CARDIOVASCULAR DISEASE (CVD) RISK MANAGEMENT

Comprehensive support for cardiovascular disease testing

labcorp

Identify and monitor patients at risk for cardiovascular disease

We believe confidence is key for providing care. That's why we offer a range of cardiovascular disease testing to help you diagnose and support your patients.

85%

Cardiovascular diseases represent the leading cause of death globally, with 85% of these deaths due to heart attack and stroke.[1] The majority of these deaths are considered preventable with appropriate medical treatment and healthy lifestyle behaviors.

Understand the prevalence

Approximately 50% of all U.S. adults have cardiovascular disease, including dyslipidemia, coronary artery disease, peripheral artery disease, stroke, heart failure, arrhythmia and inherited cholesterol disorders.[2]

Recognize at-risk patients

Cardiovascular disease risk factors include[3]:

- Dyslipidemia
- Hypertension
- Diabetes
- Obesity
- Lifestyle choices (smoking, unhealthy diet, physical inactivity, excessive alcohol use)

Enable earlier interventions with timely screening and diagnosis

Cardiovascular diagnostic and prognostic testing—coupled with our complementary analytical tools—can support risk assessment and management interventions in primary care settings and help reduce the complexities of cardiovascular care.

Together, let's empower clear, confident decisions for your patients' health.

Assess risk with standard lipid screening

Guidelines recommend screening cholesterol with a lipid panel every 4–6 years for average-risk adults over the age of 20 and more frequently for high-risk patients.[4] Children, teens and young adults should be tested once between the ages of 9 and 11 and then again between the ages of 17 and 21.[5]

Monitoring may be done more frequently if risk factors for heart disease are present, if prior results showed high risk levels and/or when undergoing treatment for unhealthy lipid levels.

Test Name	Test No.
Lipid Panel	**303756**
Lipid Panel With LDL:HDL Ratio	**235010**
Lipid Panel With Total Cholesterol:HDL Ratio	**221010**
Lipid Profile With Non-HDL Cholesterol	**343925**

Assess the risk of adverse cardiovascular events: Advanced lipoprotein testing

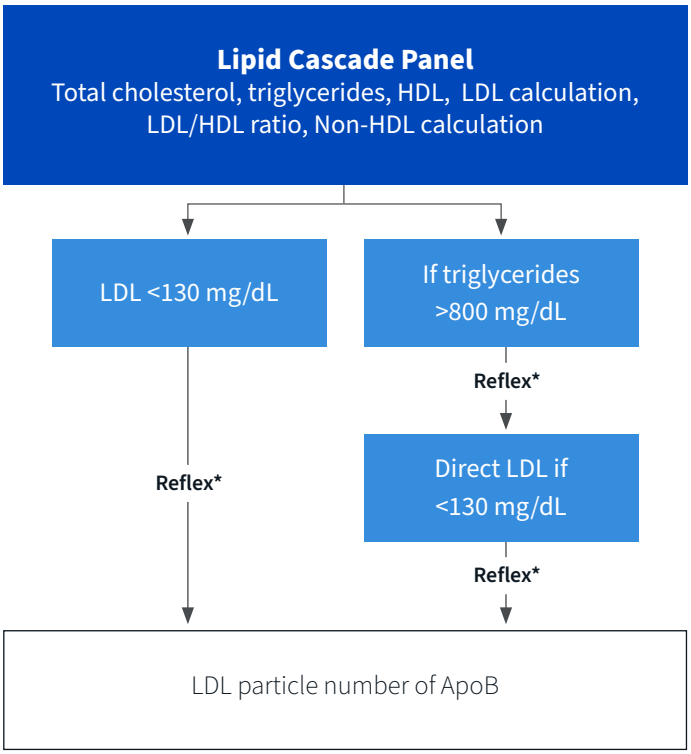
Evaluate response to therapy and optimize treatment decisions with reliable measures of LDL levels

Low-density lipoprotein particles (LDL-P) are highly atherogenic, playing a key role in the development and progression of atherosclerosis and cardiovascular disease.

Traditional low-density lipoprotein cholesterol (LDL-C) measurements—which are only an estimate of LDL-P quantity—may be an unreliable measure for at-risk patients in a management setting.[6,7]

To provide better markers for prediction of cardiovascular disease than total LDL-C, the Labcorp Lipid Cascade starts with a traditional lipid panel that reflexes to either LDL-P measurement by nuclear magnetic resonance (NMR) or Apolipoprotein B (ApoB) (depending upon the ordered test option) when LDL <130 mg/dL.

These Labcorp tests can help inform patient management for at-risk patients with Type 2 diabetes (T2D), statin-treated patients and those with cardiometabolic risk factors.[7-13]



Test Name	Test No.
Lipid Cascade With Reflex to Lipoprotein Particle Assessment by NMR (Without Graph)	**361946**
Lipid Cascade With Reflex to Apolipoprotein B	**363676**
NMR LipoProfile® With Lipids (Without Graph)*	**884247**
NMR LipoProfile® with Insulin Resistance Markers (Without Graph)*	**88400**

*Additional charge

*For other NMR LipoProfile® configurations, please visit our test menu on Labcorp.com

Identify residual risk in your patients with lipoprotein and apolipoprotein testing

Apolipoprotein B

Apolipoprotein B (ApoB) provides an accurate assessment of atherogenic particle number and its associated atherosclerotic cardiovascular disease (ASCVD) risk, whereas low-density lipoprotein cholesterol (LDL-C) does not.

Although LDL-C, non-HDL-C, and ApoB are highly correlated, "discordance analyses" have demonstrated that ASCVD risk tracks with ApoB, not the cholesterol measures, when levels differ.[8,10,13,14]

Test Name	Test No.
Apolipoprotein B	**167015**
Lipid Panel With Apolipoprotein B (ApoB)	**123544**

Lipoprotein(a)

Lipoprotein(a) is an independent risk factor for coronary artery disease and cerebral infarction equal to high LDL cholesterol.[12,15]

Test Name	Test No.
Lipoprotein(a)	**120188**

Low-Density Lipoprotein Cholesterol

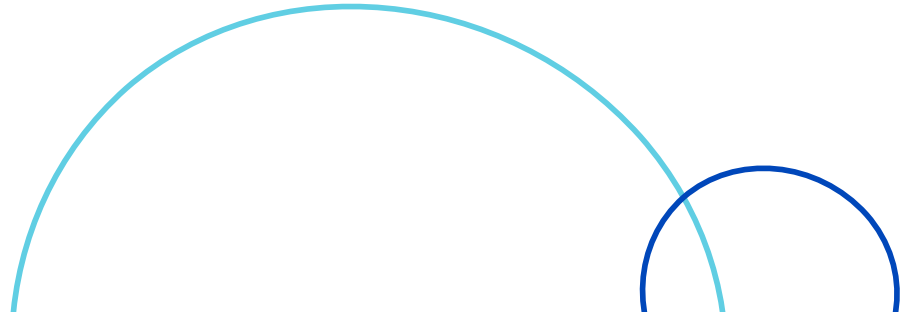
LDL cholesterol measurement, in conjunction with other lipid measurements, has been shown to be useful in assessing the risk of coronary heart disease in non-fasting patients or in patients whose fasting triglycerides are >800 mg/dL.

Test Name	Test No.
Low-density Lipoprotein Cholesterol (Direct)	**120295**

Oxidized low-density lipoprotein (oxLDL)

OxLDL particles are considered to be an important driving factor in the pathophysiology of atherosclerosis and oxLDL measurement has been used to test the efficacy of CVD drugs (e.g., statins) to reduce oxidative stress.[16]

Test Name	Test No.
Oxidized Low-density Lipoprotein (OxLDL)	**123023**



Identify emerging risk factors and inflammatory markers of CVD

We're here to assist clinicians in identifying risk factors and sustained inflammation to help stratify individuals at risk for acute cardiovascular and cerebrovascular events.

GlycA: A more stable measure of inflammation

As a composite biomarker, GlycA integrates the protein levels and glycosylation states of several of the most abundant acute phase proteins in serum.[17]

Data suggest that GlycA has clinical utility similar to high-sensitivity C-reactive protein (hs-CRP) but has the advantage of having much lower intra-individual day-to-day variability. However, GlycA and hsCRP together could also serve as complementary inflammatory biomarkers that may provide a more reliable indication of a patient's inflammatory CVD risk than either marker alone.[17-19]

Test Name	Test No.
GlycA	**123850**
C-Reactive Protein (CRP), High Sensitivity (Cardiac Risk Assessment)	**120766**
Lipid Panel with GlycA (Inflammation)	**123510**

Understand the disease potential of your patients and monitor risk

Homocysteine can be considered to be an independent risk factor for the development of cardiovascular disease.[20-22] Patients with cardiovascular disease, including heart disease, stroke, peripheral vascular disease and thromboembolic disease generally have higher homocysteine levels than matched controls.

Lipoprotein-Associated Phospholipase A_2 activity may be used in conjunction with clinical evaluation and patient risk assessment as an aid in predicting risk of coronary heart disease (CHD) in patients with no prior history of cardiovascular events.[12,23]

High levels of TMAO have been associated with an increased risk of heart disease.[24-29] The TMAO test may be used as an aid in the assessment of risk for cardiovascular disease, independent of established risk factors, aid in the determination of altered gut microbiome (gut dysbiosis) in individuals who may benefit from intensive dietary intervention, and monitor therapy aimed at reducing TMAO concentrations.

Test Name	Test No.
Homocyst(e)ine	**706994**

Test Name	Test No.
Lipoprotein-associated Phospholipase A_2 Activity	**123283**

Test Name	Test No.
TMAO (Trimethylamine N-oxide)	**123413**

Assess, diagnose and monitor patients for heart failure and acute coronary syndromes

Labcorp cardiac biomarkers allow for the assessment of cardiac events and should be used in accordance with published guidelines for use and in appropriate settings.

Test Name	Test No.
Creatine Kinase (CK), MB	**120816**
Creatine Kinase (CK), Total	**001362**
Myoglobin	**010405**
Troponin T (Highly Sensitive)	**140150**
B-Type Natriuretic Peptide (BNP)	**140889**
NT-proBNP	**143000**

For test specific TAT information please visit **Labcorp.com/testmenu** or contact your local representative.

Cardiovascular disease and diabetes: Identify cardiometabolic comorbidities to inform disease management decisions

Patients with diabetes are two to four times more likely to develop cardiovascular disease as compared to patients without diabetes.[30, 31]

Guidelines recommend screening patients with diabetes for comorbidities—such as cardiovascular disease, chronic kidney disease and liver disease—which can help inform your clinical decision making.[32]

Test Name	Test No.
Metabolic Panel (14), Comprehensive	**322000**
Metabolic Panel (8), Basic	**322758**
Metabolic Syndrome Profile	**335884**
Diabetes Risk–Asymptomatic Adults	**090400**
Diabetes Comorbidity Assessment	**023400**
Kidney profile	**140301**
Albumin/Creatinine Ratio, Random Urine	**140285**

Simple, reliable ways to assess insulin resistance, systemic inflammation and cardiovascular disease

The assessments of insulin resistance, systemic inflammation and lipoprotein particle levels can provide a more detailed—and in some cases, a more accurate—depiction of a patient's cardiometabolic risk.[33-37]

The Labcorp proprietary Diabetes Risk Index (DRI) was developed to assist clinicians in identifying patients at risk of developing T2D as more than 80 million U.S. adults are considered "prediabetic."[38, 39]

The DRI score uses both the measured Lipoprotein Insulin Resistance Index (LP-IR) and selected branched-chain amino acid (BCAA) levels to predict the development of T2D—independent of the level of glycemia. LP-IR is an easy way to assess insulin resistance, and as such the LP-IR score predicts a patient's likelihood of future development of T2D,[40–42] while BCAA levels have also been shown to predict incident Type 2 diabetes.[43–46]

We offer comprehensive, innovative panels to help identify cardiometabolic risk with a refined and cost-effective approach.

Test Name	Test No.
Lipid Panel With Diabetes Risk Index (DRI)	**123525**
Lipid Panel With GlycA (Inflammation) and Diabetes Risk Index (DRI)	**123559**
Lipid Panel With Apolipoprotein B (ApoB), GlycA (Inflammation), Diabetes Risk Index (DRI)	**123567**
NMR LipoProfile with Insulin Resistance Markers without Lipids	**884209**

Genetic testing—a powerful tool to uncover the causes of familial cardiac disease

Cardiogenetic assessment to support early diagnosis

GeneSeq® Cardio offers comprehensive genetic testing for clinical indications associated with cardiomyopathies, arrhythmias, aortopathies, RASopathies, congenital heart defects, early-onset coronary artery disease, and familial hypercholesterolemia. Identification of a pathogenic variant(s) in genes associated with these cardiovascular diseases is helpful in confirming a clinical diagnosis, defining a genetic etiology, and directing treatment options. This information can also be used to identify at-risk family members, thereby allowing for earlier initiation of preventative treatment and reducing the risk of heart attack, stroke and sudden cardiac death. Labcorp also offers full gene and variant-specific sequencing for all genes included into GeneSeq® Cardio panels.

Test Name	Test No.
GeneSeq®: Cardio-Familial Hypercholesterolemia Profile	**452040**
GeneSeq®: Cardio-Early-onset Coronary Artery Disease/Familial Hypercholesterolemia Profile	**451416**
GeneSeq®: Cardio-Familial Aortopathy Profile	**451432**
GeneSeq®: Cardio-Familial Arrhythmia Profile	**451412**
GeneSeq®: Cardio-Familial Cardiomyopathy Profile	**451422**
GeneSeq®: Cardio-Noonan Syndrome/RASopathies Profile	**451441**
GeneSeq®: Cardio-Familial Congenital Heart Disease Profile	**451402**
FBN1 (Marfan Syndrome) Full Gene Sequencing	**452028**
GeneSeq®: Cardio-Gene Specific Sequencing	**452053***
Mutation-specific Sequencing, Whole Blood	**451382****

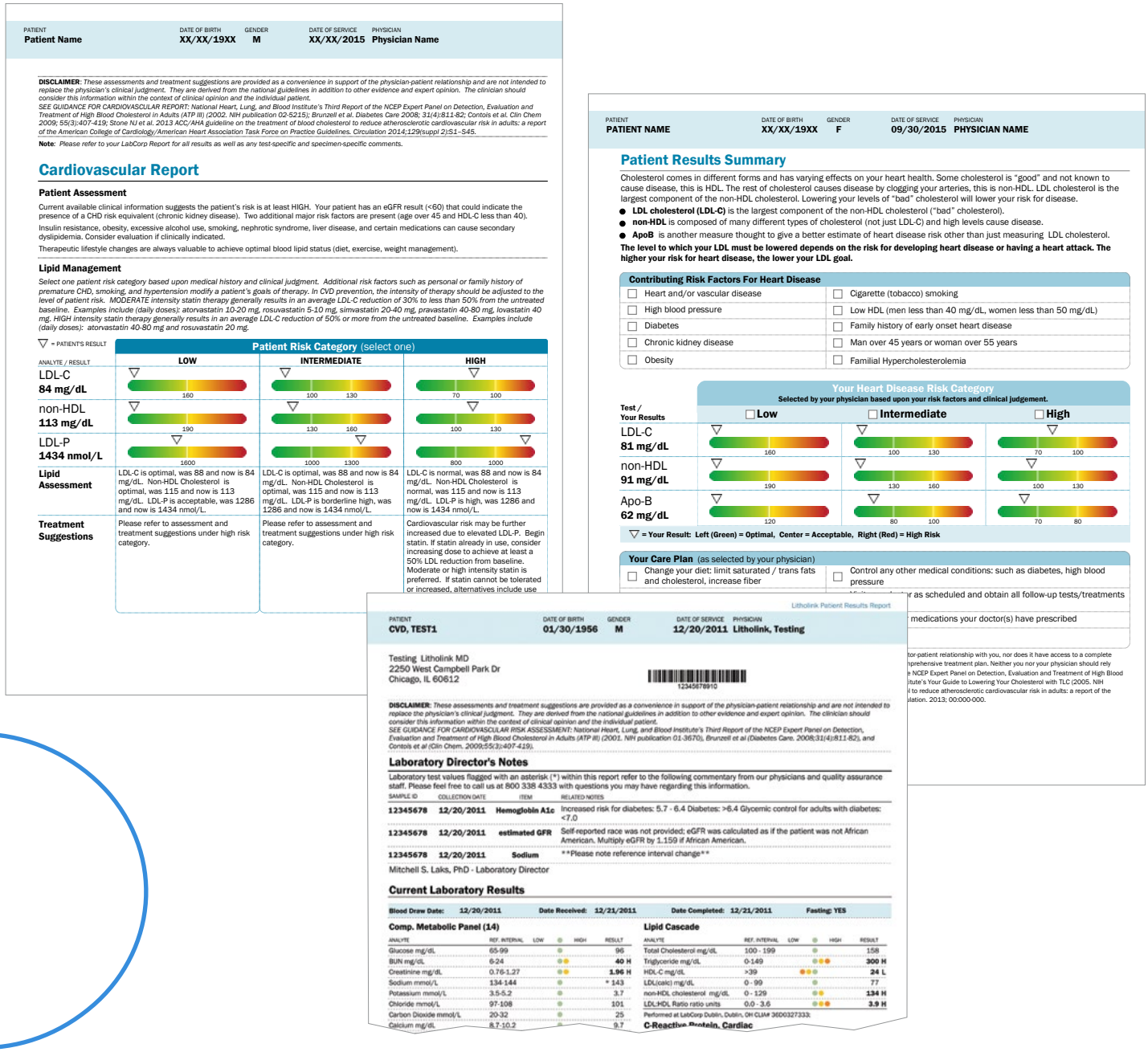
*Full gene sequencing for any gene(s) on any of the GeneSeq®: Cardio panels
**Targeted variant analysis for any gene(s) on any of the GeneSeq®: Cardio panels

Measure what matters: Enable opportunities for early detection and diagnosis

Through our world-class diagnostic tests, we deliver health answers that power clearer, more confident decisions for both patients and healthcare providers.

Get actionable information to support clinical decision-making

Our complimentary reports provide you with a patient-specific, guideline-based analysis of test results as they relate to cardiovascular risk factors. We also offer patient-friendly versions to help educate and counsel your patients.



PATIENT **Patient Name** DATE OF BIRTH **XX/XX/19XX** GENDER **M** DATE OF SERVICE **XX/XX/2015** PHYSICIAN **Physician Name**

DISCLAIMER: *These assessments and treatment suggestions are provided as a convenience in support of the physician-patient relationship and are not intended to replace the physician's clinical judgment. They are derived from the national guidelines in addition to other evidence and expert opinion. The clinician should consider this information within the context of clinical opinion and the individual patient.*
SEE GUIDANCE FOR CARDIOVASCULAR REPORT: National Heart, Lung, and Blood Institute's Third Report of the NCEP Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (ATP III) (2002. NIH publication 02-5215); Brunzell et al. Diabetes Care 2008; 31(4):811-82; Contois et al. Clin Chem 2009; 55(3):407-419; Stone NJ et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation 2014;129(suppl 2):S1–S45.

Note: *Please refer to your LabCorp Report for all results as well as any test-specific and specimen-specific comments.*

Cardiovascular Report

Patient Assessment

Current available clinical information suggests the patient's risk is at least HIGH. Your patient has an eGFR result (<60) that could indicate the presence of a CHD risk equivalent (chronic kidney disease). Two additional major risk factors are present (age over 45 and HDL-C less than 40).

Insulin resistance, obesity, excessive alcohol use, smoking, nephrotic syndrome, liver disease, and certain medications can cause secondary dyslipidemia. Consider evaluation if clinically indicated.

Therapeutic lifestyle changes are always valuable to achieve optimal blood lipid status (diet, exercise, weight management).

Lipid Management

Select one patient risk category based upon medical history and clinical judgment. Additional risk factors such as personal or family history of premature CHD, smoking, and hypertension modify a patient's goals of therapy. In CVD prevention, the intensity of therapy should be adjusted to the level of patient risk. MODERATE intensity statin therapy generally results in an average LDL-C reduction of 30% to less than 50% from the untreated baseline. Examples include (daily doses): atorvastatin 10-20 mg, rosuvastatin 5-10 mg, simvastatin 20-40 mg, pravastatin 40-80 mg, lovastatin 40 mg. HIGH intensity statin therapy generally results in an average LDL-C reduction of 50% or more from the untreated baseline. Examples include (daily doses): atorvastatin 40-80 mg and rosuvastatin 20 mg.

▽ = PATIENT'S RESULT

ANALYTE / RESULT	Patient Risk Category (select one) LOW	INTERMEDIATE	HIGH
LDL-C **84 mg/dL**	▽ 160	▽ 100 130	▽ 70 100
non-HDL **113 mg/dL**	▽ 190	▽ 130 160	▽ 100 130
LDL-P **1434 nmol/L**	▽ 1600	▽ 1000 1300	▽ 800 1000
Lipid Assessment	LDL-C is optimal, was 88 and now is 84 mg/dL. Non-HDL Cholesterol is optimal, was 115 and now is 113 mg/dL. LDL-P is acceptable, was 1286 and now is 1434 nmol/L.	LDL-C is optimal, was 88 and now is 84 mg/dL. Non-HDL Cholesterol is optimal, was 115 and now is 113 mg/dL. LDL-P is borderline high, was 1286 and now is 1434 nmol/L.	LDL-C is normal, was 88 and now is 84 mg/dL. Non-HDL Cholesterol is normal, was 115 and now is 113 mg/dL. LDL-P is high, was 1286 and now is 1434 nmol/L.
Treatment Suggestions	Please refer to assessment and treatment suggestions under high risk category.	Please refer to assessment and treatment suggestions under high risk category.	Cardiovascular risk may be further increased due to elevated LDL-P. Begin statin. If statin already in use, consider increasing dose to achieve at least a 50% LDL reduction from baseline. Moderate or high intensity statin is preferred. If statin cannot be tolerated or increased, alternatives include use

PATIENT **PATIENT NAME** DATE OF BIRTH **XX/XX/19XX** GENDER **F** DATE OF SERVICE **09/30/2015** PHYSICIAN **PHYSICIAN NAME**

Patient Results Summary

Cholesterol comes in different forms and has varying effects on your heart health. Some cholesterol is "good" and not known to cause disease, this is HDL. The rest of cholesterol causes disease by clogging your arteries, this is non-HDL. LDL cholesterol is the largest component of the non-HDL cholesterol. Lowering your levels of "bad" cholesterol will lower your risk for disease.

- **LDL cholesterol (LDL-C)** is the largest component of the non-HDL cholesterol ("bad" cholesterol).
- **non-HDL** is composed of many different types of cholesterol (not just LDL-C) and high levels cause disease.
- **ApoB** is another measure thought to give a better estimate of heart disease risk other than just measuring LDL cholesterol.

The level to which your LDL must be lowered depends on the risk for developing heart disease or having a heart attack. The higher your risk for heart disease, the lower your LDL goal.

Contributing Risk Factors For Heart Disease

☐ Heart and/or vascular disease	☐ Cigarette (tobacco) smoking
☐ High blood pressure	☐ Low HDL (men less than 40 mg/dL, women less than 50 mg/dL)
☐ Diabetes	☐ Family history of early onset heart disease
☐ Chronic kidney disease	☐ Man over 45 years or woman over 55 years
☐ Obesity	☐ Familial Hypercholesterolemia

Test / Your Results	Your Heart Disease Risk Category — Selected by your physician based upon your risk factors and clinical judgement. ☐ Low	☐ Intermediate	☐ High
LDL-C **81 mg/dL**	▽ 160	▽ 100 130	▽ 70 100
non-HDL **91 mg/dL**	▽ 190	▽ 130 160	▽ 100 130
Apo-B **62 mg/dL**	▽ 120	▽ 80 100	▽ 70 80

▽ = Your Result: **Left (Green) = Optimal, Center = Acceptable, Right (Red) = High Risk**

Your Care Plan (as selected by your physician)

☐ Change your diet: limit saturated / trans fats and cholesterol, increase fiber	☐ Control any other medical conditions: such as diabetes, high blood pressure
	☐ r as scheduled and obtain all follow-up tests/treatments
	☐ medications your doctor(s) have prescribed

tor-patient relationship with you, nor does it have access to a complete nprehensive treatment plan. Neither you nor your physician should rely e NCEP Expert Panel on Detection, Evaluation and Treatment of High Blood itute's Your Guide to Lowering Your Cholesterol with TLC (2005. NIH l to reduce atherosclerotic cardiovascular risk in adults: a report of the ulation. 2013; 00:000-000.

Litholink Patient Results Report

PATIENT **CVD, TEST1** DATE OF BIRTH **01/30/1956** GENDER **M** DATE OF SERVICE **12/20/2011** PHYSICIAN **Litholink, Testing**

Testing Litholink MD
2250 West Campbell Park Dr
Chicago, IL 60612

12345678910

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SEE GUIDANCE FOR CARDIOVASCULAR RISK ASSESSMENT: National Heart, Lung, and Blood Institute's Third Report of the NCEP Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (ATP III) (2001. NIH publication 01-3670), Brunzell et al (Diabetes Care. 2008;31(4):811-82), and Contois et al (Clin Chem. 2009;55(3):407-419).

Laboratory Director's Notes

Laboratory test values flagged with an asterisk (*) within this report refer to the following commentary from our physicians and quality assurance staff. Please feel free to call us at 800 338 4333 with questions you may have regarding this information.

SAMPLE ID	COLLECTION DATE	ITEM	RELATED NOTES
12345678	12/20/2011	Hemoglobin A1c	Increased risk for diabetes: 5.7 - 6.4 Diabetes: >6.4 Glycemic control for adults with diabetes: <7.0
12345678	12/20/2011	estimated GFR	Self-reported race was not provided; eGFR was calculated as if the patient was not African American. Multiply eGFR by 1.159 if African American.
12345678	12/20/2011	Sodium	**Please note reference interval change**

Mitchell S. Laks, PhD - Laboratory Director

Current Laboratory Results

Blood Draw Date: 12/20/2011 **Date Received:** 12/21/2011 **Date Completed:** 12/21/2011 **Fasting:** YES

Comp. Metabolic Panel (14)

ANALYTE	REF. INTERVAL	LOW	HIGH	RESULT
Glucose mg/dL	65-99			96
BUN mg/dL	6-24			40 H
Creatinine mg/dL	0.76-1.27			1.96 H
Sodium mmol/L	134-144			* 143
Potassium mmol/L	3.5-5.2			3.7
Chloride mmol/L	97-108			101
Carbon Dioxide mmol/L	20-32			25
Calcium mg/dL	8.7-10.2			9.7

Lipid Cascade

ANALYTE	REF. INTERVAL	LOW	HIGH	RESULT
Total Cholesterol mg/dL	100 - 199			158
Triglyceride mg/dL	0-149			300 H
HDL-C mg/dL	>39			24 L
LDL(calc) mg/dL	0 - 99			77
non-HDL cholesterol mg/dL	0 - 129			134 H
LDL:HDL Ratio ratio units	0.0 - 3.6			3.9 H

Performed at LabCorp Dublin, Dublin, OH CLIA# 36D0327333:

C-Reactive Protein, Cardiac

References

1. World Health Organization (WHO). Cardiovascular diseases. WHO website: https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1. Published 2021. Accessed 9 Oct. 2022.
2. American Heart Association. "Nearly Half of All U.S. Adults Have Some Form of Cardiovascular Disease." American Heart Association website: https://newsroom.heart.org/news/nearly-half-of-all-u-s-adults-have-some-form-of-cardiovascular-disease. Accessed 9, Oct. 2022.
3. Centers for Disease Control and Prevention (CDC). Know Your Risk for Heart Disease. CDC website: https://www.cdc.gov/heartdisease/risk_factors.htm. Accessed October 13, 2022.
4. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2019 Sep 10;140(11):3596-3646.
5. Centers for Disease Control and Prevention (CDC). Get a Cholesterol Test. CDC website: https://www.cdc.gov/cholesterol/cholesterol_screening.htm. Accessed October 24, 2022.
6. Cromwell WC, Triffon DW. Clinical Utility of LDL Particle Number to Optimize Management of LDL-Related Cardiovascular Risk. *J Fam Pract*. 2016 Jul;65(7)Suppl.
7. Brunzell JD, Davidson M, Furberg CD, et al. Lipoprotein management in patients with cardiometabolic risk: consensus statement from the American Diabetes Association and the American College of Cardiology Foundation. *Diabetes Care*. 2008 Apr;31(4):811-822.
8. Ivanova EA, Myasoedova VA, Melnichenko AA, Grechko AV, Orekhov AN. Small Dense Low-Density Lipoprotein as Biomarker for Atherosclerotic Diseases. *Oxid Med Cell Longev*. 2017;2017:1273042.
9. Sniderman AD, Williams K, Contois JH, et al. A meta-analysis of low-density lipoprotein cholesterol, non-high-density lipoprotein cholesterol, and apolipoprotein B as markers of cardiovascular risk. *Circ Cardiovasc Qual Outcomes*. 2011 May;4(3):337-345.
10. Garber AJ, Abrahamson MJ, Barzilay JI, et al. American Association of Clinical Endocrinologists' comprehensive diabetes management algorithm 2013 consensus statement--executive summary. *Endocr Pract*. 2013 May-Jun;19(3):536-557.
11. Contois JH, McConnell JP, Sethi AA, et al. Apolipoprotein B and cardiovascular disease risk: position statement from the AACC Lipoproteins and Vascular Diseases Division Working Group on Best Practices. *Clin Chem*. 2009 Mar;55(3):407-419.
12. Davidson MH, Ballantyne CM, Jacobson TA, et al. Clinical utility of inflammatory markers and advanced lipoprotein testing: advice from an expert panel of lipid specialists. *J Clin Lipidol*. 2011 Sep-Oct;5(5):338-367.
13. Jellinger PS, Smith DA, Mehta AE, et al. American Association of Clinical Endocrinologists' Guidelines for Management of Dyslipidemia and Prevention of Atherosclerosis. *Endocr Pract*. 2012 Mar-Apr;18 Suppl 1:1-78.
14. Cantey EP, Wilkins JT. Discordance between lipoprotein particle number and cholesterol content: an update. *Curr Opin Endocrinol Diabetes* Obes. 2018 Apr;25(2):130-136.
15. Wilson DP, Jacobson TA, Jones PH, et al. Use of Lipoprotein(a) in clinical practice: A biomarker whose time has come. A scientific statement from the National Lipid Association. *J Clin Lipidol*. 2019 May-Jun;13(3):374-392.
16. Pfützner A, Efstrathios K, Löbig M, Armbruster FP, Hanefeld M, Forst T. Differences in the results and interpretation of oxidized LDL cholesterol by two ELISA assays--an evaluation with samples from the PIOstat study. *Clin Lab*. 2009;55(7-8):275-281.
17. Otvos JD, Shalaurova I, Wolak-Dinsmore J, et al. GlycA: A Composite Nuclear Magnetic Resonance Biomarker of Systemic Inflammation. *Clin Chem*. 2015 May;61(5):714-723.
18. Ballout RA, Remaley AT. GlycA: A New Biomarker for Systemic Inflammation and Cardiovascular Disease (CVD) Risk Assessment. *J Lab Precis Med*. 2020 Apr;5:17.
19. Mehta NN, Dey AK, Maddineni R, Kraus WE, Huffman KM. GlycA measured by NMR spectroscopy is associated with disease activity and cardiovascular disease risk in chronic inflammatory diseases. *Am J Prev Cardiol*. 2020 Nov 7;4:100120.
20. Malinow MR, Bostom AG, Krauss RM. Homocyst(e)ine, diet, and cardiovascular diseases: a statement for healthcare professionals from the Nutrition Committee, American Heart Association. *Circulation*. 1999 Jan;99(1):178-182.
21. Clarke R, Stansbie D. Assessment of homocysteine as a cardiovascular risk factor in clinical practice. *Ann Clin Biochem*. 2001 Nov;38(Pt 6):624-632.
22. Herrmann W. The importance of hyperhomocysteinemia as a risk factor for diseases: an overview. *Clin Chem Lab Med*. 2001 Aug;39(8):666-674.
23. Pokharel Y, Sun W, Polfus LM, et al. Lipoprotein associated phospholipase A2 activity, apolipoprotein C3 loss-of-function variants and cardiovascular disease: The Atherosclerosis Risk In Communities Study. *Atherosclerosis*. 2015 Aug;241(2):641-648.
24. Garcia E, Wolak-Dinsmore J, Wang Z, et al. NMR quantification of trimethylamine-N-oxide in human serum and plasma in the clinical laboratory setting. *Clin Biochem*. 2017 Nov;50(16-17):947-955.
25. Wang Z, Klipfell E, Bennett BJ, et al. Gut Flora Metabolism of Phosphatidylcholine Promotes Cardiovascular Disease. *Nature*. 2011 Apr 7;472(7341):57-63.
26. Koeth RA, Wang Z, Levison BS, et al. Intestinal Microbiota Metabolism of L-Carnitine, a Nutrient in Red Meat, Promotes Atherosclerosis. *Nat Med*. 2013 May;19(5):576-585.
27. Tang WHW, Wang Z, Levison BS, et al. Intestinal Microbial Metabolism of Phosphatidylcholine and Cardiovascular Risk. *N Engl J Med*. 2013 Apr;368(17):1575-1584.
28. Zhu W, Gregory JC, Org E, et al. Gut Microbial Metabolite TMAO Enhances Platelet Hyperreactivity and Thrombosis Risk. *Cell*. 2016 Mar 24;165(1):111-124.
29. Senthong V, Li XS, Hudec T, et al. Plasma Trimethylamine N-Oxide, a Gut Microbe-Generated Phosphatidylcholine Metabolite, Is Associated With Atherosclerotic Burden. *J Am Coll Cardiol*. 2016 Jun 7;67(22):2620-2628.
30. Johns Hopkins Medicine. Diabetes and Heart Disease. Johns Hopkins Medicine website: https://www.hopkinsmedicine.org/health/conditions-and-diseases/diabetes/diabetes-and-heart-disease. Accessed February 2023.
31. Deedwania P. Hypertension, dyslipidemia, and insulin resistance in patients with diabetes mellitus or the cardiometabolic syndrome: benefits of vasodilating β-blockers. *J Clin Hypertens (Greenwich).* 2011 Jan;13(1):52-59.
32. Introduction: Standards of Medical Care in Diabetes—2019. *Diabetes Care*. 2019 Jan;42(Suppl 1):S1-S2.
33. Choy E, Ganeshalingam K, Semb AG, Szekanecz Z, Nurmohamed M. Cardiovascular risk in rheumatoid arthritis: recent advances in the understanding of the pivotal role of inflammation, risk predictors and the impact of treatment. *Rheumatology (Oxford).* 2014 Dec;53(12):2143-2154.
34. Myasoedova E, Crowson CS, Kremers HM, et al. Lipid paradox in rheumatoid arthritis: the impact of serum lipid measures and systemic inflammation on the risk of cardiovascular disease. *Ann Rheum Dis*. 2011 Mar;70(3):482-487.
35. Bag-Ozbek A, Giles JT. Inflammation, adiposity, and atherogenic dyslipidemia in rheumatoid arthritis: is there a paradoxical relationship? *Curr Allergy Asthma Rep*. 2015 Feb;15(2):497.
36. Mackey RH, Mora S, Bertoni AG, et al. Lipoprotein particles and incident type 2 diabetes in the multi-ethnic study of atherosclerosis. *Diabetes Care*. 2015 Apr;38(4):628-636.
37. Dugani SB, Akinkuolie AO, Paynter N, Glynn RJ, Ridker PM, Mora S. Association of Lipoproteins, Insulin Resistance, and Rosuvastatin With Incident Type 2 Diabetes Mellitus : Secondary Analysis of a Randomized Clinical Trial. *JAMA Cardiol*. 2016 May 1;1(2):136-145.
38. Ackermann RT. From Programs to Policy and Back Again: The Push and Pull of Realizing Type 2 Diabetes Prevention on a National Scale. *Diabetes Care*. 2017 Oct;40(10):1298-1301.
39. Flores-Guerrero JL, Gruppen EG, Connelly MA, et al. A Newly Developed Diabetes Risk Index, Based on Lipoprotein Subfractions and Branched Chain Amino Acids, is Associated with Incident Type 2 Diabetes Mellitus in the PREVEND Cohort. *J Clin Med*. 2020 Aug 27;9(9):2781.
40. Shalaurova I, Connelly MA, Garvey WT, Otvos JD. Lipoprotein insulin resistance index: a lipoprotein particle-derived measure of insulin resistance. *Metab Syndr Relat Disord*. 2014 Oct;12(8):422-429.
41. Harada PHN, Demler OV, Dugani SB, et al. Lipoprotein insulin resistance score and risk of incident diabetes during extended follow-up of 20 years: The Women's Health Study. *J Clin Lipidol*. 2017 Sep-Oct;11(5):1257-1267.e2.
42. Flores-Guerrero JL, Connelly MA, Shalaurova I, et al. Lipoprotein insulin resistance index, a high-throughput measure of insulin resistance, is associated with incident type II diabetes mellitus in the Prevention of Renal and Vascular End-Stage Disease study. *J Clin Lipidol*. 2019 Jan-Feb;13(1):129-137.e1.
43. Wolak-Dinsmore J, Gruppen EG, Shalaurova I, et al. A Novel NMR-Based Assay to Measure Circulating Concentrations of Branched-Chain Amino Acids: Elevation in Subjects with Type 2 Diabetes Mellitus and Association with Carotid Intima Media Thickness. *Clin Biochem*. 2018 Apr;54:92-99.
44. Flores-Guerrero JL, Osté MCJ, Kieneker LM, et al. Plasma Branched-Chain Amino Acids and Risk of Incident Type 2 Diabetes: Results from the PREVEND Prospective Cohort Study. *J Clin Med*. 2018 Dec 4;7(12):513.
45. Tobias DK, Mora S, Verma S, Lawler PR. Altered branched chain amino acid metabolism: toward a unifying cardiometabolic hypothesis. *Curr Opin Cardiol*. 2018 Sep;33(5):558-564.
46. Shephard R, Semsarian C. Advances in the prevention of sudden cardiac death in the young. *Ther Adv Cardiovasc Dis*. 2009 Apr;3(2):145-155.

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