

# Normal Lab Values Study guide cheat sheet

## Immune

CD4+ T-cell	500 - 1600 cells / L
CD4-to-CD8 ratio	2:1

## Coagulation

aPTT	30 to 40 seconds
PTT	60 to 70 seconds
PT	11-12.5 seconds
INR	0.8 - 1.1
Platelets	150k - 400k cells/mm <sup>3</sup>

## Blood

### Hemoglobin

Male adult	14 - 18 g / dL
Female adult	12 - 16 g / dL

### Hematocrit

Male adult	42 % - 52 %
Female adult	37 % - 47 %

### Iron

Male adult	65 - 175 mcg / dL
Female adult	50 - 170 mcg / dL

### Red Blood Cells

Male adult	4.7 - 6.1 million / $\mu$ L
Female adult	4.2 - 5.4 million / $\mu$ L

WBC 5,000 - 10,000 cells/mm<sup>3</sup>

## Serum Enzymes

CK	26 - 174 units / L
CK - MB	0 % - 5 % of total
Troponin I	< 0.1 ng / mL
BNP	Less than 100 pg / mL

## Elements

Calcium	9 to 10.5 mg / dL
Magnesium	1.3 to 2.1 mg / dL
Phosphorus	3.0 to 4.5 mg / dL

## Renal

Cr	0.6 to 1.2 mg / dL
BUN	10 to 20 mg / dL
Hemoglobin A1c	< 7 %

## Electrolytes

Sodium	136 - 145 mEq/L
Potassium	3.5 - 5.0 mEq/L
Chloride	98 - 106 mEq/L

## Gastrointestinal

Albumin	3.4 to 5 g / dL
Ammonia	10 to 80 mcg / dL
ALT	4 to 36 units / L
AST	0 to 35 units / L
Amylase	30 to 220 units / L
Lipase	10 to 140 units / L
Lipids	
Total Cholesterol	below 200 mg / dL
HDL	less than 130 mg / dL
LDL	60 mg / dL and above

# Nursing Lab Values and What They Mean

Lab Test	Normal Range	Purpose of Lab	Reasons for High	Reasons for Low
<b>BMP (Basic Metabolic Panel)</b>				
<b>Glucose</b>	<b>70-110</b> mg/dL	Monitor in diabetes patients to adjust insulin dosage	diabetes mellitus, acute stress response, cushing syndrome	Insulinoma, hypothyroidism, hypopituitarism, Addison disease
<b>Calcium (Ca)</b>	<b>9-10.5</b> mg/dL	Monitor renal, hyperparathyroidism, malignancies	Hyperparathyroidism, Lung or renal carcinoma, Addison disease,	Hypoparathyroidism, Renal failure, Rickets, Vit D deficiency
<b>Sodium (Na)</b>	<b>136-145</b> mEq/L	Evaluate the between sodium intake and renal excretion	Cushing syndrome, excessive sweating, Diabetes insipidus	Addison disease, diarrhea, vomiting, diuretics, CHF, SIADH, Ascites
<b>Potassium (K)</b>	<b>3.5-5.0</b> mEq/L	Monitor renal function & maintain cardiac function	Renal failure, hemolysis, infection, acidosis	Burns, diarrhea, vomiting, diuretics, cushing syndrome,
<b>Blood Urea Nitrogen (BUN)</b>	<b>10-20</b> mg/dL	Indirectly measures kidney function through liver function	Hypovolemia, shock, burns, dehydration, CHF, MI, GI bleeding, Sepsis	Liver failure, overhydration caused by fluids overload or SIADH, malnutrition
<b>Creatinine (Cr)</b>	Male <b>0.6-1.2</b> mg/dL Female <b>0.5-1.1</b> mg/dL	Directly measures kidney function	Glomerulonephritis, pyelonephritis, urinary tract obstruction, shock, dehydration, CHF	Debilitation, muscular dystrophy, myasthenia gravis
<b>CBC (Complete Blood Count)</b>				
<b>Red Blood Cell Count (RBC)</b>	Male <b>4.7-6.1</b> Female <b>4.2-5.4</b>	Monitor for anemia	High altitude, Congenital heart disease, dehydration	Anemia, hemorrhage, hemolysis, Leukemia
<b>Hemoglobin (Hgb)</b>	Male <b>14-18</b> g/dL Female <b>12-16</b> g/dL	Reflects the # of red blood cells in the blood. Vehicle for O2 and CO2 transport	Congenital heart disease, COPD, CHF, high altitudes, dehydration	Anemia, hemorrhage, hemolysis, nutritional deficiency
<b>Hematocrit (Hct)</b>	Male <b>42%-52%</b> Female <b>37%-47%</b>	measure of red blood cell count and used to measure anemia	Congenital heart disease, severe dehydration, eclampsia	Anemia, hyperthyroidism, cirrosis, hemolytic reactions, hemorrhage
<b>White Blood Cell count (WBC)</b>	<b>5,000-10,000</b> /mm3	Indicates presence of an infection	Infection, Leukemic neoplasia, trauma, stress, inflammation	Drug toxicity, bone marrow failure, overwhelming infections
<b>Platelet (Pit)</b>	<b>150,000-400,000</b> /mm3	assess bleeding, monitor thrombocytopenia or bone marrow failure	Malignant disorder, Rheumatoid arthritis, Iron deficiency anemia	Hypersplenism, hemorrhage, Immune thrombocytopenia, Leukemia
<b>Coagulation Tests</b>				
<b>Prothrombin Time (PT)</b>	<b>11-12.5</b> seconds	Measures clotting ability of factors I, II, V, VII and X	Cirrhosis, hepatitis, vitamin K deficiency, hereditary factor deficiency, DIC	increased risk for blood clots
<b>International normalized ratio (INR)</b>	<b>0.8-1.1</b>	Tests coagulation	Blood is too thin, increased risk for bleeding, on warfarin (coumadin) therapy	Blood not thin enough while on warfarin (coumadin) therapy
<b>Partial Thromboplastin Time (PTT)</b>	<b>60-70</b> seconds	Used to measure pathway for clot formation & monitor the thinning of blood during Heparin therapy	DIC, Heparin administration, hemophilia, cirrhosis of the liver, vitamin K deficiency	Early stages of DIC, Extensive cancer
<b>Activated Partial Thromboplastin time (aPTT)</b>	<b>30-40</b> seconds	Used to measure pathway for clot formation		
<b>D-Dimer</b>	<b>&lt;250</b> ng/mL	Assess for the presence of a clot (PE, DVT)		

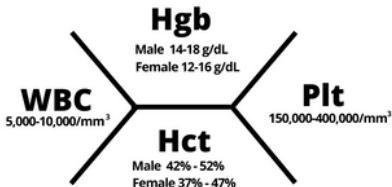


# Critical Lab Results

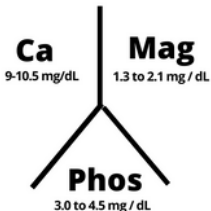
Lab Test	Normal Range	Critical
<b>BMP</b>		
Glucose	76-106 mg/dL	<40 and >400 mg / dL
Calcium (Ca)	9-10.5 mg/dL	<6 or >13 mg / dL
Sodium (Na)	136-145 mEq/L	<120 or >160 mEq / L
Potassium (K)	3.5-5.0 mEq/L	<2.5 or >6.5 mEq / L
Chloride (Cl)	98-106 mEq/L	<80 or 115 mEq / L
Blood Urea Nitrogen (BUN)	10-20 mg/dL	>100 mg / dL
Creatinine (Cr)	Male 0.6-1.2 mg/dL Female 0.5-1.1mg/dL	>4 mg / dL
<b>CBC</b>		
Red Blood Cell Count (RBC)	Male 4.7-6.1 Female 4.2-5.4	
Hemoglobin (Hgb)	Male 14-18 g/dL Female 12-16 g/dL	<5.0 g / dL or >20 g / dL
Hematocrit (Hct)	Male 42%-52% Female 37%-47%	<15% or 60%
White Blood Cell count (WBC)	5,000-10,000/mm <sup>3</sup>	<2,500 or >30, 000/mm <sup>3</sup>
Platelet (Plt)	150,000-400,000/mm <sup>3</sup>	<50,000 or >1 million/mm <sup>3</sup>
<b>Coagulation Tests</b>		
Prothrombin Time (PT)	11-12.5 seconds	>20 seconds
International normalized ratio (INR)	0.8-1.1	>5.5
Partial Thromboplastin Time (PTT)	60-70 seconds	>100 seconds
Activated Partial Thromboplastin time (aPTT)	30-40 seconds	>70 seconds
D-Dimer	<250 ng/mL	
Fibrinogen	200-400 mg/dL	<100 mg/dL



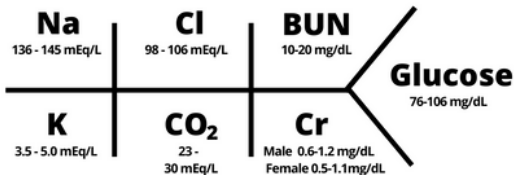
# Nursing Lab Skeletons; fishbone labs



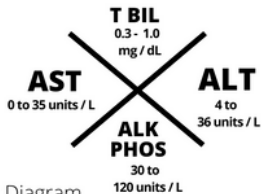
Complete Blood Count - CBC



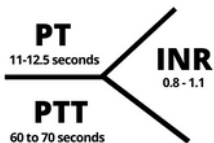
Elements



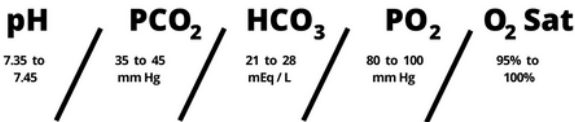
Basic Metabolic Panel - BMP



Liver Diagram



Coagulation



Arterial Blood Gas (ABG)

<b>Acid-Base</b>	<b>pH</b>	<b>Pco<sub>2</sub> (mm Hg)</b>	<b>HCO<sub>3</sub> (mEq/L)</b>	<b>Common Causes</b>	<b>Mode of Compensation</b>
<b>None (normal values)</b>	<b>7.35 - 7.45</b>	<b>35 - 45</b>	<b>22 - 26</b>		
<b>Respiratory acidosis</b>	↓	↑	<b>Normal</b>	Respiratory depression (drugs, CNS trauma) Pulmonary disease (PNA, COPD, respiratory under ventilation)	Kidneys will retain increased amounts of HCO <sub>3</sub> to increase pH.
<b>Respiratory alkalosis</b>	↑	↓	<b>Normal</b>	Hyper-ventilation (emotions, pain, respirator overventilation)	Kidneys will excrete increased amounts of HCO <sub>3</sub> to lower pH.
<b>Metabolic acidosis</b>	↓	<b>Normal</b>	↓	Diabetes, shock, renal failure, intestinal fistula	Lungs blow off CO <sub>2</sub> to raise pH.
<b>Metabolic alkalosis</b>	↑	<b>Normal</b>	↑	Sodium bicarbonate overdose, prolonged vomiting, nasogastric drainage	Lungs retain CO <sub>2</sub> to lower pH.

