

MEDICAL POLICY



SUBJECT: CARDIOVASCULAR DISEASE RISK ASSESSMENT - LABORATORY EVALUATION OF LIPIDS POLICY NUMBER: 2.02.29 CATEGORY: Laboratory Test	EFFECTIVE DATE: 09/15/05 REVISED DATE: 07/20/06, 05/17/07, 07/17/08, 07/16/09, 10/28/10, 10/20/11, 10/18/12, 10/17/13 PAGE: 1 OF: 9
<ul style="list-style-type: none">• <i>If the member's subscriber contract excludes coverage for a specific service it is not covered under that contract. In such cases, medical policy criteria are not applied.</i>• <i>Medical policies apply to commercial and Medicaid products only when a contract benefit for the specific service exists.</i>• <i>Medical policies only apply to Medicare products when a contract benefit exists and where there are no National or Local Medicare coverage decisions for the specific service.</i>	

POLICY STATEMENT:

Based on our criteria and review of the peer-reviewed literature, use of the following laboratory tests in the assessment of cardiovascular disease risk have not been proven to improve health outcomes and are considered **investigational**:

- I. Apolipoprotein A-I;
- II. Apolipoprotein B;
- III. Apolipoprotein E;
- IV. High density lipoprotein subclasses;
- V. Intermediate density lipoprotein (remnant-like particles);
- VI. Low density small lipoprotein; and
- VII. Lipoprotein(a) enzyme immunoassay.

Refer to Corporate Medical Policy # 2.02.15 regarding Inflammatory Markers of Coronary Artery Disease Risk.

Refer to Corporate Medical Policy # 11.01.03 regarding Experimental or Investigational Services.

POLICY GUIDELINES:

- I. This policy applies only to routine coronary artery disease risk assessment and does not apply to the evaluation of possible familial lipid disorders or other dyslipidemias.
- II. The Federal Employees Health Benefit Program (FEHBP/FEP) requires that procedures, devices or laboratory tests approved by the U.S. Food and Drug Administration (FDA) may not be considered investigational and thus these procedures, devices or laboratory tests may be assessed only on the basis of their medical necessity.

DESCRIPTION:

Cardiovascular disease (CVD), defined as coronary artery disease (CAD), cerebrovascular disease, and peripheral arterial disease is the major cause of morbidity and mortality in the Western world. Most patients with CVD have at least one major risk factor, however the same can be said for most middle-aged and elderly people without CVD. Therefore, risk factors cannot account for all incident cardiovascular events. Although low-density lipoproteins (LDL) and high-density lipoproteins (HDL) are considered the major lipid risk factors for CVD, they do not completely predict risk of disease. Only a minority of subjects with elevated LDL and cholesterol levels will develop clinical disease, and up to 50% of cases of coronary artery disease occur in subjects with normal levels of total and LDL cholesterol. There is interest in determining whether lipid subclasses, including concentration and size of LDL and HDL particles, may further stratify risk for CVD above traditional risk factor measurement.

Apolipoprotein A-1 (apo A-1) is a lipid-binding protein that forms complexes with other proteins and lipids to form HDL particles. It is the major protein component of HDL and is usually reduced when the HDL level is low. Low levels of apo A-1 may be associated with an increased risk for cardiovascular disease. Direct measurement of apo A-I has been proposed as more accurate than the traditional use of HDL level in evaluation of the cardioprotective, or 'good', cholesterol. In addition, the ratio of apo B/apo A-I has been proposed as a superior measure of the ratio of pro-atherogenic (e.g., "bad") cholesterol to anti-atherogenic (e.g., "good") cholesterol. Some, but not all, epidemiologic studies have reported that the apo B/apo A-I ratio is superior to other ratios, such as TC/HDL-C, or non-HDL chol/HDL-C.

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Apolipoprotein B (apo B) is the major protein of all lipoproteins *except* for high-density lipoprotein (HDL). The most abundant form of apo B, large B or B-100, constitutes the apo B found in low-density and very low-density lipoproteins. It has been proposed that apo B is a better marker of cardiovascular risk than total LDL. Some experts feel using apo B as a measure of the number of atherogenic particles may be useful to monitor statin and niacin therapy.

Apolipoprotein E (apo E) is the primary apolipoprotein found in very low-density lipoproteins. It is the primary binding protein for LDL receptors in the liver and is thought to play an important role in lipid metabolism. The genotype of apo E can be assessed by gene amplification techniques. The apo E phenotype can be assessed by measuring plasma levels of apo E. It has been proposed that various genotypes are more atherogenic than others, and that apo E measurement may provide information on risk of coronary artery disease above traditional risk factor measurement. It has also been proposed that the apo E genotype may be useful in selection of specific components of lipid-lowering therapy, such as drug selection. Some experts feel that measurement of apo E may be useful in patients with elevated triglycerides and elevated total cholesterol, especially in the presence of palmar crease or tuberous xanthomas. Apolipoprotein E isoforms have also been investigated as a risk factor for Alzheimer's disease.

High Density Lipoprotein (HDL) subclass (lipoprotein AI (LpAI) and lipoprotein AI/AII (LpAI/AII) and/or HDL3 and HDL2) may have a protective role against cardiovascular disease. A large body of epidemiologic literature has demonstrated an inverse relationship between HDL levels and cardiovascular risk. It has been proposed that various subclasses of HDL may have a greater role in protection from atherosclerosis. Particles can be characterized based on size/density, and/or on the lipoprotein composition. Using size/density, HDL can be classified into HDL2, the larger less dense particles that may have the greatest degree of cardioprotection, and HDL3, the smaller more dense particles. HDL contains two associated lipoproteins, LpA-I and A-II. HDL particles can also be classified on whether they contain apolipoprotein A-1 (apo A-1). There has been substantial interest in determining whether subclasses of HDL can be used to provide additional information on cardiovascular risk compared to HDL alone. More recently, measurement of apo A-I has become the preferred surrogate method for HDL subclass type.

Intermediate Density Lipoprotein (remnant-like particles). Triglyceride-rich proteins (TRL) consist of a great variety of lipoproteins differing in size, density, and apolipoprotein content. Based on their size and ability to enter the arterial wall, certain TRLs are considered atherogenic while others are not. Remnant lipoproteins, which are considered atherogenic, consist of low-density lipoproteins that are reduced in size, partially depleted of triglycerides, and enriched with cholesteryl esters. Remnant lipoproteins are also referred to as intermediate density lipoproteins based on how they separate on ultracentrifugation. Measurement of intermediate density lipoproteins has been investigated as a tool for risk assessment for coronary heart disease and as a technique to diagnose type III hyperlipoproteinemia.

Low Density (Small) Lipoprotein (LDL) particle size has been hypothesized to be a risk factor for coronary heart disease. The National Cholesterol Education Program (NCEP) has designated total LDL as the primary target of therapy in the Adult Treatment Panel (ATP III) recommendations. However, LDL particles are not uniform in size or density, and particle size/density has been proposed as a technique to further stratify patient risk beyond total LDL. LDL size has also been proposed as a potentially useful measure of treatment response. Lipid-lowering treatment decreases total LDL and may also induce a shift in the type of LDL, from small, dense particles to larger particles. It has been proposed that this shift in lipid profile may be beneficial in reducing risk for coronary artery disease (CAD) independent of the total LDL level.

There are two main subclass patterns of LDL. Subclass pattern A particles have a diameter larger than 25 nm and are less dense. Subclass pattern B particles have a diameter less than 25 nm and a higher density. Subclass pattern B is a commonly inherited disorder associated with a more atherogenic lipoprotein profile.

Lipoprotein(a) Enzyme Immunoassay (Lp[a]) is a low-density, lipoprotein-like, lipid-rich particle similar to LDL. Apolipoprotein B is the major apolipoprotein associated with LDL; in Lp(a), however, there is an additional apolipoprotein A linked to apolipoprotein B. The apolipoprotein (a) molecule is structurally similar to plasminogen, suggesting that Lp(a) may contribute to the thrombotic and atherogenic basis of cardiovascular disease. The similarity between apolipoprotein (a) and fibrinogen has stimulated interest in Lp(a) as a link between atherosclerosis and thrombosis. Approximately 20% of patients with coronary artery disease (CAD) have elevated levels of Lp(a).

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Therefore, it has been proposed the levels of Lp(a) may be an independent risk factor for CAD. Some experts feel Lp(a) may be useful as a determinant of CHD onset in familial hypercholesterolemia patients, in patients with early CHD and no risk factors, and in those with a significant family history.

RATIONALE:

Improved ability to predict risk and/or treatment response does not by itself result in better health outcomes. To improve health outcomes, clinicians must have the tools to incorporate emerging risk factors into existing risk prediction models that have been demonstrated to classify patients into risk categories with greater accuracy. Such tools are currently not available. Predictive models also need to be accompanied by treatment guidelines that target intervention toward patients who will get the most benefit. The Adult Treatment Panel (ATP III) practice guidelines from the report of the National Cholesterol Education Program continues to tie clinical decision making to conventional lipid measures, such as total cholesterol, LDL cholesterol (LDL-C) and HDL cholesterol (HDL-C).

Apolipoprotein A-I. Literature continues to focus on the utility of apo A-I and the apo B/apo A-I ratio as additional predictors of cardiovascular risk, and on the relationship of these apolipoprotein measures to traditional lipid risk factors. Clinical evidence indicates inconsistent findings regarding the predictive value of apo A-I for future cardiovascular events. The Air Force/Texas Atherosclerosis Prevention Study (AFCAPS/TexCAPS) found that apo A-1 at baseline and at one year was predictive of future cardiovascular events. The Physicians Health Survey found apo A-1 had little or no predictive value after adjustment for other risk factors. In the Atherosclerosis Risk in Communities (ARIC) study, apo A-1 was also found to have little or no predictive value in assessing patients at risk for cardiovascular disease.

Apolipoprotein B. Some experts continue to argue that apo B is superior to LDL cholesterol, and that the apo B/apo A-I ratio is superior to the LDL/HDL ratio, as predictors of cardiovascular risk, and that these apolipoprotein measures should supplement or replace traditional lipid measures. Furthermore, a publication from a recent consensus conference from the American Diabetes Association and the American College of Cardiology Foundation included specific recommendations for incorporating apo B testing into clinical care for high-risk patients. This expert panel stated, "ApoB and LDL particle number also appear to be more discriminating measures of the adequacy of LDL lowering therapy than are LDL cholesterol or non-HDL cholesterol." They therefore recommend that for patients with metabolic syndrome who are being treated with statins, both LDL cholesterol and apo B should be used as treatment targets, with an apo B target of less than 90mg/dl. Treatment should be intensified for patients with apoB above this level even if target LDL has been achieved. The current evidence does in general support the contention that apo B and apo B/apo A-I are as good as or better than currently used lipid measures as predictors of cardiovascular risk. Also, tools for assisting clinicians in applying apo B measurements to clinical care are being developed. However, it is not yet possible to conclude that the use of apo B levels will improve outcomes when used in routine clinical care. First, the evidence suggests that any incremental improvement in predictive ability over traditional measures is likely to be small and of uncertain clinical significance. Second, none of the major lipid treatment guidelines, such as The Adult Treatment Panel III (ATP III) of the National Cholesterol Education Program (NCEP), have yet to formally incorporate the measurement of apolipoproteins into their recommendations. This creates difficulties in interpreting and applying the results of apo B and/or apo B/apo A-I measurements to routine clinical care. As a result, it does not appear likely that in the near future, apolipoprotein measures will replace traditional lipid measurements for cardiovascular risk prediction in routine clinical care.

Apolipoprotein E genotype or phenotype. A large body of research has focused on the correlation between lipid levels and the underlying apolipoprotein E (apo E) genotype. Other studies have focused on the relationship between genotype and clinical disease. Clinical evidence suggests that apo E is not clinically useful in providing additional information on risk for CAD when compared with other established and emerging risk factors. None of the studies reviewed provide adequate data to suggest that apo E genotype improves outcomes when used in clinical care.

High density lipoprotein subclass (HDL). Retrospective cross-sectional studies have suggested that the protective effect of HDL was associated primarily with the HDL-2 subclass. However, these studies could not determine whether decreased HDL-2 preceded the development of cardiovascular disease or was its result. A number of large, prospective studies designed to answer this question have reported mixed results. While a number of studies suggest the HDL

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subclassification provides independent information on risk assessment for CAD, this finding has not been reported consistently in all studies. HDL subclassification has not been incorporate into quantitative risk assessment models or treatment guidelines, such as the Adult Treatment Panel (ATP III) that can be used in clinical practice.

Intermediate density lipoprotein (remnant-like particles). An immunoseparation assay has received approval from the U.S. Food and Drug Administration (FDA) for the direct measurement of intermediate density lipoprotein. While measurement of intermediate-density lipoproteins (IDLs) has emerged as an important research tool in evaluating cardiac risk factors and understanding how different components of plasma triglycerides contribute to cardiac risk, it is unclear how the management of IDLs can be used in the management of the patient. The majority of publications focus on the pathophysiology and basic science aspects of IDL, with a smaller number of research studies reporting data with potential clinical relevance. There are no prospective, large-scale cohort studies that evaluated IDLs as a predictor of cardiovascular risk, nor are there any large diagnostic studies that evaluated the utility of IDLs in diagnosing type III hyperlipidemia. None of the available studies provide guidance on the clinical use of IDL measurements, nor does this evidence suggest that health outcomes are improved as a result of measuring IDL level.

Low density (small) lipoprotein particle size. Small LDL size is one component of an atherogenic lipid profile that also includes increased triglycerides, increased apolipoprotein B, and decreased HDL. Some studies have reported that LDL size is an independent risk factor for CAD, and others have reported that a shift in LDL size may be useful marker of treatment response. A relatively small number of published articles contain clinically relevant evidence on the utility of measuring the concentration of small, dense LDL (or LDL particle size). The available publications primarily focus either on the use of these measures as a predictor of cardiovascular risk, or the effect of pharmacologic treatment on small, dense LDL. Studies predicting cardiac risk were cross-sectional studies that evaluated the association of small, dense LDL with a variety of cardiovascular outcomes. There are no large, prospective cohort studies that evaluate the predictive ability of small, dense LDL for future cardiovascular events. The studies of treatment effect examined the impact of diet and/or pharmacologic agents on small, dense LDL and other LDL subclasses. These studies generally confirmed that small, dense LDL is impacted preferentially by fibrate treatment, and possibly also by statin therapy. However, none of the studies demonstrate that preferentially targeting small, dense LDL leads to improved outcomes, as compared to using the standard LDL targets that are widespread in clinical care. These newly published studies do not provide evidence that measurement of small, dense LDL leads to improved clinical outcomes. Tools for linking concentration of LDL particles to clinical decision making, both in risk assessment and treatment response, are currently not available.

Lipoprotein(a) enzyme immunoassay [Lp(a)]. Numerous studies evaluate Lp(a) as a cardiovascular risk factor. A large number of retrospective studies suggest that elevated levels of Lp(a) are associated with CVD. However they could not determine whether the elevation of Lp(a) preceded the development of CVD or was a result of CVD. Prospective studies have produced mixed results. A meta-analysis (Smolders B, et al. 2007) summarized evidence from observational studies of the relationship between Lp(a) and stroke. There were 5 prospective cohort studies and 23 case-control studies included in this analysis. From prospective cohort studies, Lp(a) added a modest amount of incremental predictive information (combined RR for the highest one-third of Lp(a) 1.22, 95% CI: 1.04-1.43). From case-control studies, an elevated Lp(a) level was also associated with an increased risk of stroke (combined OR 2.39, 95% CI: 1.57-3.63). The authors concluded that this meta-analysis suggests that elevated Lp(a) is a risk factor for incident stroke. The authors noted however, that the use of formal meta-analytic methods to observational studies is controversial, because weaknesses implicit in the study design of case-control studies and cohort studies may bias the strength of associations within the data. Evaluation of Lp(a) as a risk factor is complicated by the lack of a standardized assay, different study methodologies, the variation of Lp(a) levels in different races and ethnic groups, and the complicated interplay of various lipid cardiovascular risks associated with other lipid parameters. The Adult Treatment Panel (ATP) III identified Lp(a) as an “emerging risk factor,” however improved risk prediction does not by itself result in better health outcomes. Tools for linking Lp(a) to clinical decision making, both in risk assessment and treatment response, are currently not available.

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CODES: Number Description

Eligibility for reimbursement is based upon the benefits set forth in the member's subscriber contract.

CODES MAY NOT BE COVERED UNDER ALL CIRCUMSTANCES. PLEASE READ THE POLICY AND GUIDELINES STATEMENTS CAREFULLY.

Codes may not be all inclusive as the AMA and CMS code updates may occur more frequently than policy updates.

Code Key: Experimental/Investigational = (E/I), Not medically necessary/ appropriate = (NMN).

CPT:	82172 (E/I)	Apolipoprotein, each
	83695 (E/I)	Lipoprotein (a)
	83700	Lipoprotein, blood; electrophoretic separation and quantitation
	83701	Lipoprotein, blood; high resolution fractionation and quantitation of lipoproteins including lipoprotein subclasses when performed (e.g. electrophoresis, ultracentrifugation)
	83704 (E/I)	Lipoprotein, blood: quantitation of lipoprotein particle numbers and lipoprotein particle subclasses (e.g. by nuclear magnetic resonance spectroscopy)

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HCPCS: No specific codes

ICD9:	272	Disorders of lipid metabolism (code range)
	410-414	Ischemic heart disease (code range)
	440	Atherosclerosis (code range)
	V12.5	Personal history of disease of the circulatory system
	V17.3-17.4	Family history of ischemic heart disease or other cardiovascular disease

ICD10:	E71.30	Disorder of fatty-acid metabolism, unspecified
	E75.21	Fabry (-Anderson) disease
	E75.22	Gaucher disease
	E75.240-E75.249	Niemann-Pick disease (code range)
	E75.3	Sphingolipidosis, unspecified
	E75.5-E75.6	Other lipid storage disorders (code range)
	E77.0-E77.9	Disorders of glycoprotein metabolism
	E78.0-E78.6	Disorders of lipoprotein metabolism and other lipidemias
	E78.70	Disorder of bile acid and cholesterol metabolism, unspecified
	E78.79	Other disorders of bile acid and cholesterol metabolism
	E78.81-E78.9	Other disorders of lipoprotein metabolism
	E88.1-E88.2	Other and unspecified metabolic disorders (code range)
	E88.89	Other specified metabolic disorders
	I20.0-I20.9	Angina pectoris (code range)

Proprietary Information of Excellus Health Plan, Inc.

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I21.01-I21.4	ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (code range)
I22.0-I22.8	Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (code range)
I22.9	Subsequent ST elevation (STEMI) myocardial infarction of unspecified site
I24.0	Acute coronary thrombosis not resulting in myocardial infarction
I24.1	Dressler's syndrome
I24.8	Other forms of acute ischemic heart disease
I24.9	Acute ischemic heart disease, unspecified
I25.10-I25.9	Chronic ischemic heart disease (code range)
I70.0-I70.92	Atherosclerosis (code range)
Z82.41	Family history of sudden cardiac death
Z82.49	Family history of ischemic heart disease and other diseases of the circulatory system
Z86.711	Personal history of pulmonary embolism
Z86.718	Personal history of other venous thrombosis and embolism
Z86.72	Personal history of thrombophlebitis
Z86.73	Personal history of transient ischemic attack (TIA), and cerebral infarction without residual deficits
Z86.74	Personal history of sudden cardiac arrest
Z86.79	Personal history of other diseases of the circulatory system

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* key article

KEY WORDS:

Apolipoprotein A-I, Apolipoprotein B, Apolipoprotein E, Lipoprotein(a) enzyme immunoassay.

SUBJECT: CARDIOVASCULAR DISEASE RISK ASSESSMENT - LABORATORY EVALUATION OF LIPIDS	EFFECTIVE DATE: 09/15/05
POLICY NUMBER: 2.02.29	REVISED DATE: 07/20/06, 05/17/07, 07/17/08, 07/16/09, 10/28/10, 10/20/11, 10/18/12, 10/17/13
CATEGORY: Laboratory Test	PAGE: 9 OF: 9

CMS COVERAGE FOR MEDICARE PRODUCT MEMBERS

There is currently a National Coverage Determination (NCD) for Lipid Testing. Please refer to the following NCD website for Medicare Members: <http://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?NCDId=102&ncdver=2&bc=AgAAgAAAAAA&>

CMS covers tests for cardiac risk factors (total cholesterol, cholesterol high density lipoproteins, triglycerides) but does not provide specific language regarding the lipid subclass tests addressed in this policy.

However, CPT code 83704 - Lipoprotein, blood: quantitation of lipoprotein particle numbers and lipoprotein particle subclasses (e.g. by nuclear magnetic resonance spectroscopy) is listed as a covered code.