

Critical values

- ✓ **Potassium ≥ 6.5 mEq/L** — cardiac monitor and notify the provider
- ✓ **Sodium ≥ 160 mEq/L** — seizure risk; precautions and notify
- ✓ **INR > 4** — bleeding risk; notify and anticipate intervention
- ✓ **Platelets $< 50,000/\text{mm}^3$** — spontaneous bleeding risk; bleeding precautions, anticipate holding anticoagulants and invasive procedures
- ✓ **WBC $> 20,000/\text{mm}^3$** — assess for severe infection, sepsis, leukemia, or inflammation

Fluid volume

- ✓ **Deficit** — dry mucous membranes, poor turgor, tachycardia, hypotension (late), urine < 30 mL/hr and concentrated. **Tachycardia and falling urine output come before hypotension**
- ✓ **Excess** — peripheral edema, crackles, weight gain, JVD, bounding pulses, hypertension, falling SpO_2
- ✓ **Older adults overload easily** — reduced cardiac and renal reserve
- ✓ **ADH** retains water (excess = SIADH) • **aldosterone** retains Na and water, excretes K • **ANP** excretes Na and water, opposing aldosterone
- ✓ **Assess fluid status before you interpret an electrolyte** — especially sodium

Electrolyte imbalances

Imbalance	Key signs
Hyponatremia (< 135)	Headache, confusion, nausea, lethargy, seizures — water shifts <i>into</i> brain cells
Hypernatremia	Thirst, dry skin, restlessness, confusion — reflects water loss , so replace water
Hypokalemia (< 3.5)	Muscle weakness, ileus, dysrhythmias. ECG: flat T waves , U waves , ST depression
Hyperkalemia	Weakness, paresthesias, dysrhythmias, arrest. ECG: peaked T waves , widened QRS, prolonged PR, sine wave
Hypocalcemia (< 8.5)	Tetany, cramps, positive Chvostek or Trousseau
Hypercalcemia	“Stones, bones, groans, and psychiatric overtones”
Hypomagnesemia	Tremors, hyperreflexia, dysrhythmias
Hypermagnesemia	$\downarrow$ BP, bradycardia, loss of deep tendon reflexes (early toxicity), respiratory depression

- ✓ **Potassium shifts opposite to pH** — acidosis raises serum K, alkalosis lowers it. **DKA has a total-body potassium deficit despite a normal or high serum level**
- ✓ **Drug causes** — loop diuretics $\rightarrow$ hypokalemia • thiazides $\rightarrow$ hyponatremia • ACE inhibitors $\rightarrow$ hyperkalemia • corticosteroids $\rightarrow$ sodium retention • lithium is destabilized by sodium loss
- ✓ **Correct slowly.** Rapid correction of chronic hyponatremia causes **osmotic demyelination**; rapid correction of hypernatremia causes **cerebral edema**
- ✓ Potassium abnormalities threaten the heart first — **cardiac monitoring is the priority** with moderate-to-severe values or ECG change