

BENICOMP[®]

ADVANTAGE

HEALTHY LIVING HAS ITS REWARDS.™

Understanding Your Results

**EXPANDED
SCREENING
EDITION**



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BE IN CONTROL OF YOUR HEALTHCARE COSTS

With BeniComp Advantage (BCA), you can change the way insurance deductibles affect you — now and in the future. Just like avoiding speeding tickets and getting good grades help reduce car insurance premiums, the BCA supplemental wellness program rewards you by lowering your deductibles based on wellness credits you earn for each plan year. By choosing to make healthy choices each year, you may increase credits toward your health plan deductibles and decrease your need to see the doctor.

BE IN CONTROL OF YOUR HEALTH

To maximize your BCA health credits, it helps to fully understand the health screenings and the goals you are aiming for. This brochure outlines and defines the wellness categories that may be considered as part of your company's program. Once you review this information and your company's specific requirements for each wellness area, you'll be better prepared to review your results. Note that you may not have been screened for every test listed in this booklet.

BODY MASS INDEX

Body mass index (BMI) assesses your body weight relative to height. It's a useful, indirect measure of body composition because it correlates highly with body fat in most people. Weight in kilograms is divided by height in meters squared (kg/M^2).

In studies by the National Center for Health Statistics,

- BMI values less than 18.5 are considered underweight.
- BMI values from 18.5 to 24.9 are healthy.
- Overweight is defined as a BMI of 25.0 to less than 30.0. A BMI of about $25 \text{ kg}/\text{M}^2$ corresponds to about 10 percent over ideal body weight. People with BMIs in this range have an increased risk of heart and blood vessel disease.
- Obesity is defined as a BMI of 30.0 or greater (based on NIH guidelines) — about 30 pounds or more overweight. People with BMIs of 30 or more are at higher risk of cardiovascular disease.
- Extreme obesity is defined as a BMI of 40 or greater.

Some well-trained people with dense muscle mass may have a high BMI score but very little body fat. For them, more direct methods of measuring body fat may be more useful. When BMI is included as a reward category BCA provides credits for healthy BMI, and grants an exception if BMI is greater than goal but body composition is ideal.

BODY COMPOSITION

Your body composition tells how much muscle versus fat is in your body. The number is expressed in a percentage of body fat and/or percentage of lean body mass.

MALE BODY FAT	AGE	RECOMMENDED
	20-39	8-20%
	40-59	11-21%
	60-79	13-25%

FEMALE BODY FAT	AGE	RECOMMENDED
	20-39	21-33%
	40-59	23-34%
	60-79	24-36%

Knowing your body composition can help you be aware of your health risks. Obesity is a medical term that refers to an excess amount of fat stored in the body, and it can cause various illnesses. The higher your percentage of body fat, the higher your risk of getting obesity-related illnesses. After smoking, obesity is the leading cause of preventable death in the United States. Obese people are at greater risk for Type 2 diabetes, coronary heart disease, stroke, certain cancers, osteoarthritis, sleep apnea and other serious illnesses.

Your body composition is measured using the Bioelectrical Impedance Analysis technique. This is based on lean tissues having high water content and providing a good electrical pathway. Fat mass contains a lower percentage of body water and is a poorer conductor of the electrical signal. Resistance is measured by sending a low-energy electrical signal through the body.

An alternate measurement to body fat is waist circumference or waist-to-hip ratio. Males should have a waist circumference of 35 inches or less or a waist-to-hip ratio no greater than .95. If you're a woman, a waist circumference of 33 inches or less or a waist-to-hip ratio no greater than .80 is desirable.

How can I improve my body composition and reduce my risk for obesity-related illnesses?

- Maintain a low-fat diet.
- Consume a higher amount of fiber. The daily recommendation is 25-35 grams.
- Follow the Food Guide Pyramid.
- Exercise regularly (three to five days per week). For example, accumulate 20-30 minutes of walking three to five days a week (10,000 steps a day).
- Increase daily activity (e.g., take the stairs, park farther from destination).
- Eat smaller, more frequent meals.
- Drink more water and less calorie-filled beverages, such as soft drinks and juice.

BLOOD PRESSURE

When blood pressure is taken, two numbers are measured. The first is the systolic or top number and the second is the diastolic or bottom number. Systolic measures pressure while the heart is actually beating. Diastolic measures pressure when the heart is resting between beats.

Your blood pressure should be below 120 for systolic and below 80 for diastolic. Any blood pressure reading between 120/80 and 139/89 is a prehypertensive classification. Someone who is prehypertensive may not have high blood pressure but is likely to develop it in the future. Any systolic reading above 140 or diastolic above 90 is high blood pressure, or hypertension. This is a risk factor for heart disease, which can lead to heart attack and stroke. Estimates are that one in four adult Americans has high blood pressure and nearly one-third who have high blood pressure do not know it.

If your blood pressure is high or on the high end of the normal range, consult your physician. Blood pressure levels may be temporarily elevated by caffeine, exercise, anxiety or a number of other sources.

TIPS TO REDUCE YOUR BLOOD PRESSURE LEVEL:

- Reduce stress.
- Decrease salt intake.
- Lose weight or maintain a healthy weight.
- Consume adequate amounts of potassium, calcium and magnesium.
- Limit alcohol consumption.
- Consume less dietary saturated fats (red meat, whole milk, cheese).
- Exercise regularly.
- If you smoke or use other tobacco products, quit.

CHOLESTEROL

Heart disease is the #1 killer in the United States. Having a high blood cholesterol level greatly increases your risk for heart disease. This is why you should be tested regularly for cholesterol. If your numbers are outside the desirable ranges, consult your physician. If you are over age 20 and your numbers are within a desirable range, you should have your cholesterol checked at least once every five years. Cholesterol is a necessary component of cell membranes and nerve fibers. It is important for Vitamin D and hormone production. It is manufactured by the liver and is in certain foods.

What do your numbers mean?

Total cholesterol level is determined by the amount of cholesterol you eat and the amount of cholesterol your body makes. A total cholesterol level greater than 200 mg/dL is a risk factor for heart disease. Your total cholesterol reading will include good and bad cholesterol.

- **High-density lipoprotein (HDL)** is your "good" cholesterol. It protects you from heart disease by transporting cholesterol away from the arteries and out of the body. Your HDL level should be greater than 40 mg/dL (greater than 60 mg/dL for maximum protection). You can raise HDL by quitting smoking if you smoke, losing weight or

maintaining a healthy weight, exercising and increasing the amount of monounsaturated fats in your diet.

- **Low-density lipoprotein (LDL)** is your “bad” cholesterol. LDL cholesterol clogs your arteries and increases your risk for heart disease. Aim for an LDL level less than 100 mg/dL. You can lower LDL by losing weight or maintaining a healthy weight, exercising, consuming fewer saturated fats, cutting back on foods high in cholesterol and eating more foods high in soluble fiber.

CHOLESTEROL/HDL RATIO

When is it ordered?

HDL is usually ordered with other tests, including cholesterol, LDL, and triglycerides as part of a lipid profile. A complete lipid profile requires fasting for at least 12 hours. If the testing occurs when a person is not fasting, only the HDL and total cholesterol values may be used for risk assessment.

What does the test result mean?

High HDL is better than low HDL. It is usually reported as a measured value. If HDL is less than 40 mg/dL (1.04 mmol/L), there is an increased risk of heart disease. A desirable level of HDL is greater than 40 mg/dL (1.04 mmol/L) and is associated with average risk of heart disease. A good level of HDL is 60 mg/dL (1.55 mmol/L) or more and is associated with a less than average risk of heart disease.

Some laboratories report a ratio of total cholesterol to HDL cholesterol. The ratio is obtained by dividing the total cholesterol by the HDL cholesterol. For example, if a person has a total cholesterol of 200 mg/dL and an HDL cholesterol level of 50 mg/dL, the ratio would be stated as 4 (or 4:1). A desirable ratio is below 5 (5:1); the optimum ratio is 3.5 (3.5:1). The American Heart Association recommends that the absolute numbers for total blood cholesterol and HDL cholesterol levels be used because they are more useful than the ratio in determining appropriate treatment for patients.

CHOLESTEROL LDL/HDL RATIO

This cholesterol ratio is also sometimes used to help predict the chances of developing heart disease. It looks at the ratio between bad cholesterol (LDL) to good cholesterol (HDL). For the LDL/HDL cholesterol ratio, the goal is to keep it below 3.5:1, with the ideal being under 2.5:1.

However, similar to the total/HDL cholesterol ratio, the medical community is divided on whether the LDL/HDL cholesterol ratio is better than total cholesterol or LDL cholesterol levels in predicting a person’s risk for heart disease. For treatment of high cholesterol, using the absolute numbers for LDL and HDL is recommended.

TOBACCO/NICOTINE

Tobacco/nicotine usage is currently the #1 preventable killer of American adults. Nicotine is a drug that is naturally present in the tobacco plant and is primarily responsible for a person's addiction to tobacco products. While using tobacco products, nicotine is absorbed quickly into the bloodstream and travels to the brain in a matter of seconds. Quitting tobacco usage decreases the risk of lung and other cancers, heart attack, stroke and chronic lung disease.

TIPS TO HELP YOU QUIT SMOKING

First and foremost, set a quit date and quit COMPLETELY on that day. To prepare for that day:

- Identify the times you are most likely to smoke. For example, do you tend to smoke when feeling stressed? When you are out at night with friends? While you are drinking coffee? When you are bored? While you are driving?
- Keep a diary to help you determine such risky times. Record each time you have a cigarette, including time of day and what you are doing.
- Make a plan about what you will do instead of smoking at those times that you are most likely to smoke. For example, drink tea instead of coffee — tea may not trigger the desire for a cigarette. Or, take a walk when feeling stressed. Remove ashtrays and cigarettes from the car. Place pretzels or hard candies there instead. Pretend-smoke with a straw.
- Let all of your friends, family, and co-workers know of your plan to stop smoking and your quit date. Just being aware that they know can be a helpful reminder and motivator.
- Prior to your quit date, start reducing your cigarette use, including decreasing the number and strength of the cigarettes. However, DON'T do this simply to make your diary "look good!" Get rid of all of your cigarettes just prior to the quit date and clean out anything that smells like smoke, such as clothes and furniture.

GLUCOSE

Glucose can be used to diagnose diabetes and to monitor patients who have diabetes. Diabetes is a very common disease that affects about 2% of the general population. Diabetes results from an insulin deficiency or insulin insensitivity. The chart below indicates the National Institutes of Health (NIH) recommended target for Fasting Blood Glucose:

FASTING BLOOD GLUCOSE

From 70 to 99 mg/dL (3.9 to 5.5 mmol/L)	Normal glucose tolerance
From 100 to 125 mg/dL (5.6 to 6.9 mmol/L)	Impaired fasting glucose (pre-diabetes)
126 mg/dL (7.0 mmol/L) and above on more than one testing occasion	Diabetes

HYPERGLYCEMIA AND HYPOGLYCEMIA

What is hyperglycemia?

Hyperglycemia (hi"per-gli-SE'me-ah) is an increase in plasma glucose (blood sugar). It can turn into a complex medical condition — diabetic ketoacidosis (ke"to-as"i-d-O'sis) and coma — if it's not treated in time and adequately. Hyperglycemia is usually the first sign of diabetes mellitus.

Symptoms of hyperglycemia are:

- polyuria (pol"e-YUR'e-ah) (excess urine)
- polydipsia (pol"e-DIP'se-ah) (thirst)
- polyphagia (pol"e-FA'je-ah) (excessive hunger)

What is hypoglycemia?

Hypoglycemia (hi"po-gli-SE'me-ah) is a low level of plasma glucose (blood sugar). It's a dangerous condition because glucose is the major source of energy for the brain. Lack of glucose, like lack of oxygen, produces brain damage or even death if the deficit is prolonged. Hypoglycemia can occur after insulin excess and/or inadequate glucose intake, among other causes. These situations are common in people with diabetes who receive too much insulin or who don't eat enough. Hypoglycemia starts to cause these symptoms when glucose levels fall below 50 milligrams per deciliter (mg/dL):

- sweating
- dizziness
- abnormal behavior
- tremors
- headache
- convulsions
- anxiety
- cloudy vision
- loss of consciousness
- hunger
- confusion

What should you do if hypoglycemia occurs?

If you suspect that you are hypoglycemic, you must eat carbohydrates (starches or sugars) immediately.

ADDITIONAL LAB MEASURES

ALBUMIN

Reference Range: 3.8-5.0 g/dL

Critical Level: <2 and >8 g/dL

Why get tested?

To screen for a liver disorder or kidney disease or to evaluate nutritional status, especially in hospitalized patients (prealbumin is sometimes used instead of albumin in this situation).

When to get tested?

If your doctor thinks you have symptoms of a liver disorder or kidney disease, if you have a recent, rapid weight change, or prior to a planned surgery. Higher values may indicate dehydration.

ALB/GLO RATIO-TOTAL PROTEIN

Reference Range: 6.5-8.3 mg/dL

Critical Level: <4 and >10

Why get tested?

To determine your nutritional status or to screen for certain liver and kidney disorders as well as other diseases.

When to get tested?

If you experience unexpected weight loss or fatigue or if your doctor thinks that you have symptoms of a liver or kidney disorder.

High Values may be an indicator of dehydration or chronic inflammation. Extremely low values may be associated with malnutrition or peripheral edema.

A1c

Reference Range: 4.6-6.0%

Critical Level: >12.0%

Also known as: Hemoglobin A1c, HbA1c, Glycohemoglobin, Glycated hemoglobin, Glycosylated hemoglobin.

Why get tested?

To monitor a person's diabetes and to aid in treatment decisions.

When to get tested?

When first diagnosed with diabetes and then 2 to 4 times per year.

What is being tested?

The A1c test evaluates the average amount of glucose in the blood over the last 2 to 3 months. It does this by measuring the concentration of glycosylated hemoglobin. As glucose circulates in the blood, some of it spontaneously binds to hemoglobin A (the primary form of hemoglobin in adults). Hemoglobin is a red protein that carries oxygen in the red blood cells (RBCs). Once the glucose is bound to the hemoglobin A, it remains there for the life of the red blood cell (about 120 days). The more glucose that is in the blood, the more that binds to hemoglobin A. This combination of glucose and hemoglobin A is called A1c (or hemoglobin A1c or glycohemoglobin). A1c levels do not change quickly but will shift as older RBCs die and younger ones take their place.

ALP-ALKALINE PHOSPHATASE

Reference Range: 60-109 mg/dL

Critical Level: >350 mg/dl

Alkaline Phosphatase is an enzyme found primarily in the liver and bones.

Why get tested?

To screen for or monitor treatment for a liver or bone disorder.

When to get tested?

As part of a routine liver panel or when a person has symptoms of a liver or bone disorder.

Elevated levels may be an indication of bone, kidney or liver disorders.

ALT

Reference Range: <50 U/L

Critical Level: >300 U/L

Alanine Aminotransferase (ALT) is an enzyme involved in the metabolism of the amino acid alanine. ALT is found in a number of tissues but in higher concentration in the liver.

Why get tested?
To screen for liver damage.

When to get tested?
If your doctor thinks that you have symptoms of a liver disorder.

What is being tested?
ALT is an enzyme found mostly in the liver; smaller amounts of it are also in the kidneys, heart, and muscles. Under normal conditions, ALT levels in the blood are low. When the liver is damaged, ALT is released into the blood stream, usually before more obvious symptoms of liver damage occur, such as jaundice (yellowing of the eyes and skin).

Elevated levels can be due to certain medications or extensive exercise, but can also be a sign of liver disorders.

AST

Reference Range: <40 U/L
Critical Level: >300 U/L

Aspartate Aminotransferase (AST) is an enzyme found in high concentration in heart muscle, liver cells, skeletal muscle cells and to a lesser degree in other tissues.

Why get tested?
To detect liver damage.

When to get tested?
If your doctor thinks that you have symptoms of a liver disorder.

What is being tested?
AST is an enzyme found mostly in the heart and liver, and to a lesser extent in other muscles. When liver or muscle cells are injured, they release AST into the blood.

Elevated levels of AST can indicate muscle trauma, heart damage or damage to the liver.

BILIRUBIN

Reference Range: <1.4mg/dL
Critical Level: >4.0mg/dL

Why get tested?
To screen for or monitor liver disorders.

When to get tested?
If your doctor thinks you have signs or symptoms of liver damage, liver disease, bile duct blockage, hemolytic anemia or liver-related metabolic problem.

Sample required?
In adults, a blood sample from a vein in the arm; in newborns, a blood sample from a heelstick; non-invasive technology is available in some health care facilities that will measure bilirubin by using an instrument placed on the skin (transcutaneous bilirubin meter).

BNP and NT-PROBNP

Reference Range: <125pg/mL, ages <75; <450, ages 75+
Critical Level: None

Why get tested?

To help diagnose the presence and severity of heart failure.

When to get tested?

If you have symptoms of heart failure, such as shortness of breath and fatigue, or if you are being treated for heart failure.

What is being tested?

These tests measure the concentration of BNP or NT-proBNP in the blood. When the heart is stressed, it produces a precursor, pro-BNP, which is cleaved to release the active hormone BNP and an inactive fragment, NT-proBNP. Both BNP and NT-proBNP are produced mainly in the heart's left ventricle (the organ's main pumping chamber). Your heart releases them as a natural response to heart failure, to hypotension (when your heart is not strong enough to pump enough oxygen-rich blood and nutrients to meet your body's needs), when the heart itself does not get enough oxygen (with angina and heart attack) and when the left ventricle has been "stretched" too much (hypertrophy) from the accumulation of blood and fluid.

BUN

Reference Range: 8-25 mg/dL
Critical Level: >50 mg/dL

Why get tested?

To evaluate kidney function and monitor the effectiveness of dialysis and other treatments related to kidney disease or damage.

When to get tested?

As part of a routine comprehensive or basic metabolic panel and when you are acutely or chronically ill with a condition that may cause or be exacerbated by kidney dysfunction.

CREATININE

Reference Range: 0.6-1.4 mg/dL
Critical Level: >3.0 mg/dL

Why get tested?

To determine if your kidneys are functioning normally and to monitor treatment for kidney disease.

When to get tested?

Routinely as part of a comprehensive or basic metabolic panel; if your doctor suspects that you are suffering from kidney dysfunction or if you are acutely or chronically ill with a condition that may affect your kidneys and/or be exacerbated by kidney dysfunction; at intervals to monitor treatment for kidney disease or kidney function while on certain medications.

Creatinine is a by-product of muscle tissue metabolism. Elevations might suggest kidney or vascular diseases. High protein diets may cause mild elevations.

FRUCTOSAMINE–GLYCOSYLATED SERUM PROTEIN (GSP)

Reference Range: <270 umol/L

Critical Level: >440 umol/L

How is it used?

Fructosamine testing has been available since the 1980s. Both fructosamine and A1c tests are used primarily as monitoring tools to help diabetics control their blood sugar, but the A1c test is much more popular and more widely accepted. However, the American Diabetes Association (ADA) recognizes both tests and says that fructosamine may be useful in situations where the A1c cannot be reliably measured. Instances where fructosamine may be a better monitoring choice than A1c include:

- Rapid changes in diabetes treatment—fructosamine allows the effectiveness of diet or medication adjustments to be evaluated after a couple of weeks rather than months.
- Diabetic pregnancy—good control is essential during pregnancy and the needs of the mother frequently change during gestation; fructosamine measurements may be ordered along with glucose levels to help monitor and accommodate shifting glucose and insulin requirements.
- RBC loss or abnormalities—an A1c test will not be accurate when a patient has a condition that affects the average age of red blood cells (RBCs) present, such as hemolytic anemia or blood loss. The presence of some hemoglobin variants may affect certain methods for measuring HbA1c. In these cases, fructosamine can be used to monitor glucose control.

Since the fructosamine concentrations of well-controlled diabetics may overlap with those of non-diabetics, the fructosamine test is not useful as a screen for diabetes.

When is it ordered?

Although not widely used, the fructosamine test may be ordered whenever the doctor wants to monitor a patient's average glucose over the past 2 to 3 weeks. It is primarily ordered when a diabetic treatment plan is being instituted or altered in order to monitor the effect of the change in diet or medication. Fructosamine levels also may be ordered when a diabetic patient is pregnant, or when they have an acute or systemic illness that may change their glucose and insulin requirements for a period of time. The fructosamine test may be used when monitoring is required and an A1c test cannot be reliably used.

If a patient's fructosamine is increased, then the patient's average glucose over the last 2 to 3 weeks has been elevated. In general, the higher the fructosamine concentration the higher the average blood glucose level. Trends may be more important than absolute values. If there is a trend from a normal to high fructosamine, it may indicate that a patient's glucose control is not adequate—that they are getting too much sugar, too little insulin, or that their insulin treatment has become less effective. Normal fructosamine levels may indicate that a patient is either not diabetic (and therefore should not be monitored) or that he has good diabetic control. A trend from high to normal fructosamine levels may indicate that changes to a patient's treatment regimen are effective. Fructosamine results must

be evaluated in the context of the patient's total clinical findings. Falsely low fructosamine results may be seen with decreased protein levels, increased protein loss, or a change in the type of protein produced by the body. In this case, a discrepancy between the results obtained from daily glucose monitoring and fructosamine testing may be noticed. Also, someone whose glucose concentrations swing erratically from high to low may have normal or near normal fructosamine and A1c levels but still have a condition that requires frequent monitoring.

Is there anything else I should know?

High levels of vitamin C (ascorbic acid), lipemia (high amount of fat in the blood), hemolysis (breakdown of RBCs) and hyperthyroidism can interfere with test results.

GGT

Reference Range <65 U/L

Critical Level: >400

Why get tested?

To screen for liver disease and/or alcohol abuse or to differentiate between liver and bone disease as a cause for elevated alkaline phosphatase (ALP).

When to get tested?

If your doctor thinks that you have symptoms of a liver disorder.

GLOBULIN

Reference Range: 2.2-3.7 g/dL

Critical Level: >6.0

Globulin is one of the two types of serum proteins, the other being albumin. This generic term encompasses a heterogeneous series of families of proteins, with larger molecules and less soluble in pure water than albumin, which migrate less than albumin during serum electrophoresis. Globulins are also found in seed storage proteins such as wheat gluteins, one of which may be an antigen associated with rare forms of juvenile onset diabetes.

It is sometimes used synonymously with Globular protein. However, albumin is also a globular protein, but not a globulin. All other serum globular proteins are globulins.

Protein electrophoresis is used to categorize globulins into the following four categories:

- Alpha 1 globulins
- Alpha 2 globulins
- Beta globulins
- Gamma globulins (immunoglobulins)

Recent studies have suggested that people who have elevated homocysteine levels have a much greater risk of heart attack or stroke than those with average levels. Increased concentrations of homocysteine have been associated with an increased tendency to form inappropriate blood clots. When this happens it can lead to heart attack, strokes and blood vessel blockages in any part of the body.

hs-CRP

Reference Range <3.0 mg/L

Critical Level: None

Also known as: High-sensitivity CRP

Formal name: High-sensitivity C-reactive protein

Why get tested?

May be helpful in assessing risk of developing heart disease.

When to get tested?

No current consensus exists on when to get tested; the test is most often done in conjunction with other tests that are ordered to assess risk of heart disease, such as lipid profiles.

What is being tested?

C-reactive protein (CRP) is a substance made by the liver and secreted into the bloodstream, increasing when inflammation is present. CRP has been used for many years as an indicator of bacterial or viral infection and as a monitor of changes in inflammation associated with many inflammatory and autoimmune diseases.

Some studies have shown that CRP also can be an indicator of risk of cardiovascular disease in apparently healthy people. However, the level of CRP in the blood is normally so low that an especially sensitive test is needed to measure it. This test is called high-sensitivity CRP or hs-CRP.

CBC (Complete Blood Count)

The following tests are part of the CBC:

1. HEMATOCRIT-HCT

The CBC is used as a broad screening test to check for such disorders as anemia, infection and many other diseases.

It is actually a panel of tests that examines different parts of the blood.

Why get tested?

If you have anemia (too few red blood cells) or polycythemia (too many red blood cells), to assess the severity of these conditions and to monitor their response to treatment.

2. HOMOCYSTEINE

Why get tested?

To determine if you are at increased risk of a heart attack or stroke; to determine if you are folate-deficient or B12-deficient; to help diagnose a rare inherited disorder called homocystinuria.

When to get tested?

If you have had a heart attack or stroke, or as part of a cardiac risk assessment; when a doctor suspects a vitamin B12 or folate deficiency or suspects that an infant or young person may have homocystinuria.

What is being tested?

This test determines the level of homocysteine in the blood or urine. Homocysteine is a sulfur-containing amino acid that is normally present in very small amounts in all cells of the body. Homocysteine is a product of methionine metabolism.

Methionine is one of the eleven “essential” amino acids—amino acids that must be derived from the diet since the body cannot produce them. In healthy cells, homocysteine is quickly converted to other products.

Homocysteine can be greatly increased in the blood and urine of patients with a rare inherited condition called homocystinuria. This disorder is caused by an alteration in one of several different genes. The affected person has a dysfunctional enzyme that does not allow the normal breakdown of methionine. Because of this, homocysteine and methionine begin to build up in the person’s body. A baby with this condition will appear normal at birth but within a few years will begin to develop signs such as a dislocated lens in the eye, a long slender build, long thin fingers, skeletal abnormalities, osteoporosis and a greatly increased risk of thromboembolism and of atherosclerosis that can lead to premature cardiovascular disease. The buildup may also cause progressive mental retardation, behavioral disorders and seizures.

Vitamins B6, B12 and folate are necessary to metabolize homocysteine. Patients who are deficient in these vitamins may have increased levels of homocysteine.

3. MCV, MCH, MCHC, and RDW

NOTE: A standard reference range is not available for this test. Because reference values are dependent on many factors, including patient age, gender, sample population and test method, numeric test results have different meanings in different labs.

- **MCV**

Mean corpuscular volume (MCV) is a measurement of the average size of your RBCs. The MCV is elevated when your RBCs are larger than normal (macrocytic), for example in anemia caused by vitamin B12 deficiency. When the MCV is decreased, your RBCs are smaller than normal (microcytic) as is seen in iron deficiency anemia or thalassemias.

- **MCH**

Mean corpuscular hemoglobin (MCH) is a calculation of the average amount of oxygen-carrying hemoglobin inside a red blood cell. Macrocytic RBCs are large so tend to have a higher MCH, while microcytic red cells would have a lower value.

- **MCHC**

Mean corpuscular hemoglobin concentration (MCHC) is a calculation of the average concentration of hemoglobin inside a red cell. Decreased MCHC values (hypochromia) are seen in conditions where the hemoglobin is abnormally diluted inside the red cells, such as in iron deficiency anemia and in thalassemia. Increased MCHC values (hyperchromia) are seen in conditions where the hemoglobin is abnormally concentrated inside the red cells, such as in burn patients and hereditary spherocytosis, a relatively rare congenital disorder.

- **RED BLOOD CELL DISTRIBUTION WIDTH**

The red blood cell distribution width, or RDW, is a measure of the variation of red blood cell volume that is reported as part of a standard complete blood count.

Usually red blood cells are a standard size. Certain disorders, however, cause a significant variation in cell size. Higher RDW values indicate greater variation in size. Normal range in human red blood cells is 11–15%. If anemia is observed, RDW test results are often used together with MCV results to figure out what the cause of the anemia might be. It is mainly used to differentiate between iron deficiency anemia, in which RDW is elevated, and other microcytic anemias. It may denote hereditary spherocytosis. An elevated RDW, i.e. red blood cells of unequal sizes, is known as anisocytosis.

4. RED BLOOD CELL COUNT

NOTE: A standard reference range is not available for this test. Because reference values are dependent on many factors, including patient age, gender, sample population and test method, numeric test results have different meanings in different labs.

This test counts the number of red blood cells (RBC) in a sample of whole blood. Red blood cells, which are made in the bone marrow, carry oxygen from the lungs to the cells of organs in the body and transport carbon dioxide from those cells back to the lungs. Women tend to have lower RBC counts than men, while levels may decrease with age. Changes in the RBC count are usually associated with changes in hemoglobin levels. When the values of the RBC count and hemoglobin decrease below the established reference range, the patient is said to be anemic. When the values increase above this range, the patient is said to be polycythemic.

Why get tested?

To evaluate any change in the number of red blood cells in your blood, such as to diagnose anemia.

WHITE BLOOD CELL COUNT

NOTE: A standard reference range is not available for this test. Because reference values are dependent on many factors, including patient age, gender, sample population and test method, numeric test results have different meanings in different labs.

The white blood cell (WBC) count numerates the number of white blood cells in a sample of blood. An abnormal high or low count may suggest the presence of illness. White blood cells are made in the bone marrow and protect the body against infection and aid in the immune response. If there is an infection, white blood cells will attack and destroy the bacteria, fungus or virus causing the infection.

Why get tested?

If your doctor thinks that you might have an infection or a disease that affects the production of white blood cells, and to monitor treatment.

PLATELET COUNT

The platelet count is the number of platelets in a given volume of blood. Both increases and decreases can point to abnormal conditions of excess bleeding or clotting. Mean platelet volume (MPV) is a machine-calculated measurement of the

average size of your platelets. New platelets are larger, and an increased MPV occurs when increased numbers of platelets are being produced. MPV gives your doctor information about platelet production in your bone marrow.

Why get tested?

To diagnose a bleeding disorder or a bone marrow disease.

PSA

Reference Range: 0-4.0 ng/mL

Critical Level: >20 ng/mL

Why get tested?

To screen asymptomatic and symptomatic men for prostate cancer, to help determine the necessity for a biopsy of the prostate, to monitor the effectiveness of treatment for prostate cancer and to detect recurrence of prostate cancer.

When to get tested?

The frequency of PSA testing is an individual decision that should be determined through discussion with your physician. There is continued debate among experts and national organizations over when and how often to order the PSA test to screen asymptomatic men. (For specific details, see prostate cancer screening for adults and adults 50 and up). PSA testing may be performed when a man has symptoms suggestive of prostate cancer such as difficult, painful and/or frequent urination. It may also be ordered during and at regular intervals after prostate cancer treatment.

T4

Also known as: Total T4 and Free T4

NOTE: A standard reference range is not available for this test because reference values are dependent on many factors, including patient age, gender, sample population and test methods.

Why get tested?

To help evaluate thyroid gland function; to help diagnose hypothyroidism or hyperthyroidism; to screen for hypothyroidism in newborns.

What is being tested?

This test measures the amount of thyroxine, or T4, in your blood. T4 is one of two major hormones produced by the thyroid gland (the other is called triiodothyronine, or T3). The thyroid is a small, butterfly-shaped gland located just below the Adam's apple. This gland plays a vital role in controlling the rate at which your body uses energy.

The body has a feedback system that turns thyroid hormone production on and off. When the level of T4 in the bloodstream decreases, the hypothalamus (an organ in the brain) releases thyrotropin releasing hormone, which stimulates the pituitary gland (an organ below the hypothalamus) to release thyroid-stimulating hormone (TSH), which in turn stimulates the thyroid gland to make and/or release more T4. As blood concentrations of T4 increase, TSH release is inhibited.

The most common causes of thyroid dysfunction are autoimmune-related. Graves' disease causes hyperthyroidism and Hashimoto's thyroiditis causes hypothyroidism. Both hyper- and hypothyroidism can also be caused by thyroiditis (thyroid inflammation), thyroid cancer and excessive or deficient production of TSH. The effect of these conditions on thyroid hormone production can be detected and monitored by measuring the total T4 (includes bound and free portion) or the free T4 (unbound form).

TRIGLYCERIDES

What are triglycerides?

Triglycerides are the chemical form in which most fat exists in food as well as in the body. They're also present in blood plasma and, in association with cholesterol, form the plasma lipids.

Triglycerides in plasma are derived from fats eaten in foods or made in the body from other energy sources like carbohydrates. Calories ingested in a meal and not used immediately by tissues are converted to triglycerides and transported to fat cells to be stored. Hormones regulate the release of triglycerides from fat tissue so they meet the body's needs for energy between meals.

How is an excess of triglycerides harmful?

Excess triglycerides in plasma is called hypertriglyceridemia. It's linked to the occurrence of coronary artery disease in some people. Elevated triglycerides may be a consequence of other disease, such as untreated diabetes mellitus. Like cholesterol, increases in triglyceride levels can be detected by plasma measurements. These measurements should be made after an overnight food and alcohol fast.

What are the National Cholesterol Education Program guidelines for triglycerides?

AHA Recommendation — Dietary Treatment Goals

Changes in lifestyle habits are the main therapy for hypertriglyceridemia.

These are the changes you need to make:

- If you're overweight, cut down on calories to reach your ideal body weight. This includes all sources of calories, from fats, proteins, carbohydrates and alcohol.
- Reduce the saturated fat, trans fat and cholesterol content of your diet.
- Reduce your intake of alcohol considerably. Even small amounts of alcohol can lead to large changes in plasma triglyceride levels.
- Be physically active for at least 30 minutes on most or all days each week.
- People with high triglycerides may need to substitute monounsaturated and polyunsaturated fats —such as those found in canola oil, olive oil or liquid margarine — for saturated fats. Substituting carbohydrates for fats may raise triglyceride levels and may decrease HDL ("good") cholesterol in some people.
- Substitute fish high in omega-3 fatty acids instead of meats high in saturated fat like hamburger. Fatty fish like mackerel, lake trout, herring, sardines, albacore tuna and salmon are high in omega-3 fatty acids.

Because other risk factors for coronary artery disease multiply the hazard from hyperlipidemia, control high blood pressure and avoid cigarette smoking. If drugs are used to treat hypertriglyceridemia, dietary management is still important. Patients should follow the specific plans laid out by their physicians and nutritionists.

TSH

Reference Range: 0.27-4.20 mIU/L

Critical Level: None

Also known as: Thyrotropin
Formal name: Thyroid-stimulating hormone

Why get tested?

To screen for and help diagnose thyroid disorders; to monitor treatment of hypothyroidism and hyperthyroidism.

When to get tested?

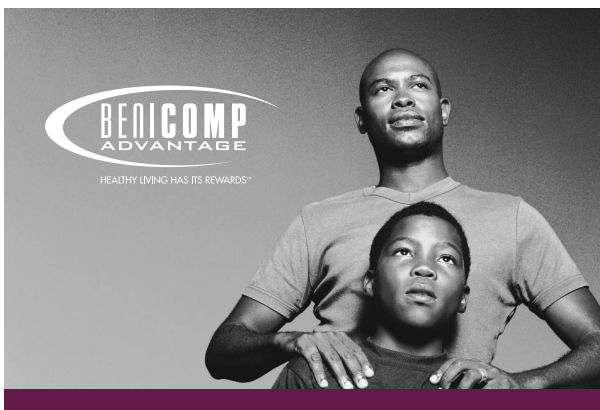
For screening: There is no consensus within the medical community as to the age adult screening should begin or whether screening should be done; however, newborn screening is widely recommended.

For monitoring treatment: as directed by your doctor
Otherwise: when a patient has symptoms of hyper- or hypothyroidism and/or an enlarged thyroid.

What is being tested?

This test measures the amount of thyroid-stimulating hormone (TSH) in your blood. TSH is produced by the pituitary gland, a tiny organ located below the brain and behind the sinus cavities. It is part of the body's feedback system to maintain stable amounts of the thyroid hormones thyroxine (T4) and triiodothyronine (T3) in the blood. Thyroid hormones help control the rate at which the body uses energy. When concentrations decrease in the blood, the hypothalamus (an organ in the brain) releases thyrotropin releasing hormone (TRH). This stimulates the release of TSH by the pituitary gland. The TSH in turn stimulates the production and release of T4 and T3 by the thyroid gland, a small butterfly-shaped gland that lies in the neck flat against the windpipe. When all three organs are functioning normally, thyroid production turns on and off to maintain constant blood thyroid hormone levels.

If there is pituitary dysfunction, then increased or decreased amounts of TSH may result. When TSH concentrations are increased, the thyroid will make and release inappropriate amounts of T4 and T3 and the patient may experience symptoms associated with hyperthyroidism, such as rapid heart rate, weight loss, nervousness, hand tremors, irritated eyes and difficulty sleeping. If there is decreased production of thyroid hormones (hypothyroidism), the patient may experience symptoms such as weight gain, dry skin, constipation, cold intolerance and fatigue. In addition to pituitary dysfunction, hyper- or hypothyroidism can occur if there is a problem with the hypothalamus (insufficient or excessive TRH). Thyroid hormone levels may also be altered by a variety of thyroid diseases regardless of the amount of TSH present in the blood.



RESULTS TRACKER

COMPONENTS	DESIRED RANGE	CURRENT LEVEL	PRIOR YEAR	OTHER
Total Cholesterol	<200			
LDL	<100			
HDL	>40			
Glucose	<100			
Triglycerides	<150			
Blood Pressure	120/80			
BMI	18-24.9			
Weight				

Please note that information provided in this pamphlet is not intended to be medical advice and should not be relied on as such.

Although the laboratory provides the largest single source of objective, scientific data on patient status, it is only one part of a complex biological picture of health or disease. Our goal is to assist you in understanding the purpose of laboratory tests and the general meaning of your laboratory results.

It is important that you communicate with your physician so that together you can integrate the pertinent information, such as age, ethnicity, health history, signs and symptoms, laboratory and other procedures, to determine your health status. The information provided through this pamphlet is not intended to substitute for such consultations with your physician nor medical advice specific to your health condition.

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