

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>
Red blood cell count	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 Thalassemia
Hemoglobin	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
Hematocrit	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	High altitude Congenital heart disease Cor pulmonale Polycythemia vera Pulmonary fibrosis Dehydration Thalassemia
Mean corpuscular volume (MCV)	Calculates the size of red blood cells Differential diagnosis of anemias Screen for occult alcoholism	Microcytic anemia Iron deficiency Thalassemia Hereditary spherocytosis	Macrocytic anemia Folic acid or B12 deficiency Alcohol abuse

Test	What this test measures	What test results may indicate			
		Low values		High values	
Mean corpuscular hemoglobin	Amount of hemoglobin per red blood cell	Microcytic or normocytic anemia		Macrocytic anemia	
	Differential diagnosis of anemias	Iron deficiency Thalassemia		Folic acid or B12 deficiency	
Mean corpuscular hemoglobin concentration	Concentration of hemoglobin per red blood cell	Hypochromic anemia		Hereditary spherocytosis	
	Used for laboratory quality control	Iron deficiency Thalassemia			
RBC distribution width (RDW)	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	MEAN CORPUSCULAR VOLUME (MCV)			
		RDW	LOW	NORMAL	HIGH
		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
White blood cell count	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	
Neutrophils	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>
Lymphocytes	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
Monocytes	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
Eosinophils	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
Basophils	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>
Platelet count	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>
Glucose, fasting	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
Uric acid	Evaluation of gout, recurrent urinary stones, or kidney failure	Overhydration Severe liver damage Malnutrition Low purine diet	Gout Impaired kidney function Leukemia Dehydration Shock Urinary tract obstruction High purine diet

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
BUN (blood urea nitrogen)	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
Creatinine	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
BUN/creatinine ratio	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>
Sodium	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>
Potassium	<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>Acute renal failure</p> <p>Dehydration</p> <p>Adrenal cortical insufficiency</p>
Chloride	<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>
Carbon dioxide	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	
		Low values	High values
Calcium	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
Phosphorus	Measures serum phosphorus levels	Hyperparathyroidism Ricketts or osteomalacia Vitamin D deficiency Hyperinsulinemia Antacids Diuretics Long-term steroid use Liver disease, cirrhosis Severe malnutrition	Hypoparathyroidism Bone cancer Excessive vitamin D intake Low blood calcium levels Exercise Dehydration Healing bone fractures Diabetes mellitus with ketosis Renal insufficiency
Protein	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
Albumin/globulin ratio	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>
Bilirubin	Evaluates liver and gallbladder function	Drug interference (e.g., barbiturates)	Liver disease Hepatitis Cirrhosis Biliary duct obstruction Gilbert's disease Pernicious anemia Hemolytic anemia
Alkaline phosphatase	Detects and monitors liver and bone disease; also used as a tumor marker	Can be low in healthy individuals May reflect zinc deficiency	Bone growth/healing fractures Acromegaly Liver or bone metastases Leukemia Hypervitaminosis D Hyperthyroidism Hyperparathyroidism Chronic alcohol ingestion Biliary obstruction Liver disease Diabetes mellitus Congestive heart failure Estrogens, birth control pills, oral hypoglycemic agents, etc
LDH (lactic acid dehydrogenase)	Measures intracellular enzyme LDH, which when present may signify injury or disease	Can be low in healthy individuals	Muscle injury Burns or trauma Kidney disease Cardiac disease Liver disease (hepatitis, cirrhosis) Hemolytic anemia Pernicious anemia Malignant tumors Infectious mononucleosis Inflammation X-ray irradiation

Test	What this test measures	What test results may indicate	
		<i>Low values</i>	<i>High values</i>
<p>Aspartate aminotransferase (AST)</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>Urinary Tract Infection</p> <p>Malnutrition</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>Obesity</p> <p><u>Marked increase:</u></p> <p>Shock</p> <p>Liver disease</p> <p>Hepatitis</p>
<p>Alanine transaminase (ALT)</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>Malnutrition</p> <p>Can be low in healthy individuals</p>	<p>All indications from AST <u>(see above) plus:</u></p> <p>Malnutrition</p> <p>Rapidly progressing acute lymphoblastic leukemia</p>
<p>Iron</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>