ΚΑΡΔΙΟΜΕΤΑΒΟΛΙΚΗ ΙΑΤΡΙΚΗ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837
ΙΑΤΡΙΚΗ ΣΧΟΛΗ ΑΘΗΝΩΝ

ΠΜΣ: Καρδιομεταβολική Ιατρική

Στεφανιαία Νόσος: Παράγοντες κινδύνου και πρωτοπαθής πρόληψη στεφανιαίας νόσου. Μοντέλα υπολογισμού κινδύνου

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Καρδιολόγος, Επιμελητής Β' ΕΣΥ

Β' ΠΑΝΕΠΙΣΤΗΜΙΑΚΗ ΚΑΡΔΙΟΛΟΓΙΚΗ ΚΛΙΝΙΚΗ ΕΚΠΑ

ΠΓΝ ΑΤΤΙΚΟΝ

Recommendations for CVD risk assessment (1)

Recommendations	Class	Level
Systematic global CVD risk assessment is recommended in individuals with any major vascular risk factor (i.e. family history of premature CVD, FH, CVD risk factors such as smoking, arterial hypertension, DM, raised lipid level, obesity, or comorbidities increasing CVD risk).	I	C
Systematic or opportunistic CV risk assessment in the general population in men >40 years of age and in women >50 years of age or postmenopausal with no known ASCVD risk factors may be considered.	IIb	C
In those individuals who have undergone CVD risk assessment in the context of opportunistic screening, a repetition of screening after 5 years (or sooner if risk was close to treatment thresholds) may be considered.	IIb	C

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(European Heart Journal 2021 – doi:10.1093/eurheartj/ehab484)

Recommendations for CVD risk assessment (2)

Recommendations	Class	Level
Opportunistic screening of BP in adults at risk for the development of hypertension, such as those who are overweight or with a known family history of hypertension, should be considered.	IIa	B
Systematic CVD risk assessment in men <40 years of age and women <50 years of age with no known CV risk factors is not recommended.	III	C

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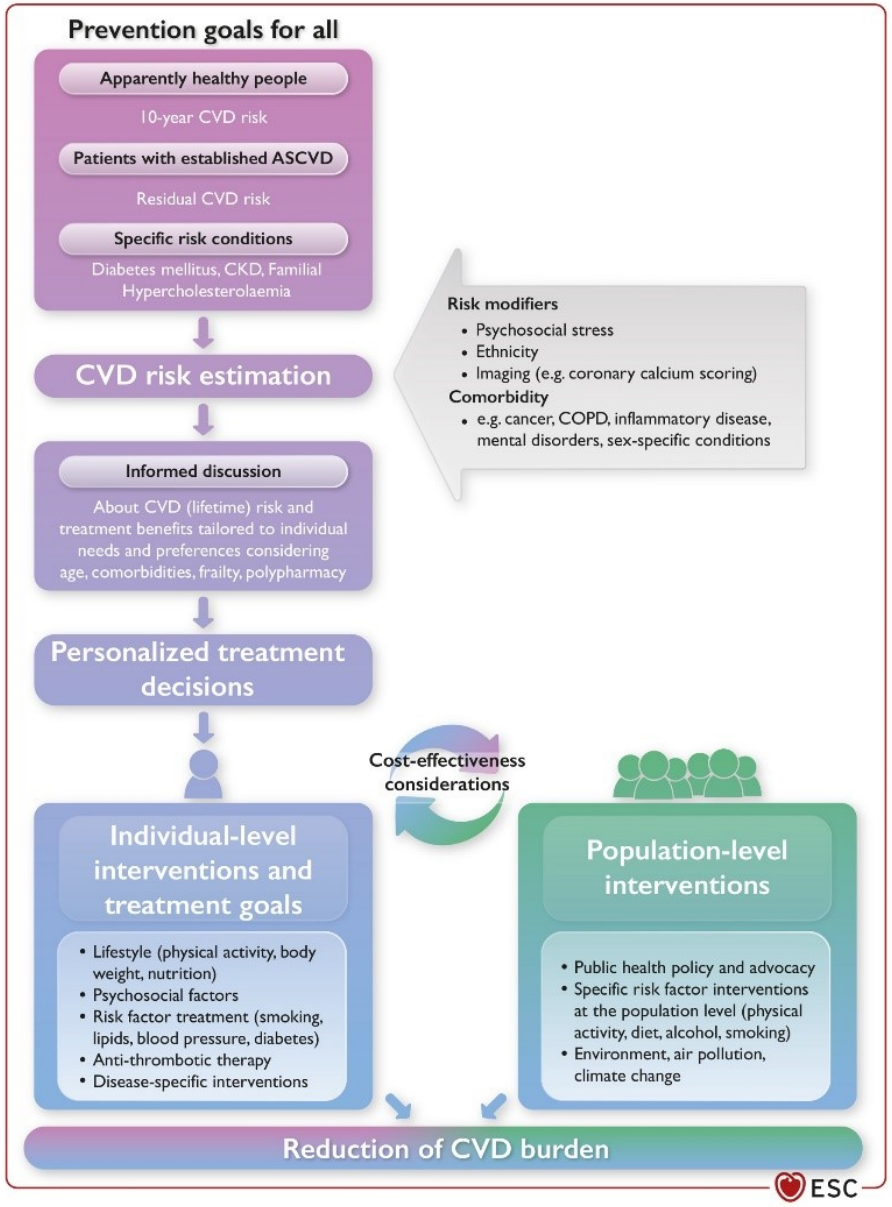
Prevention of CVD



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Patient category	Subgroups	Risk categories	CVD risk and therapy benefit estimation
Apparently healthy persons			
Persons without established ASCVD, diabetes mellitus, CKD, Familial Hypercholesterolemia	<50 years	**Low- to high-risk**	10-year CVD risk estimation (SCORE2). Lifetime risk and benefit estimation of risk factor treatment (e.g. with the LIFE-CVD lifetime model) to facilitate the communication of CVD risk and treatment benefits.
	50-69 years	**Low- to very high-risk**	10-year CVD risk estimation (SCORE2). Lifetime benefit estimation of risk factor treatment (e.g. with the LIFE-CVD lifetime model) to facilitate the communication of treatment benefits.
	≥70 years	**Low- to very high-risk**	10-year CVD risk estimation (SCORE2-OP). Lifetime benefit estimation of risk factor treatment (e.g. with the LIFE-CVD lifetime model) to facilitate the communication of treatment benefits.
Patients with CKD			
CKD without diabetes or ASCVD	Moderate CKD (eGFR 30−44 mL/min/1.73 m^2 and ACR <30 **or** eGFR 45−59 mL/min/1.73 m^2 and ACR 30−300 **or** eGFR ≥60 mL/min/1.73 m^2 and ACR >300)	**High-risk**	N/A
	Severe CKD (eGFR<30 mL/min/1.73 m^2 **or** eGFR 30−44 mL/min/1.73 m^2 and ACR >30)	**Very high-risk**	N/A
Familial Hypercholesterolemia			

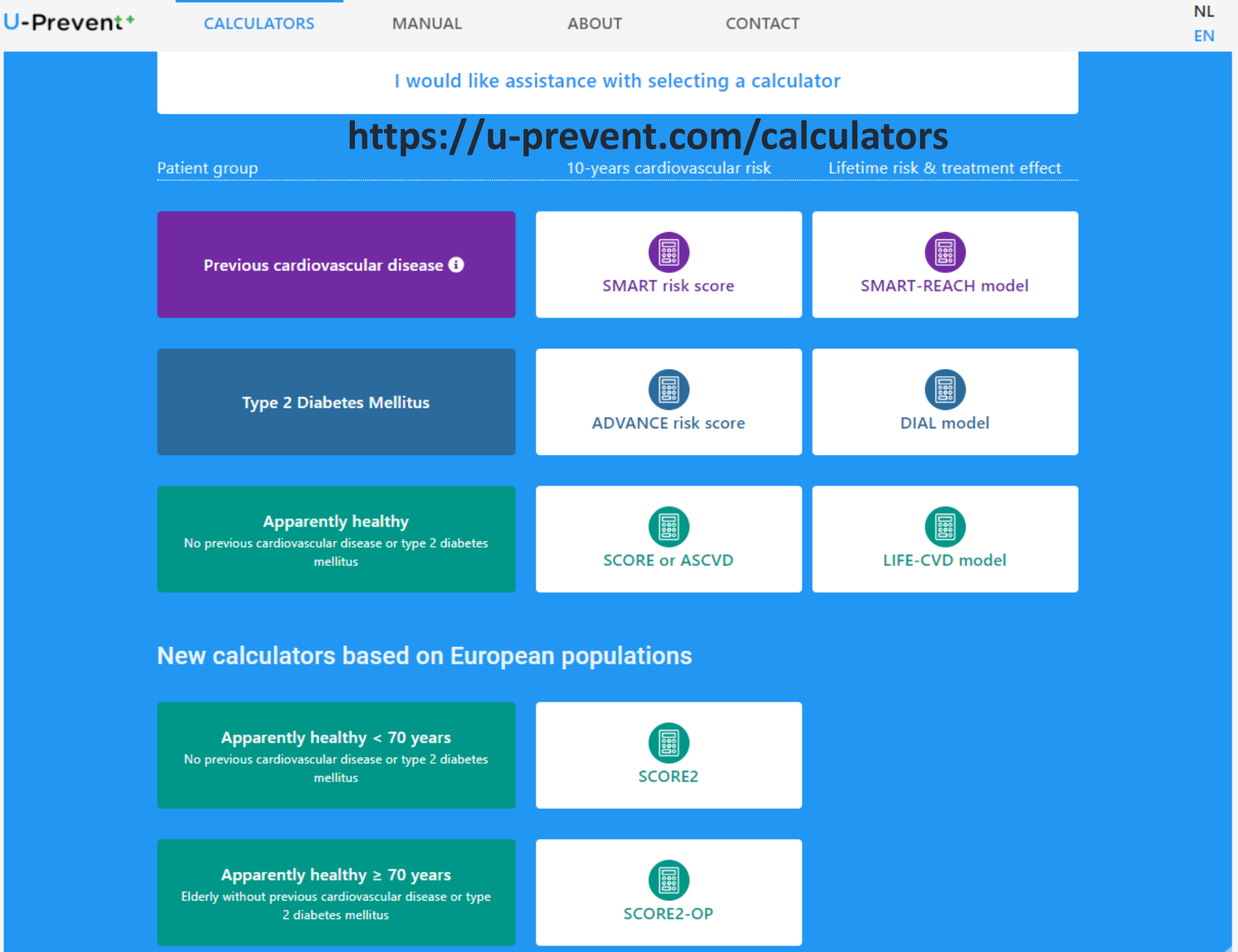
Dutch Lipid Clinic Network diagnostic criteria for familial hypercholesterolaemia

Criteria (choose only one score per group, the highest applicable; diagnosis is based on the total number of points obtained)	Points
1) Family history	
First-degree relative with known premature (men aged <55 years; women <60 years) coronary or vascular disease, or first-degree relative with known LDL-C above the 95th percentile	1
First-degree relative with tendinous xanthomata and/or arcus cornealis, or children aged <18 years with LDL-C above the 95th percentile	2
2) Clinical history	
Patient with premature (men aged <55 years; women <60 years) CAD	2
Patient with premature (men aged <55 years; women <60 years) cerebral or peripheral vascular disease	1
3) Physical examination	
Tendinous xanthomata	6
Arcus cornealis before age 45 years	4
4) LDL-C levels (without treatment)	
LDL-C ≥8.5 mmol/L (326 mg/dL)	8
LDL-C 6.5–8.4 mmol/L (251–325 mg/dL)	5
LDL-C 5.0–6.4 mmol/L (191–250 mg/dL)	3
LDL-C 4.0–4.9 mmol/L (155–190 mg/dL)	1
5) DNA analysis	
Functional mutation in the *LDLR*, *apolipoprotein B*, or *PCSK9* genes	8
A 'definite' FH diagnosis requires >8 points	
A 'probable' FH diagnosis requires 6–8 points	
A 'possible' FH diagnosis requires 3–5 points	

CAD = coronary artery disease; DNA = deoxyribonucleic acid; FH = familial hypercholesterolaemia; LDL-C = low-density lipoprotein cholesterol; LDLR = low-density lipoprotein receptor; PCSK9 = proprotein convertase subtilisin/kexin type 9.

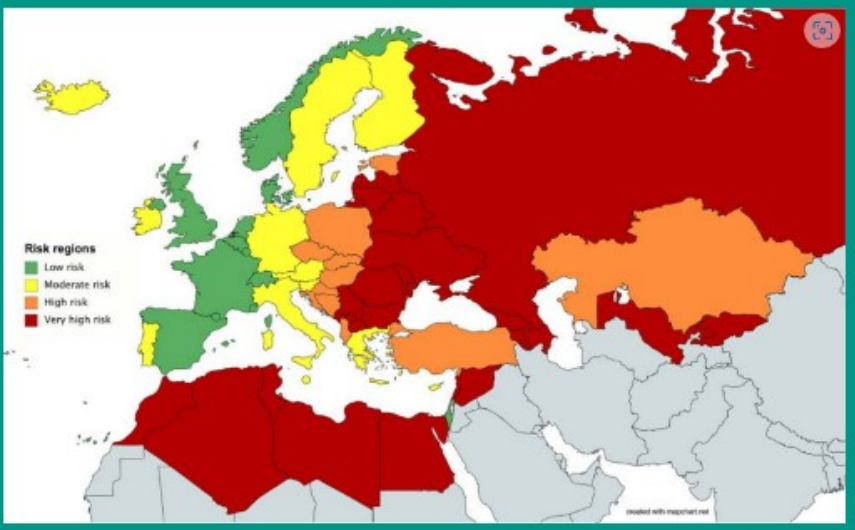
Familial Hypercholesterolemia			
Associated with markedly elevated cholesterol levels	N/A	**High-risk**	N/A

Patients with type 2 diabetes mellitus			
Patients with type 1 DM above 40 years of age may also be classified according to these criteria	Patients with well controlled short-standing DM (e.g. <10 years), no evidence of TOD and no additional ASCVD risk factors	**Moderate-risk**	N/A
	Patients with DM without ASCVD and/or severe TOD, and not fulfilling the moderate risk criteria.	**High-risk**	Residual 10-year CVD risk estimation after general prevention goals (e.g. with the ADVANCE risk score or DIAL model). Consider lifetime CVD risk and benefit estimation of risk factor treatment (e.g. DIAL model).
	Patients with DM with established ASCVD and/or severe TOD:[87, 93-95] • eGFR <45 mL/min/1.73 m^2 irrespective of albuminuria • eGFR 45-59 mL/min/1.73 m^2 and microalbuminuria (ACR 30 -300 mg/g) • Proteinuria (ACR >300 mg/g) • Presence of microvascular disease in at least 3 different sites (e.g. microalbuminuria plus retinopathy plus neuropathy)	**Very high-risk**	Residual 10-year CVD risk estimation after general prevention goals (e.g. with the SMART risk score for established CVD or with the ADVANCE risk score or with the DIAL model). Consider lifetime CVD risk and benefit estimation of risk factor treatment (e.g. DIAL model).
Patients with established ASCVD			
Documented ASCVD, clinical or unequivocal on imaging. Documented clinical ASCVD includes previous AMI, ACS, coronary revascularization and other arterial revascularization procedures, stroke and TIA, aortic aneurysm and PAD. Unequivocally documented ASCVD on imaging includes plaque on coronary angiography or carotid ultrasound or on CTA. It does NOT include some increase in continuous imaging parameters such as intima–media thickness of the carotid artery.	N/A	**Very high-risk**	Residual CVD risk estimation after general prevention goals (e.g. 10-year risk with the SMART risk score for patients with established CVD or 1- or 2-year risk with EUROASPIRE risk score for patients with CHD). Consider lifetime CVD risk and benefit estimation of risk factor treatment (e.g. SMART-REACH model; or DIAL model if diabetes).


U-Prevent
CALCULATORS
MANUAL
ABOUT
CONTACT
NL
EN
I would like assistance with selecting a calculator
https://u-prevent.com/calculators
Patient group
10-years cardiovascular risk
Lifetime risk & treatment effect
Previous cardiovascular disease
SMART risk score
SMART-REACH model
Type 2 Diabetes Mellitus
ADVANCE risk score
DIAL model
Apparently healthy
No previous cardiovascular disease or type 2 diabetes mellitus
SCORE or ASCVD
LIFE-CVD model
New calculators based on European populations
Apparently healthy < 70 years
No previous cardiovascular disease or type 2 diabetes mellitus
SCORE2
Apparently healthy ≥ 70 years
Elderly without previous cardiovascular disease or type 2 diabetes mellitus
SCORE2-OP

Personal Risk Profile

SCORE2



Low risk | Moderate risk | High risk | Very high risk

Gender: Male | Female

Age: 70 - 90 years

Current smoking

Diabetes mellitus

Systolic blood pressure: 100 - 200 mmHg

mmol/L | mg/dL

Total cholesterol: 116 - 348 mg/dL

HDL-cholesterol: 27 - 97 mg/dL

LDL-cholesterol: 3.9 - 348 mg/dL

CALCULATE

Personal Risk Profile

LIFE-CVD model

Gender: Male | Female

Age: 35 - 89 years

Smoking: No | Yes | Former

Geographic region: Europe | North America | Other

Diabetes mellitus

Parental history of MI prior to age 60

Systolic blood pressure: 85 - 200 mmHg

Enter BMI | Calculate BMI

BMI: 18 - 45 kg/m2

mmol/L | mg/dL

Total cholesterol: 120 - 300 mg/dL

HDL-cholesterol: 30 - 100 mg/dL

LDL-cholesterol: 40 - 230 mg/dL

Statin: No statin | Atorvastatin | Fluvastatin | Lovastatin | Pravastatin | Rosuvastatin | Simvastatin

Ezetimibe

Antithrombotic treatment

CALCULATE

Personal Risk Profile

SMART risk score

Gender: Male | Female

Age: 30 - 90 years

Current smoking

Years since first cardiovascular event: 0 - 30 years

Type(s) of atherosclerotic vascular disease: Coronary artery disease | Cerebrovascular disease | Peripheral artery disease | Aortic Aneurysm

Diabetes mellitus

Systolic blood pressure: 70 - 200 mmHg

Creatinin: 50 - 200 umol/L

High Sensitivity CRP: 0.1 - 15 mg/L

Personal Risk Profile

SMART-REACH model

Gender: Male | Female

Age: 45 - 80 years

Geographic region: Western Europe | Netherlands | North America | Other

Current smoking

Type(s) of atherosclerotic vascular disease: Coronary artery disease | Cerebrovascular disease | Peripheral artery disease

Diabetes mellitus

Heart failure

Atrial fibrillation

Systolic blood pressure: 100 - 200 mmHg

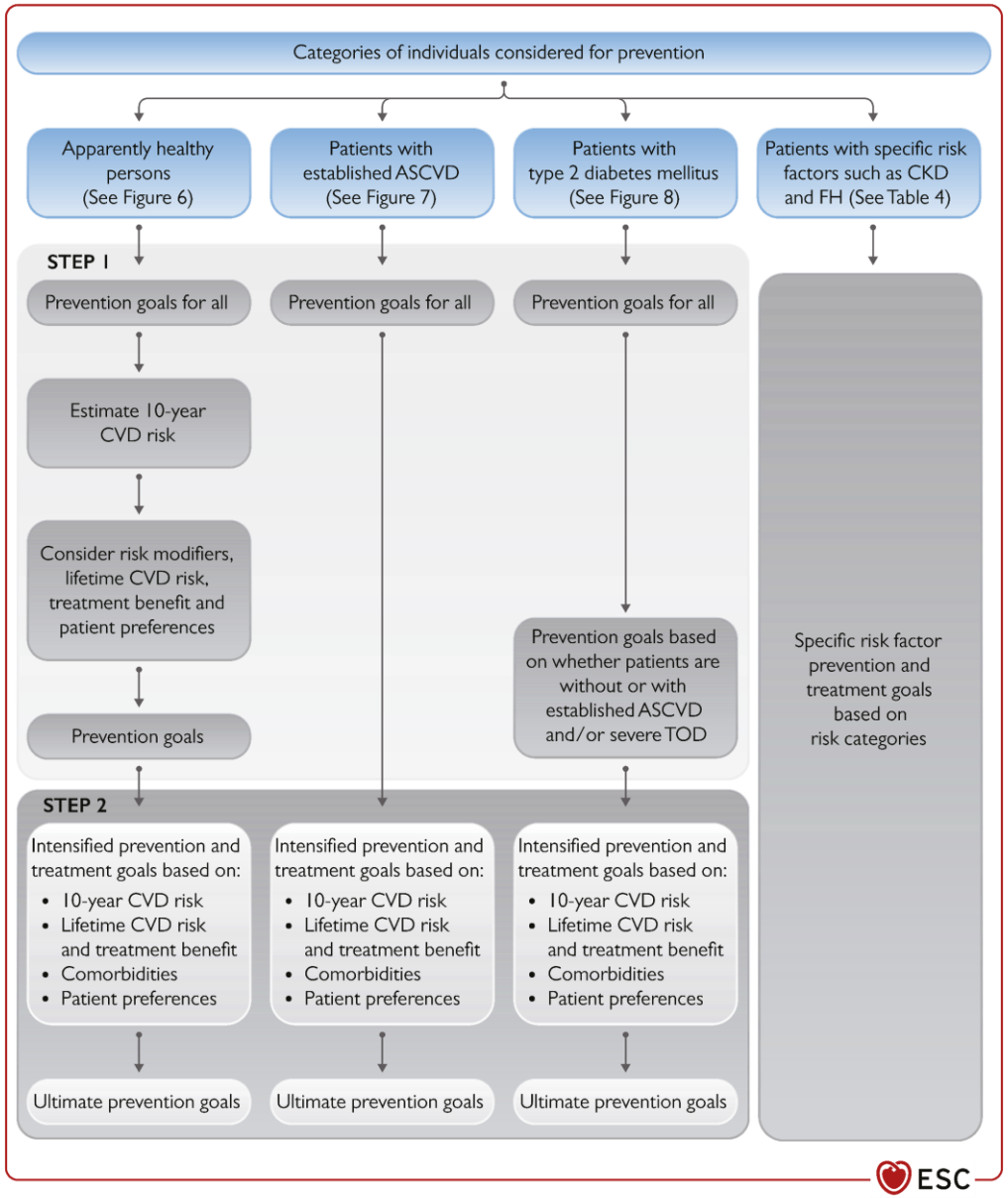
Creatinin: 30 - 500 umol/L

Personal Risk Profile

ADVANCE risk score

Gender	Male	Female
Age	55 - 90	years
Current smoking		
Duration of diabetes	0 - 36	years
Atrial fibrillation		
Retinopathy		
Treated hypertension		
Systolic blood pressure	60 - 300	mmHg
Diastolic blood pressure	40 - 200	mmHg
HbA1c	9 - 200	mmol

Gender	Male	Female
Age	30 - 85	years
Geographic region	Western Europe	Eastern Europe
	United Kingdom	Scandinavia
	North America	Asia/Oceania
	Other	
Current smoking		
History of vascular disease		
Duration of diabetes	0 - 30	years
Insulin therapy		
Systolic blood pressure	100 - 200	mmHg
	Enter BMI	Calculate BMI
BMI	18 - 46	kg/m2



Examples of a stepwise approach to risk stratification and treatment options

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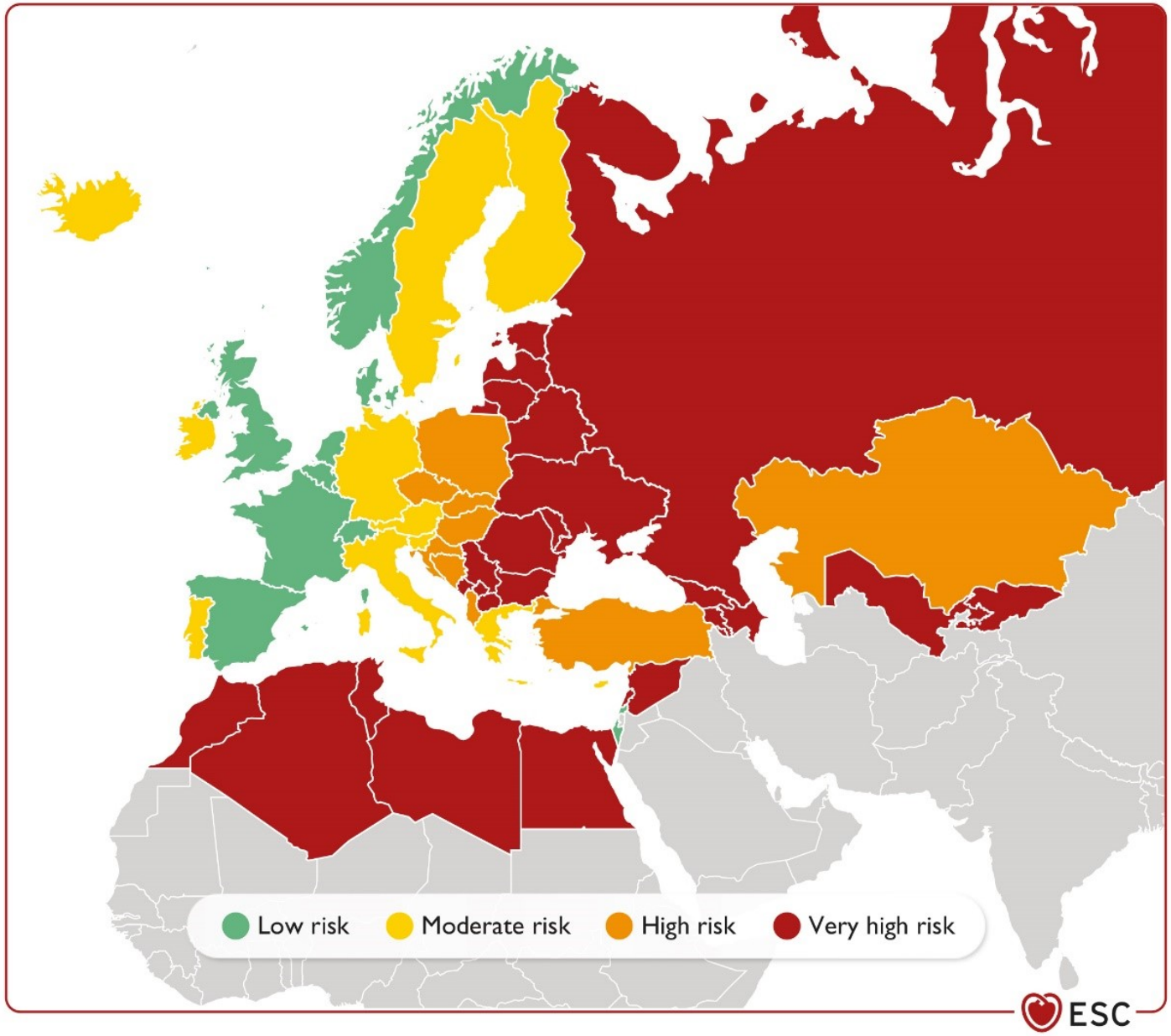

Risk regions based on World Health Organization cardiovascular mortality rates

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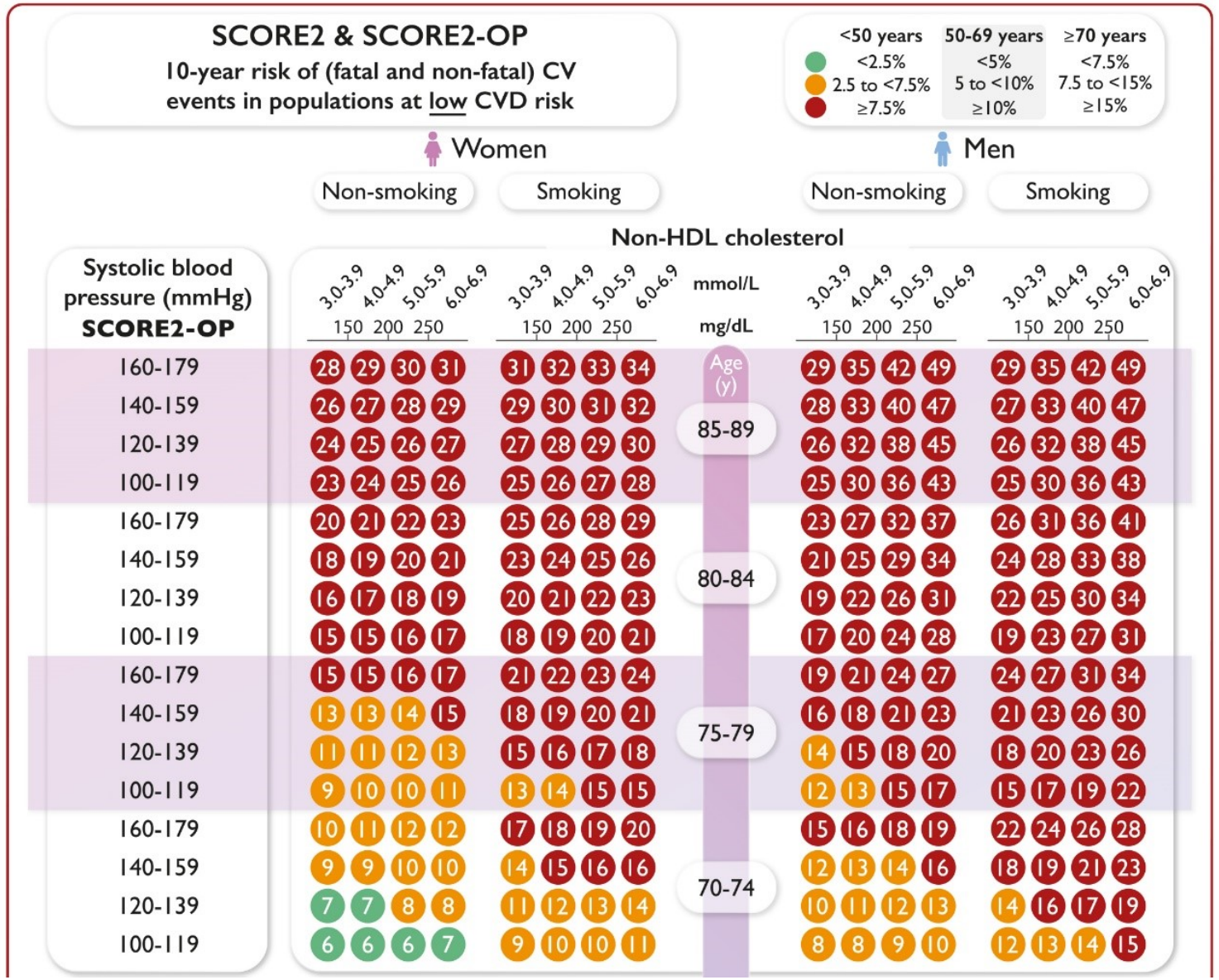

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Low CVD Risk (1)

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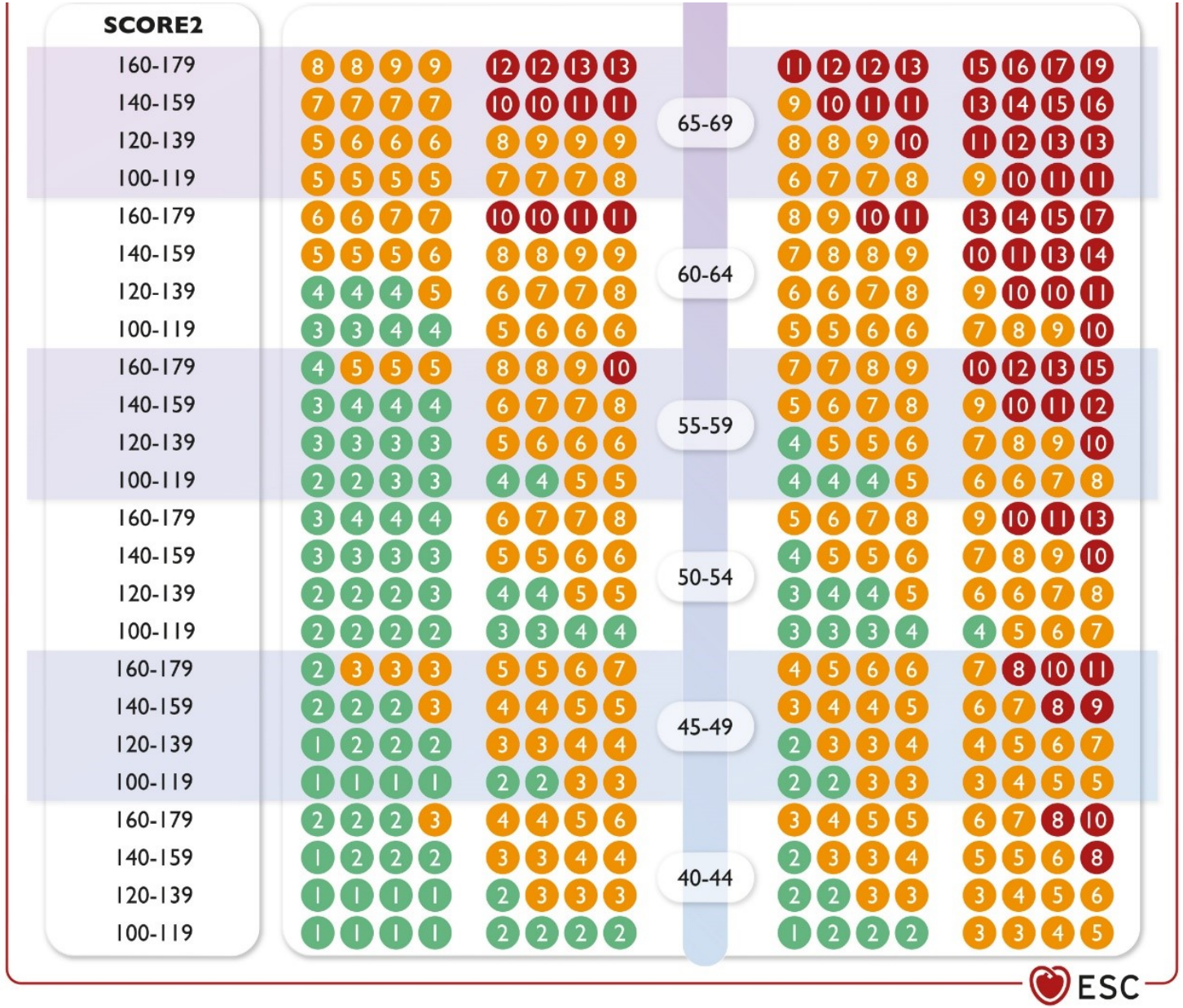

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Low CVD Risk (2)

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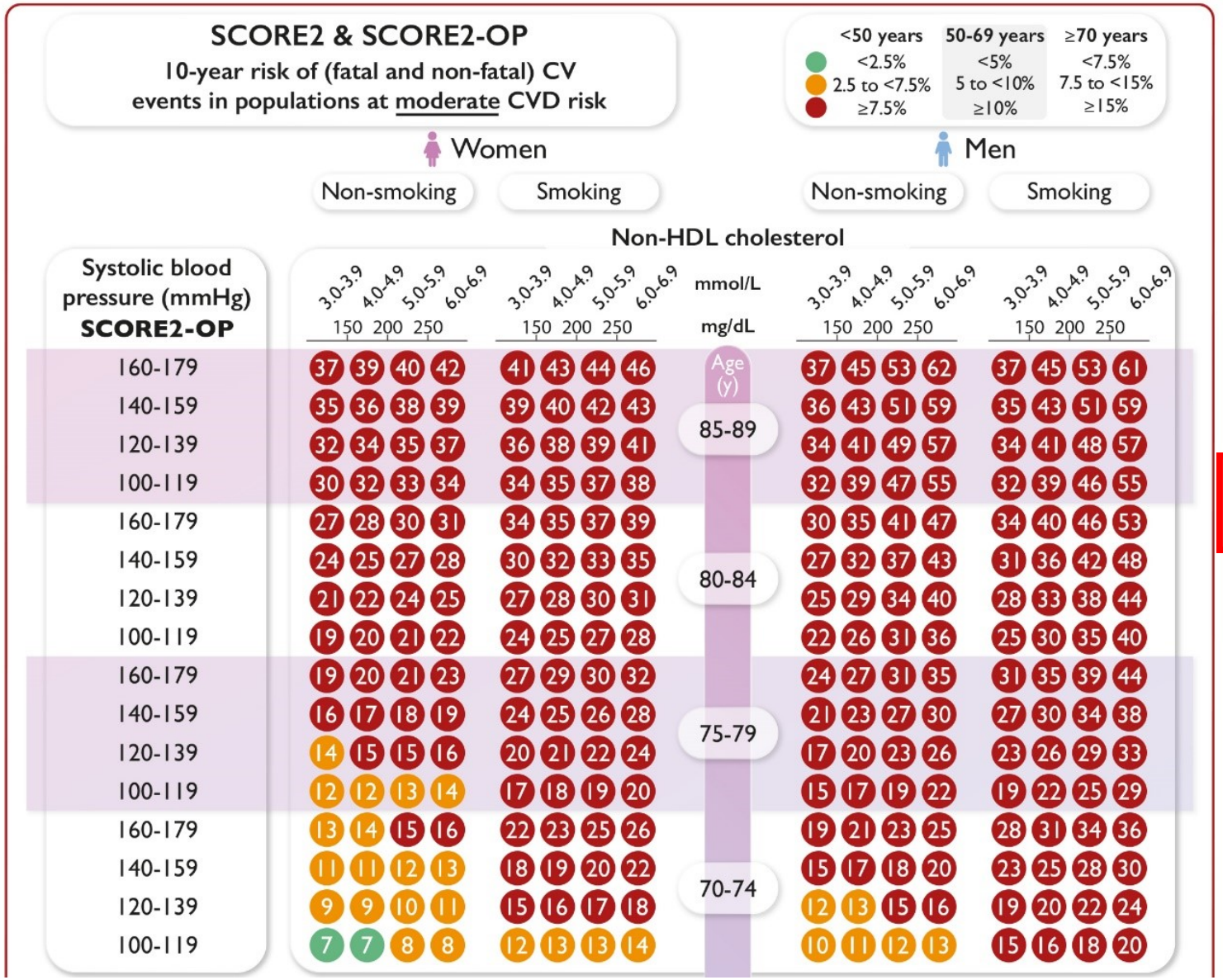

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Moderate CVD Risk (1)

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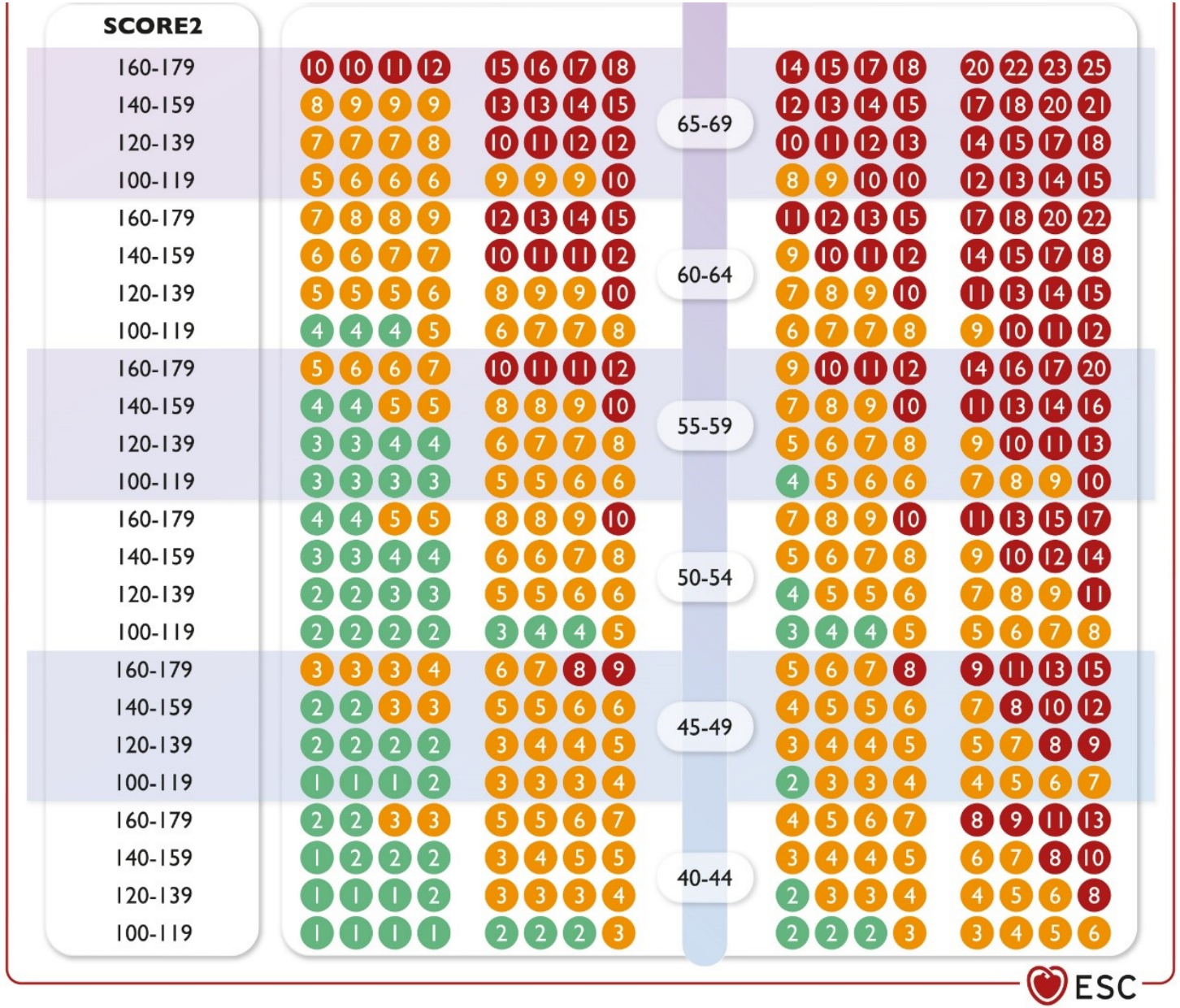

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Moderate CVD Risk (2)

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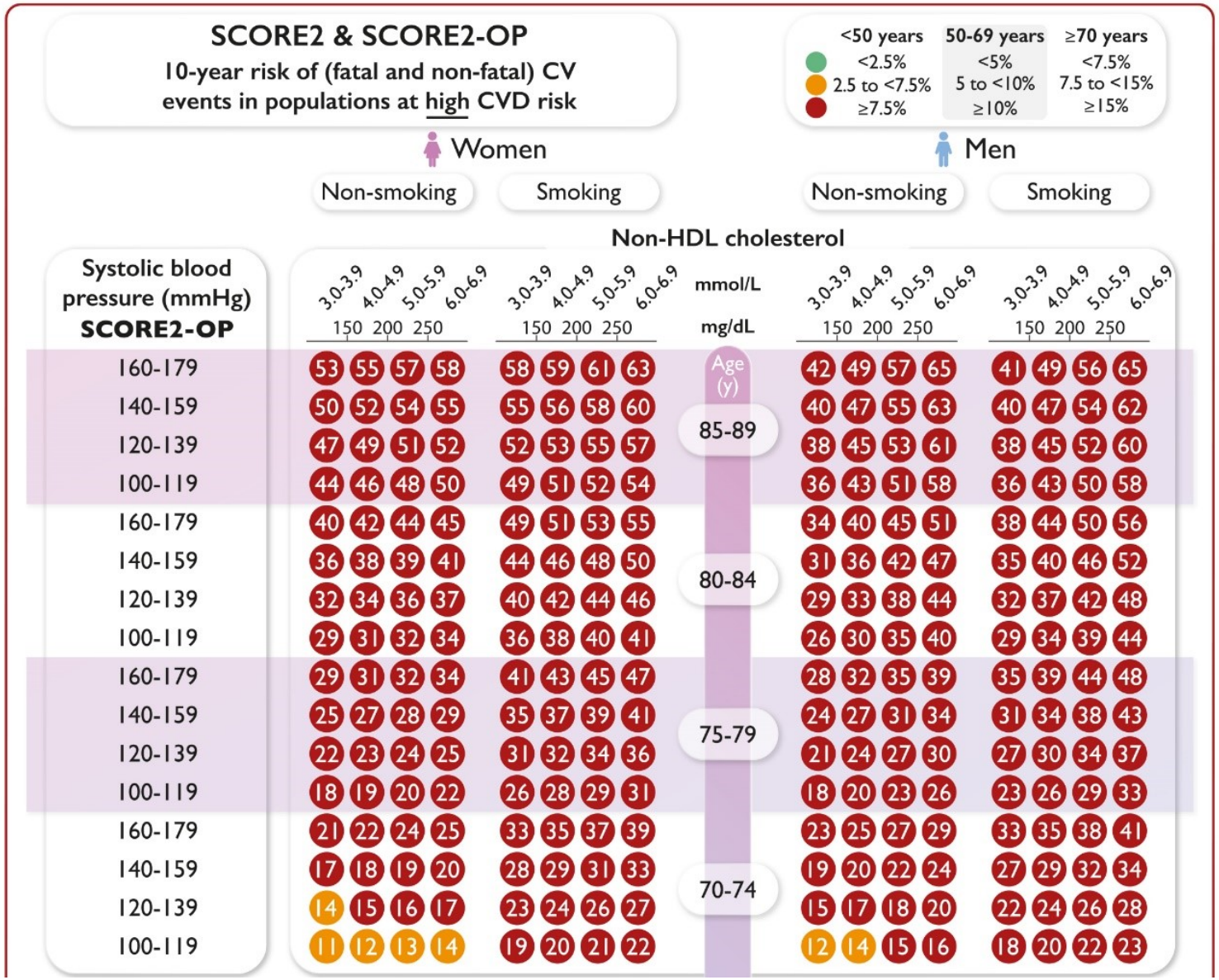

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

High CVD Risk (1)

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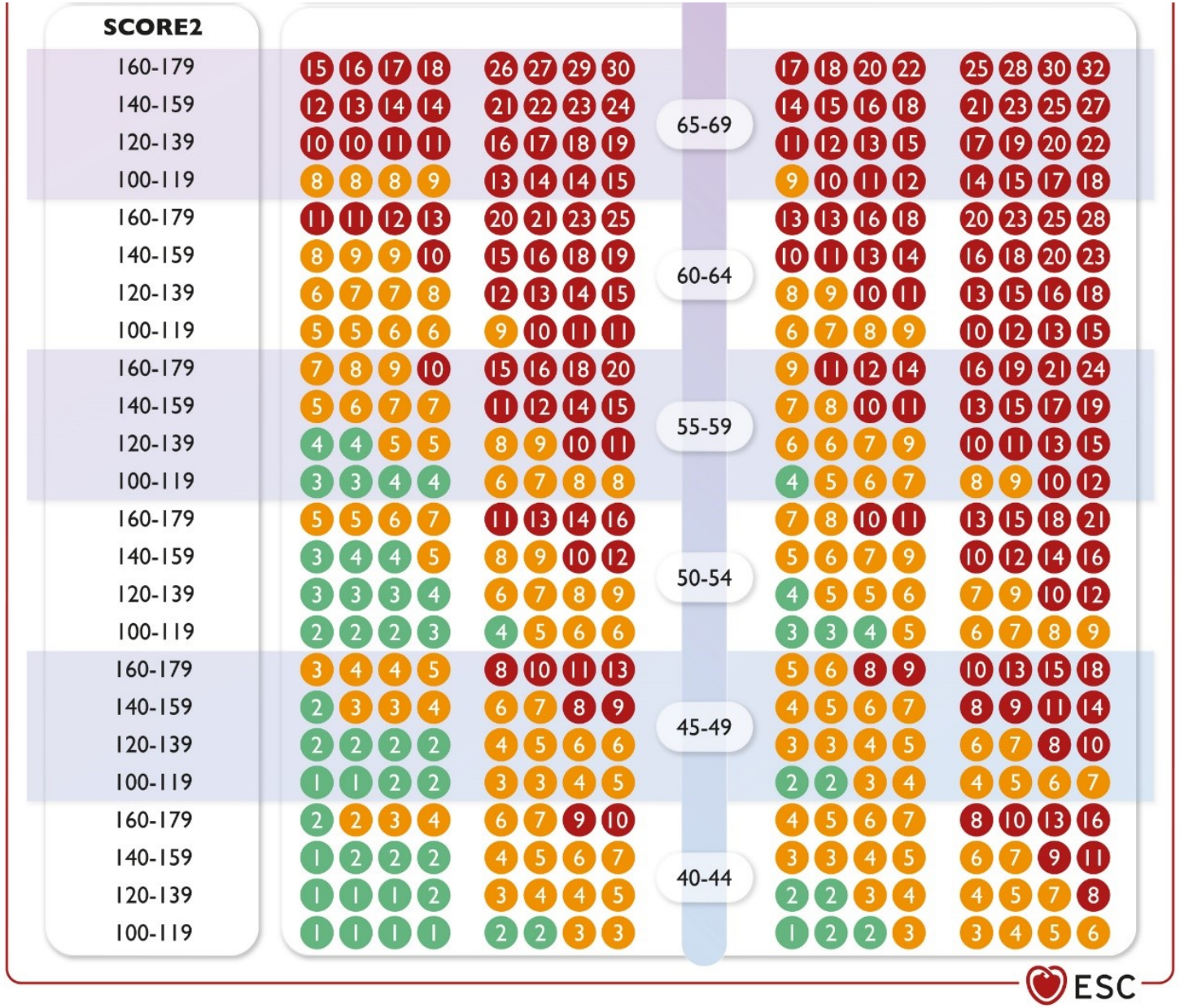

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

High CVD Risk (2)

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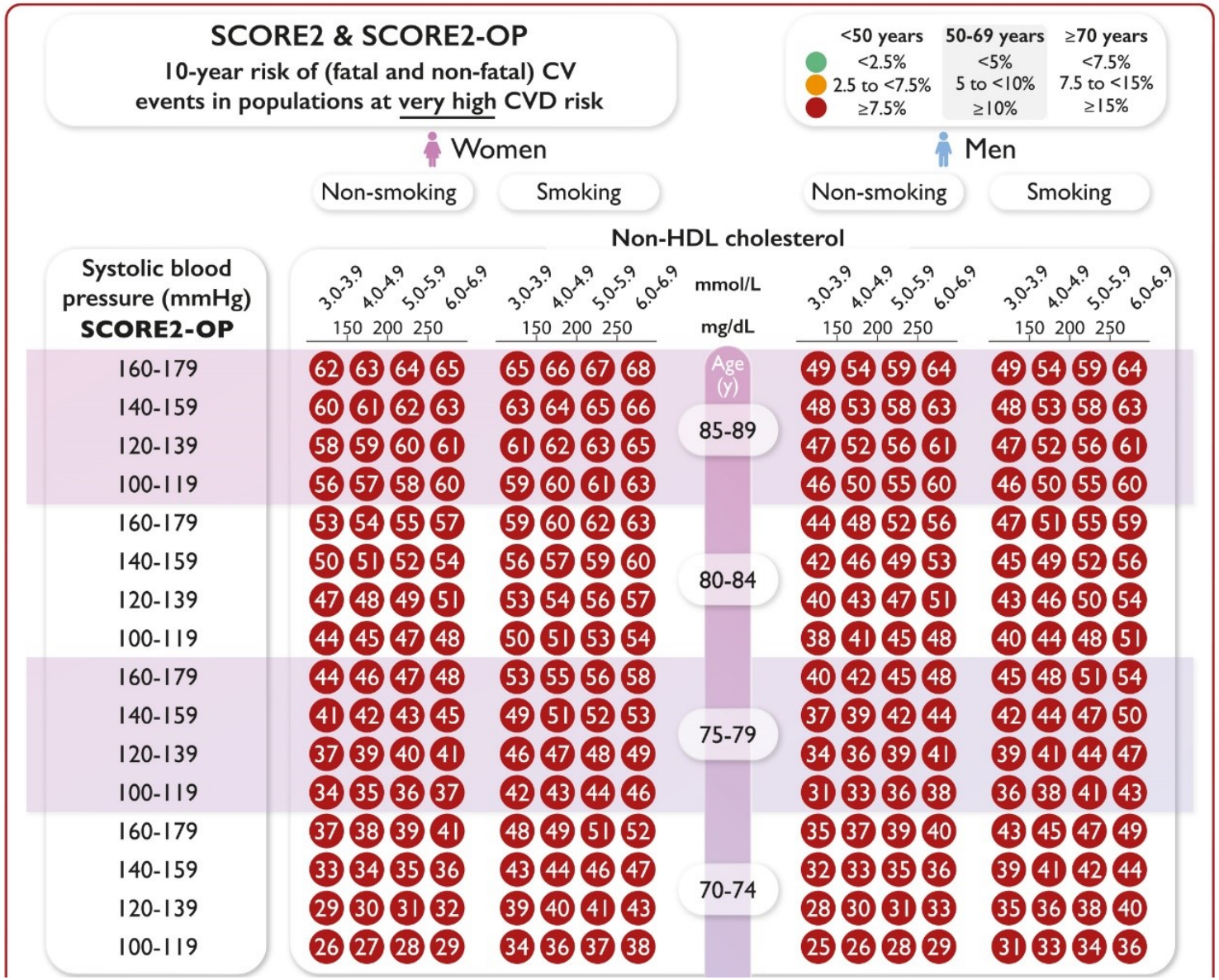

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Very high CVD Risk (1)

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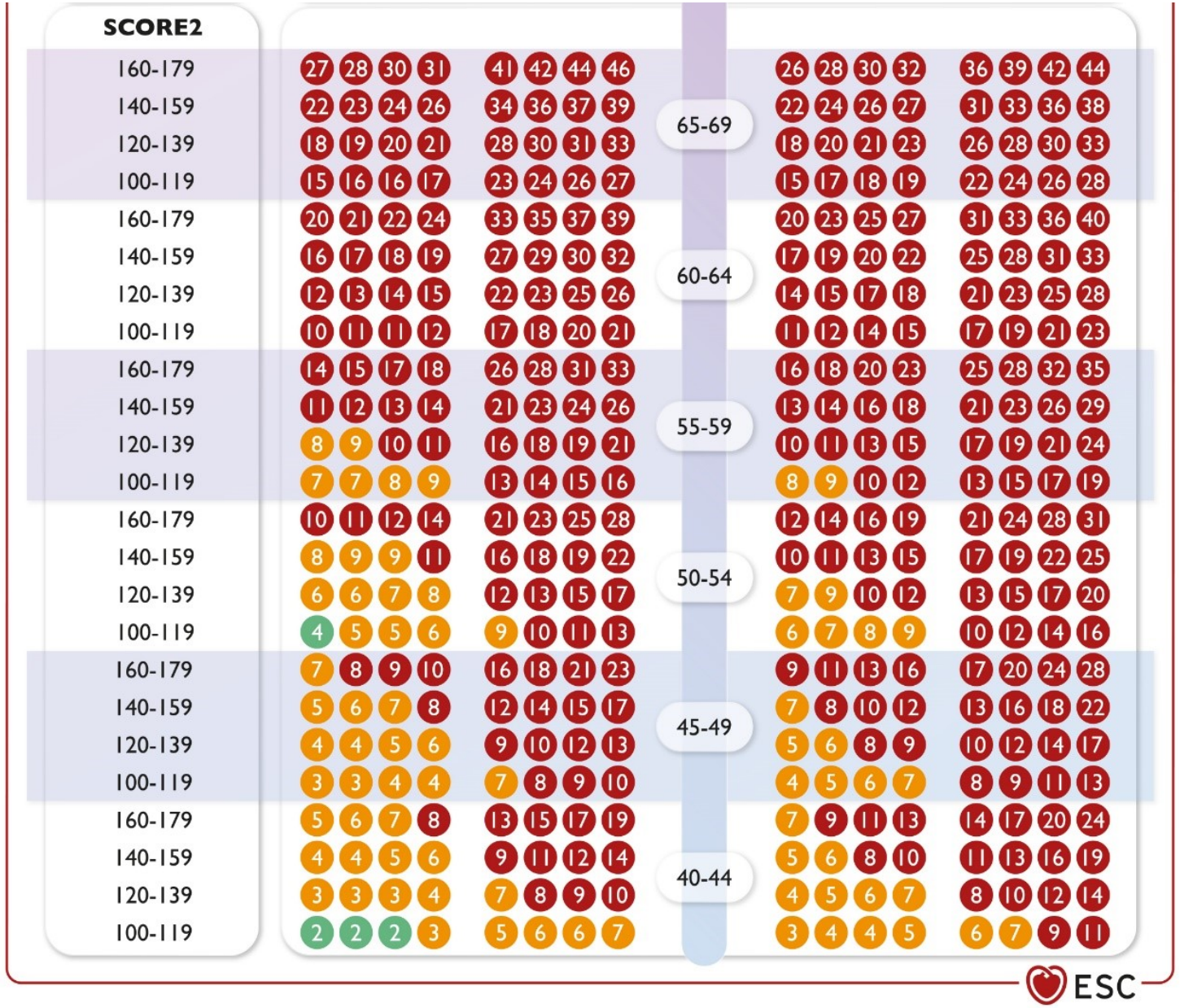

SCORE2 and SCORE2-OP risk chart for fatal and non-fatal (MI, stroke) ASCVD

Very high CVD Risk (2)

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Cardiovascular disease risk categories based on SCORE2 and SCORE2-OP in apparently healthy people according to age

	<50 years	50-69 years	≥70 years[a]
Low-to-moderate CVD risk: risk factor treatment generally not recommended	<2.5%	<5%	<7.5%
High CVD risk: risk factor treatment should be considered	2.5 to <7.5%	5 to <10%	7.5 to <15%
Very high CVD risk: risk factor treatment generally recommended[a]	≥7.5%	≥10%	≥15%

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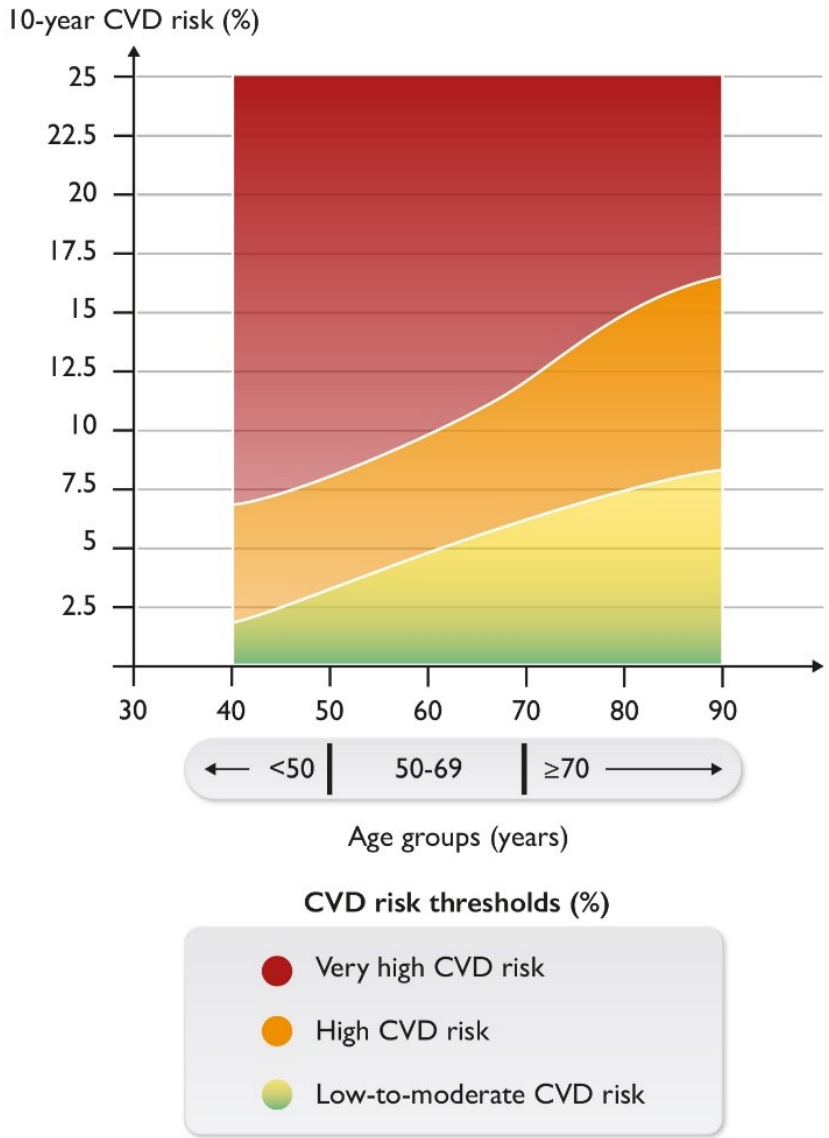

Schematic representation of increasing 10-year CVD risk thresholds across age groups

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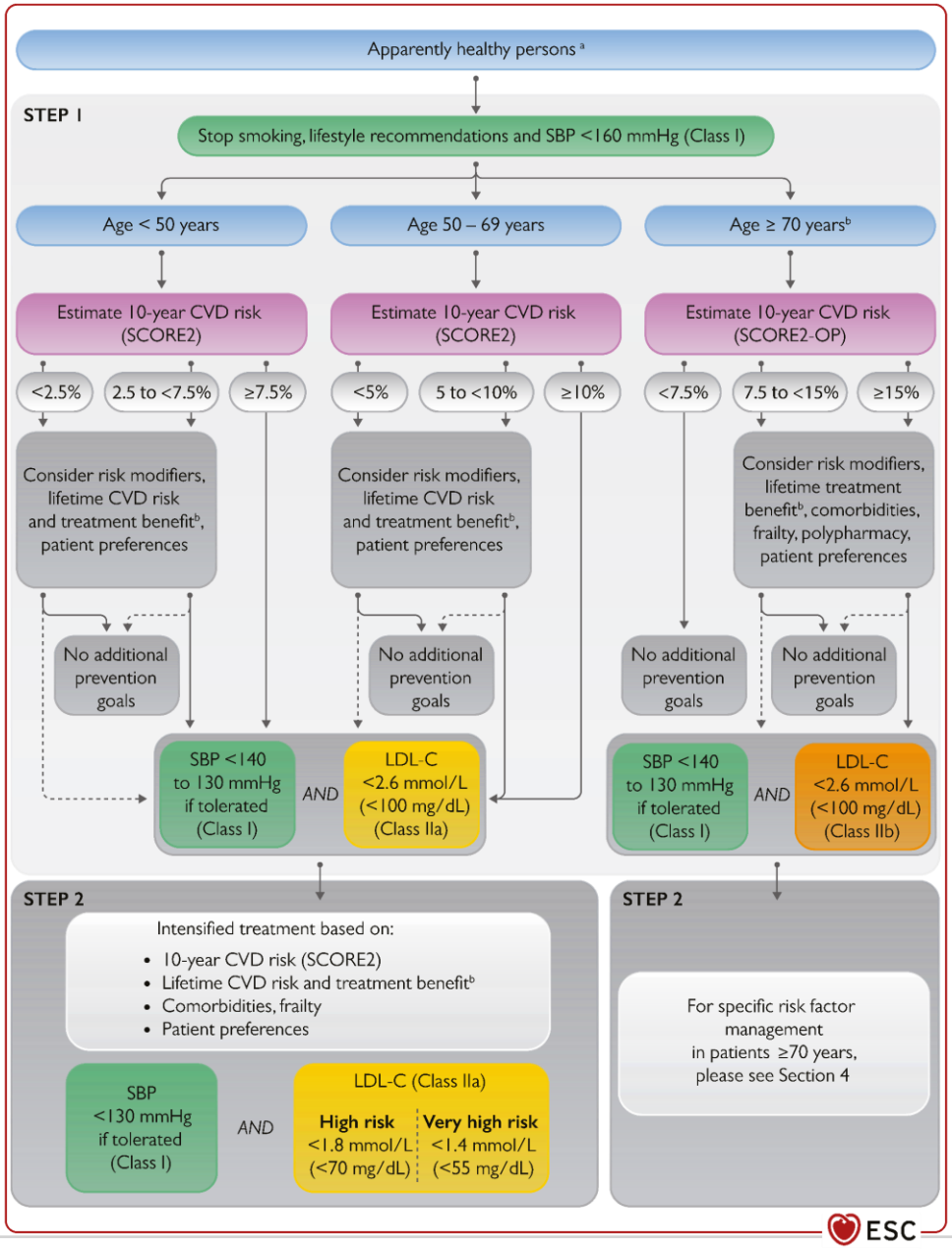

Cardiovascular risk and risk factor treatment in apparently healthy persons

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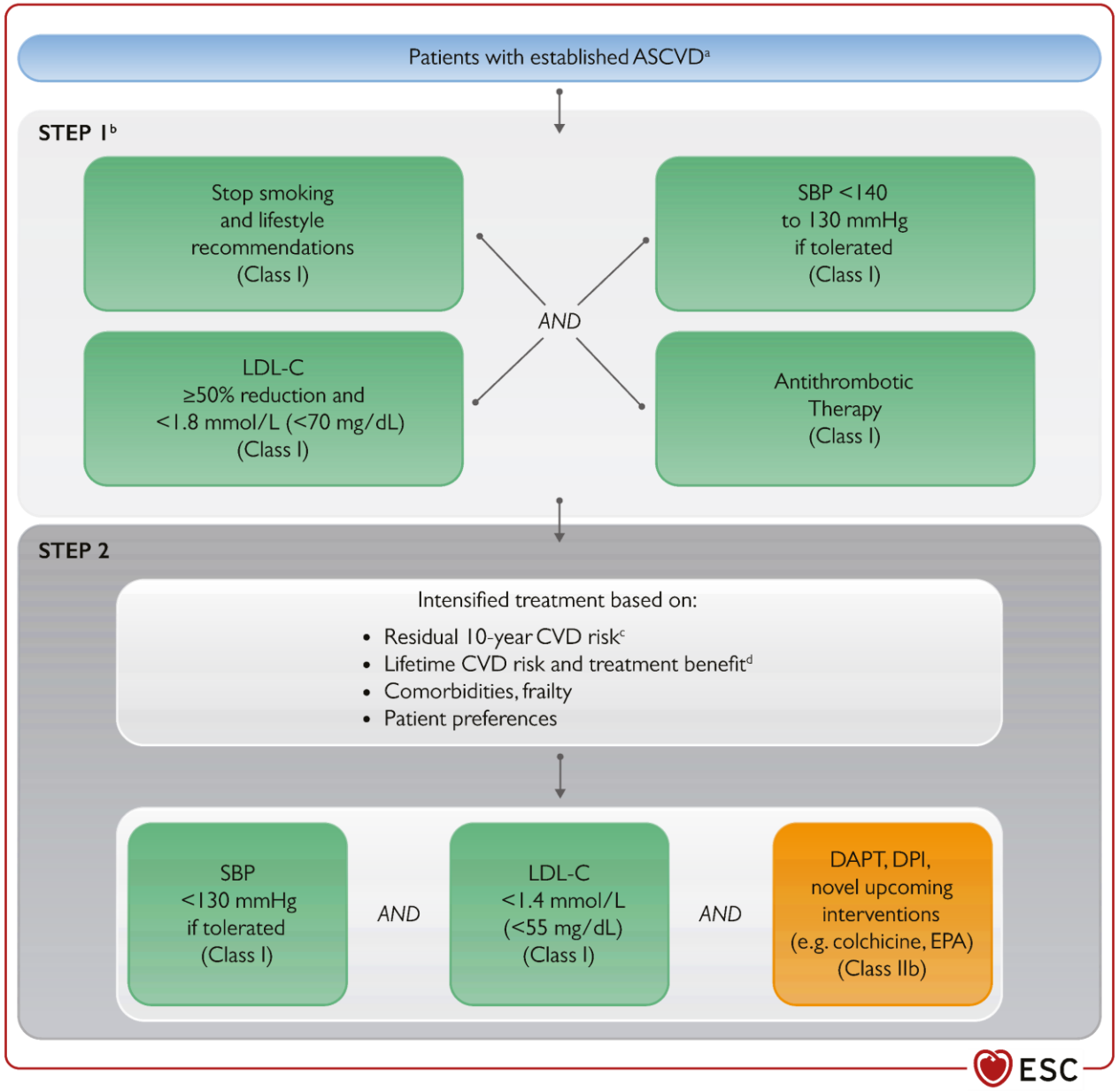

Cardiovascular risk and risk factor treatment in patients with established cardiovascular disease

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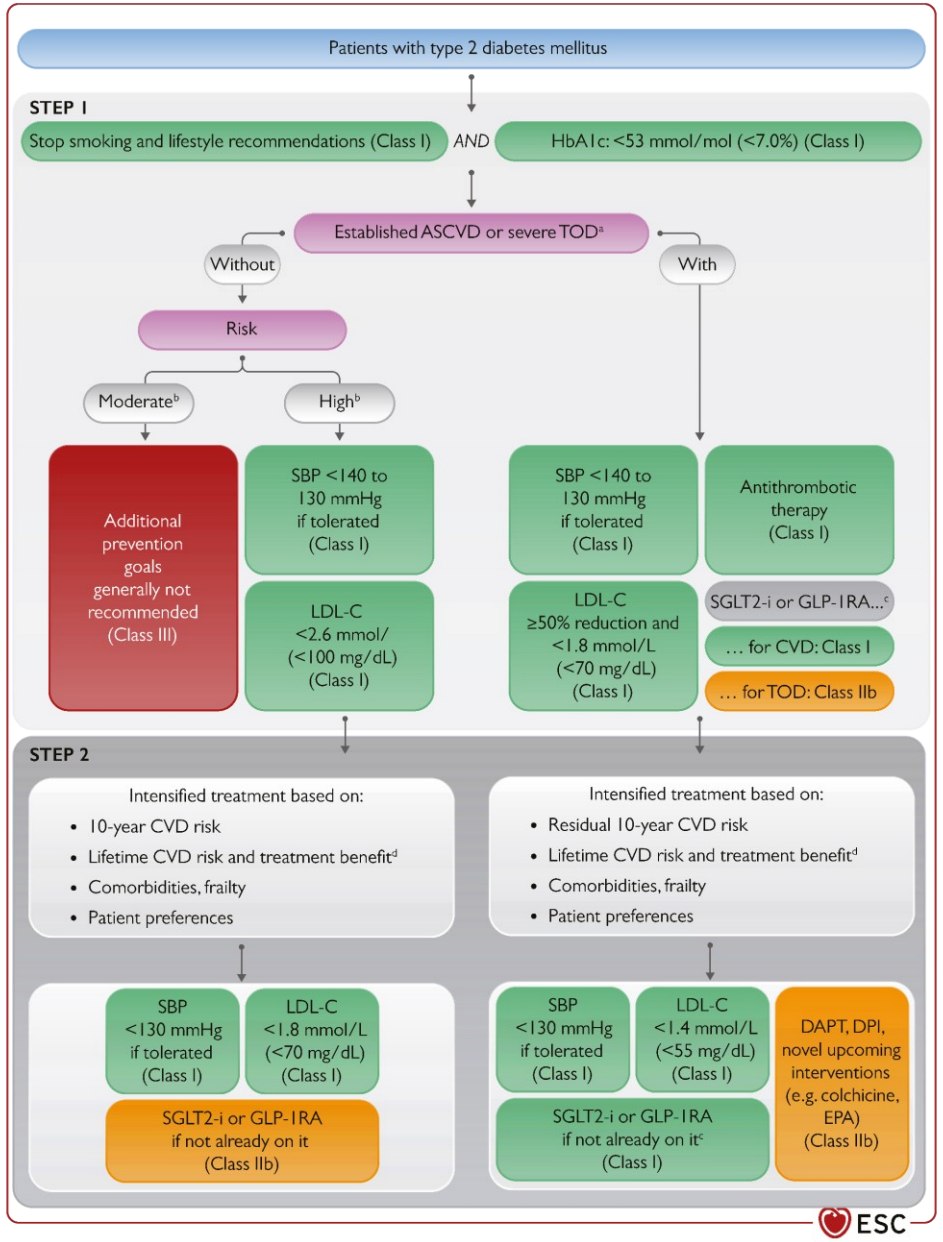

Cardiovascular risk and risk factor treatment in patients with type 2 diabetes mellitus

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Recommendations for cardiovascular disease risk estimation (1)

Recommendations	Class	Level
In apparently healthy people <70 years without established ASCVD, DM, CKD, genetic/rarer lipid or BP disorders, estimation of 10-year fatal and non-fatal CVD risk with SCORE2 is recommended.	I	B
In apparently healthy people ≥70 years without established ASCVD, DM, CKD, genetic/rarer lipid or BP disorders, estimation of 10-year fatal and non-fatal CVD risk with SCORE2-OP is recommended.	I	B
In apparently healthy people, after estimation of 10-year fatal and non-fatal CVD risk, lifetime risk and treatment benefit, risk modifiers, frailty, polypharmacy, and patient preferences should be considered.	IIa	C
Patients with established CVD and/or DM and/or moderate-to-severe renal disease and/or genetic/rarer lipid or BP disorders are to be considered at high or very high CVD risk.	I	A

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Recommendations for cardiovascular disease risk estimation (2)

Recommendations	Class	Level
A stepwise treatment-intensification approach aiming at intensive risk factor treatment is recommended for apparently healthy people at high or very high CVD risk, as well as patients with established ASCVD and/or DM, with consideration of CVD risk, treatment benefit of risk factors, risk modifiers, comorbidities, and patient preferences.	I	B
Treatment of ASCVD risk factors is recommended in apparently healthy people without DM, CKD, genetic/rarer lipid, or BP disorders who are at very high risk (SCORE2 ≥7.5% for age under 50; SCORE2 ≥10% for age 50–69; SCORE2-OP ≥15% for age ≥70 years).	I	C
Treatment of ASCVD risk factors should be considered in apparently healthy people without DM, CKD, genetic/rarer lipid, or BP disorders who are at high risk (SCORE2 2.5 to <7.5% for age under 50; SCORE2 5 to <10% for age 50–69; SCORE2-OP 7.5 to <15% for age ≥70 years), taking CVD risk modifiers, lifetime risk and treatment benefit, and patient preferences into account.	IIa	C

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Recommendations for cardiovascular disease assessment in specific clinical conditions (1)

Clinical Condition	Recommendations	Class	Level
CKD	In all CKD patients, with or without DM, appropriate screening for ASCVD and kidney disease progression, including monitoring changes in albuminuria is recommended.	I	C
Cancer	It is recommended to monitor cardiac dysfunction using imaging techniques and circulating biomarkers before, periodically during, and after cancer treatment.	I	B
	Cardioprotection in high-risk patients (those receiving high cumulative doses or combined radiotherapy) receiving anthracycline chemotherapy may be considered for prevention of LV dysfunction.	IIb	B
	Screening for ASCVD risk factors and optimization of the CV risk profile is recommended in patients on treatment for cancer.	I	C

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Recommendations for cardiovascular disease assessment in specific clinical conditions (2)

Clinical Condition	Recommendations	Class	Level
COPD	It is recommended that all COPD patients be investigated for ASCVD and ASCVD risk factors.	**I**	**C**
Inflammatory conditions	Assessment of total CVD risk may be considered in adults with chronic inflammatory conditions.	**IIb**	**B**
	Multiplication of calculated total CVD risk by a factor of 1.5 should be considered in adults with rheumatoid arthritis.	**IIa**	**B**
Migraine	Presence of migraine with aura should be considered in CVD risk assessment.	**IIa**	**B**
	Avoidance of combined hormonal contraceptives may be considered in women with migraine with aura.	**IIb**	**B**

Recommendations for cardiovascular disease assessment in specific clinical conditions (3)

Clinical Condition	Recommendations	Class	Level
Sleep disorders and OSA	In patients with ASCVD, obesity, and hypertension, regular screening for non-restorative sleep is indicated (e.g. by the question: 'how often have you been bothered by trouble falling or staying asleep, or sleeping too much?').	I	C
	If there are significant sleep problems, which are not responding within 4 weeks to sleep hygiene, referral to a specialist is recommended.	I	C
Mental disorders	It is recommended that mental disorders with either significant functional impairment or decreased use of healthcare systems be considered as influencing total CVD risk.	I	C

Recommendations for cardiovascular disease assessment in specific clinical conditions (4)

Clinical Condition	Recommendations	Class	Level
Mental disorders	It is recommended that mental disorders with either significant functional impairment or decreased use of healthcare systems be considered as influencing total CVD risk.	I	C
Sex specific conditions	In women with a history of preeclampsia and/or pregnancy-induced hypertension, periodic screening for hypertension and DM should be considered.	IIa	B
	In women with a history of polycystic ovary syndrome or gestational DM, periodic screening for DM should be considered.	IIa	B
	In women with a history of premature or stillbirth, periodic screening for hypertension and DM may be considered.	IIb	B
	Assessment of CVD risk should be considered in men with ED.	IIa	C

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Patient category	Prevention goals (STEP 1)	Intensified/additional prevention goals[a] (STEP 2)
Apparently healthy persons	For BP and lipids: initiation of drug treatment based on CVD risk assessment or SBP >160 mmHg	
<50 years	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL)	SBP <130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction in high-risk patients LDL-C <1.4 mmol/L (55 mg/dL) and ≥50% reduction in very-high-risk patients
50–69 years	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL)	SBP <130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction in high-risk patients LDL-C <1.4 mmol/L (55 mg/dL) and ≥50% reduction in very-high-risk patients
≥70 years	Stop smoking and lifestyle optimization SBP <140 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL)	For specific risk factor management in patients ≥70 years old, please see relevant sections in section 4.
Patients with CKD	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL) and ≥50% LDL-C reduction Otherwise according to ASCVD and DM history	LDL-C <1.8 mmol/L (70 mg/dL) in high-risk patients and <1.4 mmol/L (55 mg/dL) in very-high-risk patients (see *Table 4*)
Patients with FH	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL) and ≥50% LDL-C reduction Otherwise according to ASCVD and DM history	LDL-C <1.8 mmol/L (70 mg/dL) in high-risk patients and <1.4 mmol/L (55 mg/dL) in very-high-risk patients (see *Table 4*)

Patient category	Prevention goals (STEP 1)	Intensified/additional prevention goals[a] (STEP 2)
People with type 2 DM		
Well-controlled short-standing DM e.g. <10 years), no evidence of TOD and no additional ASCVD risk factors	Stop smoking and lifestyle optimization	
Without established ASCVD or severe TOD (see *Table 4* for definitions)	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL) HbA1c <53 mmol/mol (7.0%)	SBP <130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction SGLT2 inhibitor or GLP-1RA
With established ASCVD and/or severe TOD (see *Table 4* for definitions)	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) HbA1c <64 mmol/mol (8.0%) SGLT2 inhibitor or GLP-1RA CVD: antiplatelet therapy	SBP <130 mmHg if tolerated[b] LDL-C <1.4 mmol/L (55 mg/dL) and ≥50% reduction SGLT2 inhibitor or GLP-1RA if not already on *May additionally consider novel upcoming treatments: DAPT, dual pathway inhibition, colchicine, icosapent ethyl, etc.*
Patients with established ASCVD	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] Intensive oral lipid-lowering therapy aiming at LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction Antiplatelet therapy	SBP <130 mmHg if tolerated[b] LDL-C <1.4 mmol/L and ≥50% reduction (55 mg/dL) *May additionally consider novel upcoming treatments: DAPT, dual pathway inhibition, colchicine, icosapent ethyl, etc.*

Recommendations for physical activity (1)

Recommendations	Class	Level
It is recommended for adults of all ages to strive for at least 150–300 min a week of moderate-intensity or 75–150 min a week of vigorous-intensity aerobic PA, or an equivalent combination thereof, to reduce all-cause mortality, CV mortality, and morbidity.	I	A
It is recommended that adults who cannot perform 150 min of moderate-intensity PA a week should stay as active as their abilities and health condition allow.	I	B
It is recommended to reduce sedentary time to engage in at least light activity throughout the day to reduce all-cause and CV mortality and morbidity.	I	B

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Recommendations for physical activity (2)

Recommendations	Class	Level
Performing resistance exercise, in addition to aerobic activity, is recommended on 2 or more days per week to reduce all-cause mortality.	I	B
Lifestyle interventions, such as group or individual education, behaviour-change techniques, telephone counselling, and use of consumer-based wearable activity trackers, should be considered to increase PA participation.	IIa	B

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Healthy diet characteristics (1)

Adopt a more plant- and less animal-based food pattern
Saturated fatty acids should account for <10% of total energy intake, through replacement by PUFAs, MUFAs, and carbohydrates from whole grains
Trans unsaturated fatty acids should be minimized as far as possible, with none from processed foods
<5 g total salt intake per day
30–45 g of fibre per day, preferably from wholegrains
≥200 g of fruit per day (≥2–3 servings)
≥200 g of vegetables per day (≥2–3 servings)

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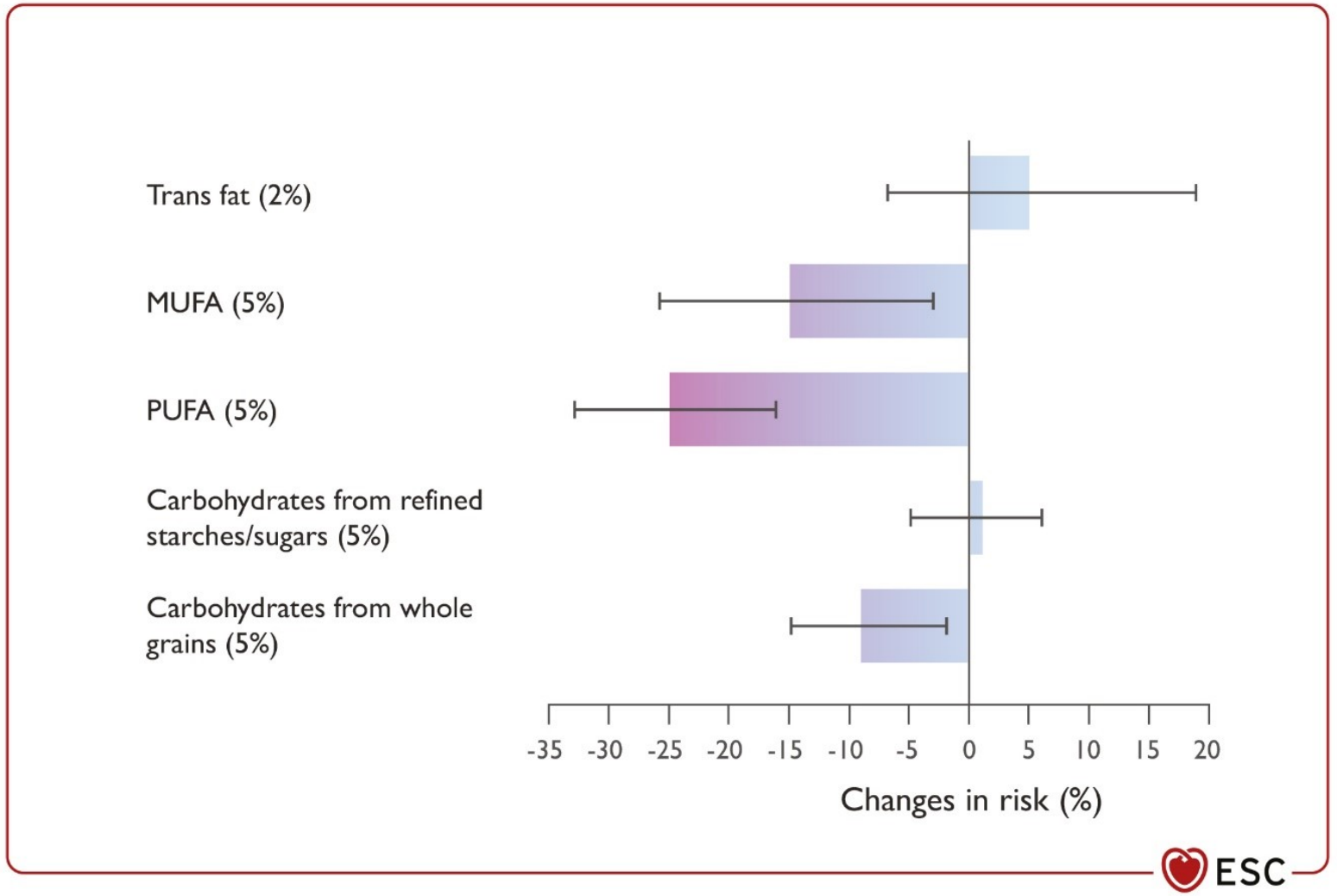
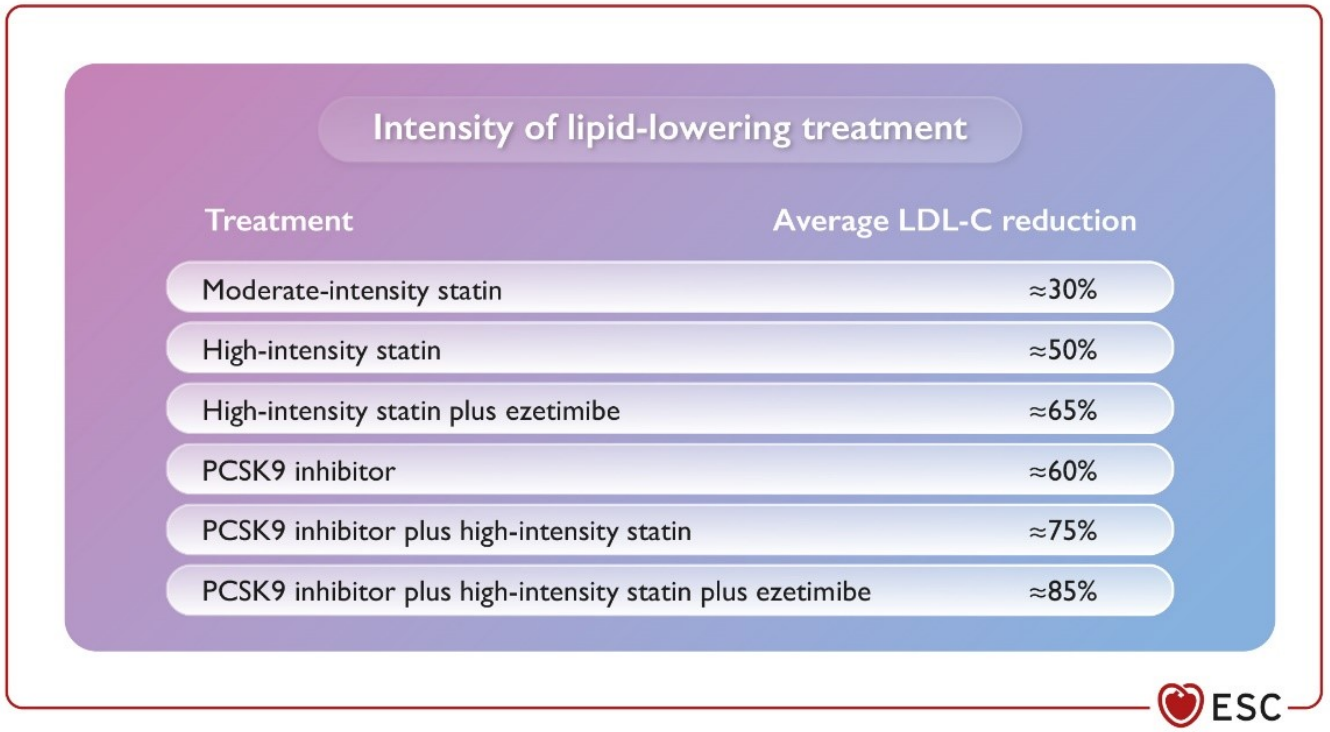
Healthy diet characteristics (2)

Red meat should be reduced to a maximum of 350–500 g a week, in particular processed meat should be minimized
Fish is recommended 1–2 times per week, in particular fatty fish
30 g unsalted nuts per day
Consumption of alcohol should be limited to a maximum of 100 g per week
Sugar-sweetened beverages, such as soft drinks and fruit juices, must be discouraged
Red meat should be reduced to a maximum of 350–500 g a week, in particular processed meat should be minimized
Fish is recommended 1–2 times per week, in particular fatty fish



Estimated percent change in risk of coronary heart disease associated with isocaloric substitutions of saturated fat for other types of fat or carbohydrates

Expected low-density lipoprotein cholesterol reductions for combination therapies



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Recommendations for pharmacological low-density lipoprotein cholesterol lowering up to 70 years of age (recommendations for persons aged >70 years, see respective recommendations tables) (1)

Recommendations	Class	Level
It is recommended that a high-intensity statin is prescribed up to the highest tolerated dose to reach the LDL-C goals set for the specific risk group.	I	A
An ultimate LDL-C goal of ≥50% reduction vs baseline and an LDL-C of <1.4 mmol/L (<55 mg/dL) should be considered in apparently healthy persons <70 years at very high risk.	IIa	C
An ultimate LDL-C goal of ≥50% reduction vs baseline and an LDL-C of <1.8 mmol/L (<70 mg/dL) should be considered in apparently healthy persons <70 years at high risk.	IIa	C

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Recommendations for pharmacological low-density lipoprotein cholesterol lowering up to 70 years of age (recommendations for persons aged >70 years, see respective recommendations tables) (2)

Recommendations	Class	Level
In patients with established ASCVD, lipid-lowering treatment with an ultimate LDL-C goal of ≥50% reduction vs baseline and an LDL-C of <1.4 mmol/L (<55 mg/dL) is recommended.	I	A
If the goals are not achieved with the maximum tolerated dose of a statin, combination with ezetimibe is recommended.	I	B
For primary prevention patients at very high risk, but without FH, if the LDL-C goal is not achieved on a maximum tolerated dose of a statin and ezetimibe, combination therapy including a PCSK9 inhibitor may be considered.	IIb	C

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Recommendations for pharmacological low-density lipoprotein cholesterol lowering up to 70 years of age (recommendations for persons aged >70 years, see respective recommendations tables) (3)

Recommendations	Class	Level
For secondary prevention patients not achieving their goals on a maximum tolerated dose of a statin and ezetimibe, combination therapy including 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 goals on a maximum tolerated dose of a statin and ezetimibe, combination therapy including a PCSK9 inhibitor is recommended.	I	C
If a statin-based regimen is not tolerated at any dosage (even after rechallenge), ezetimibe should be considered.	IIa	B

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Recommendations for drug treatments of patients with hypertriglyceridaemia

Recommendations	Class	Level
Statin treatment is recommended as the first drug of choice for reducing CVD risk in high-risk individuals with hypertriglyceridaemia (triglycerides >2.3 mmol/L [200 mg/dL]).	I	A
In patients taking statins who are at LDL-C goal with triglycerides >2.3 mmol/L (200 mg/dL), fenofibrate or bezafibrate may be considered.	IIb	B
In high-risk (or above) patients with triglycerides >1.5 mmol/L (135 mg/dL) despite statin treatment and lifestyle measures, n-3 PUFAs (icosapent ethyl 2 x 2 g/day) may be considered in combination with a statin.	IIb	B

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Recommendations for the treatment of dyslipidaemias in older people (>70 years)

Recommendations	Class	Level
Treatment with statins is recommended for older people with ASCVD in the same way as for younger patients.	I	A
Initiation of statin treatment for primary prevention in older people aged ≥70 may be considered, if at high risk or above.	IIb	B
It is recommended that the statin is started at a low dose if there is significant renal impairment and/or the potential for drug interactions.	I	C

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Recommendations for the treatment of dyslipidaemias in diabetes Mellitus (1)

Recommendations	Class	Level
In patients with type 2 DM at very high risk (e.g. with established ASCVD and/or severe TOD[a]), intensive lipid-lowering therapy, ultimately[b] aiming at ≥50% LDL-C reduction and an LDL-C of <1.4 mmol/L (55 mg/dL) is recommended.	I	A
In patients with type 2 DM >40 years at high risk, lipid-lowering treatment with an ultimate LDL-C goal of ≥50% LDL-C reduction and an LDL-C of <1.8 mmol/L (70 mg/dL) is recommended.	I	A
Statin therapy may be considered in persons aged ≤40 years with type 1 or type 2 DM with evidence of TOD and/or an LDL-C level >2.6 mmol/L (100 mg/dL), as long as pregnancy is not being planned.	IIb	C
If the LDL-C goal is not reached, statin combination with ezetimibe should be considered.	IIa	B

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Recommendations for lipid management in patients with moderate-to-severe chronic kidney disease (Kidney disease Outcomes Quality Initiative stages 3–5)

Recommendations	Class	Level
The use of statins or statin/ezetimibe combination is recommended in patients with non-dialysis-dependent, stage 3–5 CKD.	I	A
In patients already on statins, ezetimibe, or a statin/ezetimibe combination at the time of dialysis initiation, continuation of these drugs should be considered, particularly in patients with ASCVD.	IIa	C
In patients with dialysis-dependent CKD who are free of ASCVD, commencing statin therapy is not recommended.	III	A

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Summary of recommendations for the clinical management of hypertension (1)

Recommendations	Class	Level
Classification of BP		
It is recommended that BP should be classified as optimal, normal, high-normal, or grades 1–3 hypertension, according to office BP.	I	C
Diagnosis of hypertension		
It is recommended to base the diagnosis of hypertension on out-of-office BP measurement with ABPM and/or HBPM when feasible.	I	C
It is recommended to base the diagnosis of hypertension on repeated office BP measurements, on more than one visit, except when hypertension is severe (e.g. grade 3 and especially in high-risk patients).	I	C

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Summary of recommendations for the clinical management of hypertension (2)

Recommendations	Class	Level
Assessment of HMOD		
To evaluate for the presence of HMOD, measurement of serum creatinine, eGFR, electrolytes, and ACR is recommended for all patients. A 12-lead ECG is recommended for all patients, and echocardiography is recommended for those with ECG abnormalities or signs/symptoms of LV dysfunction. Fundoscopy or retinal imaging is recommended for patients with grades 2 or 3 hypertension and all hypertensive patients with DM.	I	B

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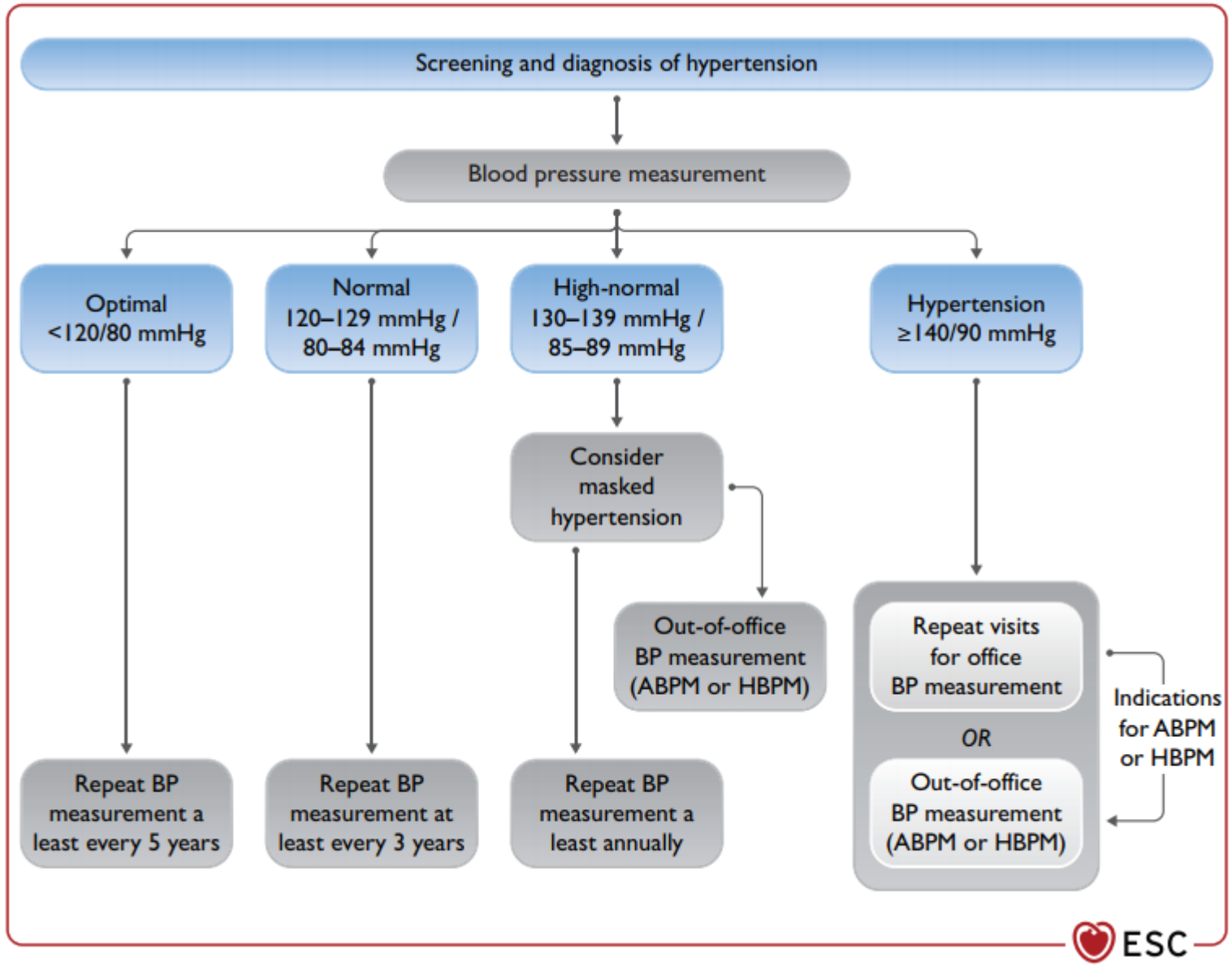
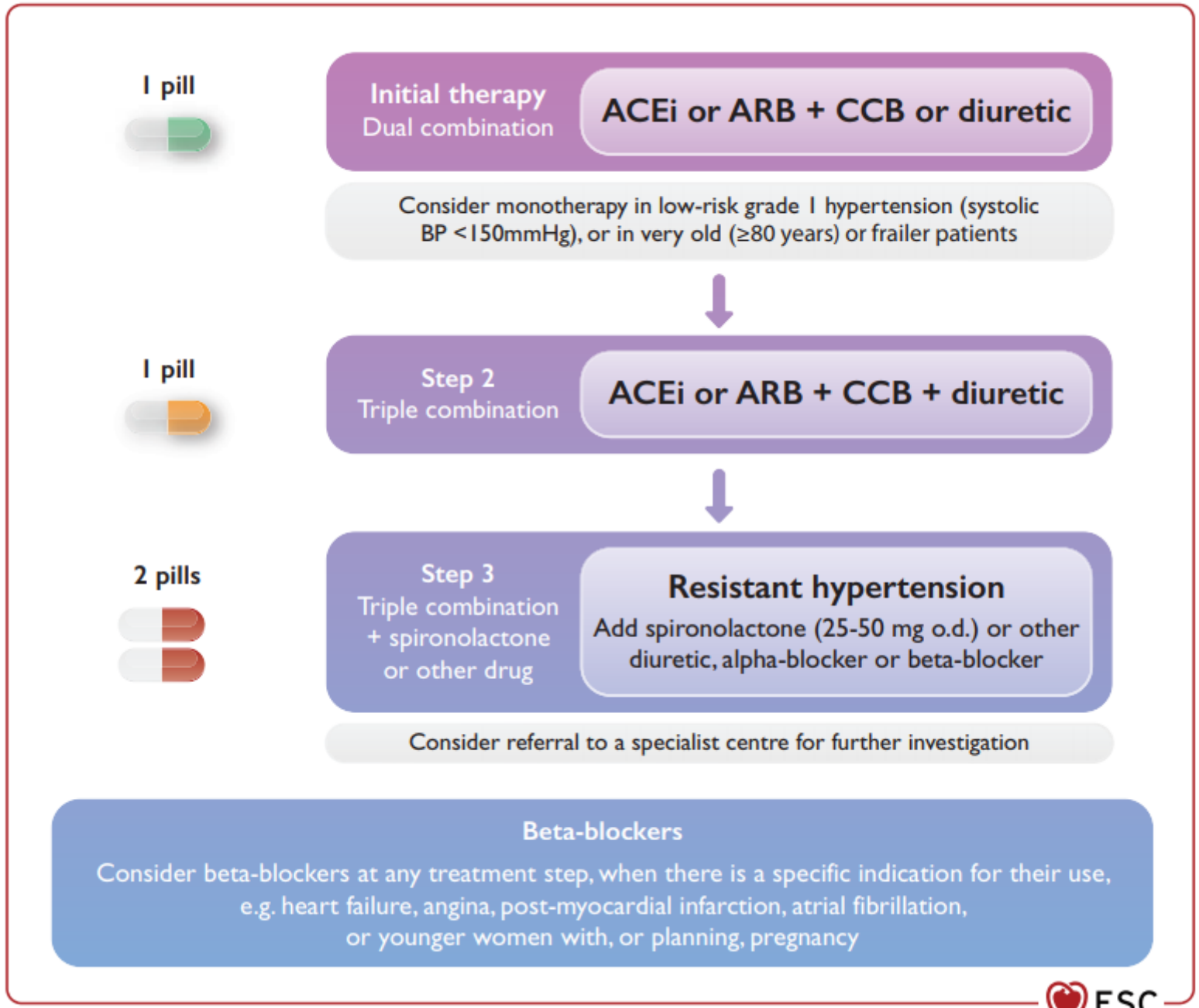


Table 12 **Categories for conventionally measured seated office blood pressure**[a]

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

Table 13 **Definitions of hypertension according to office, ambulatory, and home blood pressure**

Category	SBP (mmHg)		DBP (mmHg)
Office BP[a]	≥140	and/or	≥90
Ambulatory BP			
Daytime (or awake) mean	≥135	and/or	≥85
Night-time (or asleep) mean	≥120	and/or	≥70
24-h mean	≥130	and/or	≥80
Home BP mean	≥135	and/or	≥85


1 pill
Initial therapy
Dual combination
ACEi or ARB + CCB or diuretic
Consider monotherapy in low-risk grade 1 hypertension (systolic BP <150mmHg), or in very old (≥80 years) or frailer patients
1 pill
Step 2
Triple combination
ACEi or ARB + CCB + diuretic
2 pills
Step 3
Triple combination
+ spironolactone
or other drug
Resistant hypertension
Add spironolactone (25-50 mg o.d.) or other diuretic, alpha-blocker or beta-blocker
Consider referral to a specialist centre for further investigation
Beta-blockers
Consider beta-blockers at any treatment step, when there is a specific indication for their use, e.g. heart failure, angina, post-myocardial infarction, atrial fibrillation, or younger women with, or planning, pregnancy
ESC

Recommended office blood pressure target ranges

Age group	Office SBP treatment target ranges (mmHg)				
	Hypertension	+ DM	+ CKD	+ CAD	+ Stroke/TIA
18–69 years	120–130	120–130	<140–130	120–130	120–130
	Lower SBP acceptable if tolerated				
≥70 years	**<140 mmHg, down to 130 mmHg if tolerated** *Lower SBP acceptable if tolerated*				
DBP treatment target (mmHg)	<80 for all treated patients				

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Summary of recommendations for the clinical management of hypertension (4)

Recommendations	Class	Level
Office BP treatment targets		
It is recommended that the first objective of treatment is to lower BP to <140/90 mmHg in all patients, and that subsequent BP targets are tailored to age and specific comorbidities.	I	A
In treated patients aged 18–69 years, it is recommended that SBP should ultimately be lowered to a target range of 120–130 mmHg in most patients.	I	A
In treated patients aged ≥70 years, it is recommended that SBP should generally be targeted to <140 and down to 130 mmHg if tolerated.	I	A
In all treated patients, DBP is recommended to be lowered to <80 mmHg.	I	A

Summary of recommendations for the clinical management of hypertension (5)

Recommendations	Class	Level
Treatment of hypertension: lifestyle interventions		
Lifestyle interventions are recommended for people with high-normal BP or higher.	I	A
Treatment of hypertension: drug treatment		
It is recommended to initiate antihypertensive treatment with a two-drug combination in most patients, preferably as a single-pill combination. Exceptions are frail older patients and those with low-risk, grade 1 hypertension (particularly if SBP <150 mmHg).	I	B

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Patient characteristics that should raise the suspicion of secondary hypertension

Characteristics
Younger patients (<40 years) with grade 2 hypertension or onset of any grade of hypertension in childhood
Acute worsening of hypertension in patients with previously documented chronically stable normotension
Resistant hypertension (BP uncontrolled despite treatment with optimal or best tolerated doses of three or more drugs including a diuretic, and confirmed by ABPM or HBPM)
Severe (grade 3) hypertension or a hypertension emergency
Presence of extensive HMOD
Clinical or biochemical features suggestive of endocrine causes of hypertension or CKD
Clinical features suggestive of OSA
Symptoms suggestive of pheochromocytoma or family history of pheochromocytoma

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Recommendations for treatment of diabetes mellitus (1)

Recommendations	Class	Level
Screening		
When screening for DM in individuals with or without ASCVD, assessment of HbA1c (which can be done non-fasting) or fasting blood glucose should be considered.	IIa	A
Lifestyle		
Lifestyle changes including smoking cessation, a low saturated fat, high-fibre diet, aerobic PA, and strength training are recommended.	I	A
Reduction in energy intake is recommended to patients, to help achieve lower body weight or prevent or slow weight gain.	I	B

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Recommendations for treatment of diabetes mellitus (2)

Recommendations	Class	Level
Lifestyle (continued)		
For those motivated to try, considerable weight loss with use of low-calorie diets followed by food reintroduction and weight-maintenance phases early after diagnosis can lead to DM remission and should be considered.	IIa	A
Glycaemia targets		
A target HbA1c for the reduction of CVD risk and microvascular complications of DM of <7.0% (53 mmol/mol) is recommended for the majority of adults with either type 1 or type 2 DM.	I	A

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Recommendations for treatment of diabetes mellitus (3)

Recommendations	Class	Level
Glycaemia targets (continued)		
For patients with a long duration of DM and in old or frail adults, a relaxing of the HbA1c targets (i.e. less stringent) should be considered.	IIa	B
A target HbA1c of ≤6.5% (48 mmol/mol) should be considered at diagnosis or early in the course of type 2 DM in persons who are not frail and do not have ASCVD.	IIa	B

Recommendations for treatment of diabetes mellitus (4)

Recommendations	Class	Level
Treatment of hyperglycaemia and ASCVD/cardiorenal risks		
Metformin is recommended as first-line therapy, following evaluation of renal function, in the majority of patients without previous ASCVD, CKD, or HF.	I	B
In persons with type 2 DM with ASCVD, metformin should be considered, unless contraindications are present.	IIa	B
Avoidance of hypoglycaemia and excessive weight gain should be considered.	IIa	B

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Recommendations for treatment of diabetes mellitus (5)

Recommendations	Class	Level
Treatment of hyperglycaemia and ASCVD/cardiorenal risks (continued)		
In persons with type 2 DM and ASCVD, the use of a GLP-1RA or SGLT2 inhibitor with proven outcome benefits is recommended to reduce CV and/or cardiorenal outcomes.	I	A
In patients with type 2 DM and TOD,[a] the use of an SGLT2 inhibitor or GLP-1RA with proven outcome benefits may be considered to reduce future CV and total mortality.	IIb	B
In patients with type 2 DM and CKD, the use of an SGLT2 inhibitor is recommended to improve ASCVD and/or cardiorenal outcomes.	I	A

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Recommendations for treatment of diabetes mellitus (6)

Recommendations	Class	Level
Treatment of hyperglycaemia and ASCVD/cardiorenal risks (continued)		
In patients with type 2 DM and HFrEF, use of an SGLT2 inhibitor with proven outcome benefits is recommended to lessen HF hospitalizations and CV death.	I	A
In patients with type 2 DM but without ASCVD, HF, or CKD, use of an SGLT2 inhibitor or GLP-1RA should be considered based on estimated future risks (e.g. with the ADVANCE risk score or DIAL model) for adverse CVD or cardiorenal outcomes from risk factor profiles.	IIa	B

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Recommendations for antithrombotic therapy

Recommendations	Class	Level
Aspirin 75–100 mg daily is recommended for secondary prevention of CVD.	I	A
Clopidogrel 75 mg daily is recommended as an alternative to aspirin in secondary prevention in case of aspirin intolerance.	I	B
Clopidogrel 75 mg daily may be considered in preference to aspirin in patients with established ASCVD.	IIb	A
Concomitant use of a proton pump inhibitor is recommended in patients receiving antiplatelet therapy who are at high risk of gastrointestinal bleeding.	I	A
In patients with DM at high or very high CVD risk, low-dose aspirin may be considered for primary prevention in the absence of clear contraindications.	IIb	A
Antiplatelet therapy is not recommended in individuals with low/moderate CV risk due to the increased risk of major bleeding.	III	A

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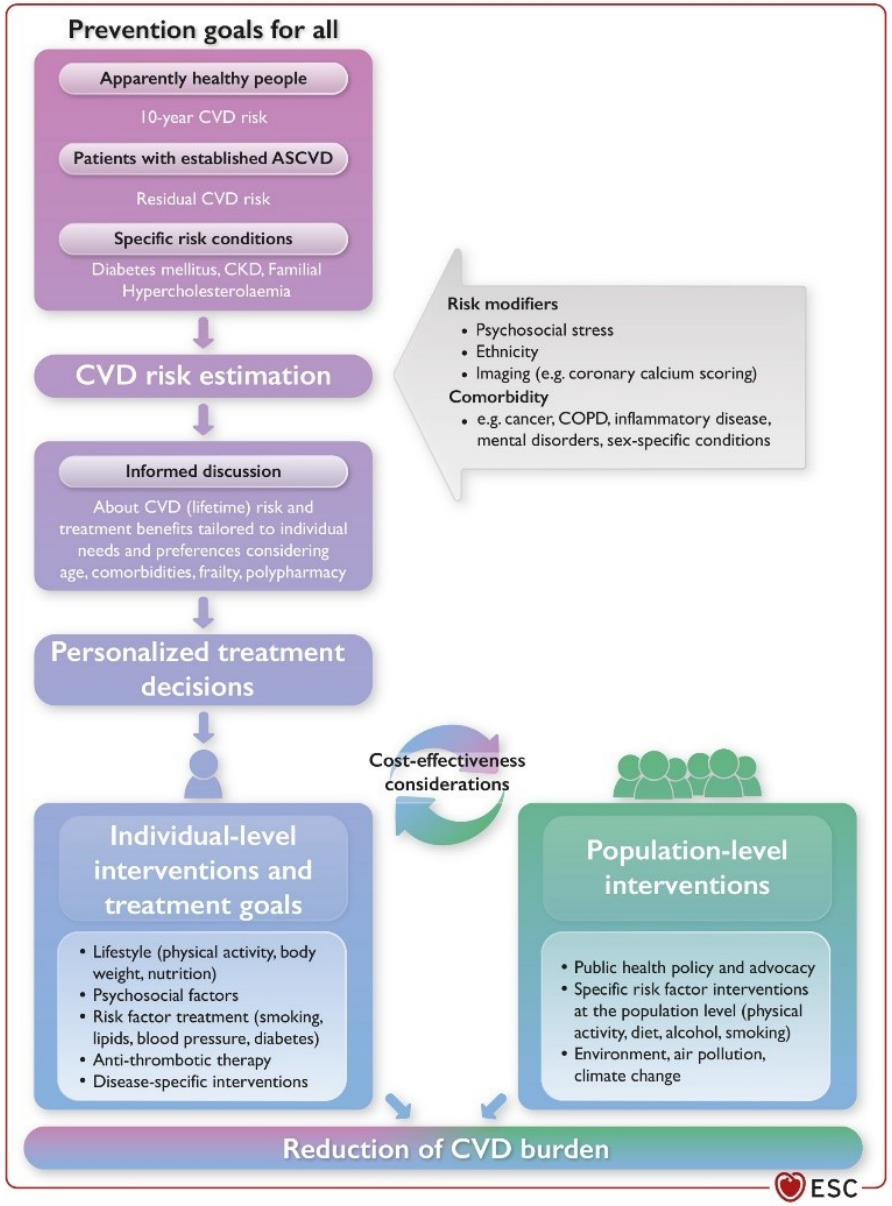
Recommendation for anti-inflammatory therapy

Recommendations	Class	Level
Low-dose colchicine (0.5 mg o.d.) may be considered in secondary prevention of CVD, particularly if other risk factors are insufficiently controlled or if recurrent CVD events occur under optimal therapy.	IIb	A



Prevention of CVD

Ευχαριστώ για την προσοχή σας!

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