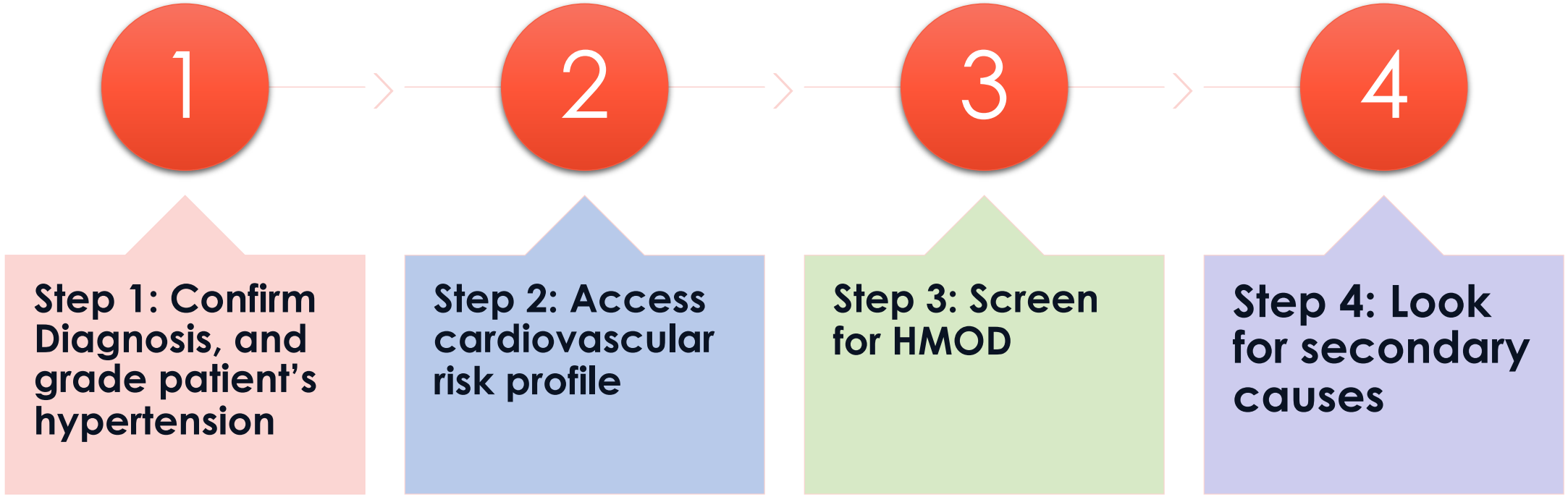
Summary of cardiovascular disease risk-stratification approach for blood pressure treatment in adults with elevated blood pressure



ESC 2024 guidelines introduced **Cardiovascular disease risk-stratification approach in patients with elevated BP**

ASCD: atherosclerotic cardiovascular disease. **BP:** blood pressure. **CAC:** coronary artery calcium. **CV:** cardiovascular. **CVD:** cardiovascular disease. **CKD:** chronic kidney disease. **DM:** diabetes mellitus. **HMOD:** hypertension mediated organ damage. **HIV**: human immunodeficiency virus.
NT-proBNP: N-terminal pro-brain natriuretic peptide. **SCORE-2/2-OP:** Systematic COronary Risk Evaluation 2/Older Persons

Key steps in management of new hypertension patients



Step 1: Confirm Diagnosis

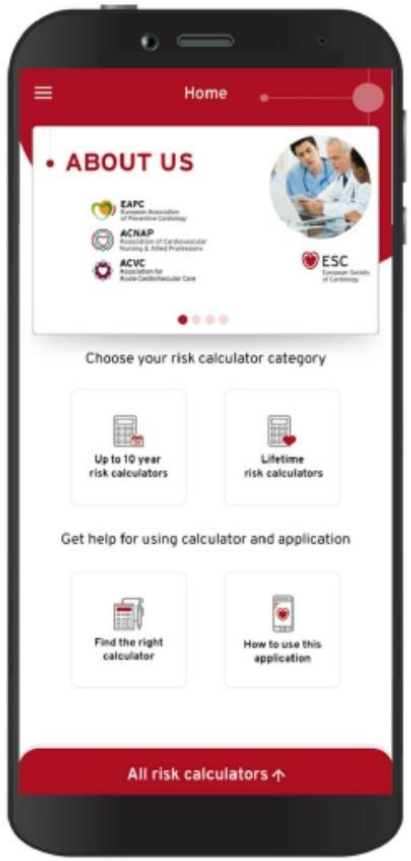
- 📍 **Repeat BP in clinic** (over a few days)
- 📍 **Home BP monitoring** (patient keeps a diary)
- 📍 **Ambulatory 24-hour BP measurement**

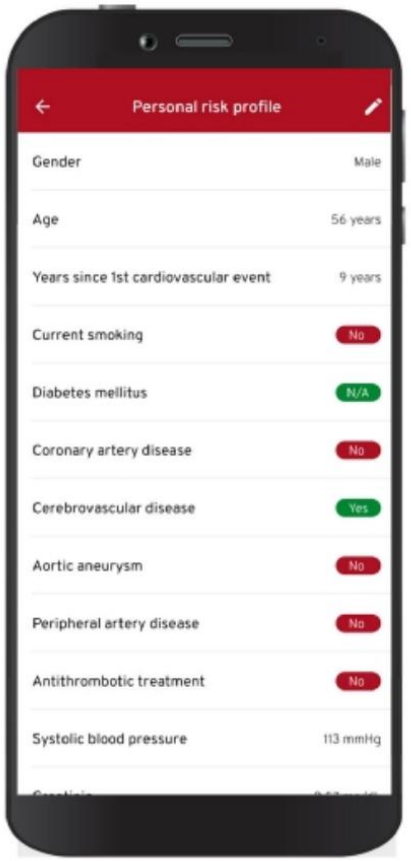
Step 2: Assess Cardiovascular risk profile

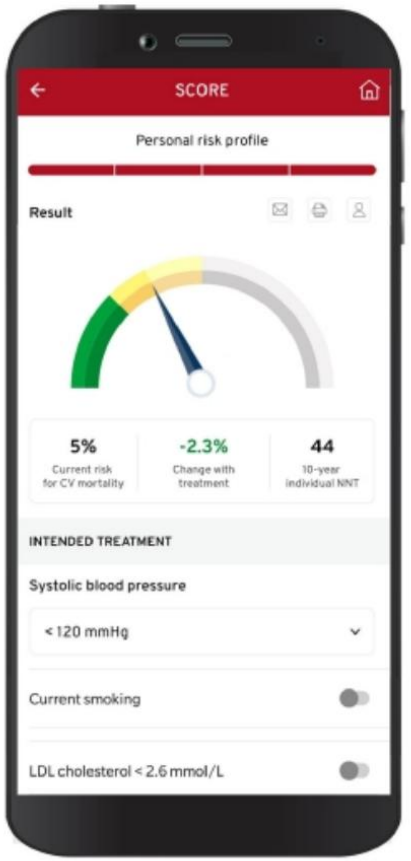
- **Lipid profile** (cholesterol levels)
- **HbA1c** (diabetes screening)
- **BMI measurement**
- **Smoking history & Alcohol intake**
- **Unhealthy diet assessment**
- **Salt intake**
- **Sedentary lifestyle**
- **Stress levels**

CV Risk Calculators

- SCORE2
- SCORE2-OP
- SCORE2-Diabetes
- ASCVD
- ADVANCE
- SMART
- SMART-REACH*
- DIAL*
- LIFE-CVD*

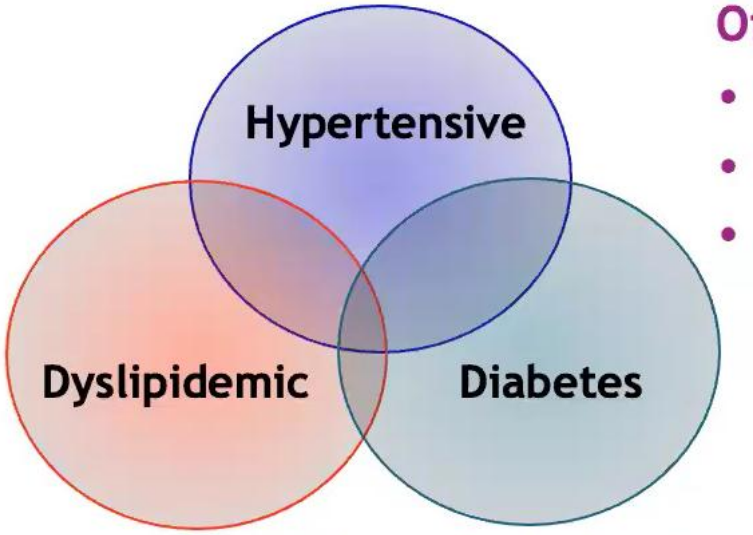






Most patients have overlapping CV risk factors

Multiple comorbidities increase risk 400-700%



Of all people with hypertension:

- 65% have dyslipidemia
- 16% have type 2 diabetes
- 45% are overweight/obese

Of all people with dyslipidemia:

- 48% have hypertension
- 14% have type 2 diabetes
- 35% are overweight/obese

Of all people with type 2 diabetes:

- 60% have hypertension
- 60% have dyslipidemia
- 90% are overweight/obese

Ivanovic et al., J Hypertension Vol 42 (suppl. 1): p e 164, May 2024. Vinereanu D et al. J Hypertension Vol 42 e-Supplement 1 , May 2024

Step 3: Check for Hypertension-Mediated Organ Damage (HMOD)

- 🫀 heart assessment - ECG +/- Echo
- 🚰 kidney function - Urinalysis, Cr, ACR
- 👁 eye damage check -Fundoscopy

Step 4: Look for Secondary Causes of Hypertension

🏥 Consider further investigations in patients with:

- 🌊 **Resistant hypertension** (uncontrolled on 3+ medications)
- 🔥 **Endocrine features** (e.g., Cushing's, pheochromocytoma signs)
- 🚀 **Young onset hypertension** (<40 years)
- 🩸 **Hypokalemia or metabolic alkalosis** (suggesting hyperaldosteronism)
- 🔍 **Renal bruit** (possible renovascular hypertension)
- 🌑 **Obstructive sleep apnea symptoms** (snoring, daytime fatigue)

2019 ESC/EAS Dyslipidemia Classification

Very high risk	People with any of the following: • Documented ASCVD, either clinical or unequivocal on imaging • DM with target organ damage, or at least three major risk factors, or early onset of T1DM of long duration (> 20 years) • Severe CKD (eGFR < 30 mL/min/1.73 m^2) • A calculated SCORE ≥ 10% for 10-year risk of fatal CVD • FH with ASCVD or with another major risk factor
High risk	People with: • Markedly elevated single risk factors, in particular TC > 8 mmol/L (310 mg/dL), LDL-C > 4.9 mmol/L (190 mg/dL), or BP ≥ 180/110 mmHg • Patients with FH without other major risk factors • Patients with DM without target organ damage, with DM duration ≥ 10 years or another additional risk factor • Moderate CKD (eGFR 30-59 mL/min/1.73 m^2) • A calculated SCORE ≥ 5% and < 10% for 10-year risk of fatal CVD
Moderate risk	• Young patients (T1DM < 35 years; T2DM < 50 years) with DM duration < 10 years, without other risk factors • Calculated SCORE ≥ 1% and < 5% for 10-year risk of fatal CVD
Low-risk	• Calculated SCORE < 1% for 10-year risk of fatal CVD

ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; FH, familial hypercholesterolaemia; LDL-C, low-density lipoprotein cholesterol; SCORE, Systematic Coronary Risk Estimation; T1DM, type 1 diabetes mellitus; T2DM, type 2 diabetes mellitus; TC, total cholesterol. Adapted from Mach F, et al. *Eur Heart J* 2020;41(1):111-88.

Clinical Cases

Clinical Case – pt AT

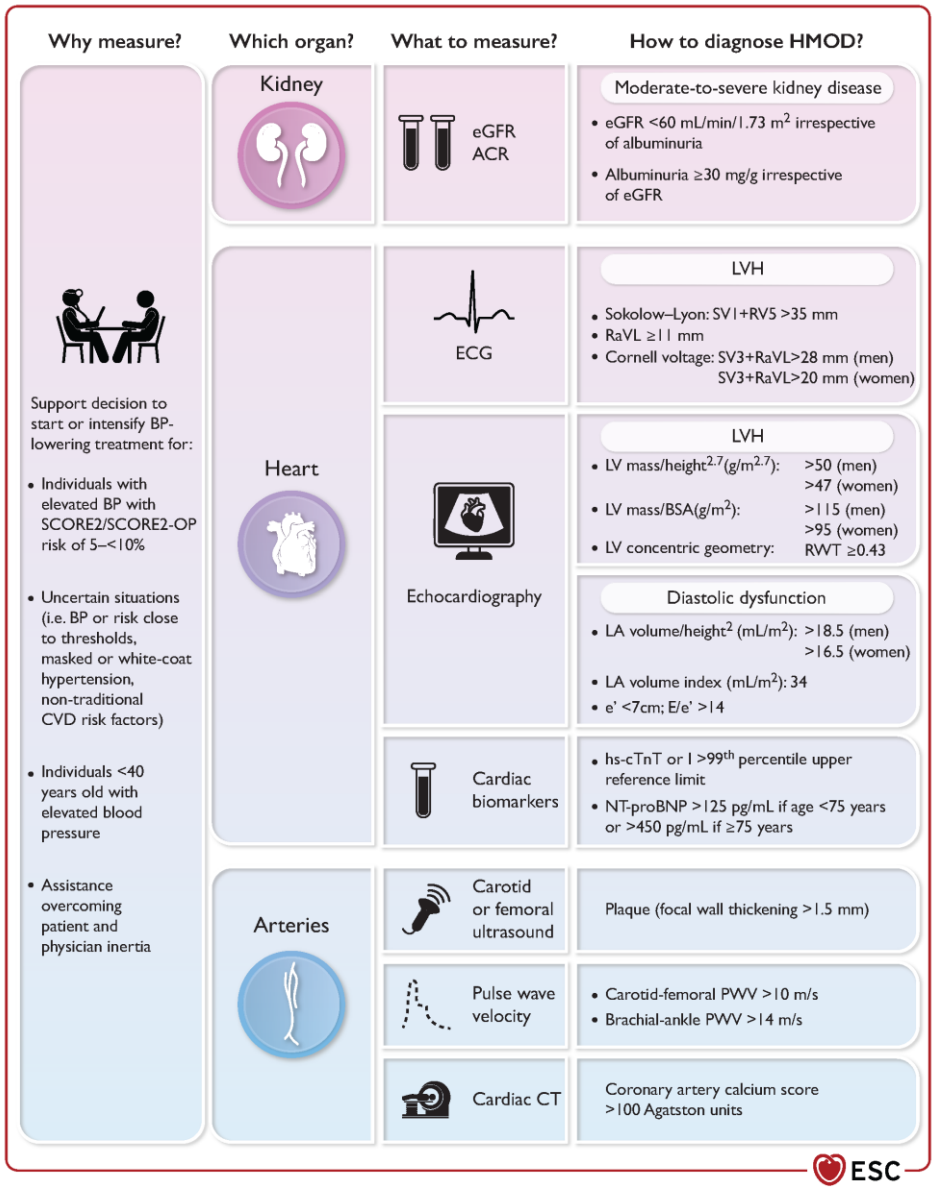
- 52 year old
- Episodes of atypical chest pain which precipitated hospital review
- Represented with atypical chest pain
- Strong FH of MI
- Father 56 year old died of MI
- PMH Nil
- DH Nil
- Ex-smoker
- Non drinker
- Office bp: 148/87mmHg, HR 79/bpm
- LDL-c 5.13mmol/L
- Negative EST

Clinical Case – pt AT

- Exercise stress test

  EST carried out according to BRUCE protocol 90% of target heart rate reached during stage 3. No symptoms reported. No significant ST changes. No arrhythmias. Normal BP response.

Tests and criteria for defining hypertension-mediated target organ damage and considerations for their use in clinical practice



2024 ESC Guidelines for the management of elevated blood pressure and hypertension (European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae178)

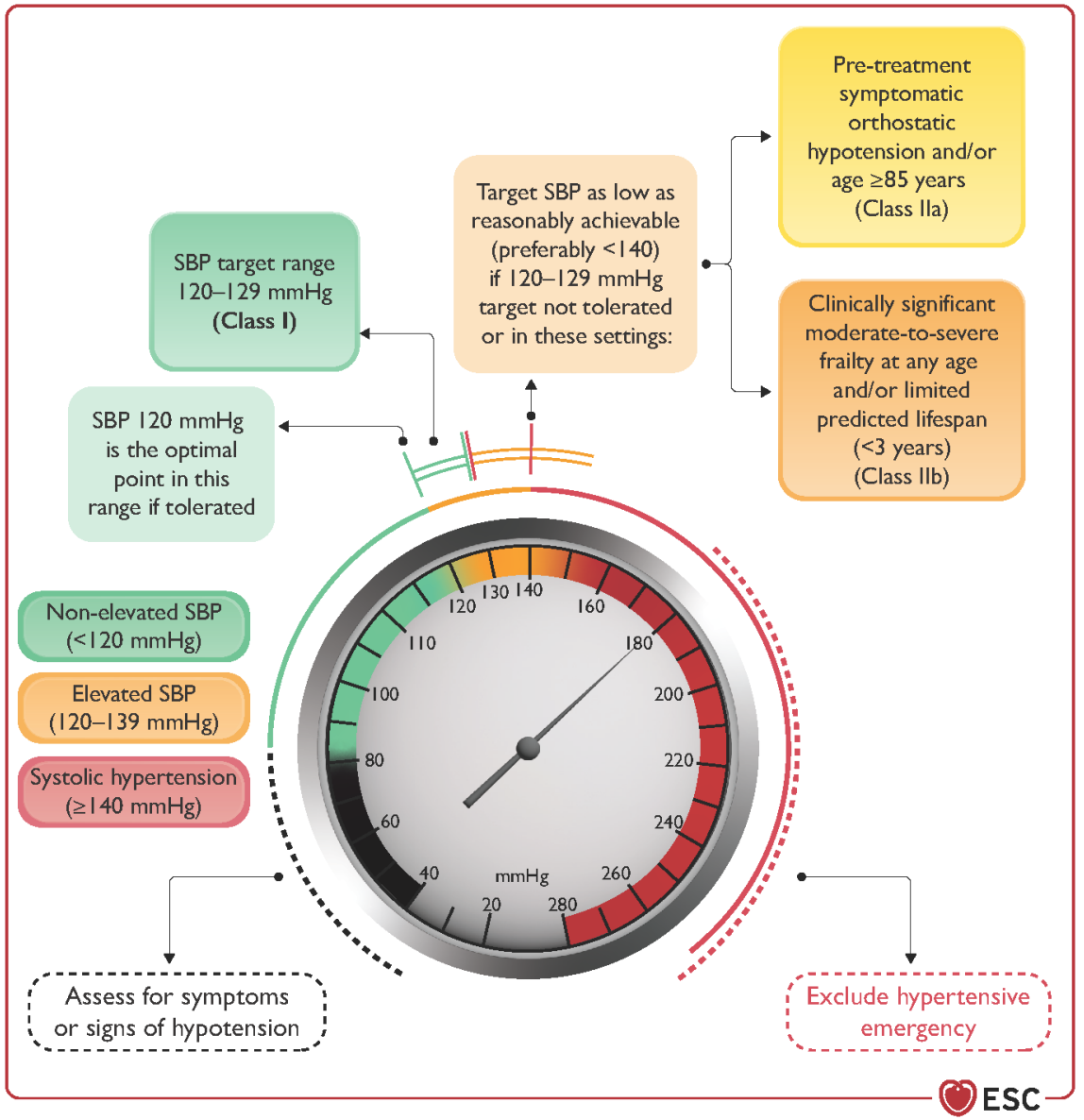
Revised recommendations (11)

2018 Guidelines	Class	Level	2024 Guidelines	Class	Level
Preventing and treating elevated blood pressure (blood pressure targets)					
It is recommended that the first objective of treatment should be to lower BP to <140/90 mmHg in all patients and, provided that the treatment is well tolerated, treated BP values should be targeted to 130/80 mmHg or lower in most patients.	**I**	**A**	To reduce CVD risk, it is recommended that treated systolic BP values in most adults be targeted to 120–129 mmHg, provided the treatment is well tolerated.	**I**	**A**
A diastolic BP target of <80 mmHg should be considered for all hypertensive patients, independent of the level of risk and comorbidities.	**IIa**	**B**	In cases where on-treatment systolic BP is at or below target (120–129 mmHg) but diastolic BP is not at target (≥80 mmHg), intensifying BP-lowering treatment to achieve an on-treatment diastolic BP of 70–79 mmHg may be considered to reduce CVD risk.	**IIb**	**C**

Revised recommendations (12)

2018 Guidelines	Class	Level	2024 Guidelines	Class	Level
Preventing and treating elevated blood pressure (blood pressure targets) cont.					
In older patients (aged ≥65 years) receiving BP-lowering drugs: • It is recommended that systolic BP should be targeted to a BP range of 130–139 mmHg.	**I**	**A**	Because the CVD benefit of an on-treatment systolic BP target of 120–129 mmHg may not generalize to the following specific settings, personalized and more lenient systolic BP targets (e.g. <140mmHg): should be considered among patients meeting the following criteria: • pre-treatment, symptomatic, orthostatic hypotension; • and/or age ≥85 years.	**IIa**	**C**

Systolic blood pressure categories and treatment target range

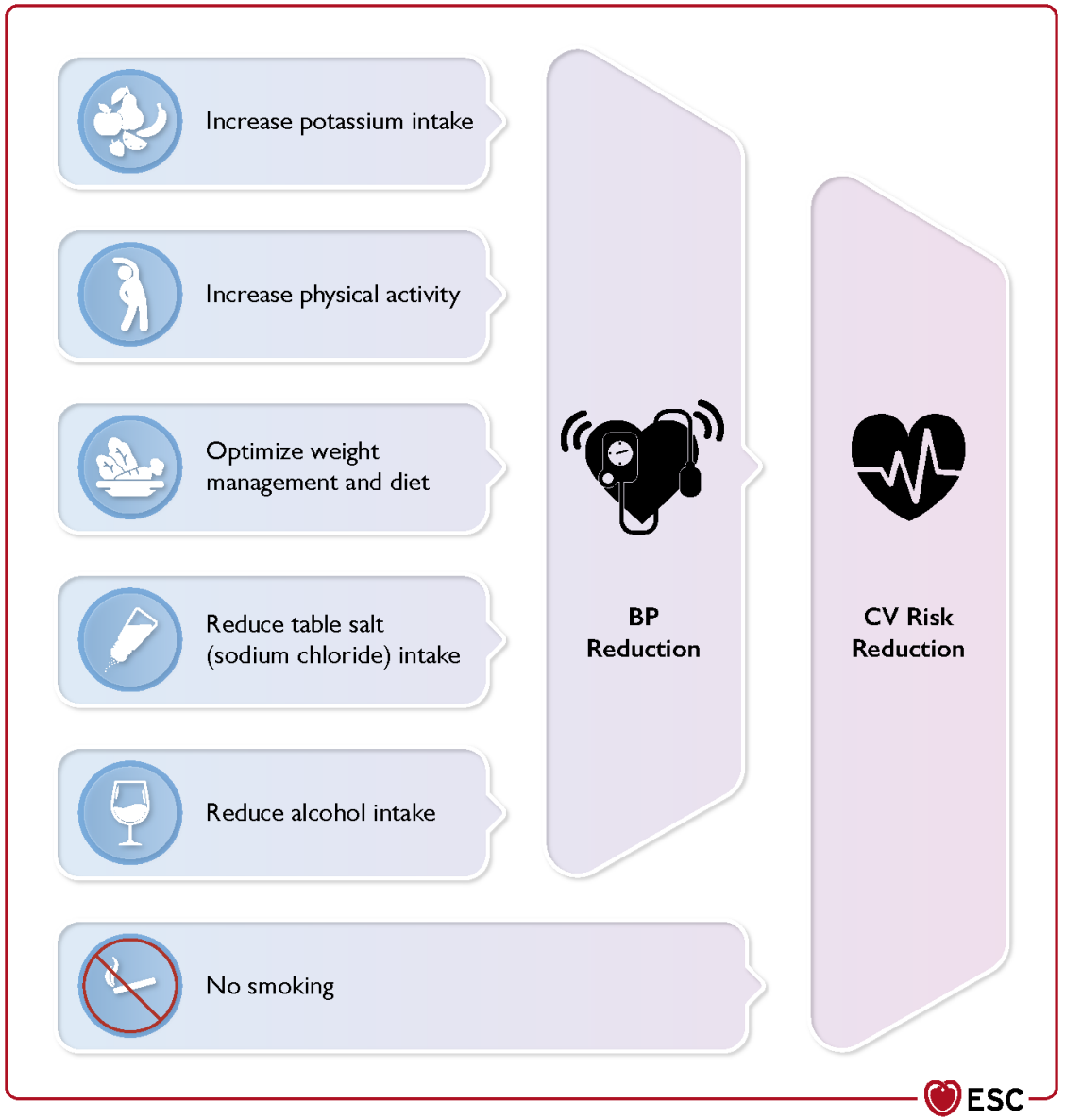


Effects of main lifestyle factors on blood pressure and cardiovascular risk reduction.

- Increased K+ intake, higher physical activity, optimized weight management: reduce BP and are associated with lower overall CV risk (short arrows).

- Salt reduction reduces BP & (for persons with high baseline intake) reduces cardiovascular risk.

- Smoking cessation reduces overall cardiovascular risk but not BP (long arrow).



2024 ESC Guidelines for the management of elevated blood pressure and hypertension
(European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae178)

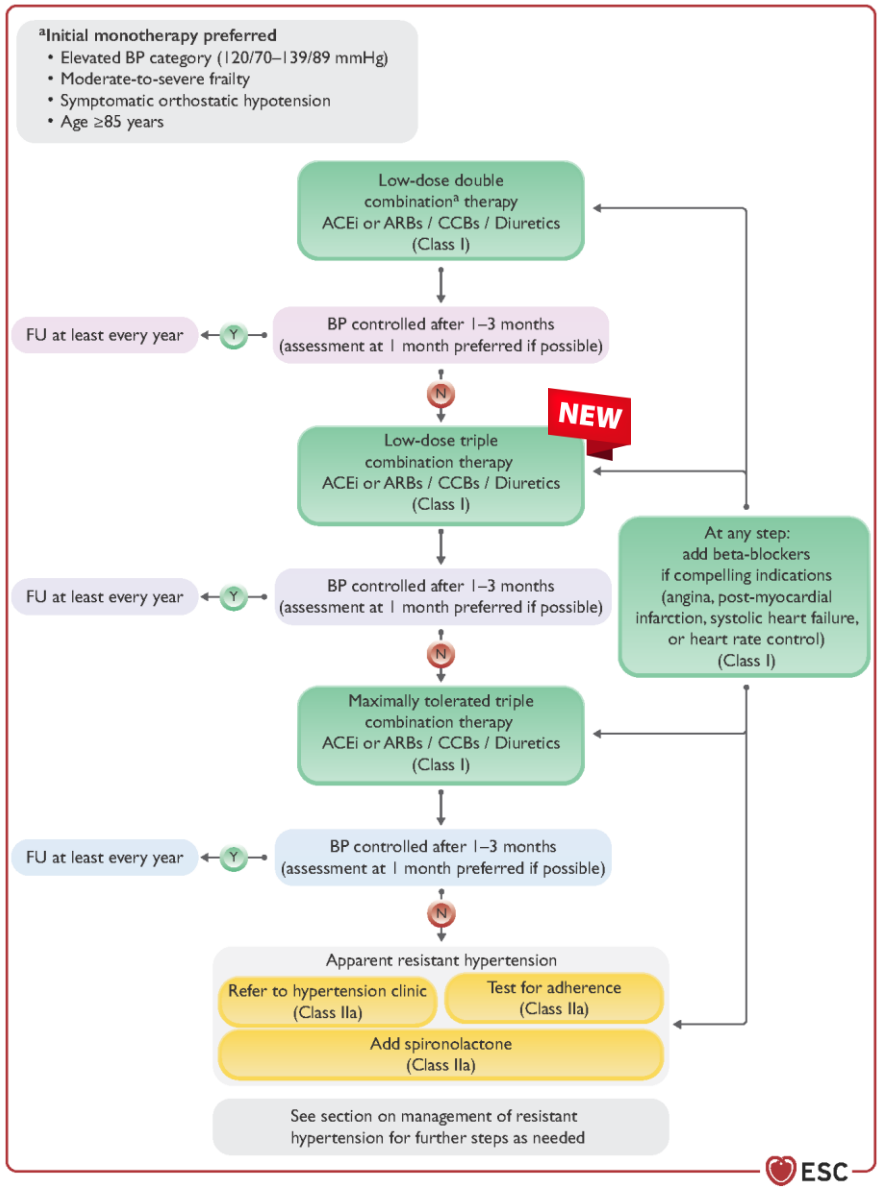
Recommendations for pharmacological treatment of hypertension (1)

Recommendations	Class	Level
Among all BP-lowering drugs, ACE inhibitors, ARBs, dihydropyridine CCBs, and diuretics (thiazides and thiazide-like drugs such as chlorthalidone and indapamide) have demonstrated the most effective reduction of BP and CVD events, and are therefore recommended as first-line treatments to lower BP.	I	A
It is recommended that beta-blockers are combined with any of the other major BP-lowering drug classes when there are other compelling indications for their use, e.g. angina, post-myocardial infarction, heart failure with reduced ejection fraction, or for heart rate control.	I	A
It is recommended to take medications at the most convenient time of day for the patient to establish a habitual pattern of medication taking to improve adherence.	I	B
In patients receiving combination BP-lowering treatment, fixed-dose single-pill combination treatment is recommended.	I	B

Recommendations for pharmacological treatment of hypertension (2)

Recommendations cont.	Class	Level
Given trial evidence for more effective BP control vs. monotherapy, combination BP-lowering treatment is recommended for most patients with confirmed hypertension (BP ≥140/90 mmHg) as initial therapy. Preferred combinations are a RAS blocker (either an ACE inhibitor or an ARB) with a dihydropyridine CCB or diuretic. Exceptions to consider include patients aged ≥85 years, those with symptomatic orthostatic hypotension, moderate-to-severe frailty, or elevated BP (systolic BP 120–139 mmHg or diastolic BP 70–89 mmHg) with a concomitant indication for treatment.	I	B
If BP is not controlled with a two-drug combination, increasing to a three-drug combination is recommended, usually a RAS blocker with a dihydropyridine CCB and a thiazide/thiazide-like diuretic, and preferably in a single-pill combination.	I	B
If BP is not controlled with a three-drug combination, adding spironolactone should be considered.	IIa	B

Practical algorithm for pharmacological blood pressure lowering



← Treatment initiation with Dual combination

← Earlier use of Triple combination

2024 ESC Guidelines for the management of elevated blood pressure and hypertension (European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae178)

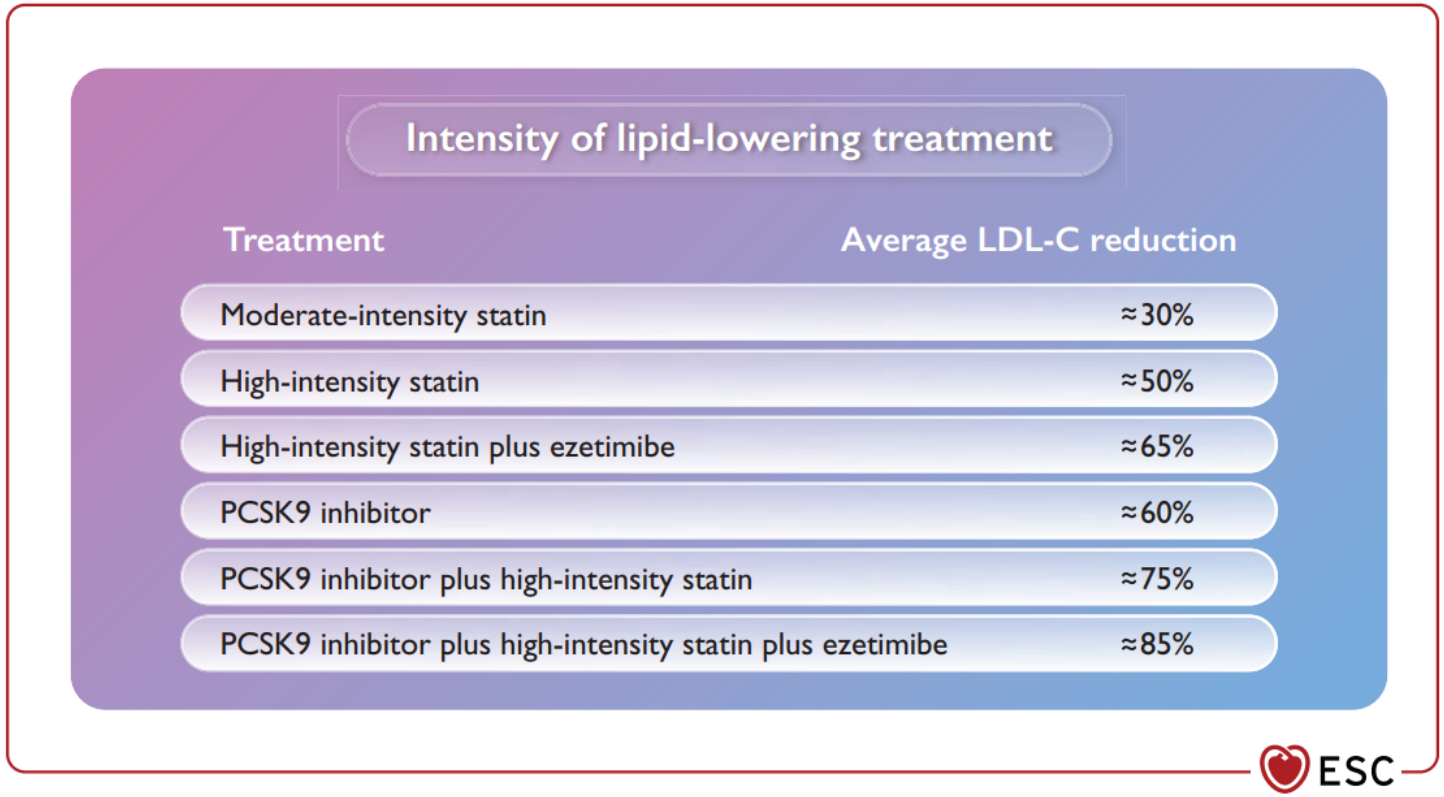
2019 ESC/EAS Guidelines

LDL < 1.0 mmol/ L VERY VERY High Risk

LDL < 1.4 mmol/ L	**Very high risk**	People with any of the following: • Documented ASCVD, either clinical or unequivocal on imaging • DM with target organ damage, or at least three major risk factors, or early onset of T1DM of long duration (> 20 years) • Severe CKD (eGFR < 30 mL/min/1.73 m^2) • A calculated SCORE ≥ 10% for 10-year risk of fatal CVD • FH with ASCVD or with another major risk factor
LDL < 1.8 mmol/ L	**High risk**	People with: • Markedly elevated single risk factors, in particular TC > 8 mmol/L (310 mg/dL), LDL-C > 4.9 mmol/L (190 mg/dL), or BP ≥ 180/110 mmHg • Patients with FH without other major risk factors • Patients with DM without target organ damage, with DM duration ≥ 10 years or another additional risk factor • Moderate CKD (eGFR 30-59 mL/min/1.73 m^2) • A calculated SCORE ≥ 5% and < 10% for 10-year risk of fatal CVD
LDL < 2.6 mmol/ L	**Moderate risk**	• Young patients (T1DM < 35 years; T2DM < 50 years) with DM duration < 10 years, without other risk factors • Calculated SCORE ≥ 1% and < 5% for 10-year risk of fatal CVD
LDL < 3 mmol/ L	**Low-risk**	• Calculated SCORE < 1% for 10-year risk of fatal CVD

- Father 56 year old died of MI
- LDL-c 5.13mmol/L

ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; FH, familial hypercholesterolaemia; LDL-C, low-density lipoprotein cholesterol; SCORE, Systematic Coronary Risk Estimation; T1DM, type 1 diabetes mellitus; T2DM, type 2 diabetes mellitus; TC, total cholesterol. Adapted from Mach F, et al. *Eur Heart J* 2020;41(1):111-88.



ESC European Society of Cardiology

European Heart Journal (2021) **42**, 3227–3337
doi:10.1093/eurheartj/ehab484

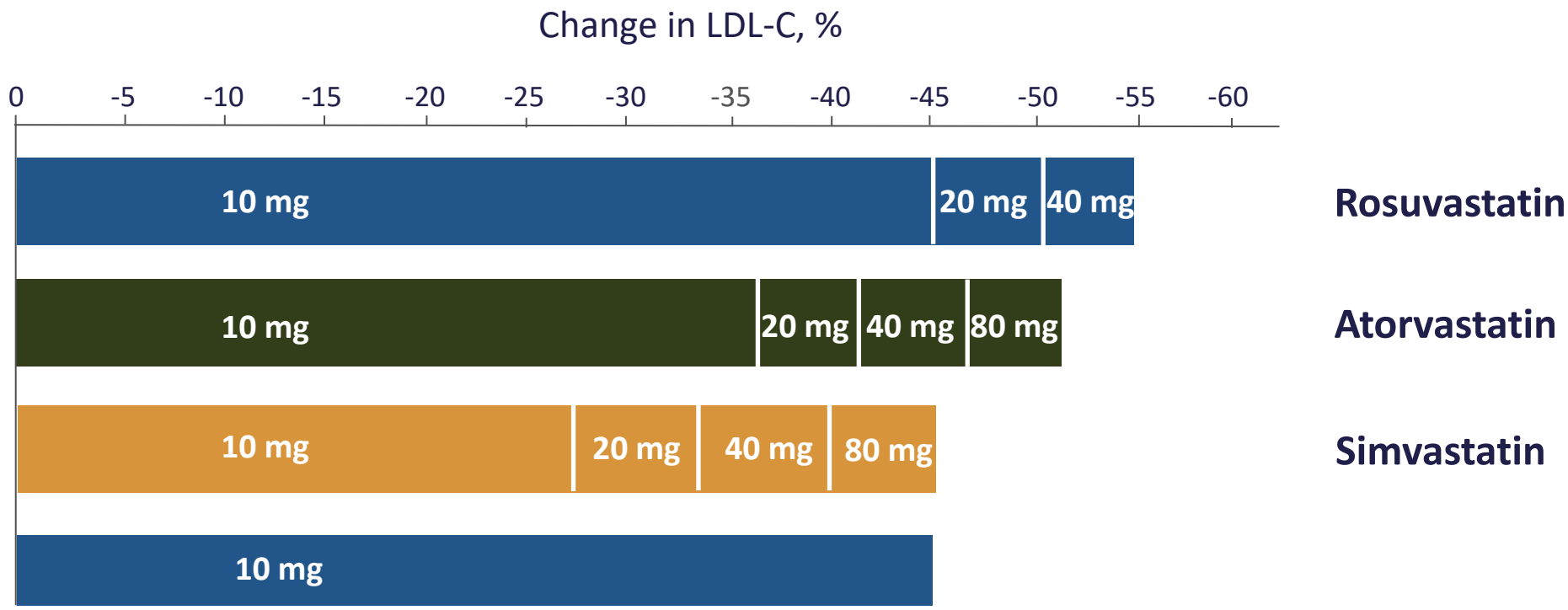
ESC GUIDELINES

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice

Statin intensity

High-Intensity Statin Therapy	Moderate-Intensity Statin Therapy	Low-Intensity Statin Therapy
Daily dose lowers LDL on average by ≥50%	Daily dose lowers LDL on average by approximately 30-49%	Daily dose lowers LDL on average by <30%
Atorvastatin 40-80 mg Rosuvastatin 20-40 mg	Atorvastatin 10-20 mg Rosuvastatin 5-10 mg Simvastatin 20-40 mg Pravastatin 40-80 mg Lovastatin 40 mg Fluvastatin XL 80 mg Fluvastatin 40 mg BID Pitavastatin 2-4 mg	Simvastatin 10 mg Pravastatin 10-20 mg Lovastatin 20 mg Fluvastatin 20-40 mg

Doubling Statin Dose will only Achieve ~6% Additional LDL-C Reduction



LDL-C, low-density lipoprotein cholesterol. Adapted from "FDA drug safety communication: New restrictions, contraindications, and dose limitations for simvastatin to reduce the risk of muscle injury." US Food & Drug Administration website. Accessed June 2020.

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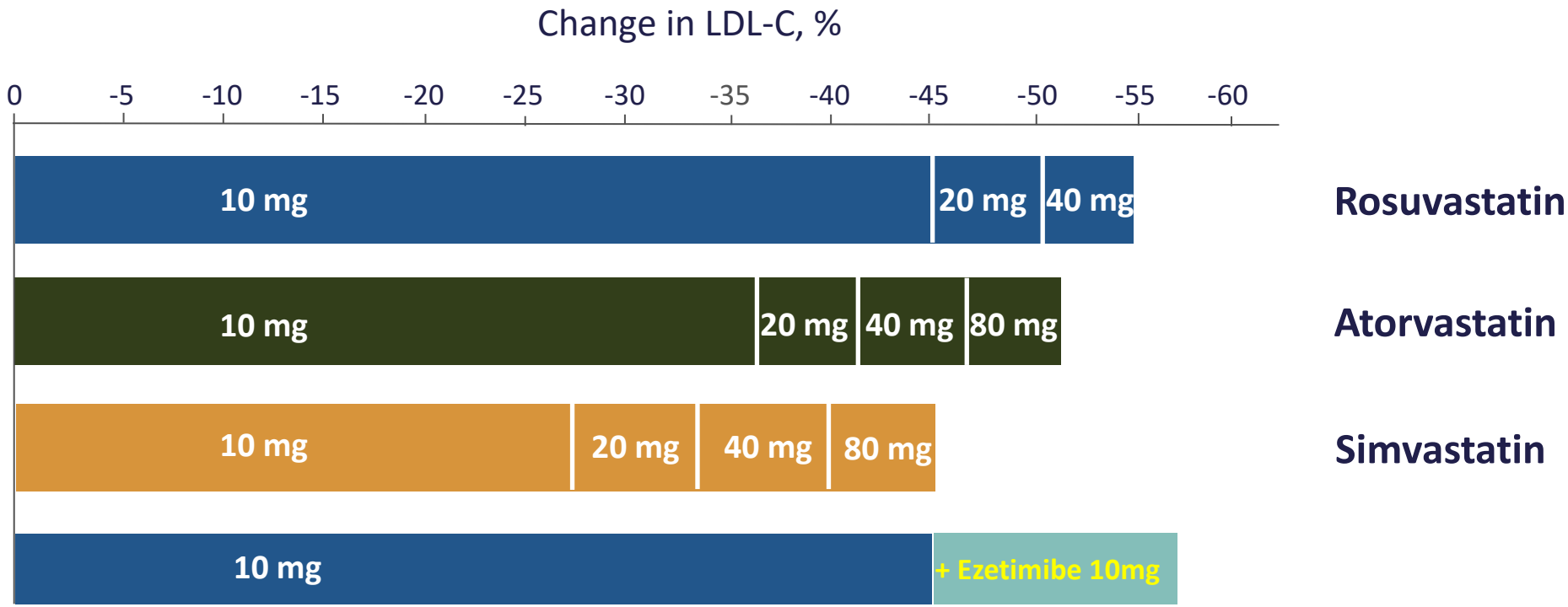

LDL-C, low-density lipoprotein cholesterol. Adapted from "FDA drug safety communication: New restrictions, contraindications, and dose limitations for simvastatin to reduce the risk of muscle injury." US Food & Drug Administration website. Accessed June 2020.

Clinical Case – pt TS

- 49-year old male
- No current treatments
- Weight gain of 7kg during pandemic
- Smoking 5 cigarettes a day
- Family history of hypertension (father) and CVD
- Current complaints: fatigue, otherwise asymptomatic
- BMI 27kg/m^2
- Office bp: 143/82mmHg, HR 78/bpm

Clinical Case – pt TS

- Fasting glucose 97mg/dL (5.4mmol/L)
- HbA1c 5.9%
- Normal serum Na+ & K+
- eGFR >60mL/min/1.73m^2
- Total cholesterol 7.1mmol/L
- HDL cholesterol 0.7 mmol/L
- TG 1.8 mmol/L
- LDL-c 5.5 mmol/L
- Non-HDL 6.4 mmol/L

Blood pressure categories

NEW

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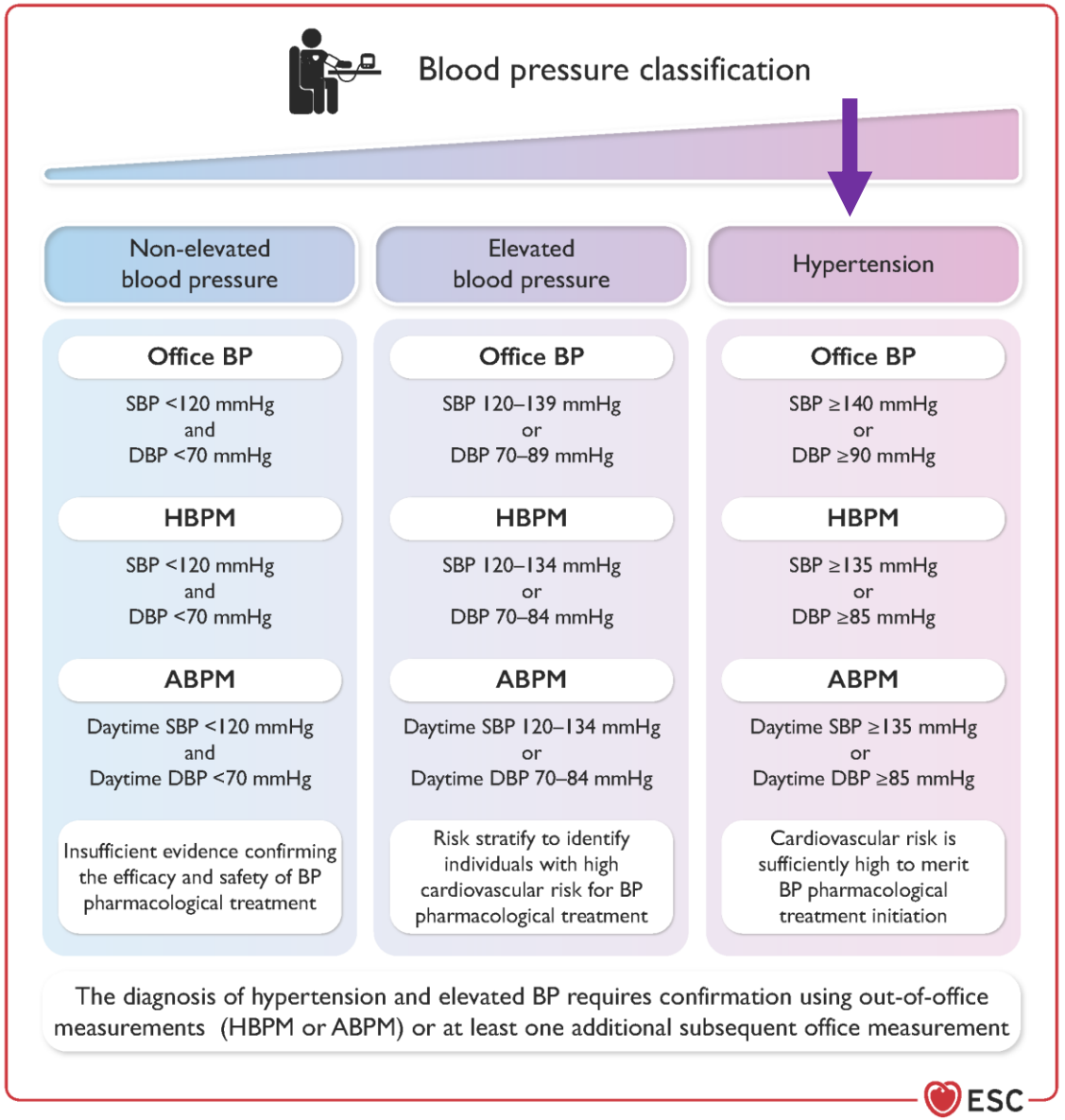
- New group of patients with elevated bp
- No hypertension grades defined
- For “Elevated bp”: risk stratify to identify high CV risk for BP pharmacological treatment



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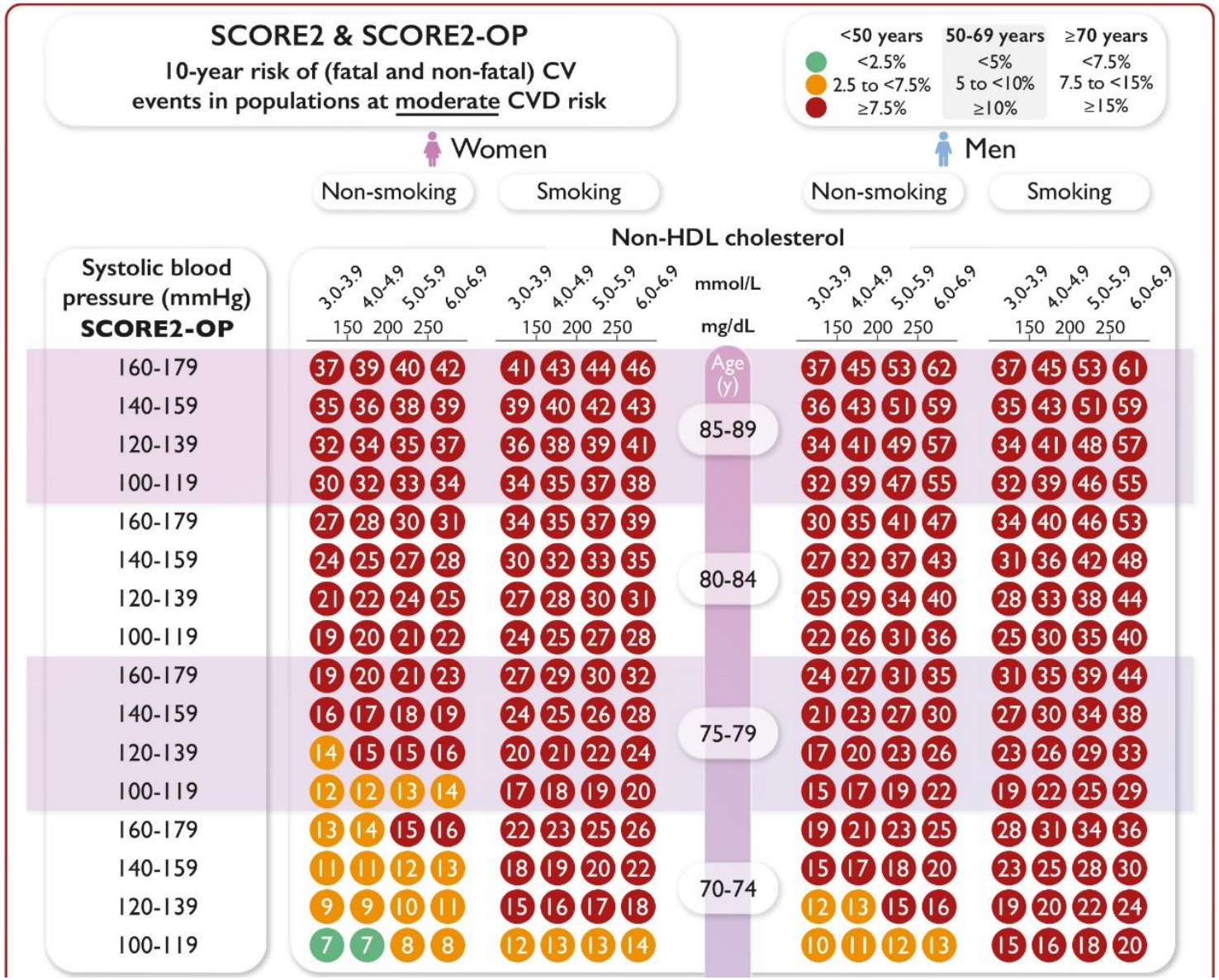
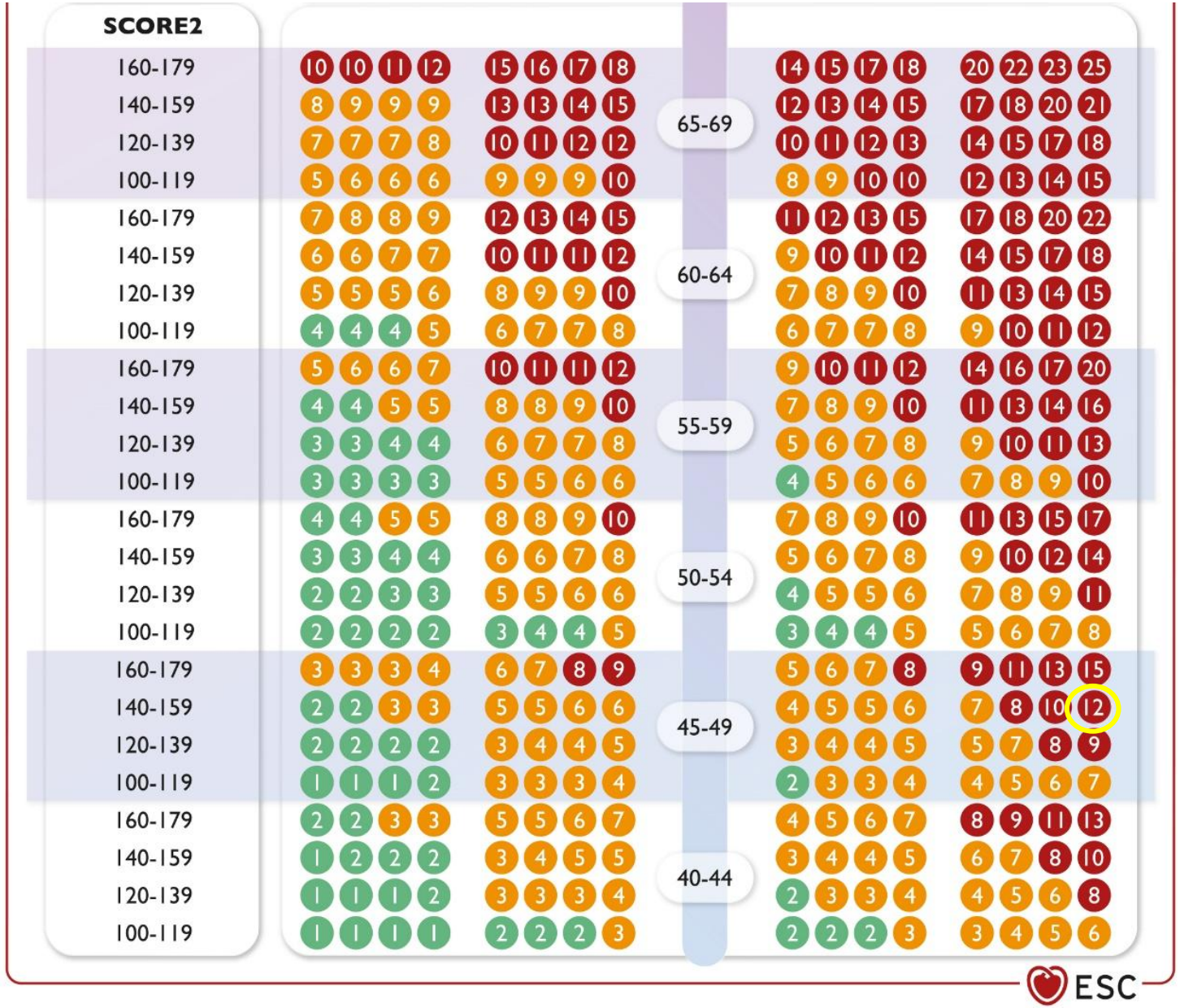


SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Moderate CVD Risk (1)

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice
(European Heart Journal 2021 – doi:10.1093/eurheartj/ehab484)



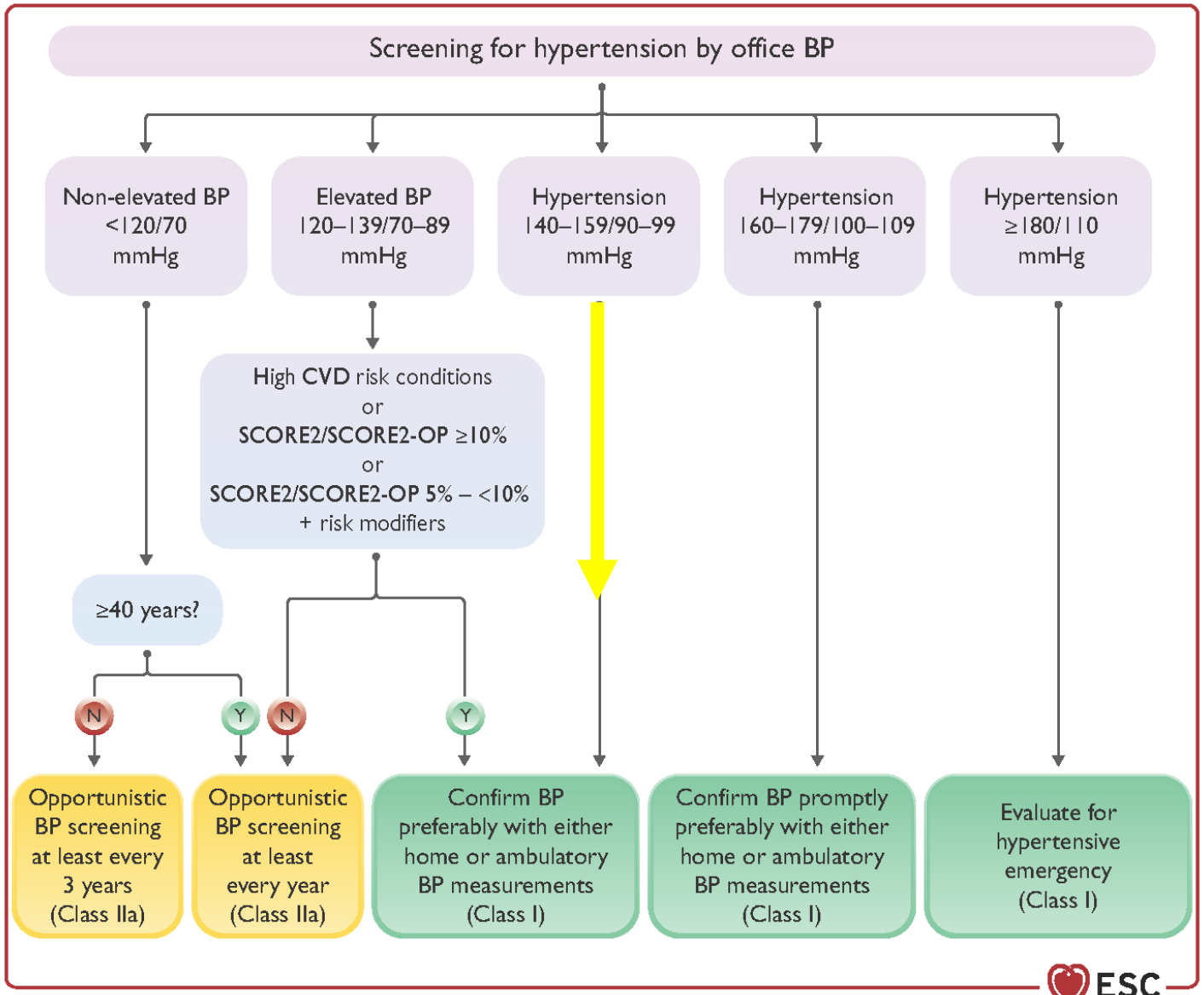
SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Moderate CVD Risk (2)

BP: 143/82mmHg
Non-HDL: 6.4mmol/L

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice
(European Heart Journal 2021 – doi:10.1093/eurheartj/ehab484)

Protocol for confirming hypertension diagnosis



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(European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae178)

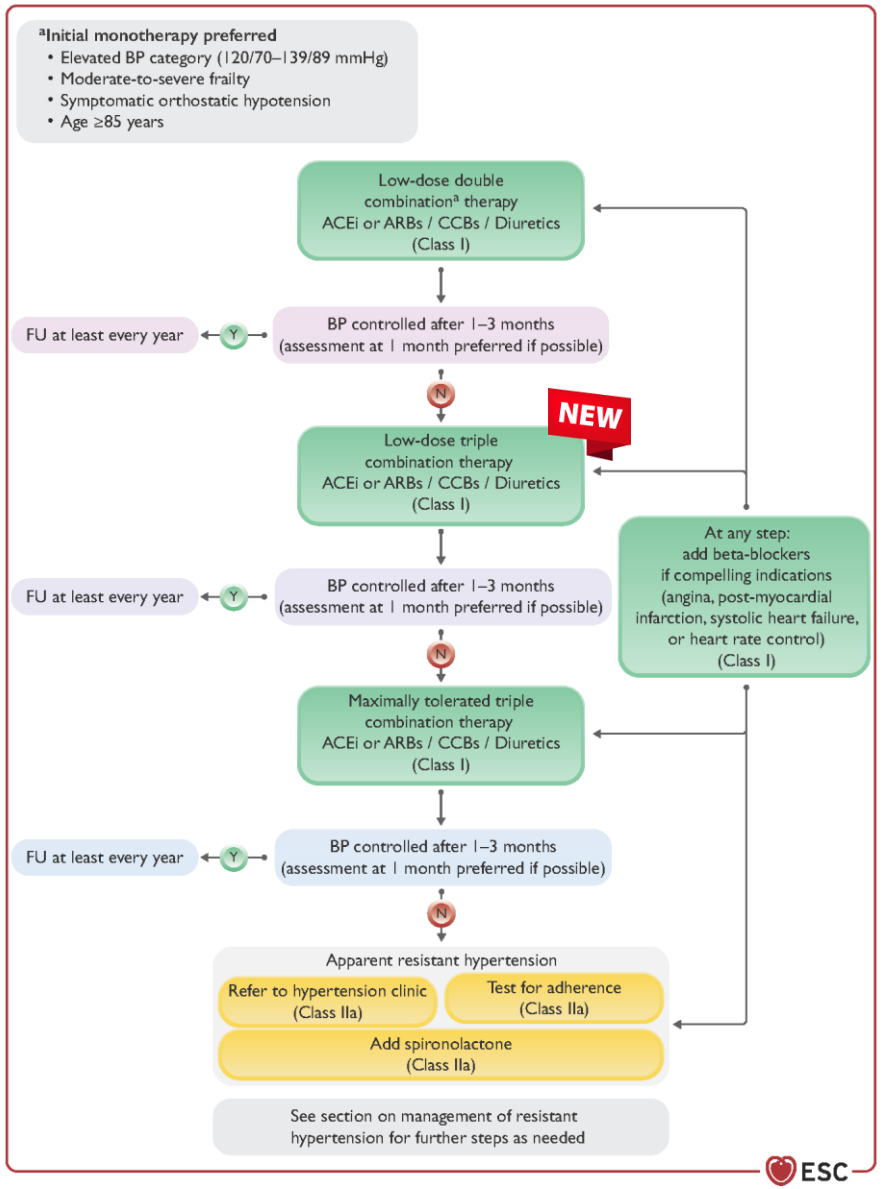
New recommendations (1)

Recommendations	Class	Level
Measuring blood pressure		
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 atrial fibrillation; BP measurement should be considered using a manual auscultatory method in these circumstances, where possible.	IIa	C

Comparison of office, home, and ambulatory blood pressure measurement thresholds for elevated blood pressure and HTN

	Office BP (mmHg)	Home BP (mmHg)	Daytime ABPM (mmHg)	24 h ABPM (mmHg)	Night-time ABPM (mmHg)
Non-elevated BP	<120/70	<120/70	<120/70	<115/65	<110/60
Elevated BP	120/70–<140/90	120/70–<135/85	120/70–<135/85	115/65–<130/80	110/60–<120/70
Hypertension	≥140/90	≥135/85	≥135/85	≥130/80	≥120/70

Practical algorithm for pharmacological blood pressure lowering



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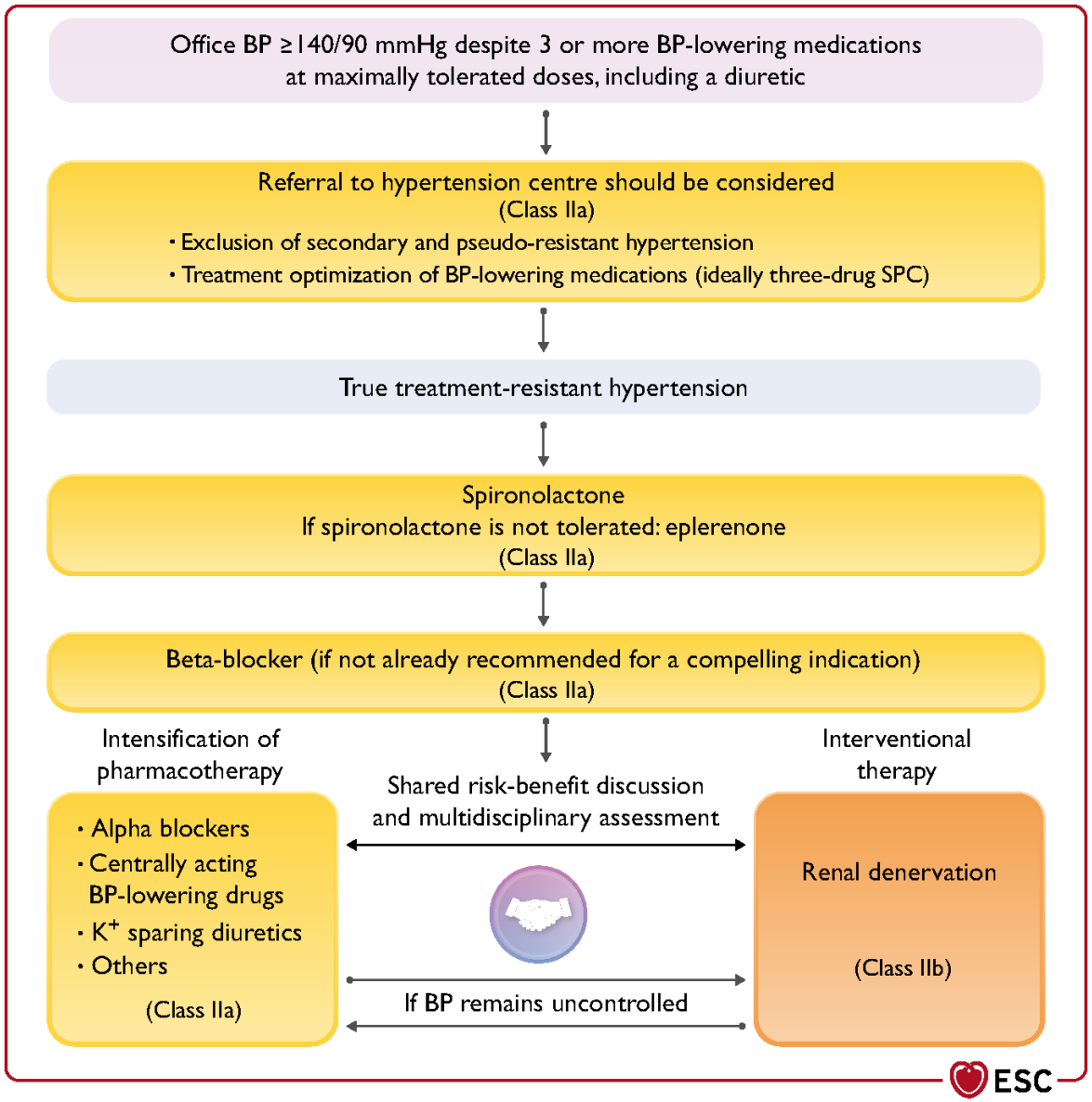
Management of resistant hypertension

In patients with true resistant hypertension, the fourth line treatment should include the MRA spironolactone (or eplerenone), or a BB (if MRA not tolerated or not effective)



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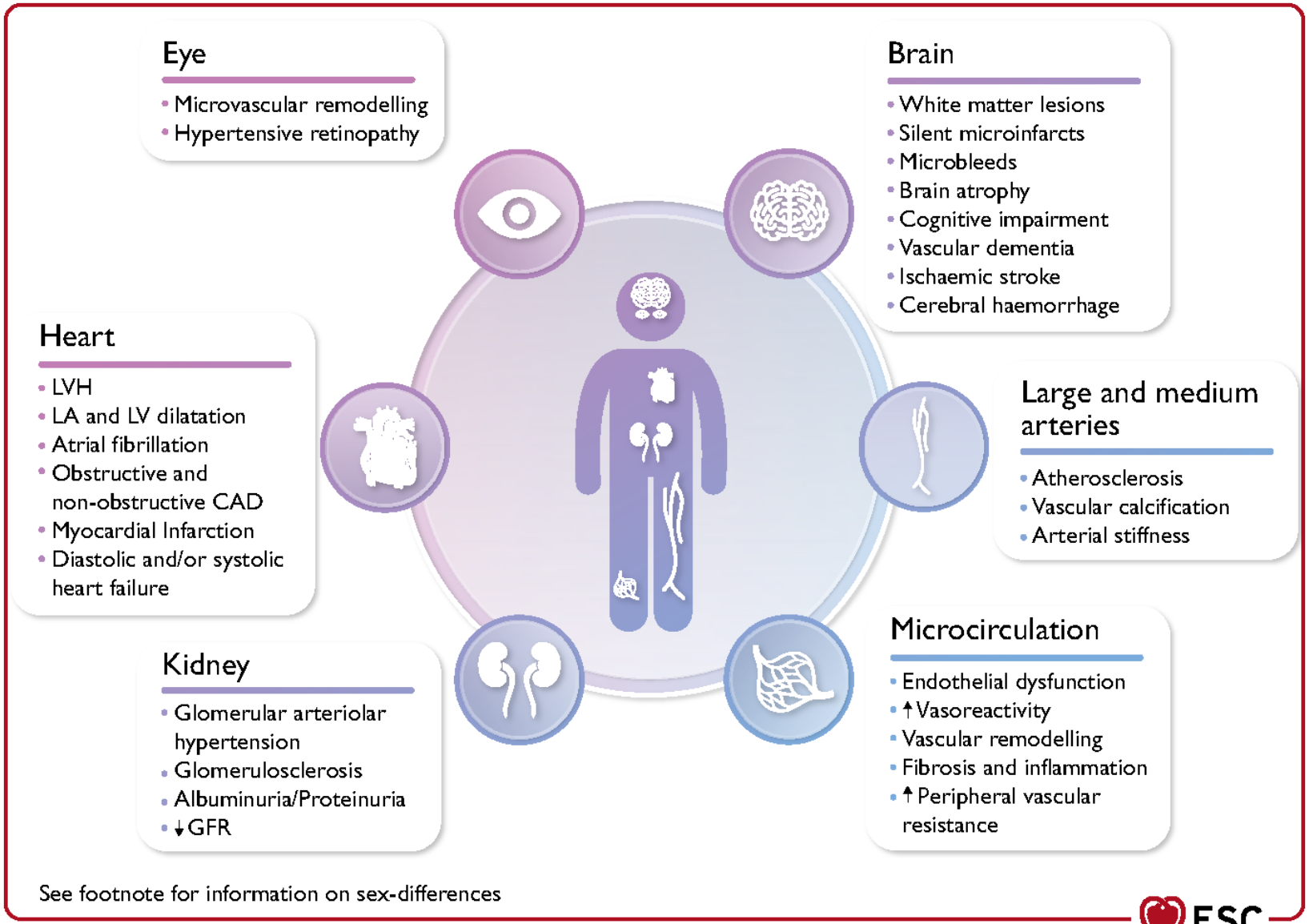
(European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae178)

Persistently elevated blood pressure and hypertension lead to hypertension-mediated organ damage and cardiovascular disease



Clinical Case – pt TS

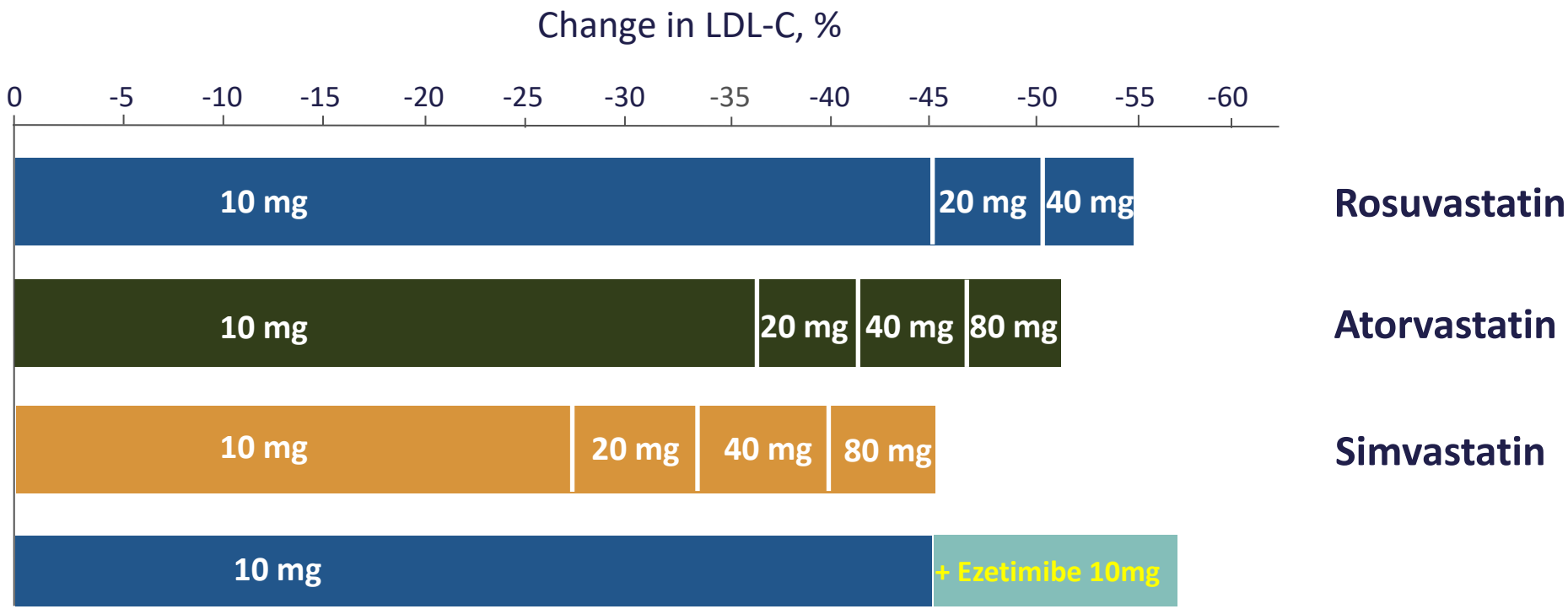
- Fasting glucose 97mg/dL (5.4mmol/L)
- HbA1c 5.9%
- Normal serum Na+ & K+
- eGFR >60mL/min/1.73m^2
- Total cholesterol 7.1mmol/L
- HDL cholesterol 0.7 mmol/L
- TG 1.8 mmol/L
- LDL-c 5.5 mmol/L
- Non-HDL 6.4 mmol/L

2019 ESC/EAS Dyslipidemia Targets

LDL-C goal		
LDL > 1.4mmol/L	**Very high risk**	People with any of the following: • Documented ASCVD, either clinical or unequivocal on imaging • DM with target organ damage, or at least three major risk factors, or early onset of T1DM of long duration (> 20 years) • Severe CKD (eGFR < 30 mL/min/1.73 m^2) • A calculated SCORE ≥ 10% for 10-year risk of fatal CVD • FH with ASCVD or with another major risk factor
LDL > 1.8mmol/L	**High risk**	People with: • Markedly elevated single risk factors, in particular TC > 8 mmol/L (310 mg/dL), LDL-C > 4.9 mmol/L (190 mg/dL), or BP ≥ 180/110 mmHg • Patients with FH without other major risk factors • Patients with DM without target organ damage, with DM duration ≥ 10 years or another additional risk factor • Moderate CKD (eGFR 30-59 mL/min/1.73 m^2) • A calculated SCORE ≥ 5% and < 10% for 10-year risk of fatal CVD
LDL > 2.6mmol/L	**Moderate risk**	• Young patients (T1DM < 35 years; T2DM < 50 years) with DM duration < 10 years, without other risk factors • Calculated SCORE ≥ 1% and < 5% for 10-year risk of fatal CVD
LDL > 3 mmol/L	**Low risk**	• Calculated SCORE < 1% for 10-year risk of fatal CVD

ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; FH, familial hypercholesterolaemia; LDL-C, low-density lipoprotein cholesterol; SCORE, Systematic Coronary Risk Estimation; T1DM, type 1 diabetes mellitus; T2DM, type 2 diabetes mellitus; TC, total cholesterol. Adapted from Mach F, et al. *Eur Heart J* 2020;41(1):111-88.

Doubling Statin Dose will only Achieve ~6% Additional LDL-C Reduction



LDL-C, low-density lipoprotein cholesterol. Adapted from "FDA drug safety communication: New restrictions, contraindications, and dose limitations for simvastatin to reduce the risk of muscle injury." US Food & Drug Administration website. Accessed June 2020.

Clinical Case – pt EB

- 48 year old male
- Smoker / on no regular Rx
- Presented with STEMI late December 2023
- Normal LV ejection fraction
- History: Revascularization (PDA / RCA / LAD) in January 2023
- TC 7.5 LDL 4.5 TG 4.4

*PDA=Posterior Descending Artery; RCA=Right coronary artery; LAD = left anterior descending artery

2019 ESC/EAS Dyslipidemia Targets

LDL-C goal		
LDL > 1.4mmol/L	**Very high risk**	People with any of the following: • Documented ASCVD, either clinical or unequivocal on imaging • DM with target organ damage, or at least three major risk factors, or early onset of T1DM of long duration (> 20 years) • Severe CKD (eGFR < 30 mL/min/1.73 m^2) • A calculated SCORE ≥ 10% for 10-year risk of fatal CVD • FH with ASCVD or with another major risk factor
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LDL > 2.6mmol/L	**Moderate risk**	• Young patients (T1DM < 35 years; T2DM < 50 years) with DM duration < 10 years, without other risk factors • Calculated SCORE ≥ 1% and < 5% for 10-year risk of fatal CVD
LDL > 3 mmol/L	**Low risk**	• Calculated SCORE < 1% for 10-year risk of fatal CVD

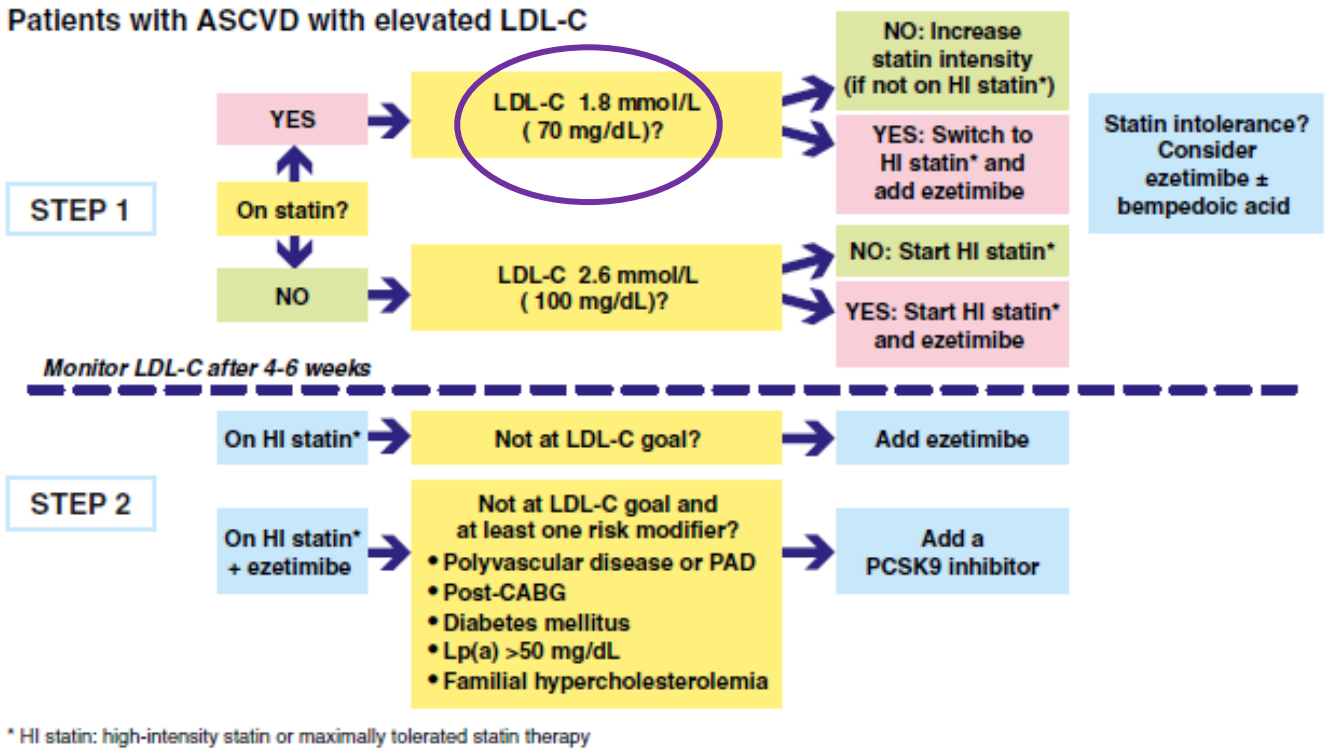
ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; FH, familial hypercholesterolaemia; LDL-C, low-density lipoprotein cholesterol; SCORE, Systematic Coronary Risk Estimation; T1DM, type 1 diabetes mellitus; T2DM, type 2 diabetes mellitus; TC, total cholesterol. Adapted from Mach F, et al. *Eur Heart J* 2020;41(1):111-88.

ESC European Society of Cardiology
European Heart Journal (2020) 41, 111–188
doi:10.1093/eurheartj/ehz455

2019 ESC/EAS Guidelines for the management of dyslipidaemias: *lipid modification to reduce cardiovascular risk*

Treatment goals for LDL-C		
In secondary prevention for patients at very-high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) are recommended.	I	A
In primary prevention for individuals at very-high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) are recommended.	I	C
In patients at high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.8 mmol/L (<70 mg/dL) are recommended.	I	A
Pharmacological LDL-C lowering		
It is recommended that a high-intensity statin is prescribed up to the highest tolerated dose to reach the goals set for the specific level of risk.	I	A
If the goals are not achieved with the maximum tolerated dose of a statin, combination with ezetimibe is recommended.	I	B
For secondary prevention in patients at very-high risk not achieving their goal on a maximum tolerated dose of a statin and ezetimibe, a combination with a PCSK9 inhibitor is recommended.	I	A
For very-high-risk FH patients (that is, with ASCVD or with another major risk factor) who do not achieve their goal on a maximum tolerated dose of a statin and ezetimibe, a combination with a PCSK9 inhibitor is recommended.	I	C

New EAS 2021 Statement supporting upfront combinations of high-intensity statin/ezetimibe and fixed-dose combinations (FDCs)



Upfront combinations

2.1.3. ***Why upfront combination treatment with a statin and ezetimibe?***

Patients with ASCVD, particularly those at enhanced risk with additional risk moderators, **or FH without ASCVD and high LDL-C levels**, are unlikely to attain LDL-C goal with intense statin monotherapy. **Therefore, this Task Force recommends upfront combination high-intensity statin-ezetimibe treatment in the patients.** This approach has particular advantages in avoiding repeated follow-up, allowing patients to be on target as early as possible , with favorable impact on cardiovascular outcome.

In FDCs

Proportion of patients at LDL-C goal by 3-fold [28]. **The availability of a fixed combination of ezetimibe and high dose of a more efficacious statin will likely improve patient adherence.**

Paradigm shift in dyslipidemia management:

moving from a sequential treatment strategy to the upfront use of combinations

Averna M et al. *Atherosclerosis*. 2021;325:99-109. doi:10.1016/j.atherosclerosis.2021.03.039.

Dose of Rosuvastatin on CV Morbidity & Mortality is important

Study Name	Rosuvastatin Dose	Population	Primary Outcome
JUPITER Trial	20 mg daily	Individuals with elevated CRP levels and normal LDL levels	Significant reduction in cardiovascular events
HOPE-3 Trial	10 mg daily	Intermediate-risk individuals without cardiovascular disease	Reduced incidence of cardiovascular events
CORONA Trial	10 mg daily	Patients with systolic heart failure	No significant reduction in primary outcome; reduced hospitalizations
ASTEROID Trial	40 mg daily	Patients with coronary artery disease	Significant regression of atherosclerosis
METEOR Trial	40 mg daily	Individuals with low Framingham risk scores and evidence of subclinical atherosclerosis	Slowed progression of carotid intima-media thickness

In high & very high risk patients, an LDL-C reduction of at least 50% from baseline together with an LDL-C goal of <1.4 mmol/L) are recommended (both goals need to be achieved).
High-intensity statins at a dose of Rosuvastatin **10-20mg** are required to give CV protection.

Practical guidance for combination lipid-modifying therapy in high- and very-high-risk patients: A statement from a European Atherosclerosis Society Task Force; Atherosclerosis. 2021 May;325:99-109 doi: 10.1016/j.atherosclerosis.2021.03.039

Clinical Case – pt EB

Timeline

STEMI Dec 2023
- TC 7.4
- LDL 4.5
- TG 4.4

Started on Rosuvastatin/Ezetimibe 10/10 Dec 2023

4 weeks later
TC 2.9
LDL 1.1
TG 0.9

10 weeks later
C 2.7
LDL 1.2
Triglycerides 1.2

Re-Testing

The expected LDL-C reductions in response to therapy are shown in *Figure 13*, and may vary widely among individuals. Therefore, monitoring the effect on LDL-C levels is recommended, with assessment of LDL-C levels 4-6 weeks after any treatment strategy initiation or change.

ESC European Society of Cardiology

European Heart Journal (2021) **42**, 3227–3337
doi:10.1093/eurheartj/ehab484

ESC GUIDELINES

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice

Conclusions

- Dyslipidemia & hypertension are important variables in Cardiovascular Disease
- Different targets for different patient populations
- Dyslipidemia treatment: *the earlier, the lower, the longer…the better*
- Hypertension guidelines place a greater emphasis on individualized care and out-of-office monitoring, while introducing a more aggressive treatment target and new definitions for elevated BP.

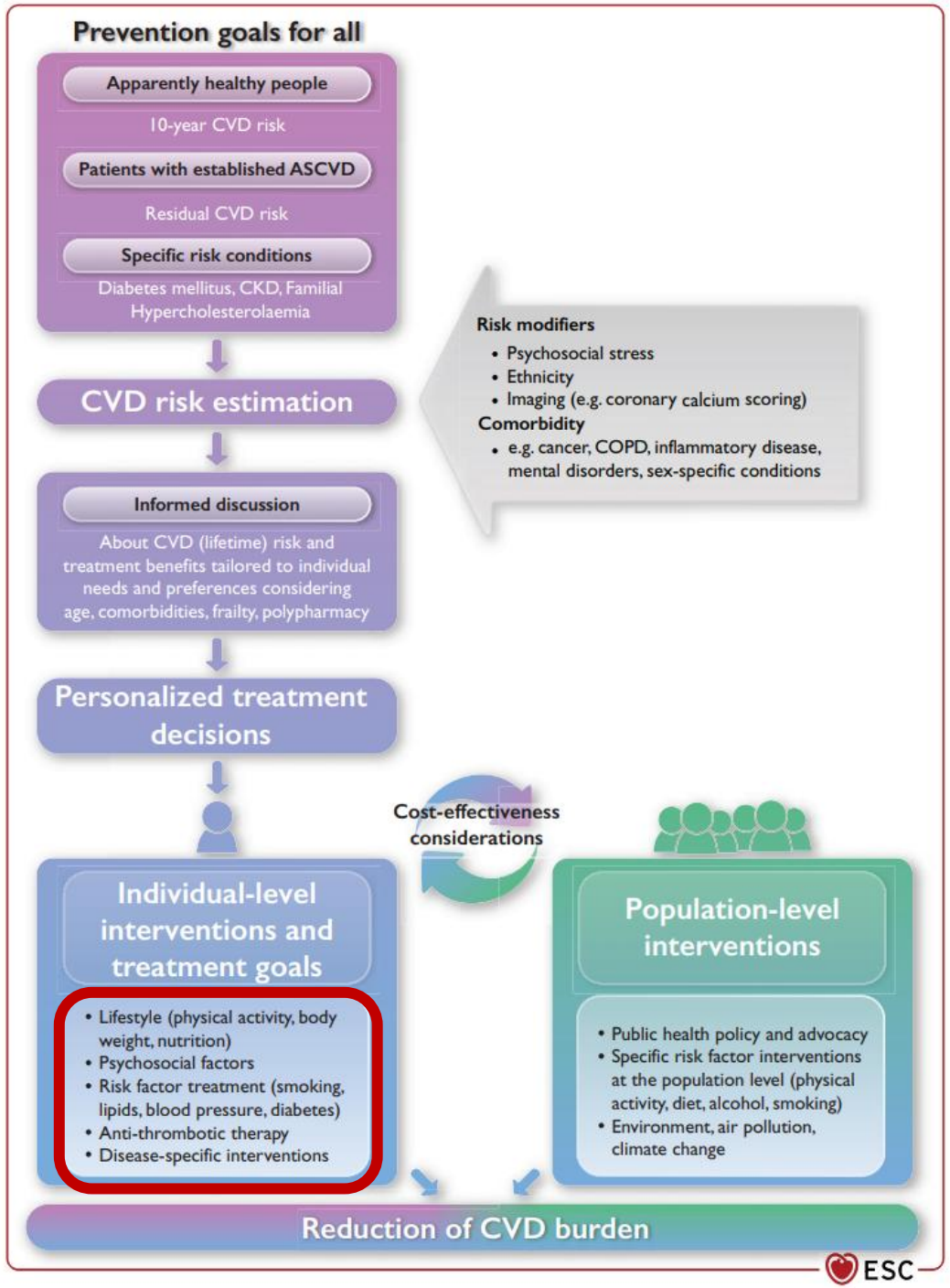
Back-up slides

Risk Assessment

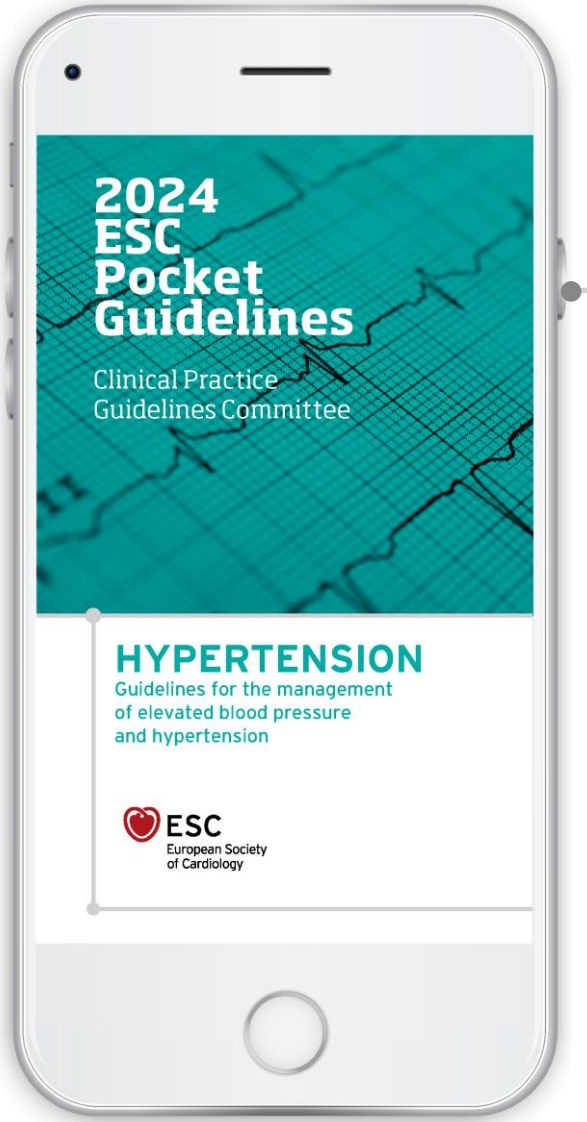
ESC European Society of Cardiology
European Heart Journal (2021) **42**, 3227–3337
doi:10.1093/eurheartj/ehab484

ESC GUIDELINES

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice



ESC Pocket Guidelines App to access



- **All ESC Pocket Guidelines**

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- **Over 140 interactive tools**
  - > Clinical decision support
  - > Algorithms
  - > Calculators
  - > Charts & Scores
- **Congress guidelines presentations**
- **Official guidelines slide sets**
- **Essential messages**

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