

Overview

Useful For

Assessment for risk of developing cardiovascular disease, major adverse cardiovascular events, or ischemic cerebrovascular events

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
NHDCH	Non HDL Cholesterol	No	Yes
CLDL	Calculated LDL	No	Yes
HDCH	Cholesterol, HDL, S	Yes	Yes
CHOL	Cholesterol, Total, S	Yes	Yes
TRIG	Triglycerides, S	Yes	Yes
CVINT	Interpretation	No	Yes
LIPA1	Lipoprotein(a), S	Yes	Yes
HSCRCP	C-Reactive Protein, High Sens, S	Yes	Yes
APOLB	Apolipoprotein B, S	Yes	Yes

Method Name

LIPA1, HSCRCP, APOLB: Immunoturbidimetry

CHOL, TRIG, HDCH: Enzymatic Colorimetric

CLDL: Friedewald Equation

NHDCH: Calculation

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Patient Preparation:

1. Patients must be fasting for at least 12 to 14 hours.
2. Patient must not consume any alcohol for 24 hours before specimen collection.

Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Submission Container/Tube: Plastic vial

Specimen Volume: 2.5 mL

Collection Instructions: Centrifuge and aliquot serum into plastic vial. Send refrigerated.

Reject Due To

Gross hemolysis Reject
 Gross lipemia Reject
 Gross icterus Reject

Specimen Minimum Volume

1.25 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	7 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Cardiovascular disease remains the leading cause of morbidity and mortality despite well-defined risk factors and treatment strategies. Atherosclerosis, the underlying cause of cardiovascular disease, is a buildup of plaque within arteries. This buildup of plaque can lead to chronic or acute restrictions in blood flow resulting in heart attacks and strokes. Many of these events occur in individuals with no prior symptoms. Standard risk factors include age, smoking status, hypertension, diabetes, total serum cholesterol, and high-density lipoprotein cholesterol.

Apolipoprotein B (ApoB), high-sensitivity C-reactive protein (hsCRP), and lipoprotein (a) (Lp[a]) are serological risk factors endorsed by multiple international guidelines for use in cardiovascular disease risk assessment. Several recent guidelines have suggested that clinicians utilize ApoB, hsCRP, and Lp(a) in selected persons to augment risk classification, guide intensity of risk-reduction therapy and modulate clinical judgment when making therapeutic decision.(1-3)

Reference Values

Age	2-17 years	> or =18 years
Non-HDL cholesterol (mg/dL)	** Acceptable: <120 Borderline high: 120-144 High: > or =145	* Desirable: <130 mg/dL Above Desirable: 130-159 mg/dL Borderline high: 160-189 mg/dL High: 190-219 mg/dL Very high: > or =220 mg/dL
LDL cholesterol (mg/dL)	** Acceptable: <110 Borderline high: 110-129 High: > or =130	*** Desirable: <100 Above Desirable: 100-129 Borderline high: 130-159 High: 160-189 Very high: > or =190
HDL cholesterol (mg/dL)	** Low: <40 Borderline low: 40-45 Acceptable: > 45	*** Males: > or =40 Females: > or =50
Total cholesterol (mg/dL)	** Acceptable: <170 Borderline	* Desirable: < 200 Borderline

	high: 170-199 High: > or =200	high: 200 - 239 High: > or = 240
LIPOPROTEIN (a) (nmol/L)	Not established	< 75 nmol/L Values >= 75 nmol/L may suggest increased risk of coronary heart disease.
C-REACTIVE PROTEIN HIGH SENSITIVITY	* Lower risk: <2.0 mg/L Higher risk: >=2.0 mg/L Acute inflammation: >10.0 mg/L	* Lower risk: <2.0 mg/L Higher risk: >=2.0 mg/L Acute inflammation: >10.0 mg/L
Apolipoprotein B (mg/dL)	Acceptable: <90 Borderline high: 90-109 High: > or =110	Desirable: <90 Above Desirable: 90-99 Borderline high: 100-119 High: 120-139 Very high: > or =140
Age	2-9 years	10-17 years
> or =18 years	Triglycerides (mg/dL)	** Acceptable: <75 Borderline high: 75-99 High: > or =100

Interpretation

Specific interpretations are provided based on lipid results according to Mayo Clinic care process models. Mayo Clinic has adopted the National Lipid Association classifications, which are included as reference values on Mayo Clinic and Mayo Clinic Laboratories reports (see Reference Values).

More aggressive treatment strategies may be pursued in patients determined to be at increased risk.

Cautions

Lipid values should be considered in the context of clinical presentation. Additional risk factors include cigarette smoking, hypertension, age and personal or family history of cardiovascular disease.

Result can be falsely decreased in patients with elevated levels of N-acetyl-p-benzoquinone imine (NAPQI)-a metabolite of acetaminophen, N-acetylcysteine (NAC), and metamizole.

Clinical Reference

- Jacobson TA, Ito MK, Maki KC, et al: National Lipid Association recommendations for patient-centered management of dyslipidemia: part 1 - executive summary. J Clin Lipidol. 2014 Sep-Oct;8(5):473-488
- Perk J, DeBacker G, Gohlke H, et al: European Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. 2012;33:1635-1701
- Grundy SM, Stone NJ, Bailey AL, et al: 2018. AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation. 2019 Jun 18;139(25):e1082-e1143
- Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents; National Heart, Lung, and Blood Institute: Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents. Pediatrics. 2011;128;S213-S256

Performance

Method Description

[The following calculations are performed in the laboratory information system, SCC Soft.](#)

Non-high-density lipoprotein (HDL) cholesterol = Total cholesterol – HDL cholesterol

Low-density lipoprotein (LDL) cholesterol = Total cholesterol - HDL cholesterol - (Triglycerides/5)

HDL Cholesterol:

Non-HDL lipoproteins such as LDL, very low-density lipoprotein (VLDL) and chylomicrons are combined with polyanions and a detergent forming a water-soluble complex. In this complex the enzymatic reaction of cholesterol esterase (CHER) and cholesterol oxidase (CHOD) towards non-HDL lipoproteins is blocked. Finally, only HDL-particles can react with CHER and CHOD. The concentration of HDL-cholesterol is determined enzymatically by CHER and CHOD. Cholesterol esters are broken down quantitatively into free cholesterol and fatty acids by CHER. In the presence of peroxidase, the hydrogen peroxide generated reacts with 4-amino-antipyrine and N-ethyl-N-(3-methylphenyl)-N'-succinylethylenediamine to form a dye. The color intensity of this dye is directly proportional to the cholesterol concentration and is measured photometrically. (Package insert: HDL-Cholesterol Gen4. Roche Diagnostics; V 2.0, 08/2018)

Total Cholesterol:

[Cholesterol esters are cleaved by the action of cholesterol esterase to yield free cholesterol and fatty acids. Cholesterol oxidase then catalyzes the oxidation of cholesterol to cholest-4-en-3-one and hydrogen peroxide.](#) In the presence of peroxidase, the hydrogen peroxide formed effects the oxidative coupling of phenol and 4-aminophenazone to form a red quinone-imine dye. The color intensity of the dye formed is directly proportional to the cholesterol concentration. It is determined by measuring the increase in absorbance. (Package insert: Cholesterol Gen2 Reagent. Roche Diagnostics; V 10.0, 03/2020)

Triglycerides:

This test uses a lipoprotein lipase from microorganisms for the rapid and complete hydrolysis of triglycerides to glycerol followed by oxidation to dihydroxyacetone phosphate and hydrogen peroxide. The hydrogen peroxide produced then reacts with 4-aminophenazone and 4-chlorophenol under the catalytic action of peroxidase to form a red dyestuff (Trinder endpoint reaction). The color intensity of the red dyestuff formed is directly proportional to the triglyceride concentration and can be measured photometrically. (Package insert: Triglycerides. Roche Diagnostics; V 9.0, 01/2020)

Lipoprotein (a):

This test is a particle enhanced immunoturbidimetric assay. Human lipoprotein (a)(Lp[a]) agglutinates with the latex particles coated with anti-Lp(a) antibodies. (Package insert: Lipoprotein (a) Gen.2 reagent. Roche Diagnostics; V2.0, 01/2015)

C-Reactive Protein:

Particle-enhanced immunoturbidimetric assay. Human C-reactive protein (CRP) agglutinates with latex particles coated with monoclonal anti-CRP antibodies. The precipitate is determined turbidimetrically. (Package insert: Cardiac C-Reactive Protein (Latex) High Sensitive. Roche Diagnostics; V 12.0, 03/2019)

Apolipoprotein B:

Anti-apolipoprotein B antibodies react with the antigen in the sample to form antigen:antibody complexes, which, following agglutination, can be measured turbidimetrically. (Package insert: Tina-quant Apolipoprotein B, Roche Diagnostics; V1.0 07/2020)

PDF Report

No

Specimen Retention Time

7 days

Performing Laboratory Location

Rochester

Fees & Codes**Test Classification**

This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

80061-Lipid panel (includes: HDL [CPT Code 83718], total cholesterol [CPT Code 82465], and triglycerides [CPT Code 84478])

83695-Lipoprotein (a)

86141-C-reactive protein; high sensitivity (hsCRP)

82172-Apolipoprotein B