

## MALE AND FEMALE PANEL CHARTS

### Complete Blood Count (CBC)

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Red blood cell count</b>	Total number of red blood cells per volume of whole blood	Blood loss Hemorrhage Bone marrow failure Deficiencies of iron, folate, or vitamins B6 or B12 Hemolysis Certain cancers	High altitude Congenital heart disease Cor pulmonale Polycythemia vera Pulmonary fibrosis Dehydration
<b>Hemoglobin</b>	Hemoglobin is the component of red blood cells that carries oxygen and carbon dioxide  Screens for anemia and may detect red blood cell breakdown or hemolytic anemia	Anemia Blood loss Deficiencies of iron, folate, or vitamins B6 or B12	Sickle cell anemia Thalassemia Transfusion reaction Hemolysis Dehydration Polycythemia vera High altitude
<b>Hematocrit</b>	Measures proportion of red blood cells to plasma	Anemia Blood loss Bone marrow failure Hemolysis Certain cancers Deficiencies of iron, folate, or vitamins B6 or B12 Cirrhosis	Dehydration Polycythemia vera High altitude
<b>Mean corpuscular volume (MCV)</b>	Calculates the size of red blood cells  Differential diagnosis of anemias  Screen for occult alcoholism	Microcytic anemia Iron deficiency Thalassemia ssemia	Macrocytic anemia Folic acid or B12 deficiency Alcohol abuse Hereditary spherocytosis

Test	What this test measures	What test results may indicate			
		Low values		High values	
<b>Mean corpuscular hemoglobin</b>	Amount of hemoglobin per red blood cell	Microcytic or normocytic anemia	Macrocytic anemia		
	Differential diagnosis of anemias	Iron deficiency	Folic acid or B12 deficiency		
<b>Mean corpuscular hemoglobin concentration</b>	Concentration of hemoglobin per red blood cell	Hypochromic anemia	Hereditary spherocytosis		
	Used for laboratory quality control	Iron deficiency Thalassemia			
<b>RBC distribution width (RDW)</b>	Measures size variability of red blood cell population  Distinguishes iron-deficiency anemia from anemia of chronic disease  Improves early detection of iron, B12, or folate deficiency  No subnormal values have been reported	<b>MEAN CORPUSCULAR VOLUME (MCV)</b>			
		<b>RDW</b>	<b>LOW</b>	<b>NORMAL</b>	<b>HIGH</b>
		Normal	Anemia of chronic disease	Anemia of Chronic disease	Myeloplastic syndrome
		High	Iron deficiency	Early deficiency of iron, vitamin B12, or folate	Deficiency of iron, vitamin B12, or folate
<b>White blood cell count</b>	Measures total white blood cell component of whole blood	Bone marrow failure	Infectious diseases (bacterial, viral, parasitic, or protozoal)		
		Presence of toxic substance	Inflammatory disease		
<b>Neutrophils</b>	The first white blood cells to respond to infection	Autoimmune diseases	Leukemia		
		Aplastic anemia	Severe emotional or physical stress		
		Liver or spleen disease	Tissue damage		
		Radiation exposure			
		Chronic infections	Bacterial, viral and parasitic infections		
		Bone marrow depression	Emotional and physical stress		
Vitamin B12 or folic acid deficiency	Hypersensitivity reactions				
Systemic lupus erythematosus	Diabetic acidosis				
			Polycythemia vera		
			Rheumatoid arthritis		

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Lymphocytes</b>	Assesses immune function	Chemotherapy Corticosteroids Congestive heart failure Aplastic anemia Malignancy AIDS Renal failure	Viral Infections: (eg., mononucleosis, hepatitis, mumps, rubella, varicella) Recovery from acute infection Addison's disease Inflammatory bowel disease Drug hypersensitivity
<b>Monocytes</b>	Monocytes provide a defense against infectious organisms through the process of ingestion, or phagocytosis  High levels often signify infection	Rheumatoid arthritis Prednisone treatment	Bacterial, viral, parasitic or protozoal infections  Leukemia (AML, CML)  Hodgkin's and non-Hodgkin's lymphoma Myeloproliferative disease Autoimmune disorders
<b>Eosinophils</b>	Eosinophils are usually found in the tissues  Presence in the blood usually indicates allergy or infection	Cushing's syndrome	Systemic parasitic infestation or fungal infection  Food allergies  Hay fever, asthma, or allergies  Pulmonary syndromes  Vascular diseases  Immune deficiencies  Drug reactions  Inflammation
<b>Basophils</b>	Often the first sign of blast crisis or an accelerated phase of chronic myelogenous leukemia	Hyperthyroidism  Pregnancy  Post irradiation or chemotherapy  Following glucocorticoid administration  Acute phase of infection	Chronic myelogenous leukemia  Basophilic leukemia  Polycythemia  Myeloid metaplasia Hodgkin's disease Post-splenectomy Chronic hemolytic anemia  Chronic sinusitis  Varicella, variola infections  Ionizing radiation

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Platelet count</b>	Platelets are necessary for normal blood clotting, and counts may be affected by several disease states	Chemotherapy Hemolytic anemia Hypersplenism Idiopathic thrombocytopenia purpura Vitamin B12 or folate deficiency Leukemia Prosthetic heart valves Sequelae of massive blood transfusion Disseminated intravascular coagulation	Post-splenectomy syndrome Primary thrombocytosis Certain malignancies Early chronic myelogenous leukemia Polycythemia vera Rheumatoid arthritis

### Chemistry Panel

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Glucose, fasting</b>	Direct measure of glucose  Common evaluation of diabetes and hypoglycemia	Pancreatic disorders Endocrine disorders (e.g., early diabetes mellitus) Malnutrition Liver damage (alcoholism) Insulin overdose Hypoglycemia	Diabetes mellitus Increased circulating epinephrine (e.g., due to emotion, burns, shock, anesthesia) Acute or chronic pancreatitis Vitamin B1 deficiency Drug interactions
<b>Uric acid</b>	Evaluation of gout, recurrent urinary stones, or kidney failure	Overhydration Severe liver damage Malnutrition Low protein intake	Gout Impaired kidney function Leukemia Dehydration Shock Urinary tract obstruction High protein intake

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>BUN (blood urea nitrogen)</b>	Measures liver function, provides indirect assessment of kidney function and filtration rate	Low protein intake Overhydration Liver disease Malnutrition Celiac disease Anabolic steroid use	Chronic renal disease Urinary tract obstruction Congestive heart failure Shock Ketoacidosis Dehydration Acute myocardial infarction Bleeding from the GI tract Muscle wasting
<b>Creatinine</b>	Creatinine is a byproduct of creatine phosphate breakdown from energy metabolism  Estimates kidney filtration rate and follows progression of renal disease  More specific of renal disease than BUN – tests used simultaneously for more complete picture	Decreased muscle mass Liver disease Inadequate dietary protein	Impaired kidney function High consumption of red meat Muscle diseases (e.g., muscular dystrophy, acromegaly, gigantism) Congestive heart failure Dehydration
<b>BUN/creatinine ratio</b>	Assesses kidney function, monitors renal disease	<u>With low BUN:</u> Low-protein diet Starvation Overhydration Severe liver disease Repeated dialysis Pregnancy <u>With high creatinine:</u> Rhabdomyolysis (severe muscle injury) Muscular patients who develop renal failure	<u>With normal creatinine:</u> Heart failure Salt depletion Dehydration Blood loss Catabolic states (increased tissue breakdown) GI hemorrhage High protein intake Impaired kidney function Drug interactions <u>With high creatinine:</u> Postrenal azotemia Prerenal azotemia

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Sodium</b>	Evaluates and monitors fluid and electrolyte balance and therapy	<p>Excessive fluid loss due to sweating, vomiting, diarrhea</p> <p>Pyloric obstruction</p> <p>Malabsorption</p> <p>Adrenal cortical insufficiency</p> <p>Diabetic acidosis</p> <p>Diuretics</p> <p>Hypothyroidism</p> <p>Chronic or acute renal failure</p>	<p>Dehydration</p> <p>Primary aldosteronism</p>
<b>Potassium</b>	<p>Evaluates and monitors electrolyte balance</p> <p>Especially important for cardiac patients</p>	<p>Diarrhea or vomiting</p> <p>Excessive sweating</p> <p>Pyloric obstruction</p> <p>Starvation</p> <p>Malabsorption</p> <p>Primary aldosteronism</p> <p>Diuretics</p>	<p>Acute renal failure</p> <p>Dehydration</p> <p>Adrenal cortical insufficiency</p>
<b>Chloride</b>	<p>Evaluates and monitors electrolyte balance</p> <p>May indicate acid-base balance and hydration status</p>	<p>Pulmonary emphysema</p> <p>Congestive heart failure</p> <p>Excessive sweating</p> <p>Diarrhea</p> <p>Adrenal cortical insufficiency</p> <p>Diabetic acidosis</p> <p>Diuretics</p>	<p>Dehydration</p> <p>Hyperventilation</p> <p>Diabetes insipidus</p> <p>Kidney disorders</p> <p>Hyperparathyroidism</p>
<b>Carbon dioxide</b>	Evaluates blood pH	<p>Respiratory alkalosis (e.g., hyperventilation)</p> <p>Metabolic acidosis (e.g., diabetes)</p> <p>Severe diarrhea</p> <p>Kidney or heart failure</p>	<p>Respiratory acidosis (e.g., chronic obstructive pulmonary disease)</p> <p>Metabolic alkalosis (e.g., severe vomiting)</p>

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Calcium</b>	Evaluates parathyroid function and calcium metabolism	Magnesium deficiency Hyperphosphatemia Hypoparathyroidism Vitamin D deficiency Malabsorption Hypoalbuminemia	Hyperparathyroidism Hyperthyroidism Paget's disease Excess ingestion of vitamins A or D Cancer Bone fracture combined with bed rest
<b>Phosphorus</b>	Measures serum phosphorus levels	Hyperparathyroidism Ricketts or osteomalacia Vitamin D deficiency Hyperinsulinemia Antacids Diuretics Long-term steroid use Severe malnutrition	Hypoparathyroidism Bone cancer Excessive vitamin D intake Low blood calcium levels Exercise Dehydration Healing bone fractures Diabetes mellitus with ketosis Liver disease, cirrhosis Renal insufficiency
<b>Protein</b>	Measures total protein in the blood, including albumin and globulin  Evaluates nutritional status, blood osmotic pressure, renal and other chronic diseases	Diarrhea Malnutrition Malabsorption Liver disease Crohn's disease or ulcerative colitis Thyroid disease Severe burns Severe skin disease Heart failure Chronic alcoholism	Dehydration Chronic liver disease Neoplasms Tropical diseases (e.g., leprosy) Granulomatous diseases Chronic infection Inflammatory diseases
<b>Albumin/globulin ratio</b>	Evaluates renal disease and other chronic diseases	Liver dysfunction Multiple myeloma Autoimmune disease	Hypothyroidism Underproduction of immunoglobulins Glucocorticoid excess (from drugs or tumors)

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<b>Bilirubin</b>	Evaluates liver and gallbladder function	Drug interference (e.g., barbiturates)	<ul style="list-style-type: none"> <li>Liver disease</li> <li>Hepatitis</li> <li>Cirrhosis</li> <li>Biliary duct obstruction</li> <li>Gilbert's disease</li> <li>Pernicious anemia</li> <li>Hemolytic anemia</li> </ul>
<b>Alkaline phosphatase</b>	Detects and monitors liver and bone disease; also used as a tumor marker		<ul style="list-style-type: none"> <li>Bone growth/healing fractures</li> <li>Acromegaly</li> <li>Liver or bone metastases</li> <li>Leukemia</li> <li>Hypervitaminosis D</li> <li>Hyperthyroidism</li> <li>Hyperparathyroidism</li> <li>Chronic alcohol ingestion</li> <li>Biliary obstruction</li> <li>Liver disease</li> <li>Diabetes mellitus</li> <li>Congestive heart failure</li> <li>Estrogens, birth control pills, oral hypoglycemic agents, etc</li> </ul>
<b>LDH (lactic acid dehydrogenase)</b>	Measures intracellular enzyme LDH, which when present may signify injury or disease	X-ray irradiation	<ul style="list-style-type: none"> <li>Muscle injury</li> <li>Burns or trauma</li> <li>Kidney disease</li> <li>Cardiac disease</li> <li>Liver disease (hepatitis, cirrhosis)</li> <li>Hemolytic anemia</li> <li>Pernicious anemia</li> <li>Malignant tumors</li> <li>Infectious mononucleosis</li> <li>Inflammation</li> </ul>



Test	What this test measures	What test results may indicate	
		Low values	High values
<p><b>Aspartate aminotransferase (AST)</b></p> <p>Also called serum glutamic-oxaloacetic transaminase (SGOT)</p>	<p>Evaluates disorders of the liver, gallbladder, and pancreas</p> <p>Indicator of cell injury or death</p>	<p>Azotemia</p> <p>Chronic kidney dialysis</p> <p>Vitamin B6 deficiency</p>	<p>Liver disease</p> <p>Trauma or surgery</p> <p>Myocardial infarction</p> <p>Acute pancreatitis</p> <p>Certain medications, including salicylates</p> <p>Chronic alcohol ingestion</p> <p>Heat exhaustion</p> <p>Mushroom poisoning</p> <p><u>Marked increase:</u></p> <p>Shock</p> <p>Liver disease</p> <p>Hepatitis</p>
<p><b>Alanine transaminase (ALT)</b></p> <p>Also called serum glutamic-pyruvic transaminase (SGPT)</p>	<p>Identifies and monitors liver disease</p> <p>Distinguishes between the liver and RBC hemolysis as the source of jaundice</p> <p>Usually parallels but is lower than AST in alcohol-related diseases</p>	<p>Urinary tract infection</p> <p>Malnutrition</p>	<p>All indications from AST (see above) plus:</p> <p>Obesity</p> <p>Rapidly progressing acute lymphoblastic leukemia</p>
<p><b>Iron</b></p>	<p>Evaluates several conditions, including iron deficiency anemia and hemochromatosis</p>	<p>Iron deficiency anemia</p> <p>Chronic blood loss</p> <p>Anemia due to infection or chronic diseases</p> <p>Nephrosis</p> <p>Hypothyroid</p> <p>Menstruation</p>	<p>Hemolytic anemia</p> <p>Hepatitis</p> <p>Acute iron toxicity</p> <p>Thalassemia</p> <p>Hemochromatosis</p>

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