Advanced CardioMetabolic Screening

signatureMD™

INTRODUCTION

SignatureMD and its affiliated physicians continuously seek out technology to identify health risk factors before they become serious diseases. SignatureMD is proud to announce the introduction of the SignatureMD Advanced CardioMetabolic Screening. This test will enable your SignatureMD physician to identify risk factors for type 2 diabetes and cardiovascular disease, the two most concerning medical epidemics in America.

DIABETES

Well before the onset of type 2 diabetes, your body is experiencing changes in three key areas; disruption in normal insulin functioning, hormonal changes and immune system activation. In most cases, with the right medical treatment and lifestyle changes, type 2 diabetes can be avoided or delayed. Furthermore, recent studies have linked pre-diabetes and diabetes to both Alzheimer's Disease and erectile dysfunction. The Advanced CardioMetabolic Screening will help you and your physician to understand how your body is functioning in each of these areas and where treatment needs to be focused.

CARDIOVASCULAR DISEASE

In recent years, research has shed light on the complex interactions in the body that contribute to cardiovascular disease (which includes heart attacks and strokes). We now understand that:

- It is not just the amount of cholesterol but also the type and size of cholesterol particles that impact risk.
- Chronic low grade inflammation accelerates the progression of cardiovascular disease.
- People with genetic pre-disposition for early onset disease require aggressive treatment.
- Type 2 diabetes and pre-diabetes increase the risk for cardiovascular disease.

SignatureMD's Advanced CardioMetabolic Panel provides you and your personalized physician with key insights into your cardiac risk based on this new found information.

Combined with your annual Executive Physical Examination, the results of the SignatureMD Advanced CardioMetabolic Screening will provide your physician with key information to use in the development of your personalized health and wellness plan. ***Please contact your SignatureMD Personal Physician to arrange for your test.***

SCREENING COST

SignatureMD has negotiated special discounted pricing for the Advanced CardioMetabolic Screening for its patients.

SignatureMD Advanced CardioMetabolic

- Patient Direct Discounted Price $180 (standard price is $475)
- SecureOption Price: $30 (qualifications below)

If you are a current subscriber/active member of a commercial insurance plan, indemnity, PPO, POS or other traditional insurance plan, *excluding Medicare, Medicaid, other government plans and all commercial HMO plans*, you are eligible to participate in the SecureOption program.

The SecureOption® program limits your out-of-pocket expenses each time eligible laboratory services are performed. You pay the appropriate Secure Option prepayment of $30 associated with the Advanced CardioMetabolic screening ordered by your physician. Biophysical submits an insurance claim and accepts the insurance reimbursement amount. The Secure Option program provides you the certainty of knowing you will have no further expenses associated with lab services ordered on that day.

Provider must complete the following steps:

1. Complete requisition including:
   - Diagnosis ICD-9 for medical necessity
   - Insurance information
   - Ordering Physician Signature
   - Patient Signature for Insurance release of information, assignment of benefits and credit card authorization

2. Provide Secure Option Prepayment by placing Credit Card information on requisition

3. Provider and Patient must agree to respond to any insurance requests for information in a timely manner in order to resolve any pending claims.

4. If payment from insurance goes directly to the patient, the patient must forward that payment amount, along with a copy of the explanation of benefits (EOB), to Biophysical.

PLEASE PRINT THIS PAGE AND PROVIDE IT TO YOUR PHYSICIAN

Cardiovascular disease is a group of diseases that result from blockages to the arteries that supply blood to the body. These blockages can occur in any part of the body, and when they occur in one area of the body, they are presumed to exist in others. Heart attacks and strokes are the two most common and dangerous problems that can result from these blockages. Heart attacks occur when there is a build-up of cholesterol and plaque (atherosclerosis) inside the arteries that supply blood to the heart. Strokes occur when this build-up is inside the arteries that supply blood to the brain. Typically, the buildup of cholesterol and plaque occurs over many years. The good news is that we now know many of the risk factors that can help identify who is likely to have this build-up. Identifying your risk factors enables you to take measures that can decrease your risk of experiencing these serious conditions.

The conventional, and most invasive, method used to diagnose atherosclerosis is a procedure known as catheterization. During this procedure, dye is injected into arteries and pictures are taken. From this procedure physicians can determine the actual presence of atherosclerosis, including the location and extent of the disease. Most people have a catheterization done only after experiencing chest pain or a heart attack. Other technologies to evaluate atherosclerosis include ultrafast or multi-slice CT for the heart and ultrasound for the carotid arteries, but this is of value only if the plaque is calcified.

CARDIOVASCULAR / STROKE EVALUATION

Long before a heart attack or stroke occurs, your body produces biomarkers that, when properly evaluated, may signal the subtle build-up of dangerous plaques.

Elevated or decreased levels of specific biomarkers are associated with increased risk for developing atherosclerosis. The goal of treatment is to modify or eliminate these risk factors. In general, more aggressive treatment is undertaken when multiple biomarker risk factors are present and when risk factors are significantly out of range.

CHOLESTEROL/LIPID PROFILE

The use of blood- based biomarkers for atherosclerosis is not new, but generally falls short by not going far enough. Historically, doctors measured total cholesterol to determine cardiovascular risk. Then science demonstrated that there are different types of cholesterol and this led to the measurement of LDL, HDL and triglyceride levels. While these measurements have been helpful, we now know that there is even more to the cholesterol story. Additional research has shown a whole constellation of biomarkers based on cholesterol particle type, particle number, particle density, and their interaction with plaque formation that narrows the blood vessel. We have incorporated all of these biomarkers into this panel to give you a better picture of your risk of atherosclerosis. (Remember, it's not just about the heart – this disease also affects the vessels of the kidneys, the brain, and virtually every other organ.)

DIRECTLY MEASURED CHOLESTEROL BIOMARKERS

Total Cholesterol is the total amount of three types of cholesterol: low density lipoprotein (LDL), high density lipoprotein (HDL) and very low density lipoprotein (VLDL). LDL and VLDL are two categories of cholesterol that are considered bad (think of "L' for lousy), so lower levels are desirable. HDL is considered good (think of "H" for healthy), therefore, high levels are desirable.

Total LDL is made up of three components: LDL real cholesterol, lipoprotein(a) (Lp(a)), and intermediate density lipoprotein cholesterol (IDL). It is important to realize that when you get your total LDL in a standard lipid panel all you get is one number, total LDL cholesterol. As you can see below, this one number contains three very different lipoproteins that significantly influence your risk for cardiovascular disease. Subsequently the treatment strategy to lower your risk is different based on each of these three components of your LDL.

HDL Cholesterol is the good or "healthy" cholesterol. It helps to carry cholesterol from the body to the liver where the cholesterol is broken down and excreted. Like other forms of cholesterol, it too comes in a gradient of sizes and types. HDL2 is large and buoyant and the most protective form of HDL cholesterol. High levels are desirable. Low levels of HDL2 are a risk factor for heart disease for people with normal LDL levels. HDL3 is small and dense and the least protective form of HDL.

Like LDL, the smaller and more dense your VLDL particles are, the greater the risk for cardiovascular disease. VLDL density is important and VLDL-3, the smallest and most dense form of VLDL is the most dangerous. VLDL1+2 is less dangerous.

Directly Measured Lipid Profile

Biomarker	Out-of-Range	In-Range	Reference Range	Risk
Total LDL				
LDL-R (Real LDL)				
Lp(a)				
IDL				
Total HDL				
HDL2				
HDL3				
Total VLDL				
VLDL1+2				
VLDL3				
Total Cholesterol				

Triglycerides play a part in transporting dietary fat to the body. As such, triglycerides are an important source of energy for the body. High triglyceride levels, however, are associated with both diabetes and cardiovascular disease. High triglycerides are directly related to the levels of blood sugar and are six times more predictive of heart disease than cholesterol.

Non-HDL Cholesterol is the total amount of LDL and VLDL (the two categories of bad cholesterol). LDL transports cholesterol to the body, while VLDL is the main lipoprotein that transports triglycerides in the circulation. Both LDL and VLDL are made up of a gradient of particle sizes and density.

Remnant Lipoproteins are triglyceride rich lipoproteins that, if present in high concentration, will increase your risk for cardiovascular disease and diabetes. Frequently, people with elevated remnant lipoproteins are those who demonstrate insulin resistance, metabolic syndrome or diabetes.

LDL Pattern Individuals with a predominance of the larger, more buoyant LDL particles are designated as Pattern A, whereas those with more small, dense particles are designated as Pattern B. Pattern A/B means you are shifting to either Pattern A or B. Lifestyle changes and medication may help to shift towards pattern A, while continued disease may shift towards pattern B. Pattern B and pattern A/B are considered risk factors for cardiovascular disease. Just remember, pattern B is “bad”. Having a low LDL cholesterol value that is pattern A is the safest place to be and the goal to achieve.

LDL Subclass Four gradients of LDL particles are measured. LDL 1 and 2 are large, buoyant particles, while LDL 3 and 4 are small, dense particles. Your LDL pattern is determined in part by the preponderance of the different sizes of LDL particles. There are however, additional factors taken into account to determine your LDL pattern. For diagnostic and treatment purposes, it is the LDL pattern type that is important. Your LDL subclass information is provided because it helps to understand how strongly you fit into your LDL pattern. Some people, for example, may be designated type A (which is good), however, after reviewing their LDL subclass measurements, we see that they are barely type A, and with time, they may progress to type A/B.

Emerging Risk Biomarkers

Biomarker	Out-of-Range	In-Range	Reference Range	Risk
Triglycerides - Direct				
Non-HDL Cholesterol (LDL + VLDL)				
Remnant Lipoproteins				
Lipoprotein (a) (Lp(a))				

LDL Pattern				
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**	**Risk**
LDL Density (Pattern)				

LDL Subclasses			
Biomarker	**Result**	**Units**	**Description**
LDL Subclass			
LDL4			small, dense
LDL3			small, dense
LDL2			large, buoyant
LDL1			large, buoyant

Apolipoprotein B100 (apoB) is a protein that is the main component of all the bad types of cholesterol. Apolipoprotein A1 (apoA1) on the other hand is related to all the good types of cholesterol. Research has determined that the ratio of these two numbers provides a very good indicator of cardiovascular risk. A low ratio (where the apoA particles dominate) is considered low risk. A one to one ratio is high risk and a higher ratio (where apoB100 particles dominate) indicates very high risk. People who have metabolic syndrome typically have a significantly higher ratio than people who do not. Additionally, the ratio is a good predictor of insulin resistance in people who do not have diabetes.

Apolipoproteins				
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**	**Risk**
Apolipoprotein B100				
Apolipoprotein A1				
Apo B100/ApoA1 ratio				

Recent research in the area of cardiovascular disease has focused on inflammation as a major factor in the development of atherosclerosis, specifically in relation to how fast the disease progresses. Doctors think of inflammation as "the match that lights the cardiovascular fire". As a result, people are paying attention to biomarkers such as **high sensitivity C-reactive protein** (hs-CRP) that reflect the presence of inflammation in the body. Levels below 1.0 mg/L are associated with the lowest risk for developing cardiovascular disease, while levels between 1-3 mg/L are associated with average risk and levels above 3 mg/L are associated with the highest risk. Levels that persist above 10 mg/L are usually associated with inflammation from a non-cardiovascular source.

High Sensitivity C-Reactive Protein				
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**	**Risk**
High Sensitivity C-Reactive Protein				

Doctors think of inflammation as "the match that lights the cardiovascular fire".

Homocysteine				
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**	**Risk**
Homocysteine				

Homocysteine is a chemical that, at high levels, is a strong risk factor for cardiovascular disease. High levels can be seen in people who have low levels of folic acid (vitamin B9) and vitamins B6 and B12.

PRE-DIABETES

Pre-diabetes is a condition that occurs before the onset of type 2 diabetes. Diabetes researchers believe that during the pre-diabetic period significant damage is already happening within the body. They estimate that by the time a person is diagnosed with type 2 diabetes, their pancreas has already lost up to 80% of its ability to produce insulin. Increasingly, physicians and patients are recognizing the need to identify and treat pre-diabetes in order to prevent damage to the body and ultimately to prevent or delay the onset of type 2 diabetes.

Numerous studies have shown that, in addition to elevated glucose levels, there are other biomarkers that change as a person begins to develop pre-diabetes. Biophysical reviewed the results from numerous large, randomized, multicenter, double-blind, placebo controlled, peer-reviewed studies that looked for biomarker changes in pre-diabetic people. From these studies, Biophysical selected the biomarkers that best indicate pre-diabetes is developing in the body. We have grouped these biomarkers so that you and your physician can determine if you are starting to experience changes associated with pre-diabetes.

Pre-diabetes is especially prevalent in people over 45 years of age who are over-weight (as indicated by a body mass index over 25). This group of people has a higher risk of developing pre-diabetes and type 2 diabetes. However, not everyone in this group will develop these conditions. Your Pre-D evaluation is especially useful for identifying people within this higher risk group who show signs of pre-diabetes and who, therefore, are most likely to benefit from early medical intervention.

Diabetes is a disease in which the body cannot make or respond to insulin, thereby allowing glucose to build up in the bloodstream. Insulin is a hormone produced by your pancreas that helps your body's cells take in glucose and convert it to energy, rather like an escort for glucose into the cells. When the pancreas does not make enough insulin or the body is resistant to the insulin that is present, excess glucose builds up in the bloodstream, setting the stage for diabetes. Diabetes is a growing health concern, affecting about 6% of the U.S. population. When poorly controlled, it plays a major role in strokes, cardiac and vascular disease and can cause injury to the kidneys, eyes, and other parts of the body.

Diabetes is generally divided into two types: Type 1 (also called juvenile or insulin-dependent diabetes) and type 2 (also called adult-onset or non-insulin dependent diabetes). In addition, there is a form of pre-diabetes called insulin resistance.

Insulin resistance is often observed in individuals with an elevated body mass index (BMI) and increases the risk of developing type 2 diabetes mellitus. Often a person is unaware they are insulin resistant. Some of the more common signs and symptoms of insulin resistance include: fatigue, inability to focus, weight gain, intestinal bloating, increased triglyceride level, increased blood pressure, depression and acanthosis nigricans (brown to blackish discolored patches of skin caused by chronically increased insulin levels). However, more often than not, there are no symptoms.

Physicians classically diagnose diabetes by measuring the fasting blood **glucose** level. A level from 65 – 100 mg/dL indicates normal glucose metabolism. A level from 101 – 125 mg/dL indicates insulin resistance, while a level above 125 mg/dL on two separate occasions indicates the presence of diabetes.

Glucose attaches to hemoglobin and, when it does, it remains attached for the entire life cycle of the hemoglobin molecule. Each hemoglobin molecule “lives” for about 60 days before being destroyed. **Hemoglobin A1c** (hgb A1c) is a measurement of the glucose bound to the hemoglobin molecule and because each molecule lives for about 60 days, the hgb A1c measurement reflects the average glucose level over the past 60 days. A high hgb A1c reflects a high glucose level over time.

Proinsulin is a hormone that is made in the beta cells of the pancreas. Proinsulin splits apart to create insulin and **C-peptide**. C-peptide is a subunit of the insulin hormone and helps newly diagnosed diabetics determine how much insulin is being produced in the body.

Insulin is the hormone released by your pancreas that helps take glucose out of your bloodstream and into your body’s cells where it can be used. An insulin measurement may help determine whether a high blood glucose reading is the result of insufficient insulin production (as in type 1) or poor use of insulin (as in type 2). In pre-diabetes and insulin resistance, both fasting blood glucose and insulin levels will be high, indicating the body’s inability to use the available insulin effectively. Some people have high insulin levels and normal glucose levels indicating the need for a lot of insulin to maintain normal blood glucose levels. Sugar and insulin are the primary cause of “silent inflammation” now recognized as the major cause of cardiovascular disease.

The proinsulin to insulin ratio helps to understand how effectively the beta cells of the pancreas are functioning and to identify people who are more insulin resistant. Insulin resistant people will have a higher proinsulin to insulin ratio than people who are insulin sensitive. High proinsulin and high proinsulin to insulin ratios are not only risk factors for type II diabetes, but researchers believe they are risk factors for a faster progression to type II diabetes.

Diabetes and Insulin Resistance Biomarkers

Biomarker	Out-of-Range	In-Range	Reference Range	Risk
Glucose				
Hemoglobin A1c				
Insulin				
C-peptide				
Proinsulin, Total				
Proinsulin/Insulin ratio				

Note: Blood glucose is best measured after fasting for at least 8 hours. If you did not fast for at least 8 hours, your fasting glucose level most likely will not reflect your diabetes status.

OBESITY AND WEIGHT RELATED BIOMARKERS

When the number of calories ingested exceeds the number of calories used, the body stores the excess calories in adipose (fat) cells. All calories are not created equal. Fructose sugar is metabolized completely differently from glucose sugar and is the primary cause of insulin resistance. It appears that different people store excess calories in different ways and this seems to be partially genetically determined and/or under the influence of hormones, particularly estrogen. Subcutaneous fat tissue is fat that is deposited under the skin. It tends to accumulate around the hips, thighs and buttocks and may give a person a "pear" shaped appearance. Visceral fat tissue is fat that accumulates around the abdominal organs. It gives a person an "apple" shaped appearance.

Visceral fat behaves differently from subcutaneous fat in two important ways. First, as the cells enlarge, they become stressed and release inflammatory biomarkers. This inflammatory response contributes to the development of diabetes. Secondly, visceral fat changes the pattern of hormone production from a healthy balance to an unhealthy one. This hormone imbalance further contributes to metabolic imbalance and the development of type 2 diabetes.

Measuring key hormones produced by adipose cells helps to understand whether there is a healthy or unhealthy balance.

HORMONES AFFECTED BY OBESITY AND ADIPOSE CELLS

Leptin is a hormone released by fat cells that helps to control body weight through its effect on the appetite centers in the brain. Increased calorie intake as well as increased body fat leads to high leptin levels which, correspondingly, causes a decrease in hunger. Decreased caloric intake and decreased body fat cause a decrease in leptin levels and, therefore, an increase in appetite. Leptin is released in a pulsatile fashion, with levels highest at night and lowest in the morning.

Because obese people have larger fat cells, they produce more leptin and levels, therefore, tend to run high. High leptin levels normally tell the body to stop eating, yet obese people continue to eat, despite having consumed enough calories. This paradox is caused by "leptin resistance". In obese people, leptin levels are chronically high and after awhile the brain starts to ignore or become resistant to its effects. Without the effect of leptin, the appetite controlling factor that tells the body that it is full and not hungry is absent.

Resistin is a hormone released by fat cells. An increase in fat cells leads to an increase in resistin levels which directly leads to insulin resistance. Because the fat cells associated with central obesity are more active in terms of producing hormones, resistin levels may be higher for these people and account for why central obesity is closely associated with insulin resistance and type 2 diabetes. There is a direct correlation between high resistin levels and type 2 diabetes and resistin, like leptin, is associated with inflammation. Resistin levels decrease with weight loss.

Adiponectin is also a hormone produced by fat cells. Unlike leptin and resistin, adiponectin levels paradoxically decrease as body fat increases. Thus, adiponectin levels have been shown to be decreased in individuals who are overweight and normal or elevated in individuals who are lean. Adiponectin has anti-inflammatory effects, therefore, high levels help to decrease inflammation in the body and low levels may allow a state of inflammation to exist.

Low levels of adiponectin (i.e., <4.0 ug/mL) have been shown to be associated with increased levels of C-reactive protein, glucose, insulin, C-peptide, and body mass index (BMI). In fact, studies show that low adiponectin levels may be an independent risk factor for type 2 diabetes.

Weight Related Biomarkers			
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**
Adiponectin			
Leptin			
Resistin			

SEX HORMONE RELATED BIOMARKERS

Some men who have an increased BMI due to an increased amount of adipose tissue, particularly abdominal fat, have a decreased level of testosterone. Low testosterone levels are linked to obesity, which is further linked to insulin resistance, type 2 diabetes, and metabolic syndrome. It is often very difficult to restore blood sugar levels to normal especially in older men with obesity, diabetes or metabolic syndrome. Insulin resistance, the condition in which the body produces insulin but is not able to use it effectively, can affect libido and sexual performance because high insulin levels reduce the amount of available testosterone.

Women with a high testosterone level may have a condition known as polycystic ovarian syndrome (PCOS). Women with PCOS are prone to insulin resistance and type 2 diabetes.

Sex hormone binding globulin (SHBG) is a protein that binds to hormones such as estradiol and testosterone and carries them in the bloodstream. Most of the estradiol and testosterone in the body is bound to SHBG, some is bound to albumin, and a small amount is free and able to enter cells for use. While testosterone and estradiol are bound to SHBG they are not biologically active, meaning, their function is inhibited. This is particularly important in the case of estradiol. Estrogens are produced by fat cells; therefore, obese people tend to have higher estrogen levels. High estrogen levels can have adverse health effects. Because SHBG helps to lower the amount of free estradiol, higher levels are more desirable. SHBG is mainly produced by the liver, and studies show that diets high in simple sugars cause the liver to produce less SHBG. Low levels of sex hormone binding globulin are seen in obesity, pre-diabetes, insulin resistance and type 2 diabetes. Low levels of SHBG are also seen in polycystic ovarian disease, a condition that is associated with obesity, insulin resistance and type 2 diabetes.

Sex Hormone Related Biomarkers			
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**
Testosterone, Total			
Sex Hormone Binding Globulin			

INFLAMMATION RELATED BIOMARKERS

Visceral obesity, insulin resistance and type 2 diabetes are associated with a pro-inflammatory state. In other words, the body is producing higher than normal levels of biomarkers that are involved in the immune system's response to disease. Studies show that inflammation itself contributes to and precedes the development of insulin resistance and type 2 diabetes.

Interleukin-6 (IL-6) is an inflammatory biomarker that normally stimulates the immune system to respond to conditions such as infection, trauma and tissue damage. Abdominal fat produces a significant amount of IL-6. IL-6, along with other types of pro-inflammatory biomarkers disrupts the normal action of insulin in the body. High IL-6 levels are also related to atherosclerosis, a common complication of diabetes.

Interleukin-8 (IL-8), like IL-6 is released by adipose (fat) tissue and studies show that people with visceral obesity may have higher IL-8 levels than people without visceral obesity. IL-8 is a pro-inflammatory biomarker that is implicated in a number of diseases that cause damage to small blood vessels, including cardiovascular disease and retinopathy (a leading cause of blindness) that may occur as a complication of diabetes.

Studies show a link between tumor necrosis factor alpha (TNF alpha) and the development of type 2 diabetes in insulin resistant people. TNF alpha is produced by a variety of cells including the fat cells associated with visceral (abdominal) obesity. Obesity causes an increase in TNF alpha levels. Studies show a correlation between high levels of TNF alpha and insulin resistance.

High sensitivity C-reactive protein (hs-CRP) is also an inflammatory biomarker. Most CRP is produced by the liver with additional production coming from fat cells and the cells that line the insides of blood vessels. Production of CRP is increased in response to an increase in levels of IL-6. Even at low levels, it is an excellent indicator of both acute and chronic inflammation in the body. Biophysical employs a high sensitivity test (hs-CRP) that can more accurately detect lower concentrations of the CRP (it is more sensitive), which makes it more useful in predicting a person's risk for disease. Studies show that people who are at highest risk for developing pre-diabetes have higher levels of hs-CRP.

...Inflammation itself contributes to and precedes the development of insulin resistance and type 2 diabetes.

Inflammation Related Biomarkers

Biomarker	Out-of-Range	In-Range	Reference Range
High Sensitivity C-Reactive Protein (hs-CRP)			
Interleukin 6 (IL-6)			
Interleukin 8 (IL-8)			
Tumor Necrosis Factor Alpha (TNF Alpha)			

BLOOD CLOTTING BIOMARKER

Plasminogen activator inhibitor type 1 (PAI-1) is an enzyme that prevents the breakdown of blood clots; therefore, elevated levels are associated with increased blood clotting. PAI-1 is produced by the cells that line the inside of blood vessels and by fat tissue. PAI-1 levels are increased in obesity, insulin resistance and metabolic syndrome, and are associated with an increase in blood clotting in people with these conditions.

Blood Clotting Biomarker			
Biomarker	**Out-of-Range**	**In-Range**	**Reference Range**
Plasminogen Activator Inhibitor Type 1 (PAI-1)			

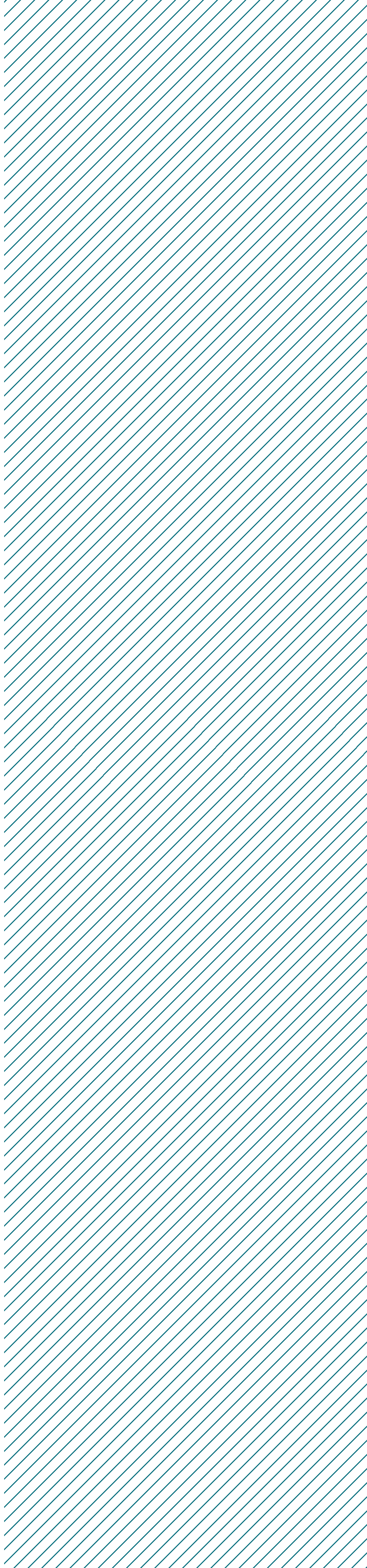
The results of your Advanced Cardiometabolic Screening are based on the following assumptions:

- You are not currently taking diabetic medications or mediations that may affect the test results (for example, glucocorticoids, insulin, beta-blockers, etc). Please consult with your physician or pharmacist to determine if your medications may alter lab results;
- You are not pregnant;
- You have been fasting for more than 8 hours.

If any of these assumptions are not true, your risk for pre-diabetes conditions may change.

Your Pre-D results indicate your risk based on blood-based biomarkers. There are other risk factors for diabetes and pre-diabetes that you and your physician should consider. These additional risk factors include:

- Age over 45 years;
- Ethnicity (increased risk for black/African American, Hispanic, native American and Hispanic people);
- Obesity, defined as a high body mass index;
- Family history of diabetes;
- High blood pressure;
- History of gestational diabetes (diabetes while you were pregnant); and
- Decreased physical activity.



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