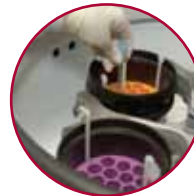


Atherotech's Medical Science Consultants are a valuable resource for clinicians working toward a better understanding of lipid particle fractionation and available tests related to CV risk reduction. For more information, please call **877-519-4807**.

Clinician Pocket Reference Guide



ATHEROTECH[®]

DIAGNOSTICS LAB

Atherotech's mission is to improve patient outcomes through comprehensive yet cost-effective testing solutions including the proprietary VAP[®] Test, friendly and dedicated service, and education for healthcare providers and patients.



VAP Test Accuracy

Lipoprotein	Total Cholesterol	HDL	LDL	VLDL	apoB
Correlation Coefficient (R)	0.989	0.989	0.988	0.976	0.960
% Bias	1.8	1.0	3.1	3.7	0.8

The accuracy of VAP measurements are verified by performing a split sample comparison with Core Laboratory for Clinical Studies, Washington University School of Medicine, St. Louis, MO, which is one of the few reference laboratories for lipoprotein analysis and uses beta quantification, a standard procedure for lipoprotein analysis based on centrifugation.

Who should get a VAP?

- Any patient with established atherosclerosis/vascular disease
- Any patient with diabetes mellitus
- Any patient with a Framingham risk score over 5%
- Any patient with an elevated inflammatory biomarker
- Any patient with NCEP/ATP III risk factors:
 - Cigarette smoking
 - Hypertension
 - Low HDL-C (< 40 mg/dL)
 - Family history of premature CHD
 - Age (men \geq 45 years; women \geq 55 years)

Total Low Density Lipoprotein (LDL)

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>LDL is the primary carrier of cholesterol.</p> <p>Total LDL components:</p> <p>LDL₄₊₃₊₂₊₁[*]: The amount of cholesterol carried by LDL particles.</p> <p>Lp(a): The amount of cholesterol carried by lipoprotein (a) particles.</p> <p>IDL: The amount of cholesterol carried by the intermediate density lipoproteins.</p>	<p>NCEP/ATP III guidelines recommend that LDL-C lowering be the primary goal of therapy.</p> <p>Elevated LDL is an independent risk factor for CAD.</p>	<p>NCEP/ATP III Goals:</p> <p>Low risk patients < 160 mg/dL</p> <p>Moderate risk patients < 130 mg/dL</p> <p>High risk patients < 100 mg/dL</p> <p>Optional NCEP Update 2004: Highest risk patients < 70 mg/dL</p>	<p>Lifestyle High saturated/trans-fat intake, caloric excess, physical inactivity</p> <p>Genetics</p> <p>Medical problems Hypothyroidism, obesity, pregnancy, liver diseases, anorexia nervosa, renal disorders, diabetes mellitus, cystic fibrosis</p> <p>Drugs Cyclosporine, thiazide diuretics, large doses of fish oil in some individuals, steroids, protease inhibitors</p>	<p>TLC* Increase stanols, sterols and high fiber foods</p> <p>Medications Statins, cholesterol absorption inhibitors, bile acid sequestrants, nicotinic acid, fibrates</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Lp(a) / IDL

Lipoprotein (a) (Lp(a))

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>Lp(a) is a mild acute phase reactant.</p> <p>An LDL-like particle with an apolipoprotein (a) linked to apoB by a single disulfide bridge.</p> <p>Strong similarity to plasminogen and may compete with plasminogen receptors by molecular mimicry.</p>	<p>High level of Lp(a) is an independent risk factor for coronary, cerebral and peripheral atherosclerosis.</p> <p>The mechanisms of Lp(a) pathogenicity are prothrombotic and proatherogenic.</p> <p>The Framingham study showed Lp(a)-C > 10mg/dL doubled CVD risk.</p>	< 10 mg/dL	<p>Primarily genetic determined</p> <p>Medical problems Renal disorders, hypothyroidism, uncontrolled diabetes mellitus, familial hypercholesterolemia, menopause</p>	<p>Manage medical problems NCEP/ATP III state that Lp(a) can count as an optional additional risk factor thereby warranting a lower LDL-C goal</p> <p>Medications Nicotinic acid</p>

Intermediate Density Lipoprotein (IDL)

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>IDL represents a lipoprotein transition between VLDL and LDL particles.</p>	<p>Data from a number of angiographic trials show IDL is significantly more atherogenic than LDL alone.</p> <p>Elevated IDL has been shown to be positively associated with progression of CAD.</p>	< 20 mg/dL	<p>Lifestyle High refined carbs</p> <p>Primarily genetically determined</p>	<p>TLC* Choose high fiber foods and omega-3 fatty acids, and limit refined carbs</p> <p>Medications Statins, nicotinic acid, fibrates</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

High Density Lipoprotein (HDL) & HDL Subclasses (HDL₂, HDL₃)

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
HDL is responsible for direct reverse cholesterol transport and serves as a potent antioxidant.	<p>HDL-C is the Framingham lipid risk factor identified in the NCEP/ATP III guidelines.</p> <p>Low HDL-C is one of the five criteria for metabolic syndrome.</p> <p>Low HDL-C levels are associated with increased CHD morbidity and mortality.</p> <p>High HDL-C levels convey reduced CVD risk.</p> <p>Low HDL₂ is a risk factor for CAD even in patients with normal cholesterol.</p>	<p>ATP III goal: HDL-C > 40 mg/dL (for men and women)</p> <p>Metabolic Syndrome criteria for HDL-C levels: Men: < 40 mg/dL Women: < 50 mg/dL</p> <p>HDL subclass goals: Men: HDL₂ > 10 mg/dL Women: HDL₂ > 15 mg/dL Men: HDL₃ > 30 mg/dL Women: HDL₃ > 25 mg/dL</p>	<p>Lifestyle Smoking, physical inactivity, high refined carbs and/or saturated/trans-fat intake, overweight or obese</p> <p>Genetics</p> <p>Medical problems Elevated serum triglycerides, insulin resistance, metabolic syndrome, diabetes mellitus</p> <p>Drugs Some beta-blockers, anabolic steroids, progestational agents</p>	<p>TLC* Smoking cessation, reduction of refined carbs, and choose healthy fats</p> <p>Manage medical problems</p> <p>Medications Nicotinic acid, fibrates, specific statins</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Total Very Low Density Lipoprotein (Total VLDL) & VLDL Subclasses (VLDL₁, VLDL₂, VLDL₃)

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>VLDL are triglyceride-rich lipoproteins.</p> <p>VLDL are produced by the liver and are precursors of LDL.</p> <p>Compared to VLDL_{1&2}, VLDL₃ consists of partially degraded VLDL and is enriched in cholesterol.</p>	<p>Elevated VLDL is a marker for elevated remnant lipoproteins.</p> <p>VLDL remnants (VLDL₃) promote atherosclerosis along with LDL.</p> <p>VLDL is part of nonHDL-C and is noted to independently predict vascular risk.</p>	<p>Total VLDL < 30 mg/dL</p> <p>VLDL_{1&2} (buoyant) < 20 mg/dL</p> <p>VLDL₃ (dense) < 10 mg/dL</p>	<p>Lifestyle High refined carbs and/or saturated/trans-fat intake, caloric excess, overweight or obese, physical inactivity, excess alcohol intake, smoking</p> <p>Genetics</p> <p>Medical problems Diabetes mellitus, insulin resistance, metabolic syndrome, hypothyroidism, chronic renal failure, nephrotic syndrome, Cushing's disease and pregnancy</p> <p>Drugs Some drugs raise triglycerides. Refer to PDR. Bile acid sequestrants – use with caution – tend to raise triglycerides</p>	<p>TLC* Reduction of refined carbs and alcohol, calorie control, increase omega-3 fatty acids and smoking cessation</p> <p>Manage medical problems</p> <p>Medications Fibrates, nicotinic acid, omega-3 fatty acids, specific statins</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Triglycerides (TGs) (Triacylglycerides)

Description	Why is it important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>Triglycerides are an ester composed of one glycerol bound to three fatty acids.</p> <p>Triglycerides are predominantly transported by chylomicrons, VLDL and IDL.</p>	<p>Elevated levels often reflect increased apoB, low HDL-C, small dense LDL, and elevated TG-rich remnants.</p> <p>Elevated TGs are one of the five criteria for metabolic syndrome.</p> <p>Elevated serum TGs are associated with increased risk for CHD.</p> <p>In non-fasting samples, TGs > 170 mg/dL increase risk for CVD event ~twofold.</p>	<p>Normal TGs: < 150 mg/dL</p> <p>Borderline TGs: 150–199 mg/dL</p> <p>High TGs: 200–499 mg/dL</p> <p>Very high TGs: ≥ 500 mg/dL</p>	<p>Lifestyle High refined carbs and/or saturated/trans-fat intake, caloric excess, overweight or obese, physical inactivity, excess alcohol intake, smoking</p> <p>Genetics</p> <p>Medical problems Diabetes mellitus, insulin resistance, metabolic syndrome, hypothyroidism, chronic renal failure, nephrotic syndrome, Cushing's disease and pregnancy</p> <p>Drugs Some drugs raise triglycerides. Refer to PDR. Bile acid sequestrants – use with caution – tend to raise triglycerides</p>	<p>TLC* Reduction of refined carbs and alcohol, calorie control, increase omega-3 fatty acids and smoking cessation</p> <p>Manage medical problems</p> <p>Medications Fibrates, nicotinic acid, omega-3 fatty acids, specific statins</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

NonHDL-C

Description	Why is it important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>NonHDL-C is the sum of cholesterol carried by all nonHDL particles (Lp(a) + LDL₄₊₃₊₂₊₁ + IDL + VLDL).</p>	<p>NCEP/ATP III recommends nonHDL-C as a secondary target of therapy in patients with triglycerides > 200 mg/dL.</p>	<p>NCEP/ATP III nonHDL-C goals are dependent upon LDL-C goal.</p> <p>NonHDL-C goal = LDL-C goal + 30 mg/dL</p>	<p>Lifestyle High refined carbs and/or saturated/trans-fat intake, caloric excess, overweight or obese, physical inactivity</p> <p>Genetics</p> <p>Medical problems Insulin resistance, diabetes mellitus, elevated triglyceride level, hypothyroidism, nephrotic syndrome, cystic fibrosis</p> <p>Drugs Retinoids, cyclosporine</p>	<p>TLC* Reduction of refined carbs, increase omega-3 fatty acids, sterols, stanols and high fiber foods</p> <p>Manage medical problems</p> <p>Medications Statins, cholesterol absorption inhibitors, nicotinic acid, bile acid sequestrants, fibrates, omega-3 fatty acids</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Remnant Lipoproteins (IDL+VLDL₃)

Description	Why is it important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
Remnant lipoproteins include small very low density lipoproteins (VLDL ₃) and intermediate density lipoproteins (IDL).	Genetic hyperlipidemias characterized by the accumulation of lipoprotein remnants commonly produce premature CHD and peripheral vascular disease. Studies have found that elevated remnants are strong predictors of coronary atherosclerosis or CHD.	Total Remnant Lipoproteins < 30 mg/dL IDL < 20 mg/dL VLDL ₃ < 10 mg/dL	Lifestyle High refined carbs and/or saturated/trans-fat intake, caloric excess, overweight or obese, physical inactivity, excess alcohol intake, smoking Genetics Medical problems Diabetes mellitus, insulin resistance, metabolic syndrome, hypothyroidism, chronic renal failure, nephrotic syndrome, Cushing's disease and pregnancy Drugs Some drugs raise triglycerides. Refer to PDR. Bile acid sequestrants – use with caution – tend to raise triglycerides	TLC* Reduction of refined carbs and alcohol, increase omega-3 fatty acids and smoking cessation Manage medical problems Medications Fibrates, nicotinic acid, omega-3 fatty acids, specific statins

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

LDL Pattern & Subclasses (LDL₄, LDL₃, LDL₂, LDL₁)

Description	Why is it important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
LDL pattern is a measurement of predominant LDL density. Pattern A is the more buoyant LDL type. Pattern A/B or B reflect more dense LDL types and exert a greater atherogenic potency.	Pattern B quadruples the risk of heart disease.	Pattern A is normal Pattern A/B or B is abnormal VAP provides four LDL subclasses: LDL ₄ Most dense LDL LDL ₃ Dense LDL LDL ₂ Buoyant LDL LDL ₁ Most buoyant LDL	Lifestyle High refined carbs and/or saturated/trans-fat intake, overweight or obese, physical inactivity, excess alcohol intake Genetics Medical problems Diabetes mellitus, insulin resistance, metabolic syndrome, hypothyroidism, high triglycerides Drugs Non-selective beta-blockers, thiazides, loop diuretics, insulin	TLC* Reduction refined carbs, saturated/trans fats and alcohol, increase omega-3 fatty acids Manage medical problems Medications Nicotinic acid, fibrates, omega-3 fatty acids, specific statins

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Apolipoprotein B (ApoB)

Description	Why is it important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>ApoB is the major apolipoprotein of nonHDL.</p> <p>ApoB reflects the total number of all atherogenic particles (VLDL, IDL, LDL and Lp(a)).</p>	Some studies have shown that ApoB is superior to LDL-C and nonHDL-C in identifying CV risk.	<p>ADA/ACC Joint Consensus Statement Guidelines for ApoB</p> <p>Goals:</p> <p>High risk patients: < 90 mg/dL</p> <p>Highest risk patients: < 80 mg/dL</p>	<p>Lifestyle</p> <p>High refined carbs and/or saturated/trans-fat intake, overweight or obese, physical inactivity</p> <p>Genetics</p> <p>Medical problems</p> <p>Insulin resistance, diabetes mellitus, elevated triglycerides levels, hypothyroidism, nephrotic syndrome, cystic fibrosis</p> <p>Drugs</p> <p>Retinoids, cyclosporine</p>	<p>TLC*</p> <p>Reduction of refined carbs, increase omega-3 fatty acids, sterols, stanols and high fiber foods, smoking cessation</p> <p>Manage medical problems</p> <p>Medications</p> <p>Statins, cholesterol absorption inhibitors, nicotinic acid, bile acid sequestrants, fibrates, omega-3 fatty acids</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Apolipoprotein A1 (ApoA1)

Description	Why is it important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>ApoA1 is the major apolipoprotein component of HDL.</p>	<p>Increased levels of ApoA1 have been associated with a reduction in CV disease.</p> <p>Low ApoA1 levels predict increased short- and long-term CVD risk especially among those with normal HDL-C levels.</p>	<p>Men: > 118 mg/dL</p> <p>Women: > 145 mg/dL</p>	<p>Lifestyle</p> <p>Smoking, physical inactivity, high refined carbs and/or saturated/trans-fat intake, overweight or obese</p> <p>Genetics</p> <p>Medical problems</p> <p>Elevated serum triglycerides, insulin resistance, metabolic syndrome, diabetes mellitus</p> <p>Drugs</p> <p>Some beta-blockers, anabolic steroids, progestational agents</p>	<p>TLC*</p> <p>Smoking cessation, limit refined carbs and choose healthy fats</p> <p>Manage medical problems</p> <p>Medications</p> <p>Nicotinic acid, fibrates, specific statins</p>

ApoB/ApoA1 Ratio

<p>This is a ratio of total circulating ApoB particles to ApoA1 particles.</p>	<p>Some studies have shown that elevated ApoB/ApoA1 ratio is a better predictor of CVD risk than traditional risk factors.</p>	<p>Men: < 0.92</p> <p>Women: < 0.75</p>	<p>See ApoB and/or ApoA1</p>	<p>See ApoB and/or ApoA1</p>
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*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

ATHEROTECH[®]

DIAGNOSTICS LAB



Additional Tests From Atherotech



Atherotech offers a variety of additional tests.


Cystatin C				
Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
Cystatin C is an enzyme mainly used as a biomarker of renal function.	<p>Cystatin C is a prognostic biomarker of CV events, CHF, CVA, PAD, metabolic syndrome and all cause mortality.</p> <p>Cystatin C is an independent risk marker for CVD events even in the absence of established renal disease.</p> <p>Unlike creatinine, Cystatin C is capable of detecting mild decreases in GFR and is affected only minimally by age, muscle mass, gender and race.</p>	0.5 – 1.03 mg/L	<p>Medical problems Hypertension, nephropathy, renal insufficiency or failure</p> <p>Drugs Medications that effect renal function</p>	Manage medical problems



Gamma-Glutamyl Transferase (GGT)				
Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
GGT is an enzyme catalyst in the degradation of glutathione, the major thiol antioxidant in the body.	<p>It is a sensitive proatherogenic, prognostic biomarker for oxidative stress and subclinical atherosclerosis and an independent predictor for metabolic syndrome.</p> <p>Elevated levels are associated with HTN, insulin resistance, diabetes mellitus, obesity and fatty liver and increase in all cause mortality and morbidity.</p>	<p>Men: 12 – 64 U/L</p> <p>Women: 9 – 36 U/L</p>	<p>Lifestyle Extra body fat, excess alcohol</p> <p>Medical problems Liver diseases, oxidative stress, atherosclerosis</p> <p>Drugs Any drug that may cause liver inflammation</p>	<p>TLC* Limit alcohol intake</p> <p>Manage medical problems</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

1,5-anhydro-D-glucitol, 1,5- AG, GlycoMark

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
Nonmetabolized monosaccharide present in small amounts in most food.	<p>Low serum levels indicate hyperglycemia above the glucose renal threshold at 180 mg/dL, detecting elevated post-meal spikes not revealed by HbA1c.</p> <p>1,5- AG reflects short term (1-2 wk) glycemic control (or lack of control).</p> <p>1,5- AG levels assist in monitoring drug efficacy and treatment alterations including diet and exercise regimens.</p>	<p>Men: 10.7 – 32.0 ug/mL</p> <p>Women: 6.8 – 29.3 ug/mL</p> <p>Levels below 6 are considered poor short term (1-2 wk) after meal glucose control</p>	<p>Lifestyle High refined carbs, visceral adiposity, physical inactivity</p> <p>Genetics</p> <p>Medical problems Persistently high urinary glucose, oxyhyperglycemia after gastectomy, pregnancy, renal failure, dialysis, cirrhosis, prolonged incapability of oral ingestion of food, Chinese medicines containing Polygalae Radix, hyperalimentation, glomerulonephritis, acarbose</p> <p>Drugs Steroid therapy</p>	<p>TLC* Increase stanols, sterols and high fiber foods</p> <p>Medications Anti-hyperglycemic drugs: Prandial insulin, sulfonylureas, biguanides, thiazolidinediones, meglitinides, alpha-glucosidase inhibitors, DPP-4 inhibitors, incretin mimetics, amylin analogs</p> 

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Homocysteine

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
Homocysteine is an amino acid associated with methionine metabolism.	<p>Homocysteinemia is an independent risk factor for primary and secondary CHD events, CHD death, stroke and all cause mortality.</p> <p>Levels > 14 umol/L have been associated with increased risk for CAD events.</p> <p>Each increase of 5 umol/L in homocysteine level increases the risk of CHD events by 20% independently of traditional CHD risk factors.</p>	<p>Men: < 11.4 umol/L</p> <p>Women: < 10.4 umol/L</p>	<p>Lifestyle Excess caffeine, alcohol, smoking</p> <p>Genetics Disorders of methionine metabolism</p> <p>Medical problems Renal disorders, hypothyroidism, Vitamin B deficiencies, pernicious anemia, psoriasis</p> <p>Drugs Nicotinic acid, fenofibrates, sulfonamides, metformin, anti-convulsants, theophylline, cyclosporine</p>	<p>TLC* Limit caffeine and alcohol, smoking cessation</p> <p>Manage medical problems</p> <p>Medications Folic acid (Note: Treating elevated homocysteine for CVD event reduction remains controversial. Treat other CVD risk factors more aggressively.)</p>

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Insulin				
Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>Insulin is a hormone central to energy regulation and glucose metabolism in the body.</p> <p>Insulin enables glucose uptake and utilization in muscle, fat, and liver cells as well as storage of energy as glycogen in liver and muscle cells.</p>	<p>Elevated levels of insulin, apoB and small dense LDL increase CVD risk eighteen fold.</p> <p>Elevated levels over time lead to a decrease in insulin sensitivity associated with IFG and IGT.</p>	3.0 – 21.1 uU/mL	<p>Lifestyle High refined carbs, visceral adiposity, physical inactivity, stress Postprandial blood sample</p> <p>Genetics</p> <p>Medical problems Metabolic syndrome, insulin resistance, diabetes mellitus, PCOS, Cushing's disease, menopause, hemochromatosis, insulinoma</p> <p>Drugs Corticosteroids, antiretrovirals, progesterone, rifampin, insulin</p>	<p>TLC* Reduction of refined carbs and alcohol</p> <p>Manage medical problems</p> <p>Medications Thiazolidinediones, fibrates, sulfonylureas, biguanides, alpha-glucosidase inhibitors, incretins</p>

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.



hs-C Reactive Protein (hs-CRP)				
Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>hs-CRP is a non-specific acute phase reactant produced by the liver in response to inflammatory adipocytokines and macrophages.</p>	<p>hs-CRP is a major nonspecific inflammatory marker.</p> <p>It is a strong and independent risk marker for primary and secondary CHD events, sudden death, stroke and peripheral vascular disease.</p> <p>Elevations are associated with insulin resistance and metabolic syndrome.</p>	<p>< 1 mg/L</p> <p>High risk: > 3 mg/L</p>	<p>Lifestyle Smoking, stress, overweight or obese</p> <p>Medical problems Acute phase reactant from any cause</p> <p>Drugs HRT, oral contraceptives</p>	<p>TLC* Smoking cessation, stress reduction</p> <p>Manage medical problems</p> <p>Medications Statins, nicotinic acid, fibrates, aspirin, platelet aggregation inhibitors, specific ACE/ARB/beta blockers, thiazolidinediones, Celebrex</p>

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Lipoprotein-associated Phospholipase A₂ (Lp-PLA₂ / PLAC®)

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>Lp-PLA₂ is an enzyme responsible for the hydrolysis of oxidized phospholipids on primarily apoB-containing lipoproteins, Lp(a), and some HDL.</p> <p>Lp-PLA₂ is a specific marker for vascular inflammation and is produced in unstable atherosclerotic, rupture-prone plaque.</p>	<p>Elevated levels indicate a twofold increased risk for CVD events and ischemic stroke.</p> <p>Elevated hs-CRP and Lp-PLA₂ together carry an elevenfold increase of ischemic stroke.</p> <p>Sixfold increased risk is seen with uncontrolled HTN and Lp-PLA₂ elevations.</p>	< 200 ng/mL	<p>Lifestyle Smoking</p> <p>Medical problems Disorders of endothelial dysfunction leading to unstable atherosclerotic, rupture-prone plaque</p>	<p>TLC* Smoking cessation</p> <p>Manage medical problems</p> <p>AJC recommends Reduction of LDL-C by additional 30 mg/dL if Lp-PLA₂ remains elevated</p> <p>Medications Statins, fibrates, nicotinic acid, omega-3 fatty acids, cholesterol absorption inhibitors</p>



Uncover hidden risk for heart attack and stroke

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NT-proBNP

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
<p>NT-proBNP is a hormone secreted mainly from cardiac myocytes in response to cardiac stress.</p>	<p>NT-proBNP is a sensitive biomarker with prognostic value for detection of sub-clinical, unsuspected cardiac dysfunction.</p>	<p>Patients: < 75 years < 125 pg/mL</p> <p>Patients: > 75 years < 450 pg/mL</p>	<p>Lifestyle Overweight or obese</p> <p>Medical problems HTN, CHF, cardiac arrhythmias, diabetes mellitus, renal disease, obstructive pulmonary diseases</p>	<p>Manage medical problems (Note: Dependent upon cardiac evaluation. Treatment depends upon findings.)</p> <p>May include: Preload reduction medications, afterload reduction medications, rate/rhythm control medications, cardiac intervention, cardiac pacing</p>

Uric Acid

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
Uric acid is the degradation product of purine metabolism.	Elevated levels are associated with gout, HTN, metabolic syndrome, CVD, CHF, stroke, dementia, preeclampsia, kidney disease, leukemia, and oxidative stress. For every 1 mg/dL increase in serum uric acid, there is a 41% excess risk of mortality.	Men: 3.5 – 7.2 mg/dL Women: 2.6 – 6.0 mg/dL	Lifestyle High purine and/or fructose intake, exposure to lead Genetics Medical problems Obesity, HTN, increasing age, kidney disease, metabolic syndrome, hyperinsulinemia, diabetes mellitus, obstructive sleep apnea Drugs Diuretics, nicotinic acid	TLC* Reduce fructose and purine intake Manage medical problems Medications Allopurinol, Probenecid, NSAIDs, colchicine, steroids, Febuxostat

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Vitamin D 25-hydroxyvitamin D (25-OH D)

Description	Why is it Important?	Measurement and Normal Value	Interference and Influence	Treatment Utilization
Vitamin D is a fat soluble vitamin made by ultraviolet light activity on exposed skin (D3), (cholecalciferol) and through plants, fortified foods and supplements (D2), (ergocalciferol). Vitamin D interacts with and regulates more than 200 genes in the body.	Low levels of Vitamin D are associated with a significant, graded increased risk for primary and secondary CAD events, PAD, stroke, diabetes mellitus and all cause mortality. Myalgias from statin therapy may be associated with low Vitamin D levels. The Framingham Offspring study revealed 1.8x risk of cardiovascular events when 25-OH Vitamin D levels were < 10 ng/mL.	Deficient: < 10 ng/mL Insufficient: 10 – 29 ng/mL Sufficient: 30 – 100 ng/mL Toxic: > 100 ng/mL	Lifestyle Inadequate sun exposure, air pollution/ smoking, decreased fat intake Medical problems Obesity, malabsorption problems, renal and liver diseases Drugs Corticosteroids, anticonvulsants, anti-rejection meds, HIV meds	TLC* Drugs 50,000 IU Vitamin D2 for eight weeks, then recheck/reload Maintenance Therapy[†] Vitamin D2 50,000 IU once or twice monthly OR Vitamin D2 2,000-4,000 IU or Vitamin D3 1,000 IU daily OR Mid-day sun exposure 5-30 minutes twice weekly [†] Appropriate dosage is weight/obesity dependent.

*Therapeutic Lifestyle Changes (TLC) include achieving healthy body weight, regular exercise, and avoiding saturated and trans-fats. Additional lifestyle changes are listed above.

Our Healthy Heart™ Program

Our Healthy Heart is a unique program offered by Atherotech. Our Healthy Heart is designed to educate patients on a healthy lifestyle that includes a balanced diet, regular physical activity and medication compliance. Our Cardiovascular Risk Reduction Educators (CREs) partner with the clinician and the patient to enhance adherence to the clinician's prescribed treatment plan for reducing diabetes, metabolic syndrome and cardiovascular disease risk. The Our Healthy Heart program guides patients in making life habit changes to reduce their risk of cardiometabolic disease.

Enrollment is open to any patient who has had a VAP or Atherotech test directly from Atherotech. There is no additional cost to the patient or clinician.

What educational topics will be discussed?

The CREs base their education program on ATP III Therapeutic Lifestyle Considerations (TLCs), physician's recommendations, patient's needs and VAP Test results. Topics include:

- Overview of VAP Test Results
- The Fats of Life
- Read What You Eat (Understanding Food Labels and Portion Sizes)
- Eating Out and Enjoying It
- Carbohydrates: The Good, The Bad, and The Ugly

How do my patients get enrolled into the program?

To enroll your patients in Our Healthy Heart, instruct them to call the toll-free number 1-866-VAP-TEST (1-866-827-8378) to schedule an appointment. Utilization of the tearoff pad sheets will provide key information for patients to encourage their participation in the Our Healthy Heart program. Your support of your patients' participation in the Our Healthy Heart program can have a significant impact on your patients' success.

Who will educate my patients?

We have professional health educators or CREs who provide individualized lifestyle management suggestions and strategies to your patient.

- Sodium: Cutting Back and Keeping the Flavor
- Shopping Smart and Cooking Light
- Stress: Living With It
- Exercise: The Right Habit for Your Heart
- Aim for a Healthy Weight



OUR HEALTHY HEART™
DISEASE MANAGEMENT FROM ATHEROTECH®

Medical Science Consultants Program

Atherotech's Medical Science Consultants (MSCs) are a valuable resource available to clinicians working toward a better understanding of lipid particle fractionation and available tests related to CV risk reduction. They provide in-depth knowledge on key clinical and scientific research supporting CVD prevention and risk reduction.

Their expertise includes collaborative support in CV risk stratification, as well as discussions of treatment options to facilitate therapy aimed at the reduction of CVD risk. Our MSCs can explain how the Vertical Auto Profile

(VAP®) and other Atherotech CV related test panels, along with the Our Healthy Heart program, can easily be integrated into daily clinical practice.

MSCs are clinical, non-sales professionals dedicated to help the medical community understand CV preventive medicine and increase clinical practice efficiency. MSCs have an extensive knowledge of CV risk reduction including comprehensive lipid testing and metabolism, insulin resistance, diabetes, metabolic syndrome, CVD and other related disorders.

Services provided by the MSC:

- Assistance in interpretation of VAP Test results, clinical implications and treatment options.
- Educational review of lipoprotein physiology and pathophysiology to better understand risk and treatment selection.
- Presentation of formal and informational case studies.
- Education about new CVD/diabetes risk markers.

Contact the MSC:

- Contact your local Atherotech representative to arrange a MSC visit.
- Call the MSC hotline and leave your request or questions. The call will be returned within 2 hours M-F. **(MSC Hotline: 877-519-4807)**
- Email the MSC (MSC@atherotech.com).

