TheWholeNest

Lab Values & Diagnostics Cheat Sheet

The high-yield numbers every nurse in training needs — CBC, electrolytes, ABGs, coags, cardiac markers, drug levels, and what to order when.

- 35+ lab values with adult reference ranges
- One-line nursing cue for every value
- Compact ABG interpretation grid (ROME method)
- Critical values to call the provider about
- 15 key diagnostics — what each test is for

High-yield nursing reference • Adult reference ranges
Ranges vary slightly by lab — always confirm with your facility's reported range.

Why reference ranges vary	Reference ranges differ slightly between laboratories, textbooks, and regions because they are derived from different patient populations and different analyzers. Treat the values on this sheet as high-yield study anchors, and always follow your own program or facility's published values in practice. **Protocols, scopes of practice, and reference ranges vary by facility and state — always follow your facility's policies and your state's Nurse Practice Act.**

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CBC — Complete Blood Count

Test	Adult Reference Range	Nursing Cue — What It Tells You
RBC (red blood cells)	M: 4.5–5.5 million/mm³ F: 4.0–5.0 million/mm³	Oxygen-carrying capacity. Low = anemia or blood loss; high = dehydration or polycythemia.
Hemoglobin (Hgb)	M: 14–18 g/dL F: 12–16 g/dL	Protein in RBCs that carries O_2. The fastest anemia check — low Hgb = fatigue, pallor, shortness of breath.
Hematocrit (Hct)	M: 40–54% F: 36–46%	% of blood that is RBCs — roughly 3× the Hgb. Low = anemia/bleeding; high = dehydration.
WBC (white blood cells)	5,000–10,000/mm³	Infection/inflammation fighters. High = infection or steroids; low = immunosuppression — neutropenic precautions.
Neutrophils (segs)	55–70% of WBCs (ANC 2,500–8,000)	First responders to bacterial infection. A "left shift" (many immature bands) = acute bacterial infection.
Platelets	150,000–400,000/mm³	Clotting. Low = bleeding risk (avoid IM injections, razors, NSAIDs); high = clot risk.

BMP & Electrolytes — Basic Metabolic Panel

Test	Adult Reference Range	Nursing Cue — What It Tells You
Sodium (Na^+)	135–145 mEq/L	Fluid balance + neuro status. Low = confusion/seizure risk; high = thirst, dry mucous membranes. Watch neuro changes first.
Potassium (K^+)	3.5–5.0 mEq/L	**The deadly one** — cardiac muscle. Low = cramps, U waves, digoxin toxicity risk; high = peaked T waves, arrest risk.
Chloride (Cl^-)	98–106 mEq/L	Follows sodium; acid-base partner. Usually moves with Na^+ — rarely interpreted alone.
CO_2 / Bicarbonate	22–26 mEq/L	Metabolic side of acid-base. Low = metabolic acidosis; high = metabolic alkalosis.
BUN	10–20 mg/dL	Kidney waste + hydration marker. Rises with dehydration, high-protein diet, GI bleed — not kidney-specific alone.
Creatinine	M: 0.6–1.2 mg/dL F: 0.5–1.1 mg/dL	Best single kidney marker — muscle waste filtered by kidneys. A rising creatinine = kidneys failing to clear.
Glucose (fasting)	70–100 mg/dL	Blood sugar. <70 = hypoglycemia (confusion, sweating); high = hyperglycemia / DKA watch.
Calcium (total)	8.5–10.5 mg/dL	Bones, muscle contraction, clotting. Low = tingling, Chvostek/Trousseau signs, tetany; high = "stones, bones, groans."
Magnesium	1.5–2.5 mEq/L	Calms nerves and muscles. Low = tremors, seizures, torsades risk, stubborn low K^+; high = lost reflexes, respiratory depression.
Phosphorus	2.5–4.5 mg/dL	Energy (ATP) + bones. Moves opposite calcium. Low = muscle weakness; high = common in kidney failure.

Kidney quick notes	GFR ≥ 90 mL/min/1.73m² = normal; < 60 for 3+ months = chronic kidney disease; < 15 = kidney failure / dialysis range. BUN:creatinine ratio ≈ 10:1–20:1 — a ratio > 20:1 with a normal creatinine suggests a **prerenal** cause (think dehydration), not kidney damage.

ABGs — Arterial Blood Gases

Test	Adult Reference Range	Nursing Cue — What It Tells You
pH	7.35–7.45	Overall acid-base. < 7.35 = acidosis; > 7.45 = alkalosis.
$PaCO_2$	35–45 mmHg	Respiratory component — lungs blow off CO_2. High = hypoventilation; low = hyperventilation.
HCO_3^-	22–26 mEq/L	Metabolic component — kidneys hold or dump bicarb.
PaO_2	80–100 mmHg	Oxygen dissolved in arterial blood — oxygenation status.
SaO_2	95–100%	% of hemoglobin saturated with O_2 — what the pulse oximeter estimates.

ABG Interpretation Grid — ROME: Respiratory = Opposite, Metabolic = Equal

Disorder	pH	$PaCO_2$	HCO_3^-
Respiratory acidosis	↓	↑	normal / ↑
Respiratory alkalosis	↑	↓	normal / ↓
Metabolic acidosis	↓	↓	↓
Metabolic alkalosis	↑	↑	↑

Read any ABG in 3 steps — **1.** pH — acidosis or alkalosis? **2.** Which value moves the *same* direction as pH (ROME)? That names the disorder. **3.** Is the other value also abnormal? That is compensation.

Coagulation, Cardiac & Liver

Coagulation

Test	Adult Reference Range	Nursing Cue — What It Tells You
PT	11–13.5 sec	Extrinsic pathway clotting time.
INR	0.9–1.2 *Therapeutic on warfarin: 2.0–3.0*	**THE warfarin monitor.** Rising INR = bleeding risk. Vitamin K reverses warfarin.
aPTT	25–35 sec *Therapeutic on heparin: ~60–80 sec*	**THE heparin monitor.** Protamine sulfate reverses heparin.

Cardiac Markers

Test	Adult Reference Range	Nursing Cue — What It Tells You
Troponin I	< 0.04 ng/mL (essentially undetectable)	Most specific MI marker — rises 3–12 hrs after injury, stays elevated 7–10 days. Any elevation = heart muscle damage until proven otherwise.

Liver Panel

Test	Adult Reference Range	Nursing Cue — What It Tells You
ALT	10–40 U/L	Most liver-specific enzyme — signals hepatocellular (liver cell) injury.
AST	10–40 U/L	Liver + heart + muscle — less specific than ALT.
Total bilirubin	0.3–1.0 mg/dL	Jaundice marker. High = yellow skin/sclera; expect clay-colored stools and dark urine.
Direct (conjugated) bilirubin	0.1–0.3 mg/dL	The water-soluble fraction — rises with bile duct obstruction.
Albumin	3.5–5.0 g/dL	Liver-made protein; nutrition + oncotic pressure. Low = edema, poor wound healing. Slow to change — a chronic marker.
Ammonia	15–45 mcg/dL	Rises in liver failure → hepatic encephalopathy: confusion, asterixis (flapping tremor). Lactulose treats it.

Thyroid, Diabetes & Therapeutic Drug Levels

Thyroid

Test	Adult Reference Range	Nursing Cue — What It Tells You
TSH	0.4–4.0 mIU/L	First-line thyroid screen — moves **opposite** thyroid hormones. High TSH = hypothyroid (low and slow); low TSH = hyperthyroid (hot and hyper).

Diabetes

Test	Adult Reference Range	Nursing Cue — What It Tells You
HbA1c	< 5.7% normal 5.7–6.4% prediabetes ≥ 6.5% diabetes < 7% typical goal	~3-month average glucose. No fasting needed.
Fasting glucose	70–100 mg/dL (≥ 126 on two tests = diabetes)	Day-to-day control. Random ≥ 200 mg/dL with symptoms is also diagnostic.

Therapeutic Drug Levels **(trough = drawn right BEFORE the next dose, unless ordered otherwise)**

Test	Adult Reference Range	Nursing Cue — What It Tells You
Digoxin	0.8–2.0 ng/mL	Vision changes (yellow-green halos), anorexia, bradycardia. Low K^+ raises toxicity risk — check potassium first.
Lithium	0.6–1.2 mEq/L *acute mania up to 1.5*	Fine tremor → coarse tremor, confusion, ataxia. Needs salt + water — dehydration spikes levels.
Phenytoin	10–20 mcg/mL	Nystagmus, ataxia, slurred speech. Chronic use → gingival hyperplasia.
Theophylline	10–20 mcg/mL	Tachycardia and seizures at high levels. Narrow window — caffeine and smoking change levels.
Vancomycin (trough)	10–20 mcg/mL	Nephrotoxic + ototoxic. Trough drawn 30 min before the 4th dose. Red man syndrome = infuse slower, not an allergy.

Key Diagnostics — What to Order & Why

Test	Details	What It Is For
BMP	Na, K, Cl, CO_2, BUN, creatinine, glucose, Ca (8 tests)	Kidney function, electrolytes, fluid balance, blood sugar.
CMP	BMP + liver panel (ALT, AST, ALP, bilirubin, albumin, total protein)	Everything in a BMP, plus liver and nutrition status.
CBC with differential	RBCs, WBCs by type, platelets	Anemia, infection (which WBC type is up tells you what kind), clotting status — the most ordered lab in the hospital.
ABGs	Arterial stick — Allen test first	Oxygenation, ventilation, acid-base. Drawn for vent changes, COPD exacerbation, DKA, overdose.
PT/INR	Clotting time, standardized ratio	Warfarin monitoring; also reflects liver synthetic function.
aPTT	Clotting time, intrinsic pathway	Heparin drip monitoring.
Troponin (serial)	Heart muscle protein	Rule out MI — drawn on arrival and repeated (e.g., 3 and 6 hrs); the trend matters more than one value.
BNP	> 100 pg/mL abnormal	Heart failure marker — markedly high supports acute HF; higher = worse cardiac strain.
D-dimer	Clot breakdown product	Elevated suggests PE or DVT. Very sensitive but nonspecific — also up in pregnancy, inflammation, cancer.
Blood cultures ×2	Two separate sites	Draw BEFORE antibiotics — catches bacteremia and rules out contamination.
Type & screen / crossmatch	Antibodies + donor-unit match	Before any transfusion — screen finds antibodies, crossmatch confirms unit compatibility.
Lipid panel	Fasting 9–12 hrs	Cholesterol/triglycerides for cardiac risk assessment.
Urinalysis	Dip + microscopy	UTI screen (WBCs, nitrites, leukocyte esterase), kidney function (protein), glucose/ketones.
ECG (12-lead)	Heart rhythm tracing	Rhythm, ischemia, MI — first test for chest pain, before troponin results.
Chest X-ray	Imaging	Line/tube placement confirmation, pneumonia, heart failure (fluid), pneumothorax.
CRP / ESR	Inflammation markers	CRP rises and falls faster and is more specific; ESR is slower and nonspecific.

Critical Values — Call the Provider NOW

K^+ < 3.0 or > 6.0	**Na^+ < 120 or > 160**	**Glucose < 40 or > 400**
Hgb < 7 or > 20 g/dL	**Platelets < 50k or > 1,000k**	**WBC < 2,500 or > 30,000**
pH < 7.25 or > 7.55	**PaO_2 < 60 mmHg**	**INR > 5.0**

Typical thresholds — always follow your facility's critical-value policy.

TheWholeNest • Adult reference ranges; confirm with your facility's lab.