

# *Cardiovascular Health Assessment Center*

*at the Cardiovascular Center of Sarasota  
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Below is a brief explanation of the tests conducted during your exam. Some tests are aimed at identifying problems with blood vessels (vascular), some are aimed at identifying heart abnormalities (cardiac), and other are used to identify markers that influence the development of cardiovascular Disease.

## **Explanation of Tests**

### **Early Vascular Abnormalities Testing Results**

#### **Arterial Elasticity Analysis**

Tests # 1 & 2: This technique involves computer analysis of the arterial pressure waveform recorded from the wrist. It provides a measure of the elasticity or stiffness of the large arteries (C1) and of the small arteries (C2) of the body. Results are calculated by age and gender. Arterial elasticity decreases with age but is more prominently reduced with blood vessel abnormalities that place individuals at risk for heart attacks or strokes. This decrease in elasticity is probably related to reduced function of the inner lining of the small arteries (the endothelium), which normally keeps the arteries flexible or elastic.

#### **Resting Blood Pressure**

Test #3: Two numbers are recorded when measuring your blood pressure. The higher (systolic) number represents the pressure while the heart is beating. The lower (diastolic) number represents the pressure when the heart is resting between beats. For adults, a blood pressure of less than 120/80 is considered normal, (0 Rasmussen points), 120-139/80-89 is considered the pre-hypertensive (starting mid range 130/85- one Rasmussen point) with the potential for the development of high blood pressure (hypertension). Blood pressure of greater than 140 over 90 (two points) is considered abnormal for adults. Your blood pressure can change from minute to minute, morning or night, with changes in posture, exercise or sleeping. Blood pressure persistently greater than 140 over 90, called hypertension is considered harmful. Elevated blood pressure causes the heart to work harder than normal. That means both the heart and arteries are more prone to injury. High blood pressure increases the risk of heart attacks, strokes, kidney failure, damage to the eyes, congestive heart failure and atherosclerosis (build up of blockages-plaque).

#### **Blood Pressure Activity Response Test**

Test #4: The magnitude of rise in blood pressure during exercise may be an indication of early stiffening of the arteries even if the resting blood pressure is normal. We measure your blood pressure response to 3 minutes of moderate exercise (5 met level) while walking on a treadmill.

#### **Eye Retina Photo**

Test #5: The back of the eye is the only place in the body we can easily visualize small arteries. Small arteries become thicker and stiffer in individuals at risk for heart attacks and strokes. Photos of these arteries allow us to examine the thickness of these small arteries as an early marker for vascular disease.

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## **Early Vascular Abnormalities Testing Results** *Continued*

### **Carotid Intimal Medial Thickness**

Test #6A: The carotid arteries are two large arteries that supply blood to the brain. Thickening of the artery wall (Intimal Medial Layer Thickness-IMT) suggests the possibility of vascular (blood vessel) disease. Normal levels for IMT are dependent on age, gender and differ slightly for the left and right artery. Your result will be indicated as normal (no increased thickening), borderline (slight thickening), or abnormal (significant thickening). Because the full length of the carotid arteries is not examined, this test is not designed to screen for carotid artery blockages.

### **Abdominal Aortic Ultrasound Screening**

Test #6B: The abdominal aorta is the main channel of blood to the lower part of the body. An aneurysm is a widening or ballooning of the wall of the aorta. Small aneurysms may be watched over time; large aneurysms may require surgical treatment. Early detection of abdominal aortic aneurysm (AAA) is important to allow monitoring or treatment when needed. A normal result indicates no increase in the size of the aorta, borderline indicates mild localized enlargement, and abnormal indicates an increase in size with further evaluation recommended.

### **Microalbumin**

Test #7: A urine specimen is obtained for the measurement of minute quantities of albumin (protein) in the urine. Microalbuminuria (small protein in the urine) suggests the presence of small artery disease in the kidney and serves as a sensitive guide for early vascular disease. If Microalbumin is absent your results will be < 0.60, borderline range of 0.61 – 0.99 and it is present is your result is > 1.0.

## **Early Cardiac Abnormalities Testing Results**

### **Brain Natriuretic Peptide (Pro-BNP)**

Test #8: This substance is manufactured in the pumping chamber of the heart and its level rises when the heart enlarges. The level of BNP in your blood is part of our overall assessment of early heart disease. The normal results range is < 125, borderline range 126-250, and an elevated range of > 251.

### **Electrocardiogram (ECG or EKG)**

Test #9: Electrical signals from the heart may give clues to problems with the structure or function of the heart. An electrocardiogram (ECG) is performed as a standard test.

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## **Early Cardiac Abnormalities Testing Results** *continued*

### **Left Ventricular Cardiac Ultrasound Screening**

Test #10: Heart disease may be present without symptoms. This disease may cause enlargement of the major pumping chamber (left ventricle). This enlargement usually precedes symptoms of heart failure by months or years. We perform portable screening ultrasounds to measure the size of the left ventricle. An abnormality on this screening test may necessitate a complete heart echocardiogram performed in an echocardiography laboratory.

### **Lipid Profile**

Test #11: Lipids are fat like substances that are found in the body and necessary for certain body functions. Abnormal levels of lipids can increase the risk of blockage in the arteries. Foods that are high in fat and cholesterol can affect lipid levels and contribute to the development of cardiovascular disease. Exercise, alcohol consumption, weight and family genetics can also influence your cholesterol level. Mild abnormalities are often managed with dietary therapy, weight reduction and exercise. Medical management may be added for abnormalities that do not respond to health habit modification or if the risk for cardiovascular disease progression is high.

#### **Total Cholesterol**

The desired level of total cholesterol is less than 200. Borderline high is from 200-239, and high is 240 or greater. This number will not equal the sum of HDL and LDL because not all lipid types are calculated in this profile.

#### **HDL Cholesterol**

This high-density form of cholesterol is often called the good cholesterol. The lower limit of normal is 40. The best mechanisms for raising your HDL are to stop smoking if you are a smoker, maintain a healthy weight and a regular program of exercise.

#### **LDL Cholesterol**

This is the low-density cholesterol or "bad" cholesterol. An LDL of less than 100 is considered optimal. Near optimal/above optimal is from 100-129, 130-159 is borderline high, 160-189 is high and 190 or greater is very high. If you have major risk factors such as diabetes or high blood pressure or a history of coronary heart disease (prior heart attack, angioplasty or bypass surgery) a level of 100 or below may be recommended.

#### **Triglycerides**

This may be an independent risk factor for cardiovascular disease. Triglycerides are a form of stored fat, which circulates in the bloodstream. Triglyceride levels below 150 are normal, 150-199 are borderline, 200-499 high and 500 or greater very high. To lower your level of triglycerides, limit alcohol, limit foods high in sugar, follow a low fat high fiber diet, and get regular exercise and lose weight if you are overweight. If your triglyceride level is substantially elevated, your physician may recommend medical therapy.

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## **Early Cardiac Abnormalities Testing Results** *continued*

### **Blood Glucose**

Test #12: A fasting (no food for 12 hours) blood sample is analyzed for glucose (sugar) concentration. Diabetes is present when the level is over 126 mg/dl, but high normal levels may indicate the presence of insulin resistance (100-109, borderline) that may occur before the development of diabetes. A glucose level of 99 or less fasting is considered to be within normal limits. A level between 111 to 125 is considered the impaired fasting glucose range and significantly increases the risk for developing Diabetes.

## **Risk Marker Testing Results**

### **High Sensitivity C-Reactive Protein (HsCRP)**

Test #13: This blood test is an indicator of inflammation. It is believed that inflammation affects the condition of the blood vessel wall and contributes to the development of cardiovascular disease. Because many conditions such as infections, colds and flu can elevate C-reactive protein levels an abnormal level may need to be repeated before risk can be established. At what specific level risk begins and ends is still being evaluated by research so this result is not used alone but in combination with other indicators to determine risk. Treatment guidelines other than reduction of risk factors have not yet been established. This is a new and emerging risk factor. The results of this test are normal if < 0.100, borderline 0.10-0.30 and abnormal >0.300.

### **Lung Function**

Test #14: The capacity of the lungs to inhale and exhale air may be reduced in the presence of lung disease or heart disease. A forced vital capacity test is routinely performed as a guide to overall lung health. The results of this test are calculated by: age, height, and gender.

### **Body Mass Index (BMI)**

Test #15: Obesity is now recognized as a major risk factor for coronary heart disease, which can lead to heart attack. Obesity is known to raise blood cholesterol and triglyceride levels. It lowers HDL good cholesterol, which is linked with a higher risk of heart disease. Obesity raises blood pressure and can induce diabetes. To assess your degree of body fat, we measure your body mass index by assessing your weight in relation to your height. The BMI correlates well with direct measures of body fat. A BMI less than 25 is targeted for decreasing risk. A BMI between 25.1 and 29.9 is considered overweight. Adults with a BMI greater than 30 have more heart disease, strokes, diabetes, high blood pressure and gallstones.