

ROUTINE LABORATORY TESTS WITH NUTRITIONAL IMPLICATIONS¹

This table presents a partial listing of some uses of commonly performed lab tests that have implications for nutritional problems.

Laboratory Test	Acceptable Range	Description
Hematology		
Red blood cell (RBC) count	4.2–5.4 × 10 ⁶ /mm ³ (women) 4.5–6.2 × 10 ⁶ /mm ³ (men)	Number of RBC; aids evaluation of anemias.
Hemoglobin (Hb)	12–15 g/dL (women) 14–17 g/dL (men)	Hemoglobin content of RBC; aids evaluation of anemias.
Hematocrit (Hct)	37–47% (women) 40–54% (men)	Percentage RBC in total blood volume; aids evaluation of anemias.
Mean corpuscular volume (MCV)	80–96 μm ³	RBC size; helps to distinguish between microcytic and macrocytic anemias.
Mean corpuscular hemoglobin concentration (MCHC)	26–32 pg	Hb concentration within RBCs; helps to distinguish iron-deficiency anemia.
White blood cell (WBC) count	4.8–11.8 × 10 ³ /mm ³	Number of WBC; general assessment of immune function and/or presence of infection.
Blood Chemistry		
Serum Proteins		
Total protein	6–8 g/dL	Protein levels are not specific to disease or highly sensitive; they can reflect poor protein intake, illness or infections, changes in hydration or metabolism, pregnancy, or medications.
Albumin	3.5–5.0 g/dL	May reflect PEM; slow to respond to improvement or worsening of disease. Synthesis rate decreases during inflammation.
Transferrin	250–380 mg/dL (women) 215–365 mg/dL (men)	May reflect illness, PEM, or iron deficiency; slightly more sensitive to changes than albumin. Synthesis rate decreases during inflammation.
Prealbumin (transthyretin)	16–35 mg/dL	May reflect PEM; more responsive to health status changes than albumin or transferrin. Synthesis rate decreases during inflammation.
C-reactive protein	<1.00 mg/dL	Acute-phase protein—indicator of inflammation or disease.

Fibrinogen	160–450 mg/dL	Acute-phase protein—indicator of inflammation or disease.
Lactate	0.3–2.3 mEq/L	Reflective of lactic acidosis—elevated during periods of critical illness.
<i>Serum Enzymes</i>		
Creatine kinase (CK, CPK)	0–145 IU/L 30–135 U/L (women) 55–170 U/L (men)	Different forms of CK are found in the muscle, brain, and heart. High blood levels may indicate heart attack, brain tissue damage, or skeletal muscle injury.
Lactate dehydrogenase (LDH)	208–378 IU/L	LDH is found in many tissues. Specific types may be elevated after heart attack, lung damage, or liver disease.
Alkaline phosphatase	30–120 U/L	Found in many tissues; often measured to evaluate liver function.
Aspartate aminotransferase (AST, formerly SGOT)	0–35 U/L	Usually monitored to assess liver damage; elevated in most liver diseases. Levels are somewhat increased after tissue damage.
Alanine aminotransferase (ALT, formerly SGPT)	4–36 U/L	Usually monitored to assess liver damage; elevated in most liver diseases. Levels are somewhat increased after tissue damage.
<i>Serum Electrolytes</i>		
Sodium	136–145 mEq/L	Helps to evaluate hydration status or neuromuscular, kidney, and adrenal functions.
Potassium	3.5–5.5 mEq/L	Helps to evaluate acid-base balance and kidney function; can detect potassium imbalances.
Chloride	95–105 mEq/L	Helps to evaluate hydration status and detect acid-base and electrolyte imbalances.
<i>Other</i>		
Glucose	70–110 mg/dL	Detects risk of glucose intolerance, diabetes mellitus, and hypoglycemia; helps to monitor diabetes treatment.
Glycosylated hemoglobin (HbA _{1c})	3.9–5.2%	Used to monitor long-term blood glucose control (average over previous 120 days).
Blood urea nitrogen (BUN)	8–18 mg/dL	Primarily used to monitor renal function; value is altered by liver failure, dehydration, or shock.
Uric acid	2.8–8.8 mg/dL (women) 4.0–9.0 mg/dL (men)	Used for detecting gout or changes in renal function; levels affected by age and diet; varies among different ethnic groups.
Creatinine (serum or plasma)	0.6–1.2 mg/dL	Used to monitor renal function.

NORMAL VALUES FOR PHYSICAL EXAMINATION

Vital Signs

Temperature

Rectal: C = 37.6°/F = 99.6°

Oral: C = 37°/F = 98.6° (± 1°)

Axilla: C = 37.4°/F = 97.6°

Blood Pressure: average 120/80 mmHg

Heart Rate (beats per minute)

Age	At Rest Awake	At Rest Asleep	Exercise or Fever
Newborn	100-180	80-160	≤220
1 week-3 months	100-220	80-200	≤220
3 months-2 years	80-150	70-120	≤200
2-10 years	70-110	60-90	≤200
11 years-adult	55-90	50-90	≤200

Respiratory Rate (breaths per minute)

Age	Respirations
Newborn	35
1-11 months	30
1-2 years	25
3-4 years	23
5-6 years	21
7-8 years	20
9-10 years	19
11-12 years	19
13-14 years	18
15-16 years	17
17-18 years	16-18
Adult	12-20

Cardiac Exam: carotid pulses equal in rate, rhythm, and strength; normal heart sounds; no murmurs

present

HEENT exam (head, eyes, ears, nose, throat)
Mouth: pink, moist, symmetrical; mucosa pink, soft, moist, smooth
Gums: pink, smooth, moist; may have patchy pigmentation
Teeth: smooth, white, shiny
Tongue: medium red or pink, smooth with free

mobility, top surface slightly rough
Eyes: pupils equal, round, reactive to light and accommodation
Ears: tympanic membrane taut, translucent, pearly gray; auricle smooth without lesions; meatus not swollen or occluded; cerumen dry (tan/light yellow) or moist (dark yellow/brown)
Nose: external nose symmetrical, nontender without discharge; mucosa pink; septum at the midline
Pharynx: mucosa pink and smooth
Neck: thyroid gland, lymph nodes not easily palpable or enlarged

Lungs: chest contour symmetrical; spine straight without lateral deviation; no bulging or active movement within the intercostal spaces during breathing; respirations clear to auscultation and percussion

Peripheral Vascular: normal pulse graded at 3+, which indicates that pulse is easy to palpate and not easily obliterated; pulses equal bilaterally and symmetrically

Neurological: normal orientation to people, place, time, with appropriate response and concentration

Skin: warm and dry to touch; should lift easily and return back to original position, indicating normal turgor and elasticity

Abdomen: umbilicus flat or concave, positioned midway between xyphoid process and symphysis pubis; bowel motility notes normal air and fluid movement every 5–15 seconds; graded as normal, audible, absent, hyperactive, or hypoactive