

LAB TEST	NORMAL RANGE	CRITICAL CONCERNS	INCREASED
HEMATOLOGY			
CBC			
*Red Blood Cells / Erythrocytes (RBC)	4.2 - 5.9 × 10 ⁶ /μL		(Polycythemia), Hemoconcentration
Reticulocytes	0.5 - 1.5%		Acute Hemorrhage
*Hemoglobin (Hgb)	12 - 17 g/dL	< 5.0 g/dL or > 20 g/dL	
*Hematocrit (Hct)	36 - 51%	< 15% or > 60%	
*White Blood Cells / Leukocytes (WBC)	4,000-10,000 μL or mm ³	< 2,500 or > 30,000 μL or mm ³	Infections, Inflammation, Stress
*Neutrophils (polys/secs)	> 75%		Bacterial Infections
Bands	< 10%	> 10%	Acute Bacterial Infection
*Absolute Neutrophil Count (ANC)	> 1000 μL or mm ³	< 1000 μL or mm ³	
*Platelets	150,000-350,000 μL or mm ³	< 50,000 or > 1 million μL or mm ³	Malignancies
COAGULATION			
Bleeding time	Less than 10 minutes	> 10 minutes	Low Platelets, DIC, ASA
Prothrombin Time (PT)	11 - 12.5 seconds	> 20 seconds	Liver dysfunction, Coumadin, Vit K Deficiency
*International Normalized Ratio (INR)	0.8 - 1.1	> 5.5	Liver dysfunction, Coumadin, Vit K Deficiency
Activated Partial Thromboplastin Time (aPTT)	25 - 35 seconds	> 70 seconds	Coagulation Deficiencies, Heparin
Partial Thromboplastin Time (PTT)	60 - 70 seconds	> 100 seconds	Coagulation Deficiencies, Heparin
D-dimer	< 0.5 mcg/mL		Thrombus
IMMUNE & INFLAMMATORY			
C-Reactive Protein (CRP)	< 1.0 mg/dL		Bacterial Infection, Inflammation
Erythrocyte Sedimentation Rate (ESR)	0 - 20 mm/h		Inflammation, Renal Failure, Malignancy
FLUID, ELECTROLYTES & RENAL			
URINE			
*Urine Specific Gravity	1.005 - 1.030		Dehydration, SIADH
METABOLIC PANEL			
*Blood Urea Nitrogen (BUN)	8 - 20 mg/dL	> 100 mg/dL	Renal Failure, Dehydration, ↑Protein Intake
*Creatinine	0.7 - 1.3 mg/dL	> 4 mg/dL	Renal Disease
Electrolytes			
*Potassium (K)	3.5 - 5.0 mEq/L	< 2.5 mEq/L or > 6.5 mEq/L	Acidosis, Renal Failure
*Sodium (Na)	136 - 145 mEq/L	< 120 mEq/L or > 160 mEq/L	Diabetes Insipidus, Cushing's, HHNK
*Calcium (Ca)	9 - 10.5 mg/dL	< 6 mg/dL or > 13 mg/dL	Hyperparathyroidism, Renal Failure
Chloride (Cl)	98 - 106 mEq/L	< 80 mEq/L or > 115 mEq/L	Dehydration, Metabolic Acidosis
*Magnesium (Mg)	1.5 - 2.4 mEq/L	< 0.5 mEq/L or > 3 mEq/L	Renal Failure
Phosphorus (Ph)	3.0 - 4.5 mg/dL	< 1 mg/dL	Hypoparathyroidism, Renal Failure
*Glucose	70 - 100 mg/dL	< 50 mg/dL or > 400 mg/dL	Diabetic Ketoacidosis, HHNK
*Protein - Total	6 - 7.8 g/dL		Hemoconcentration
*Protein - Albumin	3.5 - 5.0 g/dL		Dehydration
FLUID STATUS			
* Serum Osmolality	275 - 295 mOsm/kg	< 265 or > 320 mOsm/kg	Diabetes Insipidus, HHNK, Hyperglycemia
CARDIOPULMONARY			
ABG's			
*pH	7.35 - 7.45	< 7.25 or > 7.55	Alkalosis (resp/metabolic)
*pO ₂	80 - 100 mmHg	< 40 mmHg	Hyperoxygenation
*pCO ₂	35 - 45 mmHg	< 20 mmHg or > 60 mmHg	Hypoventilation
*HCO ₃	22- 26 mEq/L	< 15 mEq/L or > 40 mEq/L	Metabolic alkalosis
*O ₂ saturation	> 94%	< 75%	
Brain natriuretic peptide (BNP)	< 100 pg/mL		Heart failure
METABOLISM & WASTE			
Ammonia	40 - 80 mcg/dL		Liver dysfunction
Bilirubin - Total	0.3 - 1.2 mg/dL	Adult: > 12 mg/dL	Liver failure, RBC hemolysis, GB obstruction
Thyroid Stimulating Hormone (TSH)	0.5 - 5 mU/L		Thyroid dysfunction
ENZYMES			
Alkaline Phosphatase (ALP)	36 - 92 U/L	Enzymes will be released and rise with cell damage. Once the damage stops, the enzymes will return to normal.	Liver, Biliary Tract, Bone
Aminotransferase, Alanine (ALT)	0 - 35 U/L		Liver, (Less in Kidneys, Heart, Muscles)
Aminotransferase, Aspartate (AST)	0 - 35 U/L		Liver
Amylase	0 - 130 U/L		Pancreas
Creatine Kinase (CPK)	30 - 170 U/L		Heart, Brain, Muscle
Lactic Dehydrogenase (LDH)	60 - 100 U/L		Heart, Liver, Kidneys, Muscles, Brain, Lungs
Lipase	< 95 U/L		Pancreas
Troponin I & T	< 0.5ng/mL & < 0.10 ng/mL		Cardiac
THERAPEUTIC DRUG LEVELS			
Peak and Trough			
Digoxin	0.8-2.0 ng/mL	> 2.4 ng/mL = toxic level	
Lithium	0.6- 1.2 mEq/L	> 1.5 mEq/L = toxic level	Renal Failure, ↓consciousness, ECG changes

NurseThink® Quick Laboratory and Diagnostics

Do not memorize specific lab numbers – they vary greatly. It is more important to know approximate normal and recognize critical concerns – this is when a nursing action is required.

LAB TEST	DECREASED	SPECIAL NOTES	PRIORITY LABS
HEMATOLOGY			Infection, Inflammation & Immunity WBCs, Segs, Bands, ANC, CRP, ESR Liver Disorders Liver Enzymes; PT/PTT/INR; Albumin; Ammonia, Bilirubin Na, K, Glucose Renal Disorders BUN; Creatinine; Osmolality, K, Na, Ca, Ph, RBCs, Urine SG Cardiac Disorders Cardiac Enzymes, BNP, ABGs, Digoxin Level Pancreas Disorders Amylase, Lipase, Ca, Glucose Hemorrhage - DIC RBCs, Reticulocytes, Hgb, Hct, Platelets, Coagulation Studies Fluid Imbalance Protein, Albumin, Na, Urine SG, Osmolality, RBCs, Hgb, Hct, BUN
CBC			
*Red Blood Cells / Erythrocytes (RBC)	(Anemia), Blood Loss, Hemodilution	↑ with Epoetin; Too High = Clot formation; Too Low = O ₂ Transport	
Reticulocytes	Bone Marrow Failure	Immature RBCs	
*Hemoglobin (Hgb)		Oxygen Carrying Capacity; PRBC < 7 g/dL	
*Hematocrit (Hct)		Hydration Dependent	
*White Blood Cells / Leukocytes (WBC)	Chemo, Bone Marrow Failure	↑ with Filgrastim	
*Neutrophils (polys/secs)	Chemo, Bone Marrow Failure	Poly/Segs are Mature WBCs	
Bands	Bone Marrow Failure	Increase = Left Shift	
*Absolute Neutrophil Count (ANC)	(Neutropenia)	ANC = WBC x (% Neutrophils + % Bands); < 1000 = Isolation	
*Platelets	ITP, Leukemia, Chemo	< 20,000: = Spontaneous Bleed; ↑ with Oprelvekin	
COAGULATION			
Bleeding time			
Prothrombin Time (PT)		Therapeutic is > 1.5 - 2 times control with warfarin therapy	
*International Normalized Ratio (INR)		Therapeutic is 1.5 to 4 with warfarin therapy	
Activated Partial Thromboplastin Time (aPTT)		Therapeutic is 1.5-2.5 times the control with heparin therapy	
Partial Thromboplastin Time (PTT)			
D-dimer			
IMMUNE & INFLAMMATORY			
C-Reactive Protein (CRP)		Cardiac marker but not specific to myocardium	
Erythrocyte Sedimentation Rate (ESR)	Sickle Cell Anemia, Polycythemia Vera		
FLUID, ELECTROLYTES & RENAL			
URINE			
*Urine Specific Gravity	Excessive Diuresis, Diabetes Insipidus	Fluctuates Fluid Status	
METABOLIC PANEL			
*Blood Urea Nitrogen (BUN)	Hepatic Failure, Overhydration	End By-Product of Protein Breakdown	
*Creatinine	Decreased Muscle Mass	Doubling of level indicates 50% reduction in the GFR	
Electrolytes			
*Potassium (K)	Diuretics, Gastrointestinal Loss	Abnormal level leads to arrhythmias, muscle cramps	
*Sodium (Na)	SIADH, Addison's	↓ = Lethargy, Stupor, Coma, Seizures; ↑ = Agitation, Seizures	
*Calcium (Ca)	Hypoparathyroidism, Pancreatitis, Low Protein	↓ = Tetany; ↑ = Osteomalacia, Dehydration	
Chloride (Cl)	Gastrointestinal Loss, Low Na Diet	↓ = Hyperexcitability; ↑ = Weakness, Lethargy	
*Magnesium (Mg)	Alcoholism; Renal Disease	Abnormal level leads to arrhythmias, muscle irritability	
Phosphorus (Ph)	Hyperparathyroidism, Vit D Deficiency	↓ = Osteomalacia; ↑ Hypocalcemia (tetany)	
*Glucose	↓ Glucose intake or absorption, Exercise		
*Protein - Total	Malnutrition, Burns, Blood Loss	Needed for wound healing	
*Protein - Albumin	Liver Dysfunction, Nephrotic Syndrome	Impacts fluid shift in and out of the vascular space	
FLUID STATUS			
* Serum Osmolality	SIADH, Overhydration	Measures concentration of dissolved particles in blood	
CARDIOPULMONARY			
ABG's			
*pH	Acidosis(resp/metabolic)	pH is inversely proportional to H ⁺ concentration	
*pO ₂	Hypoxemia (pneumonia, etc.)	Indirect measure of O ₂ concentration in arterial blood	
*pCO ₂	Hyperventilation	Measurement of ventilation	
*HCO ₃	Metabolic acidosis	Measures metabolic component of acid-base balance	
*O ₂ saturation	Hypoxemia/Anemia	Indication of the % of Hgb saturated with oxygen	
Brain natriuretic peptide (BNP)		The higher the number the weaker the left ventricular contractions	
METABOLISM & WASTE			
Ammonia		Product of protein breakdown; Neurotoxic; Treated with Lactulose	
Bilirubin - Total		Neurotoxic to newborns	
Thyroid Stimulating Hormone (TSH)	Pituitary dysfunction, Hyperthyroidism	T3, T4, T7 often needed to rule out thyroid dysfunction	
ENZYMES			
Alkaline Phosphatase (ALP)			
Aminotransferase, Alanine (ALT)			
Aminotransferase, Aspartate (AST)			
Amylase			
Creatine Kinase (CPK)			
Lactic Dehydrogenase (LDH)			
Lipase			
Troponin I & T		Biochemical Markers for Cardiac Disease	
THERAPEUTIC DRUG LEVELS			
Peak and Trough		Monitors therapeutic drug levels of nephrotoxic medications	
Digoxin	Subtherapeutic	Cardiac Glycoside	
Lithium	Subtherapeutic: symptoms poorly controlled	Lithium clearance from the body is increased during pregnancy	

* Know APPROXIMATE Normal for NCLEX® Exam References: American College of Physicians & Mosby's Diagnostic and Laboratory Test Reference, 10th ed.