

LDL-c targets in the ESC-EAS Dyslipidaemia guidelines in a nutshell

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Foundations of new Guidelines

These Guidelines recognize that low density lipoproteins and other apoB-containing lipoproteins cause ASCVD

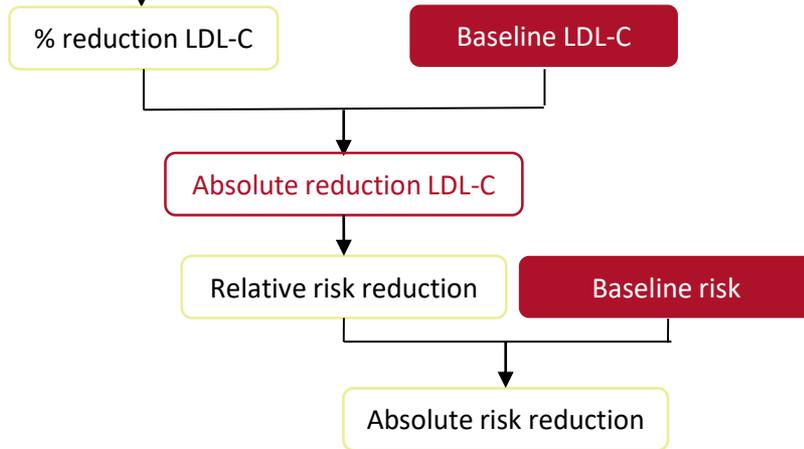
These Guidelines therefore make recommendations to reduce the risk of ASCVD by lowering LDL and other apoB-containing lipoproteins

These Guidelines recognize that **benefit of lipid lowering therapies** is determined by both the absolute reduction in LDL and other apoB-containing lipoproteins and corresponding absolute reduction in ASCVD risk

These Guidelines therefore recommend titrating lipid lowering therapy intensity based on both baseline lipid levels and baseline risk of ASCVD

These Guidelines prioritize identifying people at High and Very-High 10-year risk of experiencing a cardiovascular event because they are most likely to derive the **greatest short-term clinical benefit** from aggressive lipid lowering therapy

Intensity of lipid lowering treatment	
Treatment	Average LDL-C reduction
Moderate intensity statin	≈ 30%
High intensity statin	≈ 50%
High intensity statin plus ezetimibe	≈ 65%
PCSK9 inhibitor	≈ 60%
PCSK9 inhibitor plus moderate intensity statin	≈ 75%
PCSK9 inhibitor plus high intensity statin plus ezetimibe	≈ 85%



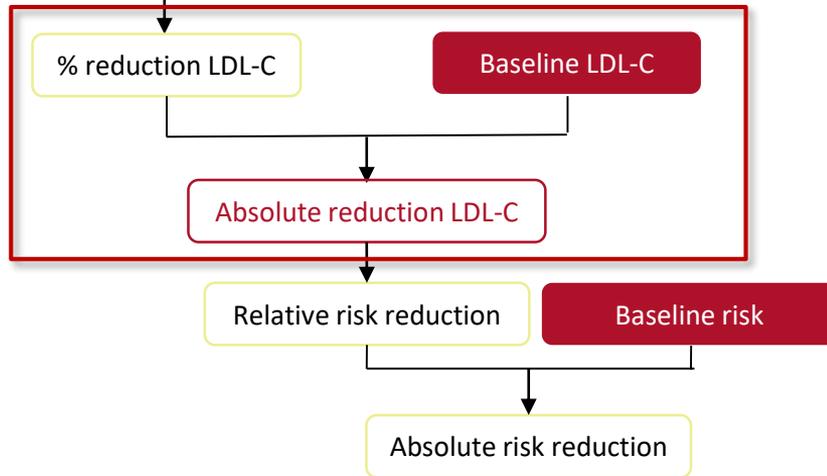
Using baseline LDL-C and risk of ASCVD to estimate expected clinical benefit of low-density lipoprotein lowering therapies

LDL-C = low-density lipoprotein cholesterol;
PCSK9 = proprotein convertase subtilisin/kexin type 9.

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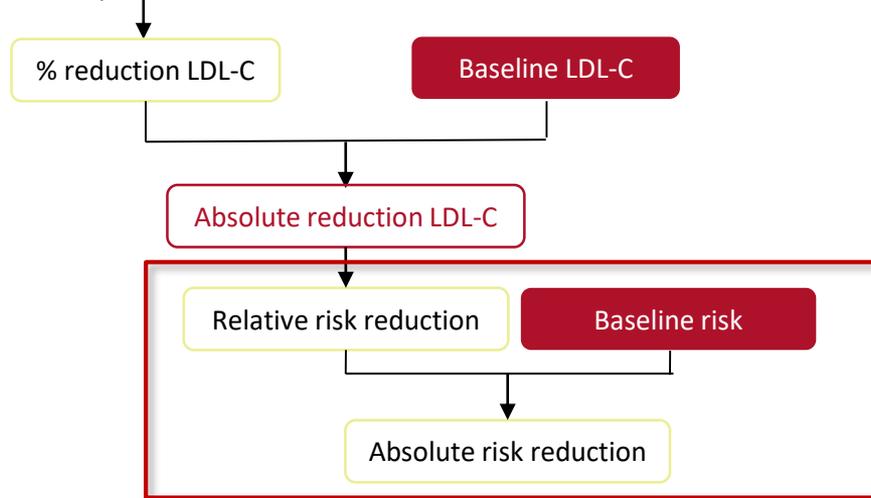
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Recommendations for cardiovascular disease risk estimation

Risk stratification proceeds in 3 stages	Class	Level
Clinical Evaluation: It is recommended that high- and very-high-risk individuals are identified on the basis of documented CVD, DM, moderate-to-severe renal disease, very high levels of individual risk factors, FH, or a high SCORE risk. It is recommended that such patients are considered as a priority for advice and management of all risk factors.	I	C
SCORE 10-year risk estimate: Total risk estimation using a risk estimation system such as SCORE is recommended for asymptomatic adults >40 years of age without evidence of CVD, DM, CKD, familial hypercholesterolaemia, or LDL-C >4.9 mmol/L (>190 mg/dL).	I	C
Assessment of Risk Modifiers: In selected individuals at low to moderate risk, other factors, including increased apolipoprotein B (apoB), lipoprotein(a) (Lp(a)), or C-reactive protein (CRP); family history of premature ASCVD; or the presence of atherosclerotic plaque on imaging may improve risk stratification and inform treatment decisions.	I	C

Cardiovascular risk categories (1)

Very-high-risk

People with any of the following:

Documented ASCVD, either clinical or unequivocal on imaging.

Documented ASCVD includes previous ACS (MI or unstable angina), stable angina, coronary revascularisation (PCI, CABG and other arterial revascularization procedures), stroke and TIA, and peripheral arterial disease. Unequivocally documented ASCVD on imaging includes those findings that are known to be predictive of clinical events, such as significant plaque on coronary angiography or CT scan (multivessel coronary disease with two major epicardial arteries having >50% stenosis) or on carotid ultrasound.

DM with target organ damage, ≥ 3 major risk factors or early onset of

T1DM of long duration (>20 years).

Severe CKD (eGFR <30 mL/min/1.73 m²).

FH with ASCVD or with another major risk factor.

A calculated SCORE $\geq 10\%$ for 10-year risk of fatal CVD.

Cardiovascular risk categories (2)

High-risk	<p>People with:</p> <ul style="list-style-type: none">Markedly elevated single risk factors, in particular TC >8 mmol/L (>310 mg/dL), LDL-C >4.9 mmol/L (>190 mg/dL), or BP ≥180/110mmHg.Patients with FH without other major risk factors.Patients with DM without target organ damage*, with DM duration ≥10years or another additional risk factors.Moderate CKD (eGFR 30–59 mL/min/1.73 m²). <p>A calculated SCORE ≥5% and <10% for 10-year risk of fatal CVD.</p>
Moderate-risk	<p>Young patients (T1DM <35 years; T2DM <50 years) with DM duration <10years, without other risk factors. Calculated SCORE ≥1% and <5% for 10-year risk of fatal CVD.</p>
Low-risk	<p>Calculated SCORE <1% for 10-year risk of fatal CVD.</p>

*Target organ damage is defined as microalbuminuria, retinopathy or neuropathy

Cardiovascular risk categories: **risk SCORE**

Very-high-risk	Calculated SCORE $\geq 10\%$ for 10-year risk of fatal CVD.
High-risk	Calculated SCORE $\geq 5\%$ and $< 10\%$ for 10-year risk of fatal CVD.
Moderate-risk	Calculated SCORE $\geq 1\%$ and $< 5\%$ for 10-year risk of fatal CVD.
Low-risk	Calculated SCORE $< 1\%$ for 10-year risk of fatal CVD.

- **SCORE** can be used to estimate risk in patients who do not have clinical ASCVD or other any clinical features that define a risk category
- Or to place a person into a *higher risk* category due to combination of lipid levels and other risk factors

Factors modifying SCORE risks (1)

Family history of premature CVD (men: <55 years; women: <60 years).

Elevated biomarkers including apoB, Lp(a), CRP, TG; or atherosclerosis on non-invasive imaging

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.

Left ventricular hypertrophy.

Chronic kidney disease; Obstructive sleep apnoea syndrome; Non-alcoholic fatty liver disease

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

Total CV risk (SCORE) %		Untreated LDL-C levels					
		<1.4 mmol/L (55 mg/dL)	1.4 to <1.8 mmol/L (55 to <70 mg/dL)	1.8 to <2.6 mmol/L (70 to <100 mg/dL)	2.6 to <3.0 mmol/L (100 to <116 mg/dL)	3.0 to <4.9 mmol/L (116 to <190 mg/dL)	≥4.9 mmol/L (≥ 190 mg/dL)
Primary Prevention	<1 low-risk	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle intervention, consider adding drug if uncontrolled	Lifestyle intervention and concomitant drug intervention
	Class ^a /Level ^b	I/C	I/C	I/C	I/C	Ia/A	Ia/A
	≥1 to <5, or moderate risk	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle intervention, consider adding drug if uncontrolled	Lifestyle intervention, consider adding drug if uncontrolled	Lifestyle intervention and concomitant drug intervention
	Class ^a /Level ^b	I/C	I/C	Ia/A	Ia/A	Ia/A	Ia/A
	≥5 to <10, or high-risk	Lifestyle advice	Lifestyle advice	Lifestyle intervention, consider adding drug if uncontrolled	Lifestyle intervention and concomitant drug intervention	Lifestyle intervention and concomitant drug intervention	Lifestyle intervention and concomitant drug intervention
	Class ^a /Level ^b	Ia/A	Ia/A	Ia/A	I/A	I/A	I/A
	≥10, or at very-high risk due to a risk condition	Lifestyle advice	Lifestyle intervention, consider adding drug if uncontrolled	Lifestyle intervention and concomitant drug intervention	Lifestyle intervention and concomitant drug intervention	Lifestyle intervention and concomitant drug intervention	Lifestyle intervention and concomitant drug intervention
Class ^a /Level ^b	Ia/B	Ia/A	I/A	I/A	I/A	I/A	
Secondary Prevention	Very-high risk	Lifestyle intervention, consider adding drug if uncontrolled	Lifestyle intervention and concomitant drug intervention	Lifestyle intervention and concomitant drug intervention			
	Class ^a /Level ^b	Ia/A	I/A	I/A	I/A	I/A	I/A

Recommendations for treatment goals for low-density lipoprotein cholesterol (1)

Recommendations	Class	Level
In secondary prevention patients at very-high risk^c , an LDL-C reduction of at least 50% from baseline^d and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) are recommended.	I	A
In primary prevention, for individuals at very-high risk but without FH^c , an LDL-C reduction of at least 50% from baseline^d and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) are recommended.	I	C
In primary prevention, for individuals with FH at very-high risk , an LDL-C reduction of at least 50% from baseline and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) should be considered.	Ila	C

^cFor definitions see Table 1.

^dThe term 'baseline' refers to the LDL-C level in a person not taking any LDL-C lowering medication. In people who are taking LDL-C-lowering medication(s), the projected baseline (untreated) LDL-C levels should be estimated, based on the average LDL-C-lowering efficacy of the given medication or combination of medications.

Recommendations for treatment goals for low-density lipoprotein cholesterol (2)

Recommendations	Class	Level
For patients with ASCVD who experience a second vascular event within 2 years (not necessarily of the same type as the first event) while taking maximally tolerated statin therapy, an LDL-C goal of <1.0 mmol/L (<40 mg/dL) <i>may be considered</i> .	IIb	B
For patients at high-risk ^c , an LDL-C reduction of at least 50% from baseline ^d and an LDL-C goal of <1.8 mmol/L (<70 mg/dL) are recommended.	I	A

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^d The term 'baseline' refers to the LDL-C level in a person not taking any LDL-C lowering medication. In people who are taking LDL-C-lowering medication(s), the projected baseline (untreated) LDL-C levels should be estimated, based on the average LDL-C-lowering efficacy of the given medication or combination of medications.

Recommendations for treatment goals for low-density lipoprotein cholesterol (3)

Recommendations	Class	Level
For individuals at moderate risk^c , an LDL-C goal of <2.6 mmol/L (<100 mg/dL) should be considered.	IIa	A
For individuals at low risk^c an LDL-C goal <3.0 mmol/L (<116 mg/dL) may be considered.	IIb	A

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^c For definitions see Table 1.

Treatment goals for low-density lipoprotein cholesterol (LDL-C) across categories of total cardiovascular disease risk

