

# Understanding Your Blood

## Test Lab Results

A comprehensive "Health Panel" has been designed specifically to screen for general abnormalities in the blood. This panel includes:

- General Chemistry Screen or (SMAC),
- Complete Blood Count or (CBC), and
- Lipid examination.

A 12 hour fast from all food and drink (water is allowed) is required to facilitate accurate results for some of the tests in this panel. Below, is a breakdown of all the components and a brief explanation of each test.

Abnormal results do not necessarily indicate the presence of disease. However, it is very important that these results are interpreted by your doctor so that he/she can accurately interpret the findings in conjunction with your medical history and order any follow-up testing if needed. The Bernards Township Health Department and the testing laboratory cannot interpret these results for you. You must speak to your doctor!



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## Chemistry Screen Components

**Albumin:** A major protein of the blood, albumin plays an important role in maintaining the osmotic pressure of water in the blood vessels. It is made in the liver and is an indicator of liver disease and nutritional status.

**A/G Ratio:** A calculated ratio of the levels of Albumin and Globulin, 2 serum proteins. Low A/G ratios can be associated with certain liver diseases, kidney disease, myeloma and other disorders.

**ALT:** Also known as SGPT, ALT is an enzyme produced by the liver and is useful in detecting liver disorders.

**Alkaline Phosphatase:** Alk. Phos is another enzyme produced mainly by the liver and the bones. It is useful in detecting liver and bone abnormalities. Increased levels are sometimes observed during the normal aging process.

**AST:** Also known as SGOT, AST is an enzyme made in the heart, liver, muscle, kidney, pancreas, spleen and lungs. Disorders involving these tissues can yield elevated AST levels.

**Bilirubin, Total:** A bile pigment formed by the spleen, bilirubin is transported by albumin to the liver for excretion in the feces. Elevated levels can be associated with liver disease, bile duct obstruction or hemolytic (red cell) disease.

**BUN (Blood Urea Nitrogen):** BUN is the main waste product produced by the liver during the breakdown of proteins. 90% of BUN is excreted by the kidneys and elevated levels can be associated with kidney disease, urinary tract blockage, congestive heart failure or a high protein diet. Low BUN levels are associated with liver disease, pregnancy, and low protein diets.

**Calcium:** A mineral with many uses. Calcium is important in bone formation, muscle contraction and blood clotting. Abnormal calcium levels can be associated with bone disease and many other conditions.

**Chloride:** Chloride is involved in maintaining the water and acid-base balance in body fluids. Chloride levels are closely associated with sodium levels and abnormal levels can be linked to metabolic acidosis, gastro-intestinal or kidney disease or adrenal gland disorders.

**Creatinine:** A product formed from the breakdown of creatine in the muscles. Creatinine is released by the muscles into the bloodstream and excreted by the kidneys. Elevated levels are therefore used as an indicator of kidney disease.

**Glucose:** A sugar used as a primary energy source for bodily functions. Glucose levels are regulated by many hormones including insulin. Blood glucose levels are useful in diagnosing and monitoring diabetes, carbohydrate metabolism and other disorders.

**Globulin:** A primary protein group in the blood, abnormal globulin is often associated with liver or collagen disease.

**Iron:** Abnormal blood iron levels can be associated with anemias, acute and chronic inflammatory diseases, hepatitis and iron overload disorders.

**LDH (Lactate Dehydrogenase):** An enzyme found in heart, liver, kidney and muscle tissue. Tissue damage, myocardial infarction, types of anemia, liver disease, cancer, muscular dystrophy can all cause elevated LDH levels.

**Magnesium:** Concentrated mostly in the bones, magnesium is necessary for the proper functioning of muscle and nervous tissue. Abnormal levels can be associated with cardiac arrhythmias, renal failure or in people ingesting antacids containing magnesium.

**Phosphorus:** Primarily found in the bones with calcium. Phosphorus is important in bone formation, metabolism, acid-base balance. Phosphorus levels fluctuate throughout the day and can be affected by diet and some antacids. Abnormal levels can be found in types of bone disease and other disease states.

**Potassium:** Potassium plays a vital role heart and muscle contraction and in nervous tissue function. Abnormal levels can be associated with diseases of the kidney, adrenal gland and gastrointestinal tract.

**Protein, Total:** Blood protein has many functions including: transport of other substances, immune defense, blood clotting, and inflammation defense. Protein levels are useful in evaluating nutritional status, infection and various other disorders.

**Sodium:** Sodium plays an important role in maintaining water and acid-base balance and nerve stimulation. Abnormal levels can be caused by many different disease states.

**Uric Acid:** A byproduct formed in the liver and excreted by the kidneys in the urine. Abnormal levels can be seen in, gout, kidney failure, dehydration, liver and endocrine disorders.

## **CBC (Complete Blood Count) Components**

**WBC (White Blood Cell):** A measurement of the blood's WBC which aids the physician in detecting states of infection and/or leukemia.

**RBC (Red Blood Cell):** A measurement of the blood's RBC's which aids the physician in detecting anemias, bleeding and other disorders.

**Hemoglobin:** A substance found within red blood cells (RBC) that is responsible for transporting oxygen throughout the body. Levels of hemoglobin are useful in evaluating blood loss, anemia, and hemolysis.

**Hematocrit:** This component is useful in evaluating anemia, blood loss, hemolytic anemia and state of hydration.

**MCV (Mean Corpuscular Volume):** MCV is a calculation used to estimate the average size of the red blood cell (RBC).

**MCH (Mean Cell Hemoglobin):** MCH is a calculation used to determine the content of hemoglobin within the RBC.

**MCHC (Mean Cell Hemoglobin Concentration):** See MCH.

**RDW (RBC Distribution Width):** RDW is a calculation used as an index of size of the RBC.

**MPV (Mean Platelet Volume):** MPV is a calculation and represents the average size of platelets.

**Platelet:** Platelets are a component of the blood responsible primarily for clotting. The platelet count helps to evaluate different bleeding disorders, states of leukemia, and chemotherapy.

**Neutrophil, Lymphocyte, Monocyte, Eosinophil, Basophil:** These 5 components make up what is known as a *Differential*. The *Differential* is used to determine the variations in WBC (White Blood Cell) numbers and types.

## Lipid Panel Components

**Cholesterol:** Used as the primary means for screening, total cholesterol levels correlate to the risk for coronary heart disease.

**Triglyceride:** This represents the fats stored in the tissue. Elevated levels of both triglyceride and cholesterol increases the probability of coronary artery disease.

**HDL (High Density Lipoprotein):** Considered as the “good” lipoprotein, HDL helps regulate blood cholesterol levels. HDL carries cholesterol away from blood vessels to the liver where it is eliminated.

**LDL (Low Density Lipoprotein):** Considered as the “bad” lipoprotein, LDL tends to bind cholesterol in the blood vessels forming fatty deposits.

**VLDL (Very Low Density Lipoprotein):** VLDL contains large quantities of triglyceride and is another form of lipoprotein responsible for the transport of fats and cholesterol.

**Risk Factor:** This is a calculation derived from the measured results of the lipid panel components. Risk factor illustrates what degree of risk a patient shows for coronary heart disease.

## Optional Tests

**PSA (Prostate Specific Antigen):** The PSA is to detect or monitor patients with prostate cancer. PSA is produced by hyperplastic and cancerous prostatic tissue and elevated levels in the blood correlate directly with progression of the disease. This test is most valuable when performed in conjunction with a digital rectal exam.

**TSH (Thyroid Stimulating Hormone):** TSH is a normal hormone released by the pituitary gland. TSH is responsible for stimulating the thyroid gland to produce thyroid hormones T<sub>3</sub> and T<sub>4</sub>. Abnormal levels of TSH can be a direct indicator of hyper or hypo-thyroidism or a damaged pituitary gland.

**T<sub>4</sub>:** T<sub>4</sub> or 'Thyroxine' is the major hormone secreted by the thyroid gland and is involved in controlling the rate of metabolic processes and physical development in the body. T<sub>4</sub>, along with TSH, aids in the diagnosis and monitoring of hyper or hypo-thyroidism.

**T<sub>3</sub>-Uptake:** Ordered in conjunction with a T<sub>4</sub>, the results of both the T<sub>4</sub> and T<sub>3</sub>-uptake, through a standardized calculation, yield a value called a Free Thyroxine Index (FTI). This value aids the physician in determining the overall activity of the thyroid gland.

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