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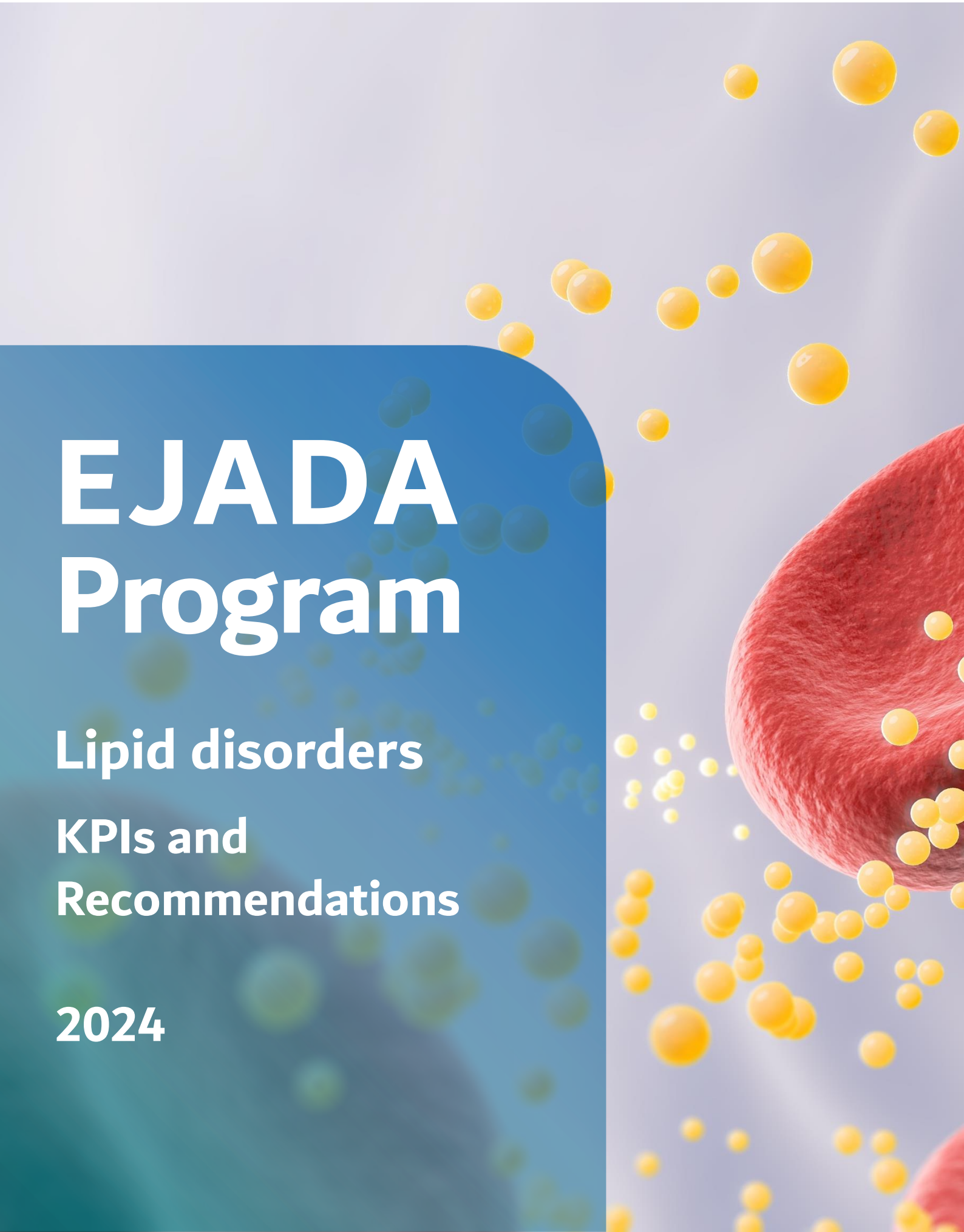
DUBAI HEALTH AUTHORITY

إجـادة
EJADA



EJADA Program

Lipid disorders

KPIs and Recommendations

2024

Lipid Disorders

KPIs and Recommendations

Content

Introduction

Dyslipidemia is characterized by imbalance of lipids such as cholesterol, low-density lipoprotein cholesterol, (LDL-C), triglycerides, and high-density lipoprotein (HDL). The major risk factors of dyslipidemia are lifestyle choices (diet and physical activity), tobacco exposure, or genetic factors. Dyslipidemia can increase the risk of cardiovascular disease (CVD) with severe complications such as atherosclerosis, coronary artery diseases, heart attacks, etc. Lipoprotein-a is an independent risk factor for development of CVDs. Among LDL, small dense LDL and oxidized LDL have been demonstrated to be the most important contributors for the increased atherosclerotic cardiovascular disease (ASCVD) in such patients.

The current treatment strategies for CVD involve the management of risk factors, especially dyslipidemia and hypertension. Dietary changes, increased physical activity, smoking cessation, and, in some situations, medication to assist decrease in LDL cholesterol and boost HDL cholesterol levels are frequently used to treat dyslipidemia. To treat dyslipidemia and lessen the risk of cardiovascular events, physicians frequently prescribe pharmacological therapies such as statins and other cholesterol-lowering medications. If statins are not effective or cause side effects, other cholesterol-lowering medications may be considered, such as ezetimibe, bile acid sequestrants, PCSK9 inhibitors, or fibrates. In some cases, aspirin may be recommended to reduce the risk of blood clots and cardiovascular events. Dyslipidemia often coexists with other health conditions, such as hypertension and diabetes. Managing such comorbidities is important in overall reduction of cardiovascular risk. In few patients, dyslipidemia might have a genetic predisposition, and more aggressive treatment strategies might be needed. Genetic testing and consultation with a specialists may be considered to treat such patients. Even though variable treatment options are available to treat dyslipidemia, treatment approaches can vary depending on an individual's specific lipid profile, overall health, and specific risk factors.

While significant progress has been made in the treatment of dyslipidemia, there are still some unmet needs and challenges in managing this condition. Firstly, management of residual risk is important in long term well being of patients. Despite achieving target levels of LDL cholesterol with statins and other medications, many individuals with dyslipidemia still experience cardiovascular events. Secondly, ensuring patient adherence to medication regimens can be challenging. Some patients may experience side effects or find it difficult to adhere to long-term therapy. Developing therapeutic options with fewer side effects and more convenient dosing options can improve adherence. Thirdly, many patients with dyslipidemia remain undiagnosed or untreated due to a lack of awareness and routine screening. Efforts to increase awareness and promote regular lipid testing, especially in high-risk populations, are needed. Lastly, the use of combination therapies (e.g., combining statins with other drugs) may provide better control of lipid levels, but the safety and efficacy of various combinations need further investigation.

Scope

The Ejada KPIs are quality indicators and ratings for physicians, facilities and insurance companies based on information collected by DHA systems from providers, payers and patients.

The dyslipidemia KPIs and recommendations are based on UAE and international guidelines. The KPIs are designed for healthcare practitioners and providers to follow international best practices in the management of dyslipidemia patients.

The dyslipidemia KPIs cover the following aspects of dyslipidemia management:

- Assessment of risk of dyslipidemia/atherosclerotic cardiovascular disease
- Pharmacological management of dyslipidemia
- Treatment for dyslipidemia in special clinical situations patients such as pregnant women
- Hospitalization and referrals of dyslipidemia patients

The KPIs and recommendations have been reviewed by leading experts in the country.

List of Abbreviations

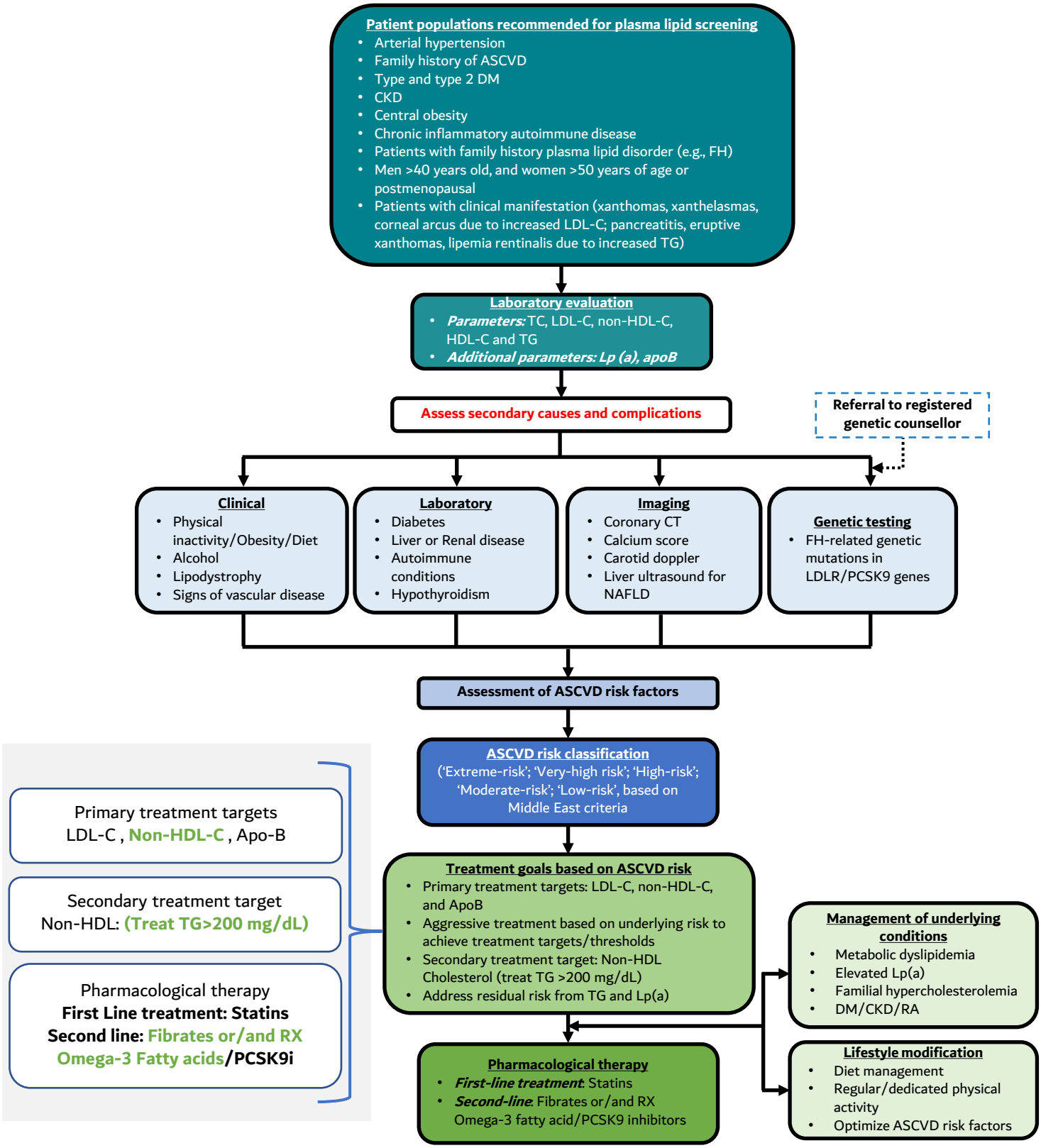
S.No.	Abbreviation	Full form
1	ABI	Ankle-brachial index
2	ACS	Acute coronary syndrome
3	AIDS	Acquired immunodeficiency syndrome
4	APO	Apolipoprotein
5	ASCVD	Atherosclerotic cardiovascular disease
6	BP	Blood pressure
7	CAC	Coronary artery calcium
8	CKD	Chronic kidney disease
9	DM	Diabetes mellitus
10	eGFR	Estimated glomerular filtration rate
11	FCS	Familial chylomicronemia syndrome
12	FCHL	Familial combined hyperlipidemia
13	FH	Familial hypercholesterolemia
14	HDL	High-density lipoprotein
15	HDL-C	High-density lipoprotein cholesterol
16	HIV	Human immunodeficiency virus
17	HMG-CoA	3-hydroxy-3-methylglutaryl-coenzyme A
18	hs-CRP	High-sensitivity c-reactive protein
19	LDL	Low-density lipoprotein
20	LDL-C	Low-density lipoprotein cholesterol
21	LDLR	Low-density lipoprotein receptor
22	Lp(a)	Lipoprotein(a)
23	NAFLD	Non-alcoholic fatty liver disease
24	PCSK9	Proprotein convertase subtilisin/kexin type 9
25	RA	Rheumatoid arthritis
26	TC	Total cholesterol
27	TG	Triglyceride
28	QRISK2 score	Cardiovascular risk score

KPIs and their Measuring Parameters

Reporting Frequency: Monthly

S.No.	KPIs	Measuring Parameters
1	Screening of lipids and lipoproteins in patients with risk of dyslipidemia/ atherosclerotic cardiovascular disease (ASCVD)	Total cholesterol, LDL-C, TG, non-HDL-c
2	Assessment of CVD risk using coronary calcium scan in patients with dyslipidemia	Coronary calcium scan, CVD risk score
3	Genetic testing for FH-related mutations (LDLR/PCSK9 genes) in patients with suspected familial dyslipidemia	Familial dyslipidemia, FH-related mutations, LDLR/PCSK9 genes
4	Atherosclerotic cardiovascular disease (ASCVD) risk classification and targeted treatment for patients with dyslipidemia	ASCVD risk classification, DDC list of drugs
5	First-line therapy with statins for patients with dyslipidemia	DDC list of drugs
6	Second-line treatment for the management of patients with dyslipidemia	DDC list of drugs
7	Appropriate treatment for lipid targets (LDL-C/Non-HDL-C/TG) in patients with high LDL-C, high non-HDL-C, and high TG	Lipid targets (LDL-C/non-HDL-c/TG), DDC list of drugs
8	Appropriate treatment for dyslipidemia patients due to underlying conditions	Metabolic dyslipidemia, elevated Lp(a), diabetes, chronic kidney disease, familial hypercholesterolemia, rheumatoid arthritis, DDC list of drugs
9	Appropriate treatment of pregnant women with hypertriglyceridemia/ familial hypercholesterolemia	DDC list of drugs
10	Referral of patients with dyslipidemia to lifestyle modification clinic	Referral Visits
11	Referral of patients with dyslipidemia to cardiovascular prevention clinic	Referral Visits
12	Referral of patients with dyslipidemia to registered genetic counsellor	Referral Visits
13	Cost of hospitalization of dyslipidemia patients due to recurrent cardiovascular events	Hospitalization costs

Assessment and management of patients with suspected dyslipidemia



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Consensus clinical recommendations for the management of plasma lipid disorders in the Middle East - 2021 update https://doi.org/10.1016/j.atherosclerosis.2021.11.022;

A Modern Approach to Dyslipidemia. Endocrine Reviews, Volume 43, Issue 4, August 2022, Pages 611-653, https://doi.org/10.1210/endrev/bnab037

Abbreviation: ACS, acute coronary syndrome; apo, apolipoprotein; ASCVD, atherosclerotic cardiovascular disease; CKD, chronic kidney disease; DM, diabetes mellitus; FCS, familial chylomicronemia syndrome; FH, familial hypercholesterolemia; HDL, high-density lipoprotein; LDL, low-density lipoprotein; LDLR, low-density lipoprotein receptor; Lp(a), lipoprotein(a); NAFLD, Non-alcoholic fatty liver disease; PCSK9, proprotein convertase subtilisin/kexin type 9; TC, total cholesterol; TG, triglyceride

Assessment and management of patients with suspected dyslipidemia

- Statins (3-hydroxy-3-methylglutaryl-coenzyme A [HMG-CoA] reductase inhibitors) remain the first line of treatment for patients with dyslipidemia as they have demonstrated substantial benefits in decreasing both fatal and non-fatal ASCVD events

- Second-line treatment are preferred if patients did not achieve the lipid management goals through statin therapy.

- Ezetimibe prevents intestinal absorption of dietary and biliary cholesterol without negatively impacting the absorption of fat-soluble nutrients.

- PCSK9 inhibitors reduce LDL-C levels by 47–57% and are more efficacious than ezetimibe in lowering LDL-C.

- **Prescription grade** Omega-3 fatty acids **(2 g – 4 g per day)** have proven effective at reducing TGs by up to 45%.

- The addition of a **fibrate** to a statin **(particularly Fenofibrate)** may benefit some patients with type 2 diabetes with both high TG and low HDL-C dyslipidemia pattern, particularly those with microvascular complications **(diabetic retinopathy)**

ESC 2019 - Dyslipidemia guidelines

HTG is the cause of approximately 10% of all cases with pancreatitis, and patients can develop pancreatitis even when their TG concentration is 5 -10 mmol/L (440-880 mg/dL). Restriction of calories and fat content (10-15% recommended) in the diet, and alcohol abstinence are obligatory. Fibrate therapy (fenofibrate) should be initiated, with prescription grade omega-3 fatty acids (2-4 g/day) as adjunct therapy

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Risk Enhancing Factors for ASCVD

Patient Characteristics	
Family history of premature ASCVD	Men: <55 years; Women: <65 years
Primary hypercholesterolaemia	LDL-C: >190 mg/dL; Non–HDL-C: 220 mg/dL
Metabolic syndrome	Increased waist circumference, TG >175 mg/dL, elevated BP, elevated glucose, and low HDL-C <40 mg/dL (men); <50 mg/dL (women) are factors; tally of 3 makes diagnosis
High-risk race/ethnicities	e.g., South Asian ancestry
Smoking	Current smoking that includes e-cigarettes/vaping
Clinical History (Underlying conditions)	
CKD	eGFR 15–59 mL/min/1.73 m^2 with or without albuminuria; not treated with dialysis or kidney transplantation
Chronic inflammatory conditions	Psoriasis, RA, or HIV/AIDS
Premature menopause/ Pregnancy	History of premature menopause (<40 years) and history of pregnancy-associated conditions that increase later ASCVD risk such as preeclampsia
Diabetes	Type 1/Type 2
Hypertension	BP >140/90 mmHg
Lipid/Biomarkers	
Persistently elevated, primary hypertriglyceridaemia	≥175 mg/dL
Elevated Lp(a)	A relative indication for its measurement is family history of premature ASCVD [An Lp(a) >75 nM/L constitutes a risk-enhancing factor especially at higher levels of Lp(a)]
Elevated ApoB	Goals are >65, 80, and 100 mg/dL for extreme, very high-, high-risk patients, respectively
hs-CRP	>2.0 mg/L
ABI	<0.9 particularly in diabetic patients
CAC score	≥100th or ≥75th percentile confers substantially higher long-term risk of ASCVD

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Abbreviation: ABI, ankle-brachial index; AIDS, acquired immunodeficiency syndrome; ApoB, apolipoprotein B; ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CAC, coronary artery calcium; eGFR, estimated glomerular filtration rate; HDL-C, high-density lipoprotein cholesterol; HIV, human immunodeficiency virus; hs-CRP, high-sensitivity C-reactive protein; LDL-C, low-density lipoprotein cholesterol; Lp(a), lipoprotein (a); RA, rheumatoid arthritis; TG, triglycerides; QRISK2 score, cardiovascular risk score

ASCVD Risk Classification and Primary Treatment Targets/Goals for Middle East

Extreme-risk	
Criteria	• ASCVD either clinical or equivocal (established or recent hospitalization for ACS, coronary, carotid or peripheral vascular disease) • Progressive ASCVD including unstable angina in patients after achieving an LDL-C <70 mg/dL • Diabetes plus microvascular end organ damage (nephropathy/retinopathy/ neuropathy), or CKD stage 3–4, or FH with established clinical ASCVD • QRISK2 score >20%
Treatment targets & goals	• *LDL-C:* Reduce by ≥50% from baseline AND to <55 mg/dL (<1.4 mmol/L) • *Non-HDL-C:* Reduce to <85 mg/dL (<2.2 mmol/L) • *ApoB:* Reduce to <65 mg/dL
Very High-risk	
Criteria	• Diabetes plus microvascular end organ damage (nephropathy, retinopathy, neuropathy), or CKD stage 3–4, or FH – PLUS 1 or more risk factor(s) • QRISK2 score 10–20%
Treatment targets & goals	• *LDL-C:* Reduce by ≥50% from baseline AND to <70 mg/dL (<1.8 mmol/L) • *Non-HDL-C:* Reduce to <100 mg/dL (<2.6 mmol/L) • *ApoB:* Reduce to <80 mg/dL
High-risk	
Criteria	• ≥2 risk factors • Diabetes plus microvascular end organ damage (nephropathy, retinopathy, neuropathy), or CKD stage 3–4, or FH – with no other risk factors • Young patients with diabetes (typ1 <35 and type2 < 50) • Metabolic syndrome • QRISK2 score 2–10%
Treatment targets & goals	• *LDL-C:* Reduce to <70 mg/dL (<1.8 mmol/L) • *Non-HDL-C:* Reduce to <100 mg/dL (<2.6 mmol/L) • *ApoB:* Reduce to <100 mg/dL
Moderate-risk	
Criteria	• ≤2 risk factors • QRISK2 score <2%
Treatment targets & goals	• *LDL-C:* Reduce to <100 mg/dL (<2.6 mmol/L) • *Non-HDL-C:* Reduce to <130 mg/dL (<3.4 mmol/L)
Low-risk	
Criteria	• No risk factors
Treatment targets & goals	• *LDL-C:* Reduce to <130 mg/dL (<3.4 mmol/L) • *Non-HDL-C:* Reduce to <160 mg/dL (<4.2 mmol/L)

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Abbreviation: ACS, acute coronary syndrome; ApoB, apolipoprotein B; ASCVD, atherosclerotic cardiovascular disease; CKD, chronic kidney disease; FH, familial hypercholesterolaemia; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; ; QRISK2 score, cardiovascular risk score

Health Outcomes Indicators

Screening of lipids and lipoproteins in patients with risk of dyslipidemia/atherosclerotic cardiovascular disease (ASCVD)

Description Title	Screening of lipids and lipoproteins in patients with risk of dyslipidemia/atherosclerotic cardiovascular disease (ASCVD)
Definition	Percentage of patients aged ≥40 years with risk of dyslipidemia/ ASCVD who were screened for lipids and lipoproteins (total cholesterol, LDL-C, TG, & non-HDL-C) during the measurement year
Numerator	Number of patients aged ≥40 years with risk of dyslipidemia/ ASCVD who were screened for lipids and lipoproteins (total cholesterol, LDL-C, TG, & non-HDL-C) during the measurement year
Denominator	Total number of patients aged ≥40 years with risk of dyslipidemia/ASCVD during the measurement year
Exclusion criteria	Patients aged <40 years with no chronic complications or disorders
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Patients considered to be at high risk for plasma lipid disorders (dyslipidemia) or the development of ASCVD include those with diabetes (type 1 and type 2), arterial hypertension, central obesity, chronic inflammatory autoimmune disease, chronic kidney disease (CKD), a family history of ASCVD, and those with parents with severe disorders of plasma lipids (e.g., FH). These patients should be screened for plasma lipid disorders at least once in their life. In those with evidence of ASCVD, lipid profiles should be measured at least annually to check adherence to medications and control of lipids. In the absence of ASCVD risk factors, middle-aged individuals should be screened for dyslipidemia at least once every 2 years. More frequent lipid testing is recommended when multiple global ASCVD risk factors are present.

Assessment of CVD risk using coronary calcium scan in patients with dyslipidemia

Description Title	Assessment of CVD risk using coronary calcium scan in patients with dyslipidemia
Definition	Percentage of patients with dyslipidemia who were assessed for risk of CVD using coronary calcium scan during the measurement year
Numerator	Number of patients with dyslipidemia who were assessed for risk of CVD using coronary calcium scan during the measurement year
Denominator	Total number of patients with dyslipidemia during the measurement year
Exclusion criteria	Patients with no plasma lipid disorders/chronic complications
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Non-invasive cardiovascular imaging techniques can play a role in the detection and measurement of atherosclerotic vascular damage. Coronary artery calcification as detected by non-contrast computed tomography (CT) provides evidence of atherosclerosis and is associated with CV events. Coronary calcium scan followed by calculation of CVD risk score should be considered in patients with documented CVD; patients with diabetes >40 years of age, those <40 years of age with diabetes for 10 years or more, or those with evidence of diabetes-related complications; familial hypercholesterolaemia; chronic kidney disease; carotid or femoral plaques; coronary artery calcium score >100 Agatston; or extreme Lp(a) elevation

Genetic testing for FH-related mutations (LDLR/PCSK9 genes) in patients with suspected familial dyslipidemia

Description Title	Genetic testing for FH-related mutations (LDLR/PCSK9 genes) in patients with suspected familial dyslipidemia
Definition	Percentage of patients with suspected familial dyslipidemia who underwent genetic testing for FH-related genetic mutations in LDLR/PCSK9 genes during the measurement year
Numerator	Number of patients with suspected familial dyslipidemia who underwent genetic testing for FH-related genetic mutations in LDLR/PCSK9 genes during the measurement year
Denominator	Total number of patients with suspected familial dyslipidemia during the measurement year
Exclusion criteria	Patients without familial dyslipidemia
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Familial dyslipidemia which include familial hypercholesterolemia (FH), familial combined hyperlipidemia (FCHL), dysbetalipoproteinaemia and familial hyperchylomicronaemia should be assessed using clinical criteria and confirmed through genetic analysis for FH-related genetic mutations in LDLR/PCSK9 genes. It is also recommended that genetic testing and cascade screening of family members should be considered in families of individuals with FH.

Atherosclerotic cardiovascular disease (ASCVD) risk classification and targeted treatment for patients with dyslipidemia

Description Title	Atherosclerotic cardiovascular disease (ASCVD) risk classification and targeted treatment for patients with dyslipidemia
Definition	Percentage of patients with dyslipidemia for whom ASCVD risk was classified based on middle-east criteria (extreme risk, very high risk, high risk, moderate risk, and low risk) and were prescribed risk based targeted treatment during the measurement year
Numerator	Number of patients with dyslipidemia for whom ASCVD risk was classified based on middle-east criteria (extreme risk, very high risk, high risk, moderate risk, and low risk) and were prescribed risk based targeted treatment during the measurement year
Denominator	Total number of patients with dyslipidemia during the measurement year
Exclusion criteria	Patients with no dyslipidemia/low ASCVD risk
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Prevention of ASCVD includes the prevention, identification and management of ASCVD risk factors early in life. The presence of risk enhancing factors helps to confirm a higher risk state. Determination of CV risk which is classified based on middle-east criteria (refer fig. 3 on 'Middle-east ASCVD risk classification criteria') can be further individualised through a clinician patient discussion of risk and may lead to initiation or intensification of therapy in patients. Risk levels for ASCVD should be used to inform treatment targets, treatment goals and treatment selection in patients with dyslipidemia.

First-line therapy with statins for patients with dyslipidemia

Description Title	First-line therapy with statins for patients with dyslipidemia
Definition	Percentage of patients with dyslipidemia who were prescribed first-line treatment with statins (atorvastatin/rosuvastatin/fluvastatin/ lovastatin/pitavastatin /pravastatin/rosuvastatin/simvastatin) during the measurement year
Numerator	Number of patients with dyslipidemia who were prescribed first-line treatment with statins (atorvastatin/rosuvastatin/fluvastatin/ lovastatin/pitavastatin /pravastatin/rosuvastatin/simvastatin) during the measurement year
Denominator	Total number of patients with dyslipidemia during the measurement year
Exclusion criteria	Patients with no lipid order/low risk of ASCVD and possible reduction of LDL-C through lifestyle modification
Reporting frequency	Dynamic
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Statins (3-hydroxy-3-methylglutaryl-coenzyme A [HMG-CoA] reductase inhibitors) remain the first line of treatment for patients with dyslipidemia as they have demonstrated substantial benefits in decreasing both fatal and non-fatal ASCVD events. Lipid-lowering target of the patient, statin–drug interactions (cytochrome pathway statins), and underlying renal function are the major factors that need to be considering while choosing the statin. The use of statins has been shown to reduce LDL-C by 25–55% , TG levels by 10–20%, and elevate HDL-C levels by 1–10%. Statin selection should be based on LDL-C targets for a given individual which could be either high-intensity (reduce LDL-C ≥50%) or moderate Intensity (reduce LDL-C 30% < 50%)

Second-line treatment (fibrates/ omega-3 fatty acids/PCSK9 inhibitors) for the management of patients with dyslipidemia

Description Title	Second-line treatment (fibrates/ omega-3 fatty acids/PCSK9 inhibitors) for the management of patients with dyslipidemia
Definition	Percentage of patients with dyslipidemia who were prescribed with second line treatment (fibrates/omega-3 fatty acids/PCSK9) either as monotherapy or in combination with statins during the measurement year
Numerator	Number of patients with dyslipidemia who were prescribed with second line treatment (fibrates/omega-3 fatty acids/PCSK9) either as monotherapy or in combination with statins during the measurement year
Denominator	Total number of patients with dyslipidemia during the measurement year
Exclusion criteria	Patients with no lipid order/risk of ASCVD
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Second-line treatment are preferred if patients did not achieve the lipid management goals through statin therapy. Ezetimibe prevents intestinal absorption of dietary and biliary cholesterol without negatively impacting the absorption of fat-soluble nutrients. PCSK9 inhibitors reduce LDL-C levels by 47–57% and are more efficacious than ezetimibe in lowering LDL-C. Bile acid sequestrants (cholestyramine, colestipol and colesevelam) were the first class of drugs to show a reduction in ASCVD risk related to LDL-C lowering. Niacin reduces LDL-C by 15–18% and TG by 20–40%. Niacin also increases HDL-C in a dose-dependent manner by up to 25%. Omega-3 fatty acids have proven effective at reducing TGs by up to 45%. The addition of a fibrate to a statin may benefit some patients with type 2 diabetes with both high TG and low HDL-C dyslipidemia pattern, particularly those with microvascular complications.

Appropriate treatment for lipid targets (LDL-C/non-HDL-C/TG) in patients with high LDL-C, high non-HDL-C, and high TG

Description Title	Appropriate treatment for lipid targets (LDL-C/Non-HDL-C/TG) in patients with high LDL-C, high non-HDL-C, and high TG
Definition	Percentage of patients aged ≥40 years with high LDL-C (≥190 mg/dL)/high non-HDL-C (220 mg/dL)/high TG (≥200 mg/dL) who were prescribed appropriate treatment to decrease LDL-C, Non-HDL-C, and TG during the measurement year
Numerator	Number of patients aged ≥40 years with high LDL-C (≥190 mg/dL)/High Non-HDL-C (220 mg/dL)/High TG (≥200 mg/dL) who were prescribed appropriate treatment to decrease LDL-C, non-HDL-C, and TG during the measurement year
Denominator	Total number of patients with high LDL-C (>190 mg/dL)/high non-HDL-C (220 mg/dL)/high TG (≥200 mg/dL) during the measurement year
Exclusion criteria	Patients with no dyslipidemia/ low ASCVD risk
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	LDL-C levels should be lowered as much as possible to prevent cardiovascular disease, especially in high and very high-risk patients. High LDL-C levels are an independent predictor of ASCVD events, with risk being directly proportional to the level of LDL-C. As a result, reduction of LDL-C levels reduces the risk of having an ASCVD event. Non-HDL-C levels to be more predictive of ASCVD risk than are LDL-C levels. Reductions in non-HDL-C levels by a range of lipid-lowering drug classes are associated with decreased ASCVD events, with an approximate 1:1 relationship between non–HDL-C decrease (%) and CHD reduction the risk of having an ASCVD event. An elevated TG level is associated with an increased risk of ASCVD. In patients identified at high residual CV risk, first line treatment is statin therapy, with dose optimization. If TG levels remain high or non-HDL-C/ApoB goals are not reached, then options include further non-HDL-C reduction with ezetimibe, a PCSK9 inhibitor, or icosapent ethyl 4 g per day.

Appropriate treatment for dyslipidemia patients due to underlying conditions

Description Title	Appropriate treatment for patients with dyslipidemia due to underlying conditions (metabolic dyslipidemia/elevated Lp(a)/diabetes/chronic kidney disease/familial hypercholesterolemia/ rheumatoid arthritis)
Definition	Percentage of patients with dyslipidemia due to underlying conditions (metabolic dyslipidemia/elevated Lp(a)/diabetes/CKD/FH/RA) who were prescribed appropriate treatment (fibrates+statins for metabolic dyslipidemia; niacin+ estrogen replacement therapy for elevated Lp(a); statins + ezetimibe for type 2 diabetes/CKD/FH; stains for type 1/rheumatoid arthritis) during the measurement year
Numerator	Number of patients with dyslipidemia due to underlying conditions (metabolic dyslipidemia/elevated Lp(a)/diabetes/CKD/FH/RA) who were prescribed appropriate treatment (fibrates+statins for metabolic dyslipidemia; niacin+ estrogen replacement therapy for elevated Lp(a); statins + ezetimibe for type 2 diabetes/CKD/FH; stains for type 1/rheumatoid arthritis) during the measurement year
Denominator	Total number of patients with dyslipidemia due to underlying conditions (metabolic dyslipidemia/elevated Lp(a)/diabetes/CKD/FH/RA) during the measurement year
Exclusion criteria	Patients with dyslipidemia without any underlying conditions
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Several underlying conditions which include metabolic dyslipidemia, elevated lipoprotein (a) [Lp(a)], diabetes mellitus, chronic kidney disease (CKD), familial hypercholesterolemia (FH), and rheumatoid arthritis (RA) that predispose individuals to abnormal plasma lipid levels (i.e., dyslipidemia). Hence, it is recommended that patients with dyslipidemia due to underlying conditions need to be appropriately treated.

Appropriate treatment of pregnant women with hypertriglyceridemia/familial hypercholesterolemia

Description Title	Appropriate treatment of pregnant women with hypertriglyceridemia/familial hypercholesterolemia
Definition	Percentage of pregnant women with hypertriglyceridemia/familial hypercholesterolemia who were prescribed appropriate treatment (omega-3 fatty acids/fibrates for hypertriglyceridemia; colesevelam/LDL apheresis for familial hypercholesterolemia) during the measurement year
Numerator	Number of pregnant women with hypertriglyceridemia/familial hypercholesterolemia who were prescribed appropriate treatment (omega-3 fatty acids/fibrates for hypertriglyceridemia; colesevelam/LDL apheresis for familial hypercholesterolemia) during the measurement year
Denominator	Total number of pregnant women with hypertriglyceridemia and familial hypercholesterolemia during the measurement year
Exclusion criteria	Non-pregnant women, pregnant women with no hypertriglyceridemia/no familial hypercholesterolemia
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Hypertriglyceridemia (≥500 mg/dl)/familial hypercholesterolemia in pregnant women may lead to an increased risk of obstetrical and fetal complications. Hence appropriate treatment should be initiated immediately and aggressively to avoid risk to the mother and infant, including pancreatitis, hyper viscosity syndrome, preeclampsia, fetal death, and preterm labor. It is advised that the statins should be halted 1–2 months before pregnancy is planned or as soon as the pregnancy is confirmed. Based on clinical judgement, hypertriglyceridemia may be treated with omega-3 fatty acids and/or fibrates (fenofibrate or gemfibrozil) into the second trimester. Pregnant women with FH may be treated with colesevelam and LDL apheresis. Lifestyle modifications should be adhered during breastfeeding. Statin and ezetimibe may be resumed only after completion of breastfeeding.

Referral of patients with dyslipidemia to lifestyle modification clinic

Description Title	Referral of patients with dyslipidemia to lifestyle modification clinic (nutrition/exercise/weight management/smoking & alcohol cessation)
Definition	Percentage of patients with dyslipidemia/risk of ASCVD who were referred to lifestyle modification clinic for nutrition, exercise, weight management, and smoking/alcohol cessation during the measurement year
Numerator	Number of patients with dyslipidemia/risk of ASCVD who were referred to lifestyle modification clinic for nutrition, exercise, weight management, and smoking/alcohol cessation during the measurement year
Denominator	Total number of patients with dyslipidemia/risk of ASCVD during the measurement year
Exclusion criteria	Patients with no CVD history, low-risk of CVD and healthy body weight
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	A diet rich in carbohydrates, LDC-C, non-HDL-c and TG increases the risk of lipid disorder/CVD. Hence patients are recommended to modify their diet to reduce trans fats, saturated fats, carbohydrates and mono- and disaccharides, whilst increasing intake of fibre, phytosterols and foods/supplements rich in n-3 poly-unsaturated fats. Regular exercise has proven benefits on plasma lipid levels and is particularly important in those with obesity, MetS and T2DM. Patients should be advised to participate in regular, moderate vigorous intensity exercise, aiming for at least 30–60 min on most days. Abdominal obesity (measured by waist-to-hip ratio) rather than BMI was significantly associated with the risk of acute myocardial infarction. It is important that all patients should be advised to reduce excess body/abdominal weight. Further, smoking & alcohol cessation should also be recommended to all patients who smoke or consume alcohol as these are risk factors for cardiovascular disease (CVD) and cessation reduces CVD risk.

Referral of patients with dyslipidemia to cardiovascular prevention clinic

Description Title	Referral of patients with dyslipidemia to cardiovascular prevention clinic
Definition	Percentage of dyslipidemia patients with ASCVD risk who were referred to cardiovascular prevention clinic during the measurement year
Numerator	Number of dyslipidemia patients with ASCVD risk who were referred to cardiovascular prevention clinic during the measurement year
Denominator	Total number of dyslipidemia patients with ASCVD risk during the measurement year
Exclusion criteria	Patients with no dyslipidemia/low ASCVD risk
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Referral of dyslipidemia patients with ASCVD risk to cardiovascular prevention clinic is important as the prevention and treatment of dyslipidemia are integral part of individual cardiovascular prevention interventions, which should be addressed primarily to those at higher risk who will benefit most.

Referral of patients with dyslipidemia to registered genetic counsellor

Description Title	Referral of patients with dyslipidemia to registered genetic counsellor
Definition	Percentage of patients with dyslipidemia who were referred to registered genetic counsellor for the assessment of genetic disorders of lipoprotein metabolism (such as familial hypercholesterolemia (FH)/familial combined hyperlipidemia (FCHL)/dysbetalipoproteinaemia/familial hyperchylomicronaemia) during the measurement year
Numerator	Number of patients with dyslipidemia who were referred to registered genetic counsellor for the assessment of genetic disorders of lipoprotein metabolism (such as familial hypercholesterolemia (FH)/familial combined hyperlipidemia (FCHL)/dysbetalipoproteinaemia/familial hyperchylomicronaemia) during the measurement year
Denominator	Total number of patients with dyslipidemia during the measurement year
Exclusion criteria	Patients with no dyslipidemia
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Genetic counseling helps better understanding of the likelihood of familial dyslipidemia and need for genetic testing. It is recommended to educate the patients about the disorder and the implication of results before (pre-test) and after (post-test) performing genetic testing by the counsellors. Further, the requirement for additional analyses, such as the evaluation of del-dups and copy number variants, need to be assessed.

Cost of hospitalization of dyslipidemia patients due to recurrent cardiovascular events

Description Title	Cost of hospitalization of dyslipidemia patients due to recurrent cardiovascular events
Definition	Average cost incurred for hospitalization of dyslipidemia patients due to recurrent cardiovascular events
Numerator	Total cost incurred for hospitalization of dyslipidemia patients due to recurrent cardiovascular events
Denominator	Total number of dyslipidemia patients during the measurement year
Exclusion criteria	Patients with no dyslipidemia/no cardiovascular events
Unit of measure	Percentage (numerator/denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Hospitalization frequency and characteristics owing to recurrent cardiovascular events in individuals with dyslipidemia may vary depending on the patient's risk factors and treatment. The data on overall costs of hospitalization due to recurrent cardiovascular events need to be evaluated in order to determine the economic burden on dyslipidemia patients and their families.

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