



ICR-LYTE-010

Critical care · metabolic
Updated 20 Jun 2026

CRITICAL CARE ORDER SET

Electrolyte Replacement

Severity-based repletion of potassium, magnesium, phosphate, and calcium in the critically ill adult, with a high-level framework for sodium disorders. Confirm renal function and access before dosing, replace magnesium alongside refractory hypokalemia, and recheck on schedule. Adapt every dose to your institutional protocol and the patient in front of you.

PATIENT _____	MRN _____	WEIGHT (KG) _____	EGFR _____
ALLERGIES _____	IV ACCESS _____	ORDERING CLINICIAN _____	DATE / TIME _____

00 General rules — apply to all electrolytes

RENAL Adjust or hold K, Mg, and Phos if **eGFR < 30 mL/min/1.73 m²** or anuric — start at half-dose, recheck more frequently, and consider nephrology input.

BEFORE EACH DOSE

- ☐ Confirm recent BMP, Mg, Phos as relevant — within **4–6 h** in unstable patients
- ☐ Verify urine output / renal function and IV access type before ordering

IV ACCESS

- ☐ **Peripheral** — adhere to max concentrations / rates to avoid phlebitis
- ☐ **Central** — may use higher concentrations; monitor for arrhythmias and extravasation

TELEMETRY

- ☐ Continuous cardiac monitoring for IV K $\geq$ **10 mEq/h**, IV Mg bolus, or severe abnormalities

RECHECK TIMING

- ☐ Mild–moderate deficits: recheck within **4–6 h** after completion of IV replacement
- ☐ Severe / symptomatic: recheck within **1–2 h**, often during or immediately after infusion

01 Potassium (K⁺) replacement

TARGET General ICU **4.0–4.5 mEq/L** (cardiac patients $\geq$ 4.0). Avoid chasing small shifts in tenuous patients without clinical context.

IV KCL — ACCESS & RATE LIMITS

ROUTE	MAX RATE / CONCENTRATION
Peripheral	$\leq$ 10 mEq/h , concentration $\leq$ 40 mEq/L (e.g., 10 mEq in 100 mL NS over 1 h)
Central + telemetry	Up to 20 mEq/h
Central, high-risk	Up to 40 mEq/h (severe hypokalemia + arrhythmia) — intensivist at bedside, q1h labs

IV DOSING BY SERUM LEVEL — stable, no EKG changes. Select one.

K ⁺ LEVEL	ORDER & RECHECK
☐ 3.0–3.4	10–20 mEq IV over 1–2 h (e.g., 10 mEq in 100 mL NS over 1 h $\times$ 1–2). Recheck in 4–6 h
☐ 2.5–2.9	20–40 mEq IV over 2–4 h (e.g., 20 mEq in 100 mL NS over 1 h $\times$ 2, central preferred). Recheck in 2–4 h
☐ < 2.5 / EKG Δ	40–80 mEq IV, central + telemetry (20 mEq in 100 mL NS over 1 h $\times$ 2–4). Recheck after 40 mEq; give Mg concurrently

ORAL KCL — gut usable, not urgent

- ☐ Mild (3.0–3.4), stable & eating: **20–40 mEq PO** now; divided doses (e.g., 20 mEq BID) to reduce GI intolerance; recheck with next BMP

RENAL / HOLD

- ☐ eGFR < 30 or oliguria/anuria: start half-dose, recheck more frequently
- ☐ Hold further K if K $\geq$ 4.5–5.0 mEq/L or rising rapidly

02 Magnesium (Mg²⁺) replacement

TARGET ICU goal **Mg $\geq$ 2.0 mg/dL** ($\geq$ 0.8 mmol/L); higher in arrhythmia-prone or QT-prolonging therapy.

IV MgSO₄ BY SEVERITY — select one

MG LEVEL	ORDER & RECHECK
☐ 1.2–1.7	2 g IV in 50–100 mL over 1–2 h; may repeat to total 4 g over 4–6 h. Recheck within 6 h
☐ < 1.2 / arrhythmia	4 g IV total: 2 g in 50 mL over 15–30 min, then 2 g in 50–100 mL over 1–2 h
☐ Torsades	2 g IV over 10–15 min, may repeat once; then consider infusion (1–3 g/h) if ongoing risk

MAINTENANCE / REFRACTORY HYPOKALEMIA

- ☐ Recurrent low Mg or refractory hypokalemia: **1–2 g IV daily** or intermittent, guided by serial Mg and renal function

RENAL

- ☐ eGFR < 30 or dialysis: lower dose (1–2 g), increase interval; avoid routine large doses; monitor Mg and deep tendon reflexes

03 Phosphate replacement

SALT Choose **KPhos** if K $\leq$ 4.0 (not hyperkalemic); **NaPhos** if K $\geq$ 4.5 or hyperkalemic.

ORAL PHOSPHATE — mild, asymptomatic, enteral access

- ☐ Phos 2.0–2.4: **15–30 mmol PO** divided; recheck in 12–24 h. Watch for diarrhea (Na-containing preps in volume-sensitive patients)

IV PHOSPHATE BY SEVERITY — adjust for renal function. Select one.

PHOS (MG/DL)	ORDER
☐ 2.0–2.4	0.16–0.25 mmol/kg IV over 4–6 h (practically 15 mmol IV over 2–4 h)
☐ 1.0–1.9	0.32–0.5 mmol/kg IV over 4–6 h (cap ~30 mmol IV over 4–6 h)
☐ < 1.0	Up to 45 mmol IV total: 30 mmol over 4–6 h, recheck; then 15 mmol if still low and renal function allows

PRECAUTIONS

- ☐ eGFR < 30 or anuric: start half-dose; repeat only after level check
- ☐ Monitor for hypocalcemia, hyperphosphatemia, and metastatic calcification (especially CKD / ESRD)

04 Calcium (Ca²⁺) replacement

MEASURE Use **ionized Ca** where available — total Ca is unreliable in hypoalbuminemia.

INDICATIONS

- ☐ Symptomatic hypocalcemia (tetany, seizure, laryngospasm), severe (ionized Ca < **0.9–1.0 mmol/L**), or EKG changes (QT prolongation)

IV CALCIUM GLUCONATE — preferred peripherally

- ☐ **Acute / symptomatic:** 1–2 g IV — 1 g in 50–100 mL D5W or NS over 10–20 min; may repeat once per symptoms / ionized Ca
- ☐ **Slow correction:** 1–2 g in 50–100 mL over 1–2 h; repeat per ionized Ca and cause (e.g., citrate toxicity on CRRT)
- ☐ **Calcium chloride** (central line) — more elemental Ca, more irritant; reserve for arrest / resuscitation, not routine replacement

CAUTION

- ☐ Avoid aggressive Ca in hyperphosphatemia (Ca–P precipitation risk)
- ☐ Digoxin patients: administer slowly with close monitoring

NOTE Na correction is disease- and time-course-specific — manage via your ICU's dedicated hyponatremia / hypernatremia protocol. This is a minimal framework only.

HYPERNATREMIA — free-water deficit

- ☐ Calculate free-water deficit; correct $\leq 8\text{--}10$ mEq/L per day
- ☐ Enteral free water via NG / PEG, or D5W IV at rate based on target fall in Na
- ☐ Na checks every 4 h during active correction

HYPONATREMIA

- ☐ **Symptomatic / severe** ($\text{Na} \leq 120$ with seizures, obtundation): 3% hypertonic saline **100 mL over 10 min**, up to 3 times, with q1–2h Na checks
- ☐ **Chronic / asymptomatic**: tailored regimen; avoid correction > 8 mEq/L per day (lower in high ODS risk)

EDUCATIONAL USE ONLY

Not a substitute for clinical judgement. Verify doses, allergies, renal function, and contraindications. Adapt all agents and thresholds to your institutional protocols, formulary, and the individual patient.

Spreading knowledge
Improving outcomes