2016 ESC/EAS Guidelines on the management of dyslipidaemias

European Heart Journal 2016 - doi:10.1093/eurheartj/ehv272

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Recommendation class - Definitions

Classes of recommendations	Definition	Suggested wording to use
Classe I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommmended/ is indicated.
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	*Weight of evidence/opinion is in favour of usefulness/efficacy.*	Should be considered.
Class IIb	*Usefulness/efficacy is less well established by evidence/opinion.*	May be considered.
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended.

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Level of evidence - Definitions

Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.

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Key messages

- Prevention of CVD, either by lifestyle changes or medication, is cost-effective in many scenarios, including population-based approaches and actions directed at high-risk individuals.
- Cost-effectiveness depends on several factors, including baseline CV risk, cost of drugs or other interventions, reimbursement procedures, and uptake of preventive strategies.

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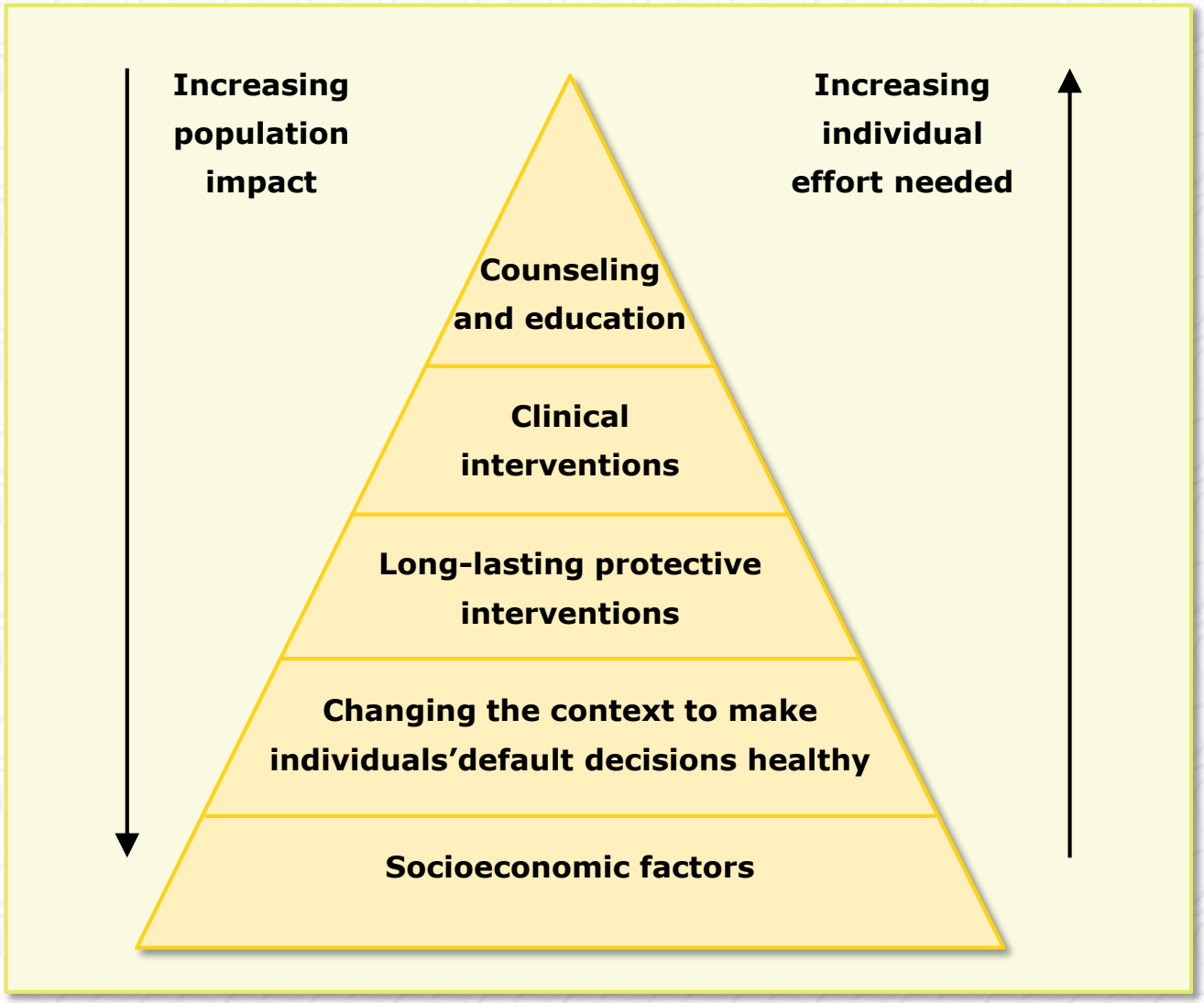
Health impact pyramid



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Suggestions for implementing healthy lifestyles

Recommendations	Class	Level
Measures aimed at implementing healthy lifestyles are more cost-effective than drug interventions at the population level.	IIa	B

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Gaps in evidence

- Most cost-effectiveness studies rely on simulation. More data are needed, particularly from randomized controlled trials.
- The effectiveness of the polypill in primary prevention awaits further investigation.

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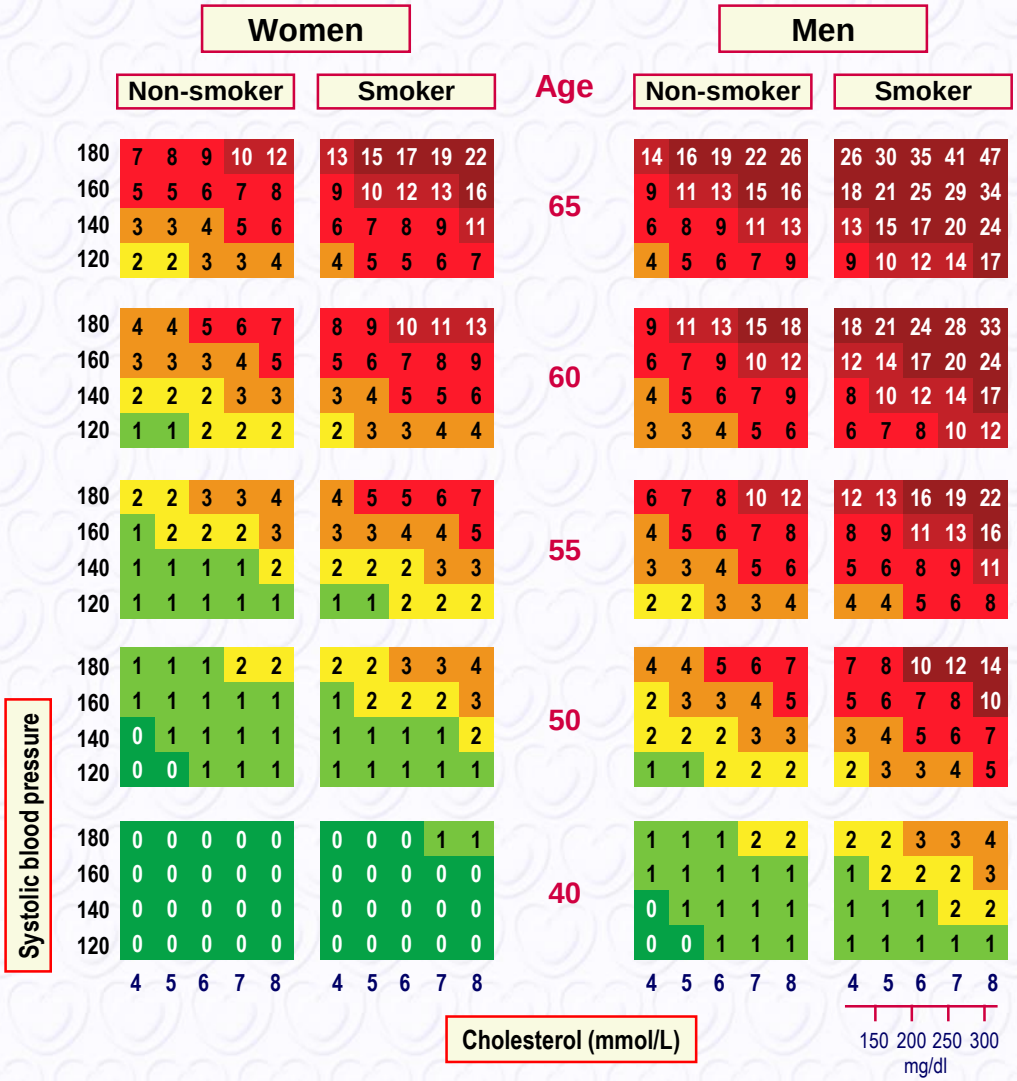
SCORE chart: 10-year risk fatal cardiovascular disease (CVD) in population at high CVD risk



SCORE

- 15% and over
- 10%-14%
- 5%-9%
- 3%-4%
- 2%
- 1%
- <1%

10-year risk of fatal CVD in populations at **High CVD risk**

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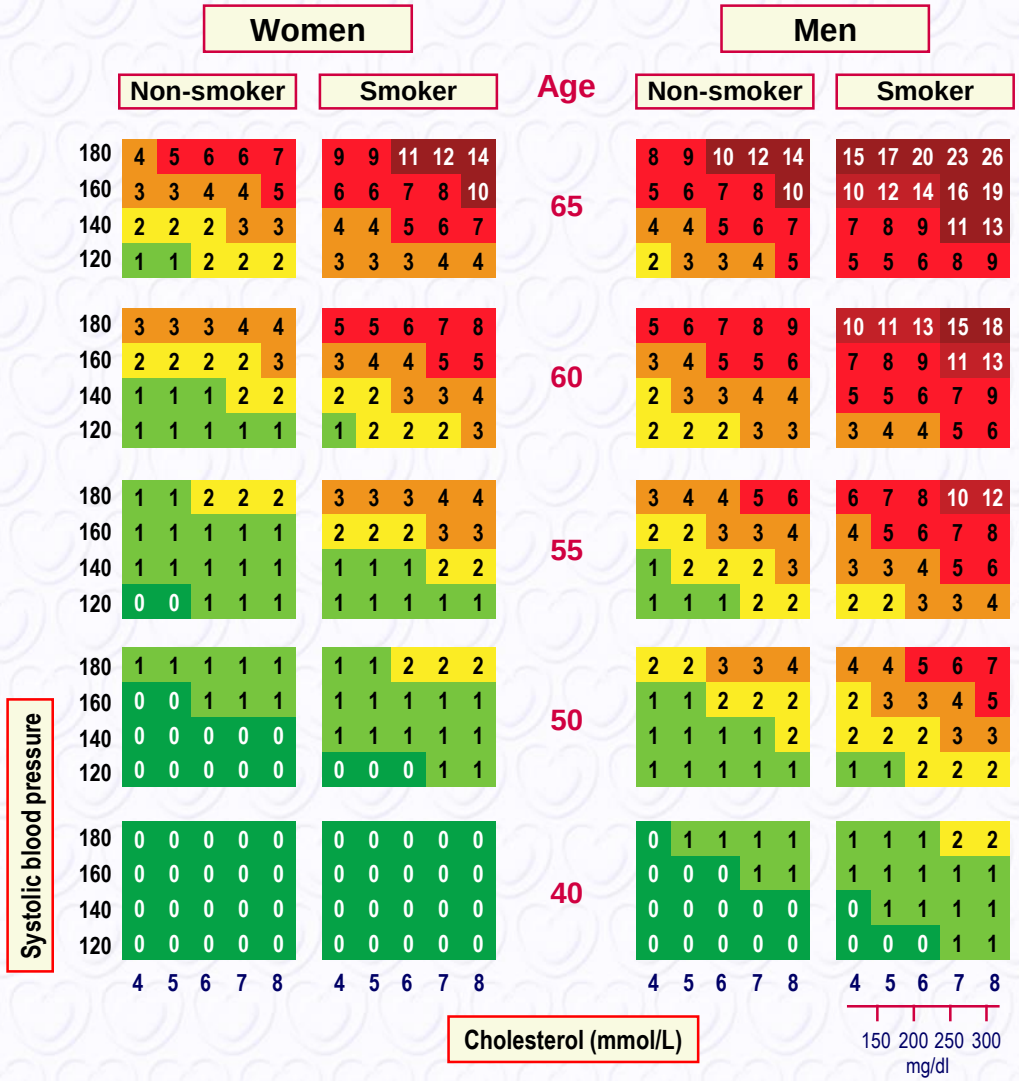
SCORE chart: 10-year risk of fatal cardiovascular disease (CVD) in population at low CVD risk



SCORE

- 15% and over
- 10%-14%
- 5%-9%
- 3%-4%
- 2%
- 1%
- <1%

10-year risk of fatal CVD in populations at **Low CVD risk**

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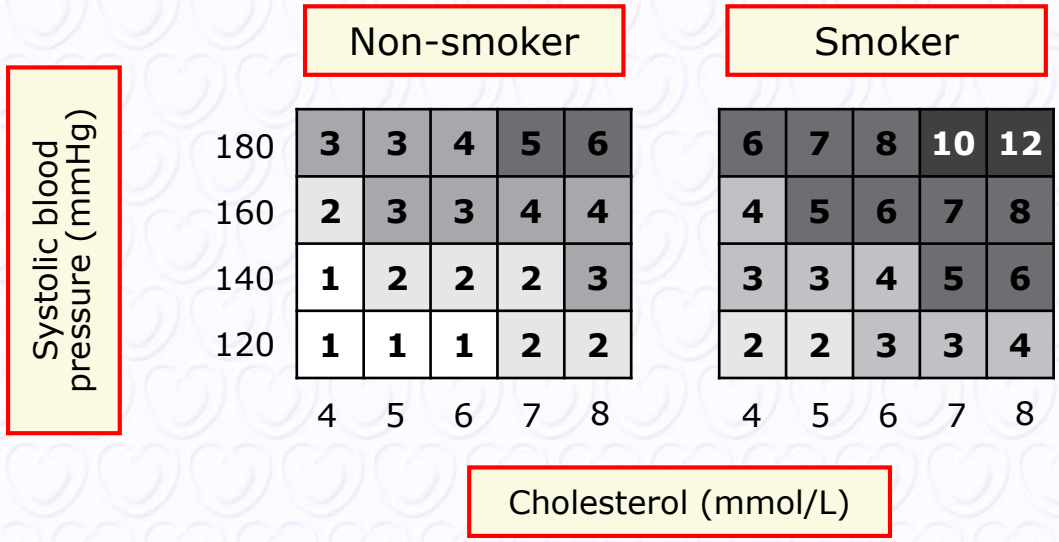
Relative risk chart for 10-year cardiovascular mortality



Please note that this chart shows RELATIVE not absolute risk. The risks are RELATIVE to 1 in the bottom left. Thus, a person in the top right hand box has a risk that is 12 times higher than a person in the bottom left.

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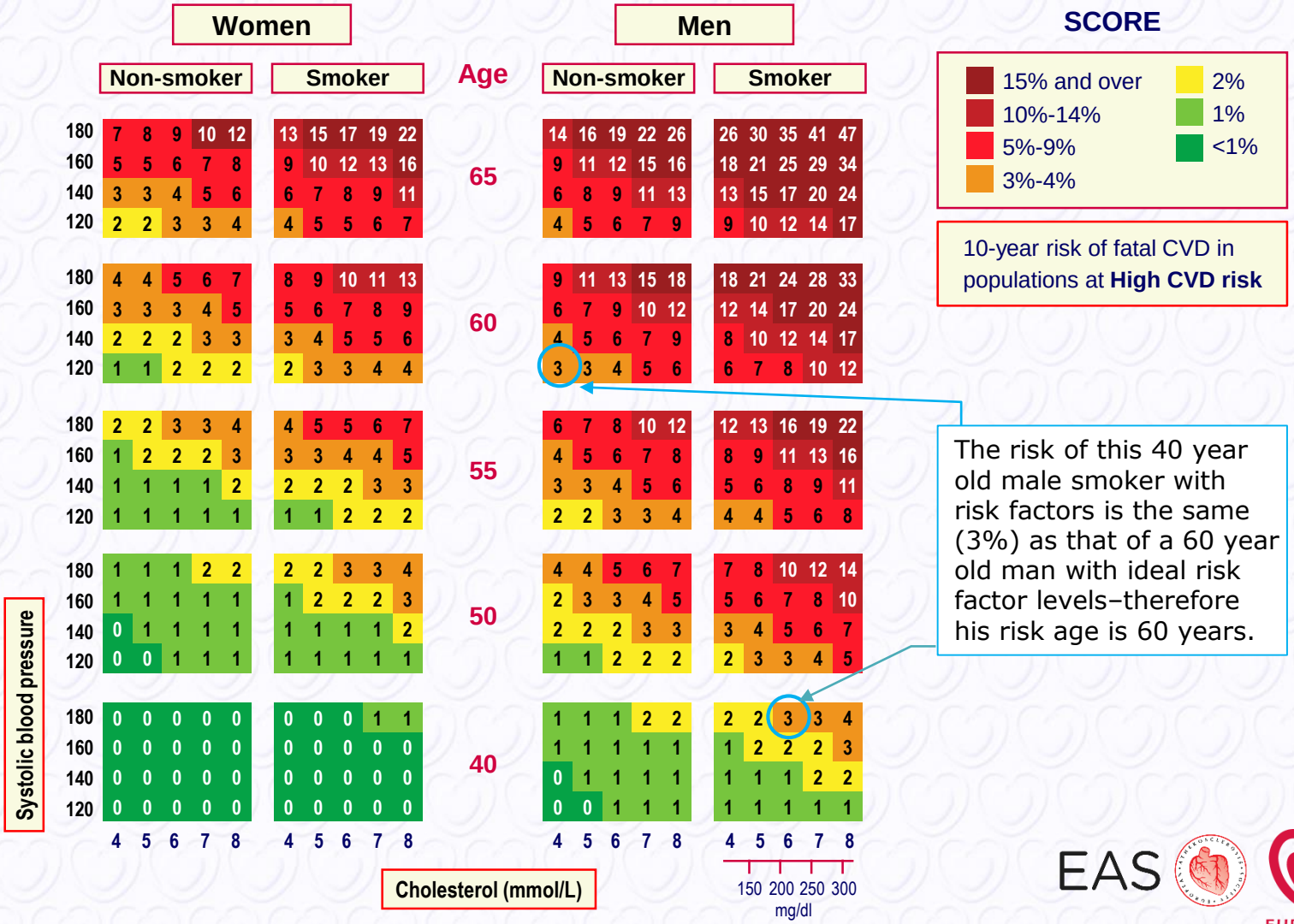
The risk age concept



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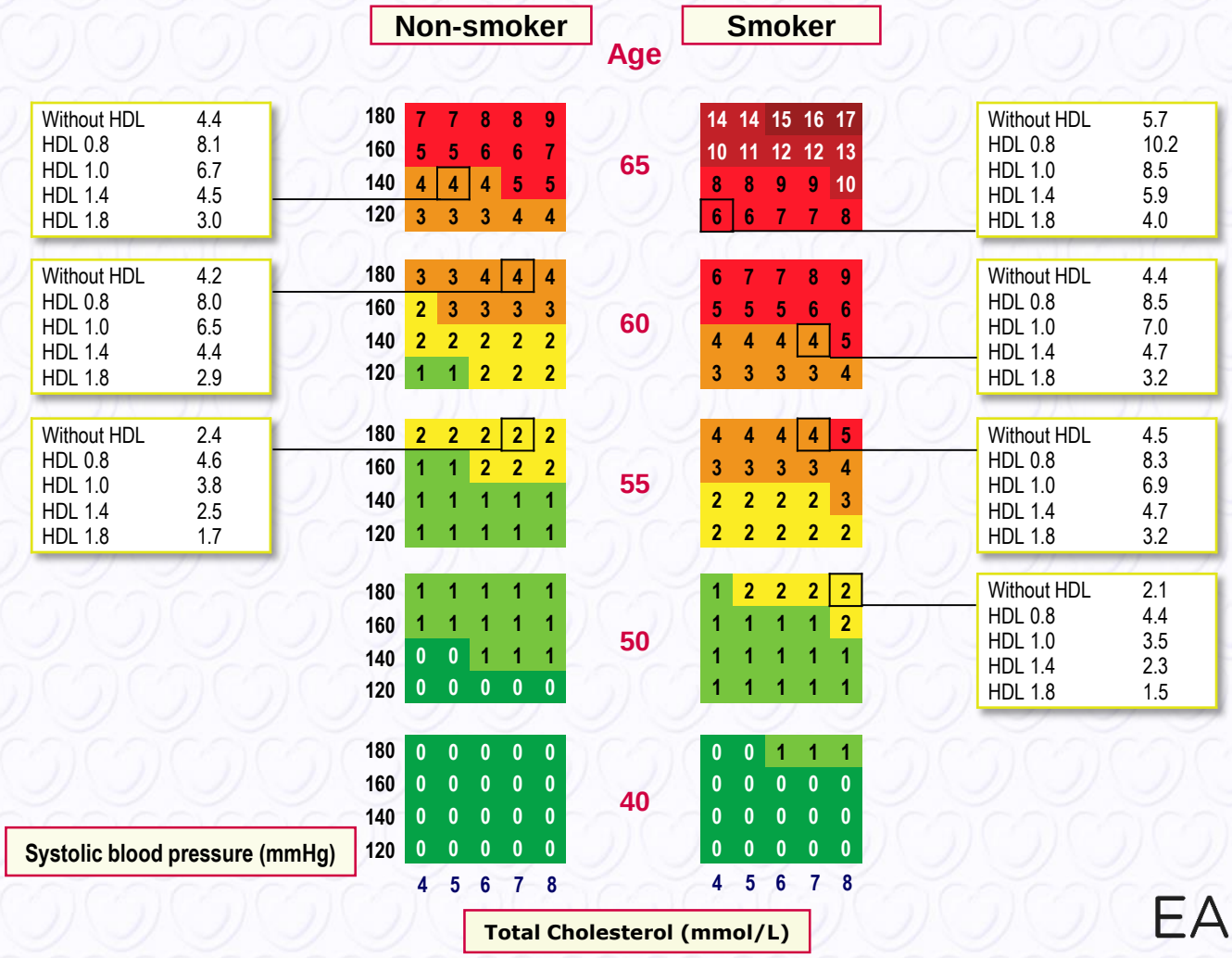
Risk function without high-density lipoprotein-cholesterol (HDL-C) for women



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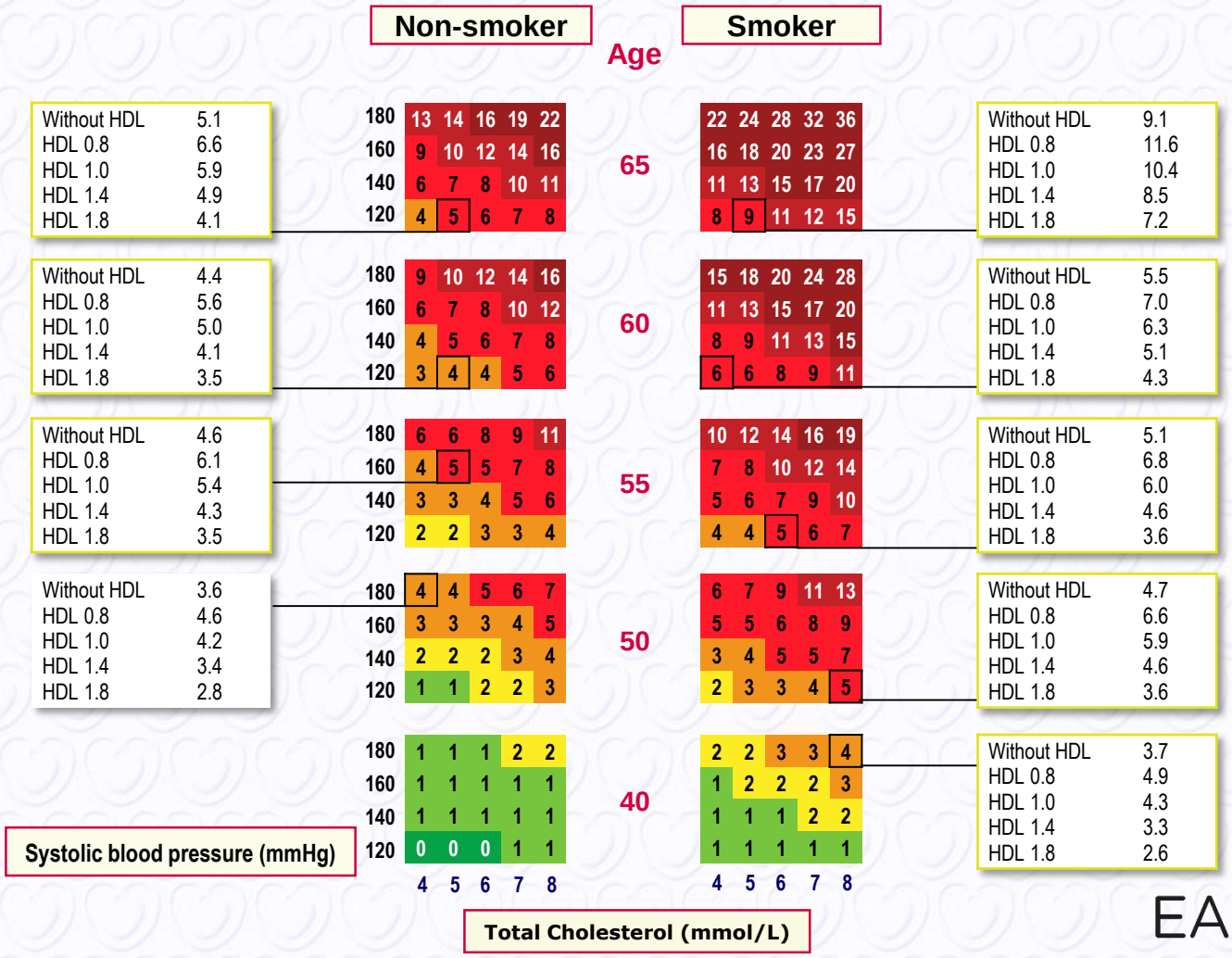
Risk function without high-density lipoprotéin-cholesterol (HDL-C) for men



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How to use the risk estimation charts

To estimate a person's 10-year risk of CVD death, find the table for his/her gender, smoking status, and age. Within the table find the cell nearest to the person's blood pressure, TC and HDL-C. Risk estimates will need to be adjusted upwards as the person approaches the next age category.
Risk is initially assessed on the level of TC and systolic blood pressure before treatment, if known. The longer the treatment and the more effective it is, the greater the reduction in risk, but in general it will not be more than about one-third of the baseline risk. For example, for a person on antihypertensive drug treatment in whom the pre-treatment blood pressure is not known, if the total CV SCORE risk is 6% then the pre-treatment total CV risk may have been 9%.
Low-risk persons should be offered advice to maintain their low-risk status. While no threshold is universally applicable, the intensity of advice should increase with increasing risk.
The charts may be used to give some indication of the effects of reducing risk factors, given that there will be a time lag before the risk reduces and that the results of randomized controlled trials in general give better estimates of benefits. In general, those who stop smoking halve their cumulative risk rapidly.

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Qualifiers

The charts can assist in risk assessment and management but must be interpreted in light of the clinician's knowledge and experience and of the patient's pre-test likelihood of CVD.
Risk will be overestimated in countries with a decreas CVD mortality, and under-estimated in countries in which mortality is increasing. This is dealt with by recalibration (www.heartscore.org).
Risk estimates appear lower in women than in men. However, risk is only deferred in women; the risk of a 60-year-old woman is similar to that of a 50-year-old man. Ultimately more women die from CVD than men.
Relative risks may be unexpectedly high in young persons, even if absolute risk levels are low. The relative risk chart and the estimated risk age may be helpful in identifying and counselling such persons.

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Factors modifying SCORE risks

Social deprivation–the origin of many of the causes of CVD.
Obesity and central obesity as measured by the body mass index and waist circumference respectively.
Physical inactivity.
Psychosocial stress including vital exhaustion.
Family history of premature CVD (men: <55 years; women: <60 years).
Autoimmune and other inflammatory disorders.
Major psychiatric disorders.
Treatment for human immunodeficiency virus (HIV) infection.
Atrial fibrillation.
Left ventricular hypertrophy.
Chronic kidney disease.
Obstructive sleep apnoea syndrome.

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Key messages

In apparently healthy persons, CVD risk is most frequently the result of multiple, interacting risk factors. This is the basis for total CV risk estimation and management.
Risk factor screening including the lipid profile should be considered in men >40 years old and in women >50 years of age or post-menopausal.
A risk estimation system such as SCORE can assist in making logical management decisions, and may help to avoid both under- and overtreatment.
Certain individuals declare themselves to be at high or very high CVD risk without needing risk scoring and require immediate attention to all risk factors.
This is true for patients with documented CVD, diabetes or CKD.
All risk estimation systems are relatively crude and require attention to qualifying statements.
Additional factors affecting risk can be accommodated in electronic risk estimation systems such as HeartScore (www.heartscore.org).
The total risk approach allows flexibility–if perfection cannot be achieved with one risk factor, risk can still be reduced by trying harder with the others.

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Risk categories

Very high-risk	Subjects with any of the following: • Documented CVD, clinical or unequivocal on imaging. Documented clinical CVD includes previous AMI, ACS, coronary revascularization and other arterial revascularization procedures, stroke and TIA, aortic aneurysm and PAD. Unequivocally documented CVD on imaging includes significant plaque on coronary angiography or carotid ultrasound. It does NOT include some increase in continuous imaging parameters such as intima–media thickness of the carotid artery. • DM with target organ damage such as proteinuria or with a major risk factor such as smoking or marked hypercholesterolaemia or marked hypertension. • Severe CKD (GFR <30 mL/min/1.73 m^2). • A calculated SCORE ≥10%.
High-risk	Subjects with: • Markedly elevated single risk factors, in particular cholesterol >8 mmol/L (>310 mg/dL) (e.g. in familial hypercholesterolaemia) or BP ≥180/110 mmHg. • Most other people with DM (with the exception of young people with type 1 DM and without major risk factors that may be at low or moderate risk). • Moderate CKD (GFR 30–59 mL/min/1.73 m^2). • A calculated SCORE ≥5% and <10%.
Moderate-risk	SCORE is ≥1% and <5% at 10 years. Many middleaged subjects belong to this category.
Low-risk	SCORE <1%.

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Intervention strategies

Total CV risk (SCORE) %	LDL-C levels				
	<70 mg/dL <1.8 mmol/L	70 to <100 mg/dL 1.8 to <2.6 mmol/L	100 to <155 mg/dL 2.6 to <4.0 mmol/L	155 to <190 mg/dL 4.0 to <4.9 mmol/L	≥190 mg/dL ≥4.9 mmol/L
<1	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle advice, consider drug if uncontrolled
Class/Level	I/C	I/C	I/C	I/C	IIa/A
≥1 to <5	Lifestyle advice	Lifestyle advice	Lifestyle advice, consider drug if uncontrolled	Lifestyle advice, consider drug if uncontrolled	Lifestyle advice, consider drug if uncontrolled
Class/Level	I/C	I/C	IIa/A	IIa/A	I/A
≥5 to <10, or high-risk	Lifestyle advice	Lifestyle advice, consider drug if uncontrolled	Lifestyle advice and drug treatment for most	Lifestyle advice and drug treatment	Lifestyle advice and drug treatment
Class/Level	IIa/A	IIa/A	IIa/A	I/A	I/A
≥10 or very high-risk	Lifestyle advice, consider drug[a]	Lifestyle advice and concomitant drug treatment	Lifestyle advice and concomitant drug treatment	Lifestyle advice and concomitant drug treatment	Lifestyle advice and concomitant drug treatment
Class/Level	IIa/A	IIa/A	I/A	IA	I/A

[a]In patients with myocardial infarction, statin therapy should be considered irrespective of total cholesterol levels.

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Risk estimation

Recommendations	Class	Level
Total risk estimation using a risk estimation system such as SCORE is recommended for asymptomatic adults >40 years of age without evidence of CVD, diabetes, CKD or familial hypercholesterolaemia.	I	C
High and very high-risk individuals can be detected on the basis of documented CVD, diabetes mellitus, moderate to severe renal disease, very high levels of individual risk factors, familial hypercholesterolaemia or a high SCORE risk and are a high priority for intensive advice with regard to all risk factors.	I	C

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Risk estimation

Recommendations	Class	Level
TC is to be used for the estimation of total CV risk by means of the SCORE system.	I	C
LDL-C is recommended to be used as the primary lipid analysis for screening, risk estimation, diagnosis and management. HDL-C is a strong independent risk factor and is recommended to be used in the HeartScore algorithm.	I	C
TG adds information to risk and is indicated for risk estimation.	I	C
Non-HDL-C is a strong independent risk factor and should be considered as a risk marker, especially in subjects with high TG.	I	C
ApoB should be considered as an alternative risk marker whenever available, especially in subjects with high TG.	IIa	C
Lp(a) should be considered in selected cases at high-risk, in patients with a family history of premature CVD, and for reclassification in subjects with borderline risk.	IIa	C
The ratio apoB/apoA1 may be considered as an alternative analysis for risk estimation.	IIa	C
The ratio non-HDL-C/HDL-C may be considered as an alternative but HDL-C used in HeartScore gives a better risk estimation.	IIa	C

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Lipid analyses

Recommendations	Class	Level
LDL-C has to be used as the primary lipid analysis.	I	C
HDL-C is recommended to be analysed before treatment.	I	C
TG adds information about risk, and is indicated for diagnosis and choice of treatment.	I	C
Non-HDL-C is recommended to be calculated, especially in subjects with high TG.	I	C
When available, apoB should be an alternative to non-HDL-C.	IIa	C
Lp(a) should be recommended in selected cases at high-risk, for reclassification at borderline risk, and in subjects with a family history of premature CVD.	IIa	C
TC may be considered but is usually not enough for the characterization of dyslipidaemia before initiation of treatment.	IIb	C

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Individuals who should be considered for lipoprotein(a) screening

Individuals with:
• Premature CVD.
• Familial hypercholesterolaemia.
• A family history of premature CVD and/or elevated Lp(a).
• Recurrent CVD despite optimal lipid-lowering treatment.
• ≥5% 10-year risk of fatal CVD according to SCORE.

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Lipid analyses as treatment targets

Recommendations	Class	Level
LDL-C is recommended as the primary target for treatment.	I	A
TC should be considered as a treatment target if other analyses are not available.	IIa	A
Non-HDL-C should be considered as a secondary treatment target.	IIa	B
ApoB should be considered as a secondary treatment target, when available.	IIa	B
HDL-C is not recommended as a target for treatment.	III	A
The ratios apoB/apoA1 and non-HDL-C/HDL-C are not recommended as targets for treatment.	III	B

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Treatment targets and goals for cardiovascular disease prevention

Smoking	No exposure to tobacco in any form.
Diet	Healthy diet low in saturated fat with a focus on whole grain products, vegetables, fruit and fish.
Physical activity	2.5–5 h moderately vigorous physical activity per week or 30–60 min most days.
Body weight	BMI 20–25 kg/m^2, waist circumference <94 cm (men) and <80 cm (women).
Blodd pressure	<140/90 mmHg.
Lipid LDL-C is the primary target	**Very high-risk: LDL-C <1.8 mmol/L (70 mg/dL)** or a reduction of at least 50% if the baseline is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL).
	High-risk: LDL-C <2.6 mmol/L (100 mg/dL) or a reduction of at least 50% if the baseline is between 2.6 and 5.2 mmol/L (100 and 200 mg/dL).
	Low to moderate risk: LDL-C <3 mmol/L (115 mg/dL).
	Non-HDL-C secondary targets are <2.6, 3.4 and 3.8 mmol/L (100, 130 and 145 mg/dL) for very high-, high- and moderate-risk subjects, respectively.
	HDL-C: no target, but >1.0 mmol/L (40 mg/dL) in men and >1.2 mmol/L (48 mg/dL) in women indicates lower risk.
	TG: no target but <1.7 mmol/L (150 mg/dL) indicates lower risk and higher levels indicate a need to look for other risk factors.
Diabetes	HbA1c: <7% (<8.6 mmol/L).

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Treatment goals for low-density lipoprotein-cholesterol

Recommendations	Class	Level
In patients at VERY HIGH CV risk, an LDL-C goal of <1.8 mmol/L (70 mg/dL) or a reduction of at least 50% if the baseline LDL-C is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL) is recommended.	I	B
In patients at HIGH CV risk, an LDL-C goal of <2.6 mmol/L (100 mg/dL), or a reduction of at least 50% if the baseline LDL-C is between 2.6 and 5.2 mmol/L (100 and 200 mg/dL) is recommended.	I	B
In subjects at LOW or MODERATE risk an LDL-C goal of <3.0 mmol/L (<115 mg/dL) should be considered.	IIa	C

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Treatment goals for low-density lipoprotein-cholesterol (LDL-C)

Examples

Patient A	Very high-risk, LDL-C >1.8 mmol/L (>70 mg/dL) on statin: the goal is still <1.8 mmol/L (70 mg/dL).
Patient B	High-risk, LDL-C >2.6 mmol/L (>100 mg/dL) on statin: the goal is still <2.6 mmol/L (100 mg/dL).
Patient C	Very high-risk, LDL-C 1.8–3.5 mmol/L (70–135 mg/dL) not on pharmacological therapy: the goal is at least a 50% reduction.
Patient D	High-risk, LDL-C 2.6–5.2 mmol/L (100–200 mg/dL) not on pharmacological therapy: the goal is at least a 50% reduction.
Patient E	Very high-risk, LDL-C >3.5 mmol/L (135 mg/dL) not in pharmacological therapy: the goal is <1.8 mmol/L (70 mg/dL).
Patient F	High-risk LDL-C >5.2 mmol/L (200 mg/dL) not in pharmacological therapy: the goal is <2.6 mmol/L (100 mg/dL).

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Impact of specific lifestyle changes on lipid levels (1)

	Magnitude of the effect	Level of evidence	References
Lifestyle interventions to reduce TC and LDL-C levels			
Reduce dietary trans fat	+++	**A**	136, 139
Reduce dietary saturated fat	+++	**A**	136, 137
Increase dietary fibre	++	**A**	140, 141
Use functional foods enriched with phytosterols	++	**A**	142, 143
Use red yeast rice supplements	++	**A**	144–146
Reduce excessive body weight	++	**A**	147, 148
Reduce dietary cholesterol	+	**B**	149
Increase habitual physical activity	+	**B**	150
Use soy protein products	+/-	**B**	151

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Impact of specific lifestyle changes on lipid levels (2)

	Magnitude of the effect	Level of evidence	References
Lifestyle interventions to reduce TG-rich lipoprotein levels			
Reduce excessive body weight	+++	**A**	147, 148
Reduce alcohol intake	+++	**A**	152, 153
Increase habitual physical activity	++	**A**	150, 154
Reduce total amount of dietary carbohydrate	++	**A**	148, 155
Use supplements of n-3 polyunsaturated fat	++	**A**	156, 157
Reduce intake of mono- and disaccharides	++	**B**	158, 159
Replace saturated fat with mono- or polyunsaturated fat	+	**B**	136, 137

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Impact of specific lifestyle changes on lipid levels (3)

	Magnitude of the effect	Level of evidence	References
Lifestyle interventions to increase HDL-C levels			
Reduce dietary trans fat	+++	A	136, 160
Increase habitual physical activity	+++	A	150, 161
Reduce excessive body weight	++	A	147, 148
Reduce dietary carbohydrates and replace them with unsaturated fat	++	A	148, 162
Modest consumption in those who take alcohol may be continued	++	B	152
Quit smoking	+	B	163
Among carbohydrate-rich foods prefer those with low glycaemic index and high fibre content	+/-	C	164
Reduce intake of mono- and disaccharides	+/-	C	158, 159

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Dietary recommendations to lower low-density lipoprotein-cholesterol

	To be preferred	To be used with moderation	To be chosen occasionally in limited amounts
Cereals	Whole grains	Refined bread, rice and pasta, biscuits, corn flakes	Pastries, muffins, pies, croissants
Vegetables	Raw and cooked vegetables	Potatoes	Vegetables prepared in butter or cream
Legumes	Lentils, beans, fava beans, peas, chickpeas, soybean		
Fruit	Fresh or frozen fruit	Dried fruit, jelly, jam, canned fruit, sorbets, popsicles, fruit juice	
Sweets and sweeteners	Non-caloric sweeteners	Sucrose, honey, chocolate, candies	Cakes, ice creams, fructose, soft drinks
Meat and fish	Lean and oily fish, poultry without skin	Lean cuts of beef, lamb, pork or veal, seafood, shellfish	Sausages, salami, bacon, spare ribs, hot dogs, organ meats
Dairy food and eggs	Skim milk and yogurt	Low fat milk, low fat cheese and other milk products, eggs	Regular cheese, cream, whole milk and yogurt
Cooking fat and dressings	Vinegar, mustard, fat-free dressings	Olive oil, non-tropical vegetable oils, soft margarines, salad dressing, mayonnaise, ketchup	Trans fats and hard margarines (better to avoid them), palm and coconut oils, butter, lard, bacon fat
Nuts/seeds		All, unsalted (except coconut)	Coconut
Cooking procedures	Grilling, boiling, steaming	Stir-frying, roasting	Frying

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Definition of central obesity

	Waist circumference
Caucasians (Europids)	Men ≥94 cm, women ≥80 cm
South Asians, Chinese, Japanese	Men ≥90 cm, women ≥80 cm
South and Central Americans	Use recommendations for South Asians until more specific data are available.
Sub-Saharan Africans	Use European data until more specific data are available.
Eastern Mediterranean and Middle East (Arabic populations)	Use European data until more specific data are available.

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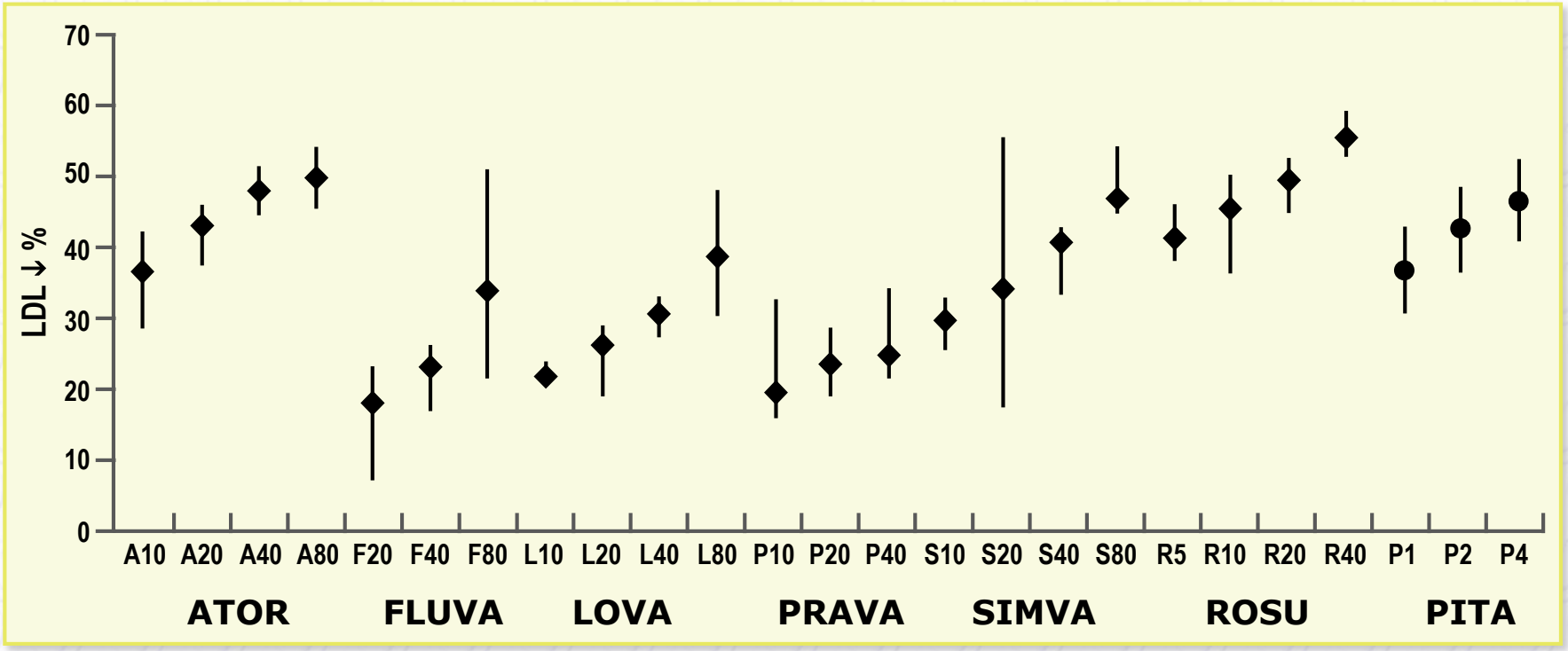
Summary of lifestyle measures and healthy food choices

Dietary recommendations should always take into account local food habits; however, interest in healthy food choices from other cultures should be promoted.
A wide variety of foods should be eaten. Energy intake should be adjusted to prevent overweight and obesity.
Consumption of fruits, vegetables, legumes, nuts, wholegrain cereal foods and fish (especially oily) should be encouraged.
Foods rich in trans or saturated fat (hard margarines, tropical oils, fatty or processed meat, sweets, cream, butter, regular cheese) should be replaced with the above foods and with monounsaturated fat (extra virgin olive oil) and polyunsaturated fat (non-tropical vegetable oils) in order to keep trans fats <1.0% of total energy and saturated fat <10% (<7% in the presence of high plasma cholesterol values).
Salt intake should be reduced to 5 g/day by avoiding table salt and limiting salt in cooking, and by choosing fresh or frozen unsalted foods; many processed and convenience foods, including bread, are high in salt.
For those who drink alcoholic beverages, moderation should be advised (<10 g/day for women and <20 g/day for men)and patients with hypertriglyceridaemia should abstain.
The intake of beverages and foods with added sugars, particularly soft drinks, should be limited, especially for persons who are overweight, have hypertriglyceridaemia, metabolic syndrome or diabetes.
Physical activity should be encouraged, aiming at regular physical exercise for at least 30 min/day every day.
Use of and exposure to tobacco products should be avoided.

A systematic review and meta-analysis of the therapeutic equivalence of statins



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Mukhtar RY, et al. *Int J Clin Pract.* 2005;59(2):239-252

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Percentage reduction of low-density LDL-C requested to achieve goals as a function of the starting value

Starting LDL-C		Reduction to reach LDL-C goal, %		
mmol/L	~ mg/dL	< 1.8 mmol/L (~ 70 mg/dL)	< 2.6 mmol/ (~ 100 mg/dL)	< 3 mmol/L (~ 115 mg/dL)
>6.2	> 240	> 70	> 60	> 55
5.2–6.2	200–240	65–70	50–60	40–55
4.4–5.2	170–200	60–65	40–50	30–45
3.9–4.4	150–170	55–60	35–40	25–30
3.4–3.9	130–150	45–55	25–35	10–25
2.9–3.4	110–130	35–45	10–25	< 10
2.3–2.9	90–110	22–35	< 10	–
1.8–2.3	70–90	< 22	–	–

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Drugs potentially interacting with statins metabolized by CYP3A4 loading to increased risk of myopathy and rhabdomyolysis

Anti-infective agents	Calcium antagonists	Other
Itraconazole	Verapamil	Ciclosporin
Ketoconazole	Diltiazem	Danazol
Posaconazole	Amlodipine	Amiodarone
Erythromycin		Ranolazine
Clarithromycin		Grapefruit juice
Telithromycin		Nefazodone
HIV protease inhibitors		Gemfibrozil

Adapted from Egan and Colman and Wiklund et al.

Pharmacological treatment of hypercholesterolaemia

Recommendations	Class	Level
Prescribe statin up to the highest recommended dose or highest tolerable dose to reach the goal.	I	A
In the case of statin intolerance, ezetimibe or bile acid sequestrants, or these combined, should be considered.	IIa	C
If the goal is not reached, statin combination with a cholesterol absorption inhibitor should be considered.	IIa	B
If the goal is not reached, statin combination with a bile acid sequestrant may be considered.	IIb	C
In patients at very high-risk, with persistent high LDL-C despite treatment with maximal tolerated statin dose, in combination with ezetimibe or in patients with statin intolerance, a PCSK9 inhibitor may be considered.	IIb	C

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Possible causes of hypertriglyceridaemia

Genetic predisposition.
Obesity.
Type 2 diabetes.
Alcohol consumption.
Diet high in simple carbohydrates.
Renal disease.
Hypothyroidism.
Pregnancy (physiological triglyceride concentrations double during the third trimester).
Paraproteinaemia and autoimmune disorders such as systemic lupus erythematosus.
Multiple medications including: • Corticosteroids. • Oestrogens, especially those taken orally. • Tamoxifen. • Antihypertensives: adrenergic beta-blocking agents (to a different degree), thiazides. • Isotretinoin. • Bile acid-binding resins. • Ciclosporin. • Antiretroviral regimens (protease inhibitors). • Psychotropic medications: phenothiazines, second generation antipsychotics.

Drug treatments of hypertriglyceridaemia

Recommendations	Class	Level
Drug treatment should be considered in high-risk patients with TG >2.3 mmol/L (200 mg/dL).	IIa	B
Statin treatment may be considered as the first drug of choice for reducing CVD risk in high-risk individuals with hypertriglyceridaemia.	IIb	B
In high-risk patients with TG >2.3 mmol/L (200 mg/dL) despite statin treatment, fenofibrate may be considered in combination with statins.	IIb	C

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Efficacy of drug combinations for the management of mixed dyslipidaemias

A combination of statins with fibrates can also be considered while monitoring for myopathy, but the combination with gemfibrozil should be avoided.
If TG are not controlled by statins or fibrates, prescription of n-3 fatty acids may be considered to decrease TG further, and these combinations are safe and well tolerated.

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Drug treatments of low high-density lipoprotein-cholesterol is considered

Recommendations	Class	Level
Statins and fibrates raise HDL-C with similar magnitude and these drugs may be considered.	IIb	B
The efficacy of fibrates to increase HDL-C may be attenuated in people with type 2 diabetes.	IIb	B

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Dutch Lipid Clinic Network diagnostic criteria for familial hypercholesterolaemia

Criteria	Points
1) Family history	
First-degree relative with known premature (men: <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 <18 years of age with LDL-C above the 95th percentile.	2
2) Clinical history	
Patient with premature (men: <55 years; women: <60 years) coronary artery disease	2
Patient with premature (men: <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	
LDL-C ≥ 8.5 mmol/L (325 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, apoB or PCSK9 gene	8

Choose only one score per group, the highest applicable Diagnosis (diagnosis is based on the total number of points obtained)

A 'definite' FH diagnosis requires >8 points

A 'probable' FH diagnosis requires 6–8 points

A 'possible' FH diagnosis requires 3–5 points

Detection and treatment of patients with heterozygous familial hypercholesterolaemia

Recommendations	Class	Level
FH is recommended to be suspected in patients with CHD before the age of 55 years for men and 60 years for women, in subjects with relatives with premature fatal or non-fatal CVD, in subjects with relatives having tendon xanthomas, and in subjects with severely elevated LDL-C [in adults >5 mmol/L (190 mg/dL), in children >4 mmol/L (150 mg/dL)].	I	C
Diagnosis is recommended to be confirmed with clinical criteria and, when available, with DNA analysis.	I	C
Family cascade screening is recommended to be performed when an index case of FH is diagnosed.	I	C
FH patients are recommended to be treated with intense-dose statin, often in combination with ezetimibe.	I	C
Treatment should be considered to aim at reaching an LDL-C <2.6 mmol/L (100 mg/dL) or in the presence of CVD <1.8 mmol/L (70 mg/dL). If targets cannot be reached, maximal reduction of LDL-C should be considered using appropriate drug combinations.	IIa	C
Treatment with a PCSK9 antibody should be considered in FH patients with CVD or with other factors putting them at very high-risk for CHD, such as other CV risk factors, family history, high Lp(a) or statin intolerance.	IIa	C
In children, testing is recommended from age 5 years, or earlier if homo-zygous FH is suspected.	I	C
Children with FH should be educated to adopt a proper diet and treated with statin from 8–10 years of age. Targets for treatment should be LDL-C <3.5 mmol/L (135 mg/dL) at >10 years of age.	IIa	C

Genetic disorders of lipoprotein metabolism

Disorder	Prevalence	Gene(s)	Effect on lipoproteins
HeFH	1 in 200–250	*LDLR* *APO B* *PCSK9*	↑ LDL-C
HoFH	1 in 160 000–320 000	*LDLR* *APO B* *PCSK9*	↑↑ LDL-C
FCH	1 in 100/200	*USF1 + modifying genes*	↑ LDL-C ↑ VLDL-C ↑ apoB
Familial dysbetalipoproteinaemia	1 in 5000	*APO E*	↑↑ IDL and chylomicron remnants (βVLDL)
Familial lipoprotein lipase deficiency	1 in 10^6	*LPL* *APO C2*	↑↑ chylomicrons and VLDL-C
Tangier disease (analpha-lipoproteinaemia)	1 in 10^6	*ABCA1*	↓↓ HDL-C
Familial LCAT deficiency	1 in 10^6	*LCAT*	↓ HDL-C

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Management of dyslipidaemia in women

Statin treatment is recommended for primary prevention of CAD in high-risk women.
Statins are recommended for secondary prevention in women with the same indications and targets as in men.
Lipid-lowering drugs should not be given when pregnancy is planned, during pregnancy or during the breastfeeding period. However, bile acid sequestrants (which are not absorbed) may be considered.

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Treatment of dyslipidaemia in older adults

Recommendations	Class	Level
Treatment with statins is recommended for older adults with established CVD in the same way as for younger patients.	I	A
Since older people often have co-morbidities and have altered pharmacokinetics, lipid-lowering medication should be started at a lower dose and then titrated with caution to achieve target lipid levels that are the same as in younger subjects.	IIa	C
Statin therapy should be considered in older adults free from CVD, particularly in the presence of hypertension, smoking, diabetes and dyslipidaemia.	IIa	B

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Summary of dyslipidaemia in metabolic syndrome and in type 2 diabetes

Dyslipidaemia in MetS represents a cluster of lipid and lipoprotein abnormalities including elevation of both fasting and postprandial TG, apoB, and small dense LDL and low HDL-C and apoA1.
Non-HDL-C or apoB are good surrogate markers of TRLs and remnants and are a secondary objective of therapy. Non-HDL-C <3.4 mmol/L (<130 mg/dL) or apoB <100 mg/dL is desirable in those at high-risk, and <2.6 mmol/L (<100 mg/dL) and <80 mg/dL, respectively, in those at very high-risk.
Increased waist circumference and elevation of TG seems to be a simple tool to capture the high-risk subjects with MetS.
Atherogenic dyslipidaemia is one of the major risk factors for CVD in people with type 2 diabetes.

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Treatment of dyslipidaemia in diabetes

Recommendations	Class	Level
In all patients with type I diabetes and in the presence of micro-albuminuria and/or renal disease, LDL-C lowering (at least 50%) with statins as the first choice is recommended irrespective of the baseline LDL-C concentration.	I	C
In patients with type 2 diabetes and CVD or CKD, and in those without CVD who are >40 years of age with one or more other CVD risk factors or markers of target organ damage, the recommended goal for LDL-C is <1.8 mmol/L (<70 mg/dL) and the secondary goal for non-HDL-C is <2.6 mmol/L (<100 mg/dL) and for apoB is <80 mg/dL.	I	B
In all patients with type 2 diabetes and no additional risk factors and/or evidence of target organ damage, LDL-C <2.6 mmol/L (<100 mg/dL) is the primary goal. Non-HDL-C <3.4 mmol/L (<130 mg/dL) and apoB <100 mg/dL are the secondary goals.	I	B

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Lipid-lowering therapy

Recommendations	Class	Level
It is recommended to initiate or continue high dose statins early after admission in all ACS patients without contraindication or history of intolerance, regardless of initial LDL-C values.	I	A
If the LDL-C target is not reached with the highest tolerable statin dose, ezetimibe should be considered in combination with statins in post-ACS patients.	IIa	B
If the LDL-C target is not reached with the highest tolerable statin dose and/or ezetimibe, PCSK9 inhibitors may be considered on top of lipid-lowering therapy; or alone or in combination with ezetimibe in statin intolerant patients or in whom a statin is contra-indicated.	IIb	C
Lipids should be re-evaluated 4–6 weeks after ACS to determine whether target levels of LDL-C <1.8 mmol/L (<70 mg/dL) or a reduction of at least 50% if the baseline is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL) have been reached and whether there are any safety issues. The therapy dose should then be adapted accordingly.	IIa	C
Routine short pretreatment or loading (on the background of chronic therapy) with high-dose statins before PCI should be considered in elective PCI or in NSTE-ACS.	IIa	A

Treatment of dyslipidaemia in heart failure or valvular disease

Recommendations	Class	Level
Cholesterol-lowering therapy with statins is not recommended (but is not harmful either) in patients with heart failure in the absence of other indications for their use.	III	A
n-3 PUFAs 1 g/day may be considered for addition to optimal treatment in patients with heart failure.	IIb	B
Cholesterol-lowering treatment is not recommended in patients with aortic valvular stenosis without CAD in the absence of other indications for their use.	III	A

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Treatment of dyslipidaemia in autoimmune diseases

Recommendations	Class	Level
The universal use of lipid-lowering drugs is not recommended.	III	C

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Lipid management in patients with moderate to severe chronic kidney disease

Recommendations	Class	Level
Patients with stage 3–5 CKD have to be considered at high or very high CV risk.	I	A
The use of statins or statin/ezetimibe combination is indicated in patients with non-dialysis-dependent CKD.	I	A
In patients with dialysis-dependent CKD and free of atherosclerotic CVD, statins should not be initiated.	III	A
In patients already on statins, ezetimibe or on a statin/ezetimibe combination at the time of dialysis initiation, these drugs should be continued particularly in patients with CVD.	IIa	C
In adult kidney transplant recipients treatment with statins may be considered.	IIb	C

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Treatment of dyslipidaemia in transplant patients

Recommendations	Class	Level
Global CV risk management strategies have to be developed in transplant patients.	I	C
Statins should be considered as the first-line agents in transplant patients. Initiation should be at low doses with careful up-titration and with caution regarding potential drug–drug interactions, particularly for those on cyclosporin.	IIa	B
In patients who are intolerant of statins or those with significant dyslipidaemia and high residual risk despite a maximally tolerated statin dose, alternative or additional therapy may be considered: ezetimibe for whose where high LDL-C is the principal abnormality; fibrates for those where hypertriglyceridaemia and/or low HDL-C is the principal abnormality.	IIb	C

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Lipid-lowering drugs in patients with peripheral arterial disease (including carotid artery disease)

Recommendations	Class	Level
PAD is a very-high-risk condition and lipid-lowering therapy (mostly statins) is recommended in these patients.	I	A
Statin therapy should be considered to prevent the progression of abdominal aortic aneurysm.	IIa	B

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Lipid-lowering drugs for primary and secondary prevention of stroke

Recommendations	Class	Level
Statin therapy to reach established treatment goals is recommended in patients at high or very high CV risk for primary prevention of stroke.	I	A
Lipid-lowering therapy is recommended in patients with other manifestations of CVD for primary prevention of stroke.	I	A
Intensive statin therapy is recommended in patients with a history of non-cardioembolic ischaemic stroke or TIA for secondary prevention of stroke.	I	A

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Lipid-lowering drugs in human immunodeficiency virus patients

Recommendations	Class	Level
Lipid lowering therapy (mostly statins) should be considered in HIV patients with dyslipidaemia to achieve the LDL-C goal as defined for high-risk subjects.	IIa	C

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Lipid-lowering pharmacological treatment in patients with mental disorders

Recommendations	Class	Level
Major psychiatric disorders are modifiers for estimating total CV risk.	I	C
The management of total CV risk in patients with a psychiatric disorder is not different from what is recommended in patients at high/very high CV risk.	I	C
In patients with psychiatric disorders particular attention has to be paid to adherence to lifestyle changes and compliance with drug treatment.	I	C

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Hints to aid adherence to lifestyle changes

1. Explore motivation and identify ambivalence. Weigh pros and cons for change, assess and build self-efficacy and confidence, avoid circular discussion.
2. Offer support and establish an alliance with the patient and his/her family.
3. Involve the partner, other household members or caregiver who may be influential in the lifestyle of the patient.
4. Use the **OARS** method (**O**pen-ended questions, **A**ffirmation, Reflective listening, Summarising; http://www.smartrecovery.org/resources/UsingMIinSR.pdf) when discussing behaviour.
5. Tailor advice to an individual patient's culture, habits and situation.
6. Use **SMART** goal setting–negotiate goals for change that are **S**pecific, **M**easurable, **A**chievable, **R**ealistic and **T**imely. Follow up on goals and record progress on a shared record.

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Tips to aid adherence to multiple drug therapies

1. 'Agree' on rather than 'dictate' a drug regimen to your patient and tailor it to his/her personal lifestyle and needs.
2. Back up verbal instructions with clear written instructions.
3. Simplify the dosing regimen and consider a fixed dose combination pill where available.
4. Perform a regular review of medicines to minimize polypharmacy (or ask the pharmacist to assist).
5. Encourage self-monitoring and use cues and technologies to act as reminders.
6. Provide information on common side effects and discuss management strategies.
7. Involve the partner, other family members or the caregiver in the patient's treatment.

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HIV-drug interaction database of the University of Liverpool

Lipid-lowering Treatment Selector

Charts revised August 2013. Full information available at www.hiv-druginteractions.org and www.hiv-druginteractionslite.org

		ATV/r	DRV/r	FPV/r	IDV/r	LPV/r	SQV/r	EFV	ETV	NVP	RPV	MVC	EVG/c	RAL	ABC	FTC	3TC	TDF	ZDV
Statines	Atorvastatin	↑	↑	↑153%	↑	↑490%	↑	↓43%	↓37%	↓	↔	↔	↑	↔	↔	↔	↔	↔	↔
	Fluvastatin	↔	↔	↔	↑	↔	↑	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Lovastatin	↑	↑	↑	↑	↑	↑		↓	↓	↔	↔	↑	↔	↔	↔	↔	↔	↔
	Pravastatin	↔	↑81%	↔	↑	↔	↓50%	↑44%	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Rosuvastatin	↑213%	↑48%	↑8%		↑107%	↑	↔	↑	↔	↔	↔	↑48%	↔	↔	↔	↔	↔	↔
	Simvastatin	↑	↑	↑	↑	↑	↑	↑68%	↓	↓	↔	↔	↑	↔	↔	↔	↔	↔	↔
Fibrates	Bezafibrate	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Clofibrate	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	⇑	↔
	Fenofibrate	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Gemfibrozil	↓	↓	↓	↓	↑41%	↓	↔	↔	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔
	Ezetimibe	↑[a]	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔

No clinically significant interaction expected.

These drugs should not be coadministered.

Potential interaction which may require a dosage adjustment or close monitoring.

Potential interaction predicted to be of weak intensity (<2 fold ↑AUC or <50% ↓AUC) No *a priori* dosage adjustment is recommended.

Numbers refer to increased or decreased AUC of the lipid-lowering drug as observed in drug-drug interaction studies.

↑ Potential increased exposure of the lipid-lowering drug

↓ Potential decreased exposure of the lipid-lowering drug

↔ No signficant effect

⇑ Potential increased exposure of HIV drug

⇓ Potential decreased exposure of HIV drug

[a]Unboosted atazanavir

HIV-drug interaction database of the University of Liverpool (1)

Lipid-lowering Treatment Selector

Charts revised August 2013. Full information available at www.hiv-druginteractions.org and www.hiv-druginteractionslite.org

		ATV/r	DRV/r	FPV/r	IDV/r	LPV/r	SQV/r	EFV	ETV	NVP	RPV	MVC	EVG/c	RAL	ABC	FTC	3TC	TDF	ZDV
Statins	Atorvastatin	↑	↑	↑153%	↑	↑490%	↑	↓43%	↓37%	↓	↔	↔	↑	↔	↔	↔	↔	↔	↔
	Fluvastatin	↔	↔	↔	↑	↔	↑	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Lovastatin	↑	↑	↑	↑	↑	↑		↓	↓	↔	↔	↑	↔	↔	↔	↔	↔	↔
	Pravastatin	↔	↑81%	↔	↑	↔	↓50%	↑44%	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Rosuvastatin	↑213%	↑48%	↑8%		↑107%	↑	↔	↑	↔	↔	↔	↑48%	↔	↔	↔	↔	↔	↔
	Simvastatin	↑	↑	↑	↑	↑	↑	↑68%	↓	↓	↔	↔	↑	↔	↔	↔	↔	↔	↔

- No clinically significant interaction expected.
- These drugs should not be coadministered.
- Potential interaction which may require a dosage adjustment or close monitoring.
- Potential interaction predicted to be of weak intensity (<2 fold ↑AUC or <50% ↓AUC). No *a priori* dosage adjustment is recommended.

↑ Potential increased exposure of the lipid-lowering drug
↓ Potential decreased exposure of the lipid-lowering drug
↔ No signficant effect
⇑ Potential increased exposure of HIV drug
⇓ Potential decreased exposure of HIV drug
[a]Unboosted atazanavir
Numbers refer to increased or decreased AUC of the lipid-lowering drug as observed in drug-drug interaction studies.

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HIV-drug interaction database of the University of Liverpool (2)

Lipid-lowering Treatment Selector

Charts revised August 2013. Full information available at www.hiv-druginteractions.org and www.hiv-druginteractionslite.org

		ATV/r	DRV/r	FPV/r	IDV/r	LPV/r	SQV/r	EFV	ETV	NVP	RPV	MVC	EVG/c	RAL	ABC	FTC	3TC	TDF	ZDV
Fibrates	Bezafibrate	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Clofibrate	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑⇑	↔
	Fenofibrate	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
	Gemfibrozil	↓	↓	↓	↓	↑41%	↓	↔	↔	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔
	Ezetimibe	↑[a]	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔

No clinically significant interaction expected.

These drugs should not be coadministered.

Potential interaction which may require a dosage adjustment or close monitoring.

Potential interaction predicted to be of weak intensity (<2 fold ↑AUC or <50% ↓AUC). No *a priori* dosage adjustment is recommended.

↑ Potential increased exposure of the lipid-lowering drug

↓ Potential decreased exposure of the lipid-lowering drug

↔ No signficant effect

⇑ Potential increased exposure of HIV drug

⇓ Potential decreased exposure of HIV drug

[a]Unboosted atazanavir

Numbers refer to increased or decreased AUC of the lipid-lowering drug as observed in drug-drug interaction studies.

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Prioritising information when educating patients

Need to know and do
e.g. Important information about diagnosis, key treatment and management of prescribed medications

Nice to know and do
Information that may be covered but can wait for a second consultation

Not necessary now, do later
e.g. Provide information, using leaflets, booklets or web-based resources, about additional services that can be provided

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Monitoring lipids and enzymes in patients on lipid-lowering therapy (1)

Testing lipids
How often should lipids be tested? • Before starting lipid-lowering drug treatment, at least two measurements should be made, with an interval of 1–12 weeks, with the exception of conditions where concomitant drug treatment is suggested such as ACS and very high-risk patients.
How often should a patient's lipids be tested after starting lipid-lowering treatment? • 8 (±4) weeks after starting treatment. • 8 (±4) weeks after adjustment of treatment until within the target range.
How often should lipids be tested once a patient has reached the target or optimal lipid level? • Annually (unless there is adherence problems or other specific reasons for more frequent reviews).
Monitoring liver and muscle enzymes
How often should liver enzymes (ALT) be routinely measured in patients on lipid-lowering drugs? • Before treatment. • Once 8–12 weeks after starting a drug treatment or after dose increase. • Routine control of ALT thereafter is not recommended during lipid-lowering treatment.

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Monitoring lipids and enzymes in patients on lipid-lowering therapy (2)

Monitoring liver and muscle enzymes (Cont'd)

What if liver enzymes become elevated in a person taking lipid-lowering drugs?

If ALT <3x ULN:
- Continue therapy.
- Recheck liver enzymes in 4–6 weeks.

If value rises to ≥3x ULN
- Stop lipid-lowering therapy or reduce dose and recheck liver enzymes within 4–6 weeks.
- Cautious reintroduction of therapy may be considered after ALT has returned to normal.
- If ALT remains elevated check for the other reasons.

How often should CK be measured in patients taking lipid-lowering drugs?

Pre-treatment
- Before starting therapy.
- If baseline CK is 4x ULN, do not start drug therapy; recheck.

Monitoring
- Routine monitoring of CK is not necessary.
- Check CK if patient develops myalgia.

Be alert regarding myopathy and CK elevation in patients at risk such as: elderly patients, concomitant interfering therapy, multiple medications, liver or renal disease or sport athletes.

Monitoring lipids and enzymes in patients on lipid-lowering therapy (3)

Monitoring liver and muscle enzymes (Cont'd)

What if CK becomes elevated in a person taking lipid-lowering drugs?
Re-evaluate indication for statin treatment.

If ≥4 x ULN:

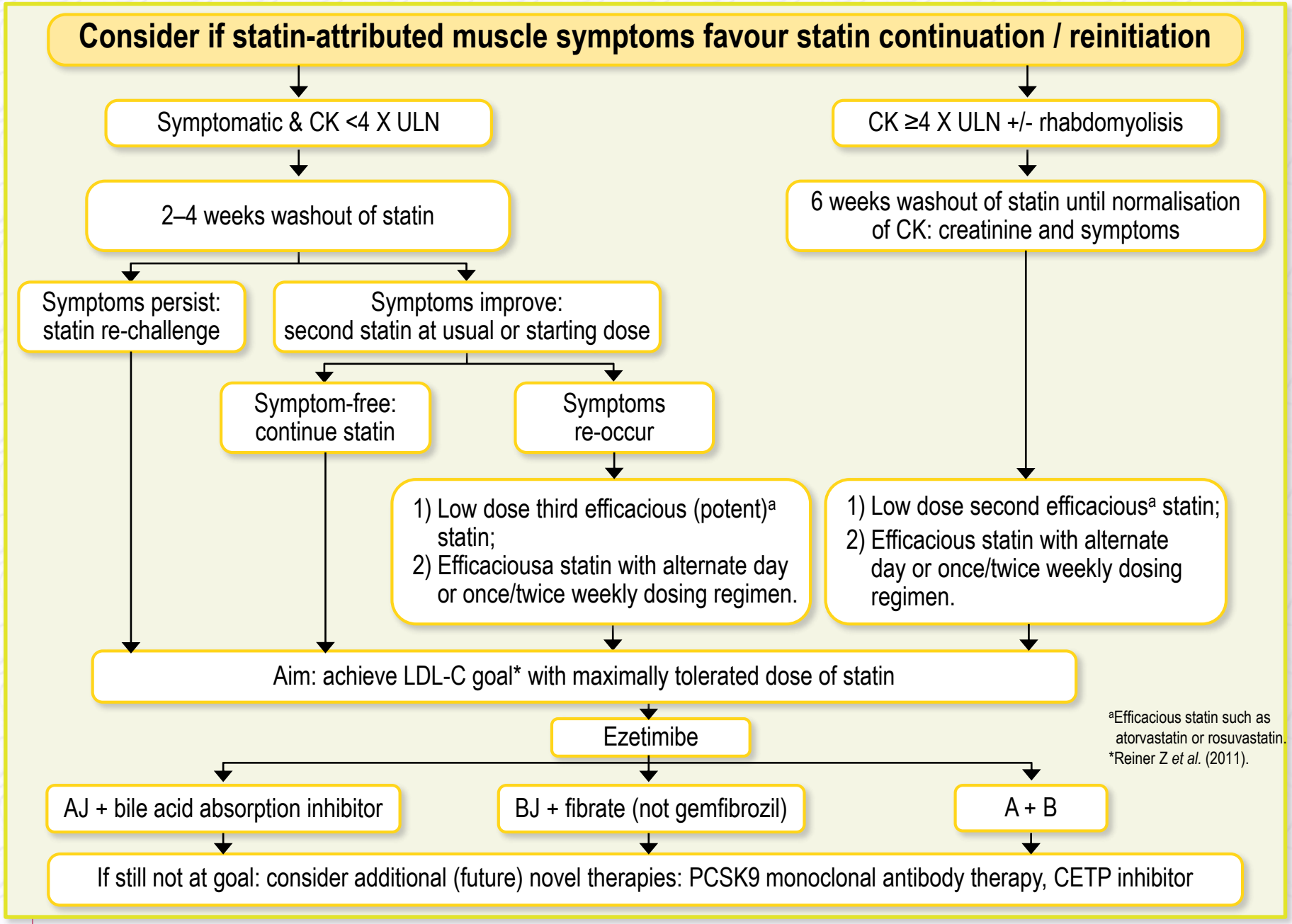
- If CK >10x ULN: stop treatment, check renal function and monitor CK every 2 weeks.
- If CK <10x ULN: if no symptoms, continue lipid lowering therapy while monitoring CK.
- If CK <10x ULN: if symptoms present, stop statin and monitor normalization of CK, before re-challenge with a lower statin dose.
- Consider the possibility of transient CK elevation for other reasons such as exertion.
- Consider myopathy if CK remains elevated.
- Consider combination therapy or an alternative drug.

If <4 x ULN:

- If no muscle symptoms, continue statin (patient should be alerted to report symptoms; check CK).
- If muscle symptoms, monitor symptoms and CK regularly.
- If symptoms persist, stop statin and re-evaluate symptoms after 6 weeks; re-evaluate indication for statin treatment.
- Consider re-challenge with the same or another statin.
- Consider low-dose statin, alternate day or once/twice weekly dosing regimen or combination therapy.

For details on CK elevation and treatment of muscular symptoms during statin treatment see algorithm in supplementary.

Algorithm for treatment of muscular symptoms during statin treatment



Images to improve recall

Names of pills	What it's for	Morning/Breakfast	Afternoon/Lunch	Evening/Dinner	Night/Bedtime
Lisinopril 20 mg 1 pill once a day	Blood pressure 				
Simvastatin 40 mg 1 pill at bedtime	Cholesterol 				
Metformin 500 mg 2 pills twice a day	Diabetes 				
Gabapentin 300 mg 1 pill every 8 hours	Nerve pain 				
Aspirin EC 81 mg 1 pill once a day	Heart 				

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To do or not to do lipid guidelines (1)

Recommendations	Class	Level
Risk estimation		
Total risk estimation using a risk estimation system such as SCORE is recommended for asymptomatic adults >40 years of age without evidence of CVD, diabetes, CKD or familial hypercholesterolaemia.	I	C
High and very high-risk individuals can be detected on the basis of documented CVD, diabetes mellitus, moderate to severe renal disease, very high levels of individual risk factors , familial hypercholesterolaemia or a high SCORE risk and are a high priority for intensive advice with regard to all risk factors.	I	C
Lipid analyses in cardiovascular disease risk estimation		
TC is to be used for the estimation of total CV risk by means of the SCORE system.	I	C
LDL-C is recommended to be used as the primary lipid analysis for screening, risk estimation, diagnosis and management. HDL-C is a strong independent risk factor and is recommended to be used in the HeartScore algorithm.	I	C
Non-HDL-C is a strong independent risk factor and should be considered as a risk marker, especially in subjects with high TG.	I	C
Lipid analyses for characterization of dyslipidaemias before treatment		
LDL-C has to be used as the primary lipid analysis.	I	C
HDL-C is recommended to be analysed before treatment.	I	C
TG adds information about risk, and is indicated for diagnosis and choice of treatment.	I	C
Non-HDL-C is recommended to be calculated, especially in subjects with high TG.	I	C

To do or not to do lipid guidelines (2)

Recommendations	Class	Level
Lipid analyses as treatment targets in the prevention of cardiovascular disease		
LDL-C is recommended as the primary target for treatment.	I	A
HDL-C is not recommended as a target for treatment.	III	A
The ratios apoB/apoA1 or non-HDL-C/HDL-C are not recommended as targets for treatment.	III	B
Treatment goals for low-density lipoprotein-cholesterol		
In patients at VERY HIGH CV riskd, an LDL-C goal of <1.8 mmol/L (70 mg/dL), or a reduction of at least 50% if the baseline LDL-Ce is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL) is recommended.	I	B
In patients at HIGH CV riskd, an LDL-C goal of <2.6 mmol/L (100 mg/dL), or a reduction of at least 50% if the baseline LDL-Ce is between 2.6 and 5.2 mmol/L (100 and 200 mg/dL) is recommended.	I	B
Pharmacological treatment of hypercholesterolaemia		
Prescribe statin up to the highest recommended dose or highest tolerable dose to reach the goal.	I	A
Detection and treatment of patients with heterozygous familial hypercholesterolaemia		
FH is recommended to be suspected in patients with CHD before the age of 55 years for men and 60 years for women, in subjects with relatives with premature fatal or non-fatal CVD, in subjects with relatives having tendon xanthomas, and in subjects with severely elevated LDL-C (in adults >5 mmol/L [190 mg/dL], in children >4 mmol/L [150 mg/dL]).	I	C
Family cascade screening is recommended to be performed when an index case of FH is diagnosed.	I	C
FH patients are recommended to be treated with intense-dose statin, often in combination with ezetimibe.	I	C
In children, testing is recommended from age 5 years, or earlier if homozygous FH is suspected.	I	C

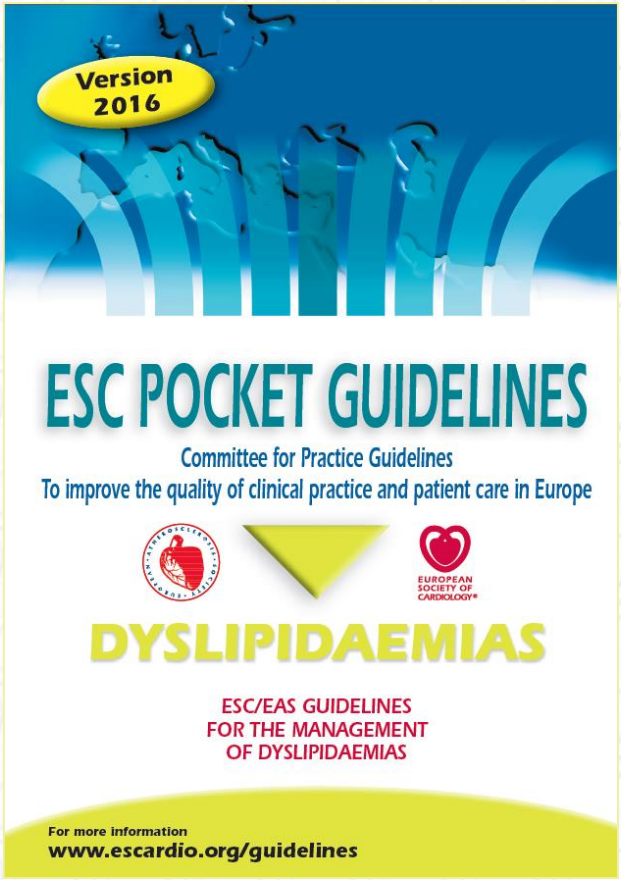
To do or not to do lipid guidelines (3)

Recommendations	Class	Level
Treatment of dyslipidaemia in older adults		
Treatment with statins is recommended for older adults with established CVD in the same way as for younger patients.	I	A
Treatment of dyslipidaemia in diabetes		
In all patients with type I diabetes and in the presence of microalbuminuria and/or renal disease, LDL-C lowering (at least 50%) with statins as the first choice is recommended irrespective of the baseline LDL-C concentration.	I	C
In patients with type 2 diabetes and CVD or CKD, and in those without CVD who are over the age of 40 years with one or more other CVD risk factors or markers of target organ damage, the recommended goal for LDL-C is <1.8 mmol/L (< 70 mg/dL) and the secondary goal for non-HDL-C is <2.6 mmol/L (< 100 mg/dL) and for apoB is <80 mg/dL.	I	B
In all patients with type 2 diabetes and no additional risk factors and/or evidence of target organ damage, LDL-C <2.6 mmol/L (<100 mg/dL) is the primary goal. Non-HDL-C <3.4 mmol/L (<130 mg/dL) and apoB <100 mg/dL are the secondary goals.	I	B
Lipid-lowering therapy in patients with acute coronary syndrome and patients undergoing percutaneous coronary intervention		
It is recommended to initiate or continue high dose statins early after admission in all ACS patients without contra-indication or history of intolerance, regardless of initial LDL-C values.	I	A
Treatment of dyslipidaemia in heart failure or valvular disease		
Cholesterol lowering therapy with statins is not recommended (but is not harmful either) in patients with heart failure in the absence of other indications for their use.	III	A
Cholesterol lowering treatment is not recommended in patients with aortic valvular stenosis without CAD in the absence of other indications for their use.	III	A

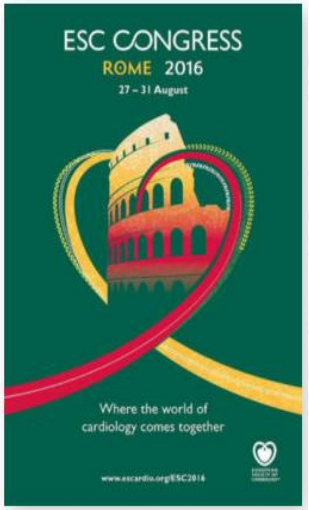
To do or not to do lipid guidelines (4)

Recommendations	Class	Level
Treatment of dyslipidaemia in autoimmune diseases		
The universal use of lipid-lowering drugs is not recommended.	III	C
Lipid management in patients with moderate to severe chronic kidney disease		
Patients with stage 3–5 CKD have to be considered at high or very high CV risk.	I	A
The use of statins or statin/ezetimibe combination is indicated in patients with non-dialysis-dependent CKD.	I	A
In patients with dialysis-dependent CKD and free of atherosclerotic CVD, statins should not be initiated.	III	A
Lipid-lowering drugs in patients with peripheral arterial disease (including carotid artery disease)		
PAD is a very high-risk condition and lipid lowering therapy (mostly statins) is recommended in these patients.	I	A
Lipid-lowering drugs for primary and secondary prevention of stroke		
Statin therapy to reach established treatment goals is recommended in patients at high or very high CV risk for primary prevention of stroke..	I	A
Lipid-lowering therapy is recommended in patients with other manifestations of CVD for primary prevention of stroke.	I	A
Intensive statin therapy is recommended in patients with a history of non-cardioembolic ischaemic stroke or TIA for secondary prevention of stroke.	I	A

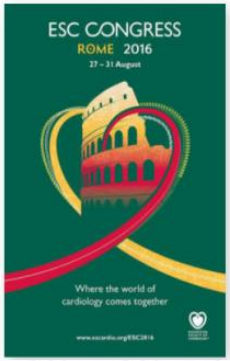
2016 Dyslipidaemias



The Pocket Guidelines are available at the registration area from Sunday 28 August afternoon



ESC Pocket Guidelines Application



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