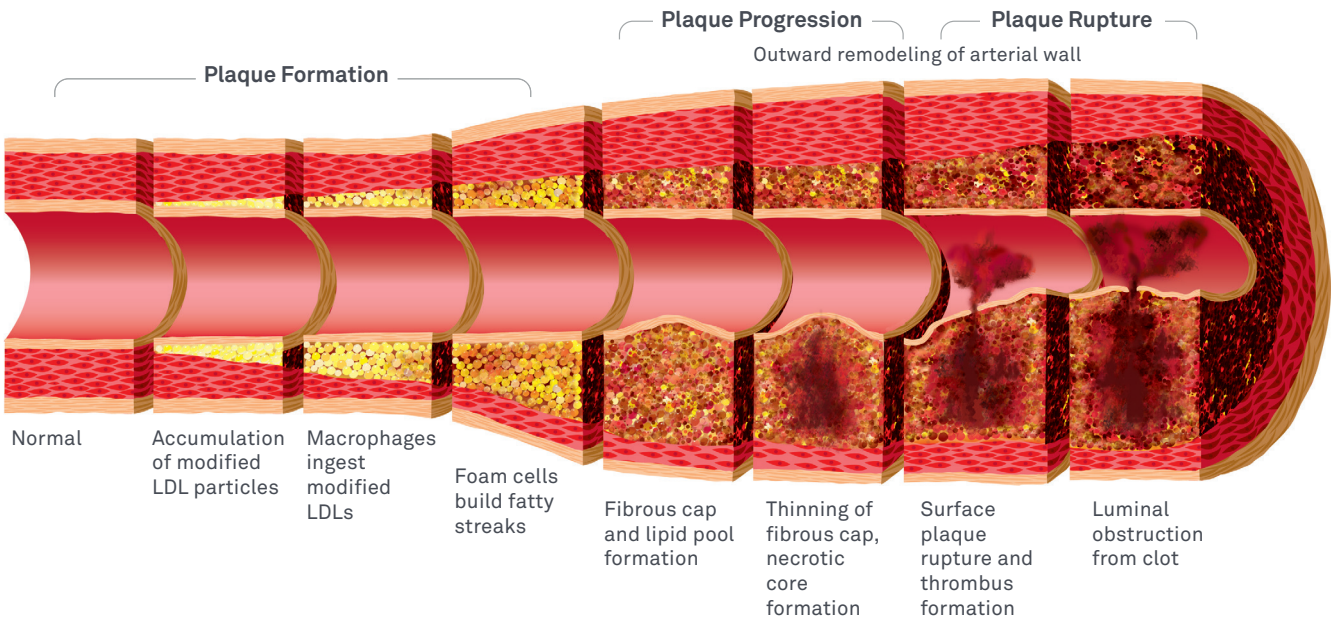
Quest Diagnostics™

Cardio IQ®

Managing Residual Risk with Advanced Cardiovascular Insights



The Cardio IQ® Report — Key Attributes

Test results are shown in "Optimal," "Moderate," or "High" risk categories and are **color-coded to display progressive risk** values.

Historic results of previous tests are provided with the Cardio IQ report to help monitor patient progress.

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Patient Information			Specimen Information	Client Information
Age: 63	Fasting: Y	Gender: M	Collected 07/23/2016	

Test Name	Units	Result and Risk Category			Result from	Risk Category Ranges		
		Optimal	Moderate	High		Optimal	Moderate	High
Lipid Panel								Lab: EZ
CHOLESTEROL, TOTAL	mg/dL	166				<200	200-239	>=240
HDL CHOLESTEROL	mg/dL	61				>=40	N/A	<40
TRIGLYCERIDES	mg/dL	81				<150	150-199	>=200
LDL-CHOLESTEROL	mg/dL	89				<100	100-129	>129
CHOL/HDLC RATIO	calc	2.7				<=3.5	3.6-5.0	>5.0
NON-HDL CHOLESTEROL	mg/dL	105				<130	130-159	>159
Lipoprotein Subfractions								Lab: EZ
LDL PARTICLE NUMBER	nmol/L		1503			<1260	1260-1538	>1538
LDL SMALL	nmol/L			236		<162	162-217	>217
LDL MEDIUM	nmol/L			273		<201	201-271	>271
HDL LARGE	nmol/L	9454				>9386	6996-9386	<6996
Apolipoproteins								Lab: EZ
APOLIPOPROTEIN A1	mg/dL			78		>=115	N/A	<115
APOLIPOPROTEIN B	mg/dL		80			<80	80-119	>=120
APOLIPOPROTEIN B/A1 RATIO				1.04		<0.77	0.77-0.95	>0.95
LIPOPROTEIN (a)	nmol/L		77			<75	75-125	>125
Inflammation								Lab: EZ
HS CRP	mg/L			4.5		<1.0	1.0-3.0	>3.0
LP PLA2	nmol/min/mL	120				<=123	N/A	>123
MYELOPEROXIDASE (MPO)	pmol/L			550		<470	470-539	>=540
FIBRINOGEN ANTIGEN	mg/dL			370		<350	N/A	>=350
Heart Failure								Lab: EZ
PROBNP, N TERMINAL	pg/mL	245				<253	N/A	>=253
ST2, SOLUBLE	ng/mL	30				<=35	N/A	>35

Note: This report example represents the entire portfolio of Quest Diagnostics Cardio IQ tests, and is not meant to represent a specific patient.

This report format is not available for patients under the age of 20 years.

Reference ranges are customized by gender and age for each patient when possible, based on data from published literature. Reference Range/Comments reported separately at the end of the report.

The Cardio IQ® Report — Key Attributes

(Continued)

Quest Diagnostics®

Patient Information			Specimen Information	Client Information
Age: 63	Fasting: Y	Gender: M	Collected 07/23/2016	

Test Name	Units	Result and Risk Category			Result from	Risk Category Ranges		
		Optimal	Moderate	High		Optimal	Moderate	High
Metabolic Markers								Lab: EZ
HOMOCYSTEINE, CARDIOVASCULAR	umol/L			12.9		<11.4	N/A	>=11.4
HEMOGLOBIN A1c	% of total Hgb		5.8			<=5.6	5.7-6.4	>=6.5
VITAMIN D, 25-OH, TOTAL	ng/mL	86				>=30	20-29	<20
INSULIN	ulU/mL	10.0				<23	N/A	>=23
GLUCOSE	mg/dL		110			65-99	100-125	>=126
Omega 3 & 6 Fatty Acids, Plasma								Lab: EZ
OMEGA 3 (EPA+DHA) INDEX	%	4.5				>3.2	2.2-3.2	<2.2

For details on reference ranges please refer to the reference range/comment section of the report.

Test Name	Result	Comments (See Guidance Statements)
Genetic Cardiovascular Markers		Lab: EZ
LPA ASPIRIN GENOTYPE	Ile/Met	Heterozygous carrier: associated with elevated Lp(a) levels and CVD risk and aspirin response in some clinical studies.
KIF6 GENOTYPE	Trp/Arg	Heterozygous carrier: associated with increased CHD risk and greater CHD event reduction with atorvastatin and pravastatin therapy in certain clinical studies.
9p21 GENOTYPE		Homozygous carrier (rs10757278 and rs133049). Increased 9p21 associated CVD risk.
rs10757278	gg	
rs1333049	cc	
APO E GENOTYPE	3/3	Apo E3 Carrier. Most common (normal) genotype.
LPA INTRON 25 GENOTYPE	tt	Homozygous noncarrier.
CYP2C19 GENOTYPE	*2	Intermediate Metabolizer.
4q25 AF RISK GENOTYPE		Noncarrier: No increased 4q25 associated risk of atrial fibrillation or cardioembolic stroke.
rs2200733	cc	
rs10033464	gg	

4myheart Diet & Exercise Coaching Program: Need help achieving and maintaining an optimal weight? Managing stress? Trying to improve physical fitness levels? The 4myheart program provides support and personalized lifestyle guidance to help improve heart health. Please talk to your provider, visit 4myheart.com or call 1.800.432.7889 option 2 to learn more.

Medical Information for Healthcare Providers: If you have any questions about any of the tests in our Cardio IQ offering, please call 1.800.432.7889 option 3 to speak to a clinical liaison. For frequently asked questions, you can also visit us at Education.QuestDiagnostics.com/FAQ/FAQ134

Risk ranges indicate **three levels of risk** based on data from published literature.

Advanced cardiovascular tests are organized into **functional categories** for ease of interpretation:

- Lipid Panel
- Lipoprotein Subfractionation
- Apolipoproteins
- Inflammation
- Heart Failure
- Metabolic Markers
- Genetic Cardiovascular Markers

The Cardio IQ® Report — Ion Mobility Detail

Lipid subclass distributions with related results are displayed graphically for ease of patient education

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Patient Information			Specimen Information	Client Information
Age: 63	Fasting: Y	Gender: M	Collected 07/23/2016	

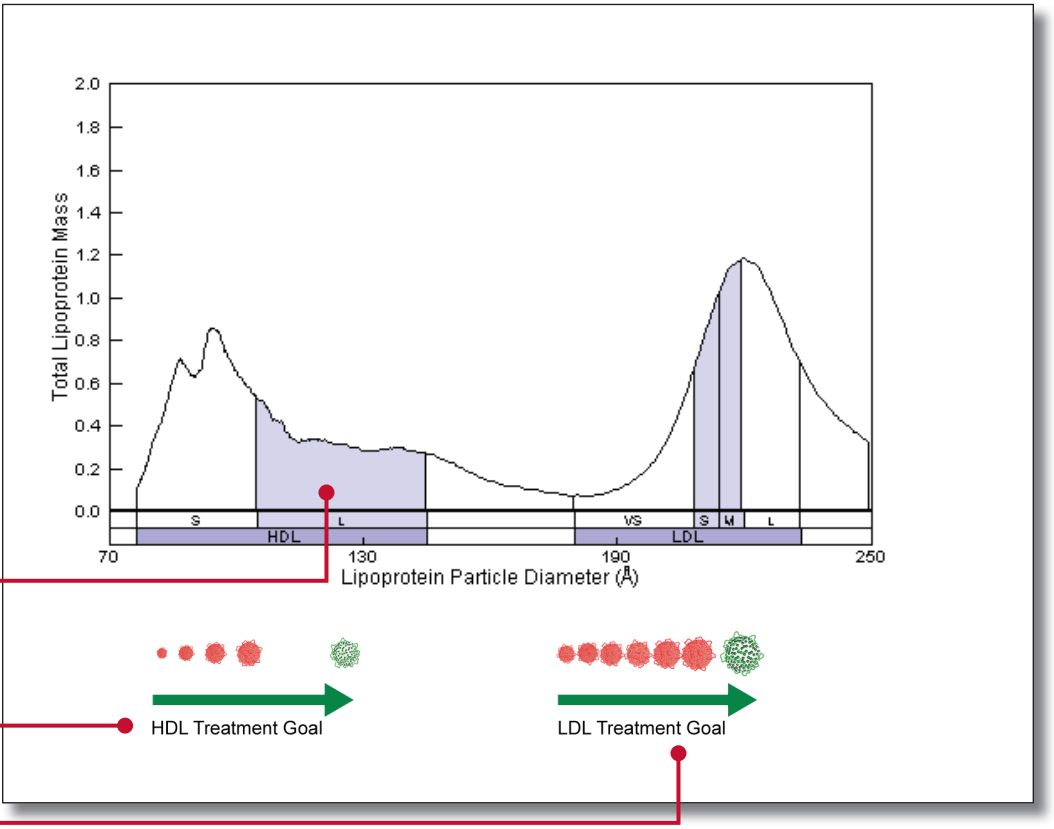
The **y-axis** of the graph shows total lipoprotein mass.

The **x-axis** of the graph shows HDL and LDL diameter in Angstroms (Å).

Shaded areas show key clinical management metrics. The height and width of the area under the curve indicate the amount of lipoprotein particles contained within each subclass.

HDL (High-Density Lipids)
The largest of the HDL particles is a surrogate marker for a functional cardioprotective reverse cholesterol transport mechanism. The goal of treatment for CVD risk reduction is to move from a predominance of small HDL particles to large HDL particles.

LDL (Low-Density Lipids)
The smaller subclasses of the LDL particles are associated with increased inflammatory potential, CVD risk, and rate of atherogenic progression. The goal of treatment for CVD risk reduction is to move from smaller to larger LDL particles.



Test Name	Units	Result with Risk Category			Result from	Risk Category Ranges		
		Optimal	Moderate	High		Optimal	Moderate	High
Lipoprotein Subfractions								**Lab: EZ**
LDL PATTERN	Pattern	A				A	N/A	B
LDL PEAK SIZE	Angstrom		220.1			>222.5	218.2-222.5	<218.2

High tertile cut-points are based on a reference range population. Risk of CVD events is based on a reanalysis (unpublished) of the data presented in Musunuru et al. *ATVB* 2009;29:1975-80.

For further information about our Cardio IQ solution, please visit Education.QuestDiagnostics.com

The Cardio IQ® Report — Other Detail

Metrics and information needed for comprehensive personalized reporting of cardiovascular risk

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Patient Information			Specimen Information	Client Information
Age: 63	Fasting: Y	Gender: M	Collected 07/23/2016	

OTHER DETAIL

Test Name	Results	Results From	Reference Range/Comments
Metabolic Markers (continued)			**Lab: SLI**
VITAMIN D, 25-OH, D3	10		See below ng/mL Reference Range: Not established
VITAMIN D, 25-OH, D2	76		See below ng/mL Reference Range: Not established
Omega 3 & 6 Fatty Acids, Plasma (continued)			**Lab: EZ**
OMEGA 6/OMEGA 3 RATIO	12.0		5.7-21.3
EPA/ARACHIDONIC ACID RATIO	0.2		0.2 OR LESS
ARACHIDONIC ACID	8.5		5.2-12.9%
EPA	1.5		0.2-1.5%
DHA	3.0		1.2-3.9%

Any test component where clinical data do not support the Optimal, Moderate, or High cut points as provided on the Result with Risk Category page will be reported in the Other Detail section of the report.

Foods High in Omega-3*			
Fish	**Oils**	**Nuts and Seeds**	**Grains and Beans**
Salmon	Walnut	Walnuts	Soybeans
Mackerel	Soybean	Flax seeds	Tofu
Sardines	Flax	Pecans	
Swordfish	Canola		
Bluefish	Cod liver		
Crab	Olive		
Cod	Sardine		
Scallops			

*Adapted from http://medicine.tufts.edu/Education/Academic-Departments/Clinical-Departments/Public-Health-and-Community-Medicine/Nutrition-and-Infection-Unit/Research/Nutrition-and-Health-Topics/Omega-3-Fatty-Acids October 26, 2016

A diet rich in Omega-3 fatty acids is associated with a decreased risk of cardiovascular events, including sudden cardiac death (SCD). These common food items provide a ready source of Omega-3.

Personal Factors

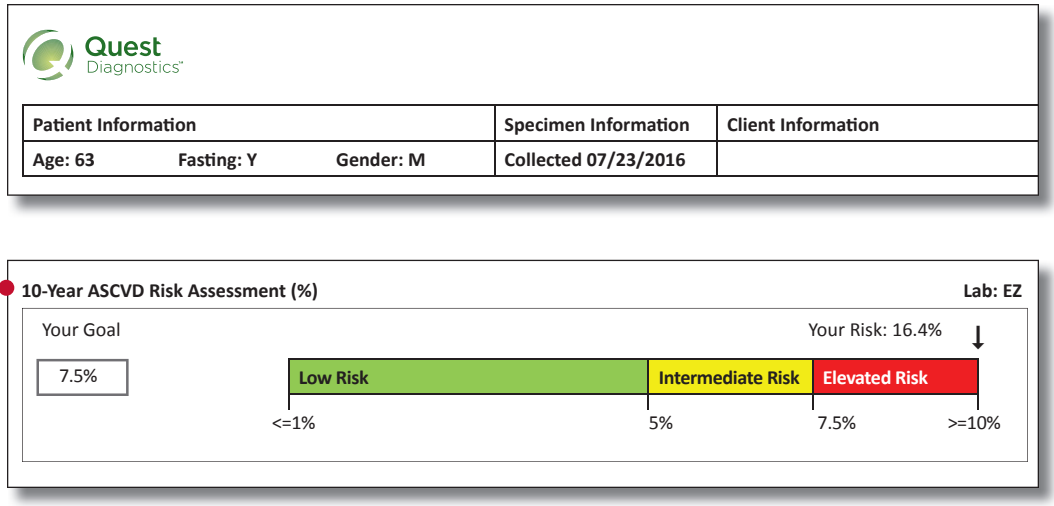
Component	Result	Component	Result
HEIGHT FEET	5 ft	**SYSTOLIC BLOOD PRESSURE**	140 mm Hg
HEIGHT INCHES	8 in	**DIASTOLIC BLOOD PRESSURE**	85 mm Hg
WEIGHT	155 lbs	**TREATMENT FOR HIGH B.P.**	YES
CALCULATED BMI	23.6	**DIABETES**	NO
AFRICAN AMERICAN	NO	**PARENTAL HISTORY OF DIAB**	NO
CURRENT SMOKER	YES		

Patient information supplied at the time of order entry used in the calculation of the Diabetes & ASCVD Risk Evaluation Scores.

The Cardio IQ® Report — ASCVD Risk Evaluation

An expanded offering for insight into ASCVD risk is now part of the Cardio IQ Report

The Lipid Panel/ASCVD Risk Panel Assessment provides the 10-year and lifetime risk and 10-year goal of atherosclerotic cardiovascular disease (ASCVD) using lipid results with anthropomorphic data and family history.*†



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10-Year ASCVD Risk Assessment (%) **Lab: EZ**

Your Goal: 7.5%

Your Risk: 16.4%

Low Risk	Intermediate Risk	Elevated Risk
<=1%	5%	7.5% >=10%

10-year ASCVD risk categories: > or =7.5% elevated risk; 5% to <7.5% intermediate risk; and <5% lower risk. Risk estimates for an ASCVD event (nonfatal MI, CHD death, or stroke) during the next 10 years are intended for patients currently free of clinical ASCVD; risk was estimated using the Pooled Cohort Equations: see guidelines for ethnic group-specific considerations. [Stone et al. *Circulation 2013*; Goff et al. *Circulation 2013*]

This patient-specific 10-year ASCVD risk goal is based on the patient's age, sex, ethnicity and optimal levels for other risk factors. This risk goal is calculated using the Pooled Cohort Equations. [Goff et al. *Circulation 2013*]

Lifetime ASCVD Risk Assessment (%) **Lab:EZ**

Your Risk

NOT CALC %

Not Calc: 10-year and/or lifetime risk/goal is not calculated because the required patient risk factors have not been provided (age, sex, race, systolic blood pressure, blood pressure medication use, diabetes, and smoker status) or because a patient value is not in the range accepted by the calculator: total cholesterol (130-320 mg/dL) HDL cholesterol (20-100 mg/dL), systolic blood pressure (90-200 mm HG), age (20-59 years, lifetime risk; 40-79 years, 10-year risk).

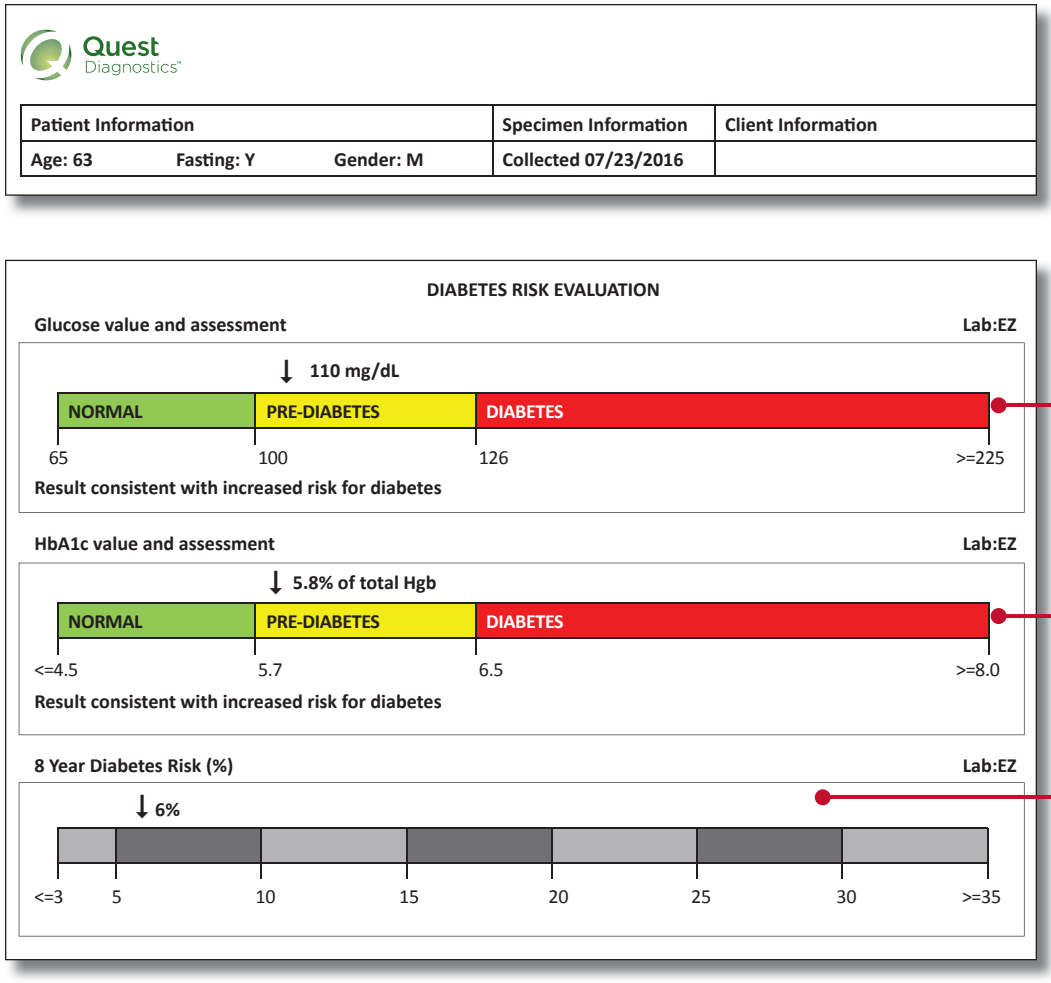
*The ASCVD risk assessment is recommended in the 2013 ACC/AHA Guidelines: Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults.[1]

†Risk calculations are provided at no additional cost and require the following personal factors at time of order entry: Age, Gender, Race, Systolic BP, Diastolic BP, Treatment for High Blood Pressure, Diabetes, Parental history of diabetes, Smoker.

Reference

1. Stone NJ, Robinson J, Lichtenstein AH, Bairey Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P, Schwartz JS, Shero ST, Smith SC Jr, Watson K, Wilson PWF. 2013 ACC/AHA guidelines 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. 2013. This article is co-published in the *Journal of the American College of Cardiology.*

The Cardio IQ® Report — Diabetic Risk Evaluation



The Metabolic Markers used in the Diabetes Risk Evaluation are visually presented to facilitate patient education.

The risk estimate is based upon the assessment of adults ages 30-79 in the Framingham study.[2] An estimate will not be provided if HbA1c and/or glucose indicate that the patient has diabetes. If fasting conditions were not met, use caution when interpreting the glucose test result and the risk estimate.[‡]

[‡]Risk calculations are provided at no additional cost and require the following personal factors at time of order entry: Age, Gender, Race, Systolic BP, Diastolic BP, Treatment for High Blood Pressure, Diabetes, Parental history of diabetes, Smoker.

Reference

2. Wilson PW, Meigs JB, Sullivan L, Fox CS, Nathan DM, D'Agostino RB Sr. Prediction of incident diabetes mellitus in middle-aged adults: The Framingham Offspring Study. *Arch Intern Med.* 2007; 167:1068-74.

The Cardio IQ® Solution

Offers a comprehensive approach to heart health

- **Assess Baseline Risk** by using advanced cardiovascular testing to help characterize a patient's individual cardiovascular disease risk.
- **Guide Personalized Therapy** by using a patient's unique makeup to help determine the therapy they need to achieve better heart health.
  - Initiate/intensify statin therapy
  - Identify opportunities for adjunct therapy
  - Set diet, exercise, and lifestyle targets
- **Monitor Response to Therapy** against a patient's testing history to hone their treatment plan.
- **Provide Ongoing Patient Support** through Clinical Educators that helps patients understand their test results and learn how they can adopt and adhere to their clinicians' treatment plans.
- **Offer the 4myheart® Program,** which is available at no additional cost for patients who have had testing performed. The Quest Diagnostics Clinical Educators work with patients to set goals, focus on lifestyle changes and develop treatment-adherence strategies to help reduce overall cardiovascular risk. For more information, visit 4myheart.com or call 1.800.432.7889.

For more information, contact your Quest Diagnostics sales representative or visit **QuestDiagnostics.com/TestCenter**

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