

Fluid & electrolyte management in the newborn

What recent international literature (2022–2026) says and how to calculate it at the bedside with NeoFast.

REFERENCES

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THE STARTING POINT

Weight loss in the first days is expected and desirable

After birth the **extracellular fluid contracts**: a physiological diuresis and natriuresis that the kidney regulates. Fluid therapy must **allow this contraction**, not fight it.¹

5–10%

usual weight loss in **term** newborns in the first week

10–15%

may be lost by **preterm** infants - more body water, more skin losses

Avoid both extremes: **hyponatremic fluid overload** (too much water) and **hypernatremic dehydration** (too little).¹

HOW MUCH FLUID?

Start low, advance daily, adjust to the baby

TERM NEWBORN

Day 1	60–80 mL/kg/day
Advance	+10–20 mL/kg/day
Target	120–160 mL/kg/day

Preterm infants often need more early on because of high transepidermal water loss, humidified incubators reduce these losses. Volumes must be individualized by gestational age.¹

Adjust every day by **weight, urine output and serum sodium.**

Positive fluid balance is not harmless

In neonates, fluid overload is associated with **higher mortality, longer mechanical ventilation, BPD, PDA and NEC.**¹

The 2024 pediatric ADQI consensus recommends describing fluid status as **daily, cumulative and % cumulative fluid balance**, and reserving “fluid overload” for a positive balance associated with harm.²

% cumulative fluid balance = (total intake – total output) ÷ reference weight × 100

Timing matters as much as dose

First days: no routine sodium until postnatal diuresis has started (usually from day 2). Early hyponatremia usually means **excess water, not lack of sodium**.⁴

Term maintenance: 2 - 3 mEq/kg/day from the 2nd day of life.

Preterm after the first week: renal sodium losses are high. AAP suggests 3-5 mEq/kg/day; ESPGHAN 2022 accepts up to 3-8 mEq/kg/day. Higher late intake reduced hyponatremia in a 2023 Cochrane review.⁴⁻⁶

Spot **urine sodium** can guide supplementation **better than serum sodium alone**.⁴

Isotonic vs hypotonic maintenance fluids

Multicenter prospective study, 21 centers, **term newborns** on IV maintenance fluids (Neofluid, 2024).³

7.9%

hyponatremia with
hypotonic fluids

1.2%

hyponatremia with
isotonic fluids

Isotonic fluids appeared safe in term infants, echoing the pediatric shift toward isotonic maintenance.³

Observational data in **term** babies - do not extrapolate to the first days of preterm infants.

Glucose, potassium & what to monitor

- **GIR** 5–7mg/kg/min (5–8 in hypoglycemia; max.12);
- **Potassium** 1–2 mEq/kg/day from day 2, only when diuresis is established;
- **Calcium gluconate 10%** — around 2 mEq/kg/day;
- **Weight** every day (more often in extremely preterm infants);
- **Urine output** and fluid balance every shift;
- **Serum sodium, potassium and glucose** frequently in the first days.

Ranges as displayed in the NeoFast Venous hydration calculator; monitoring per refs 1, 2, 4.

IN THE APP

Venous hydration: enter the prescription



Venous hydration



Weight (kg)

2



GIR (mg/kg/min)

5

Recommendation: 5-7 mg/kg/min and in cases of hypoglycemia 5-8 mg/kg/min (max. 12mg/kg/min).



Total fluid rate (mL/kg)

80

Recommendation: 1st day 60-80 mL/kg/day for FTNB and increase by 10-20 mL/kg daily up to 120-160 mL/kg. For PTNB see additional information .



NaCl 20% (mEq/kg)

0

Recommendation: from the 2nd day of life 2-3 mEq/kg/day.



GluCa10% (mEq/kg)

1

Recommendation: 2mEq/kg/day.

KCl 10%

KCl 15%

KCl 19.1%

KCl 20%



KCl 10% (mEq/kg)

0

Recommendation: from the 2nd day of life, 1-2 mEq/kg/day if diuresis is well established.

Example: **2 kg**
newborn, **day 1**

GIR **5** mg/kg/min

Fluids **80** mL/kg/day

NaCl **0** and KCl **0**:
day 1, before diuresis

Calcium gluconate
1 mEq/kg

IN THE APP

Ready-to-prescribe volumes in seconds

neofast	
Venous hydration	
Results	
Grams of glucose	14.4g
Glucose concentration	9.23%
Total fluid rate	160mL
NaCl 20%	0mL
GluCa 10%	4mL
KCl 10%	0mL
D10W	132mL
D5W	24mL
Drip in 24 hours	6.7mL/h
Type of access by glucose concentration	Peripheral or central access
Access type by Potassium concentration	Peripheral or central access

14.4 g glucose/day
at 9.23%

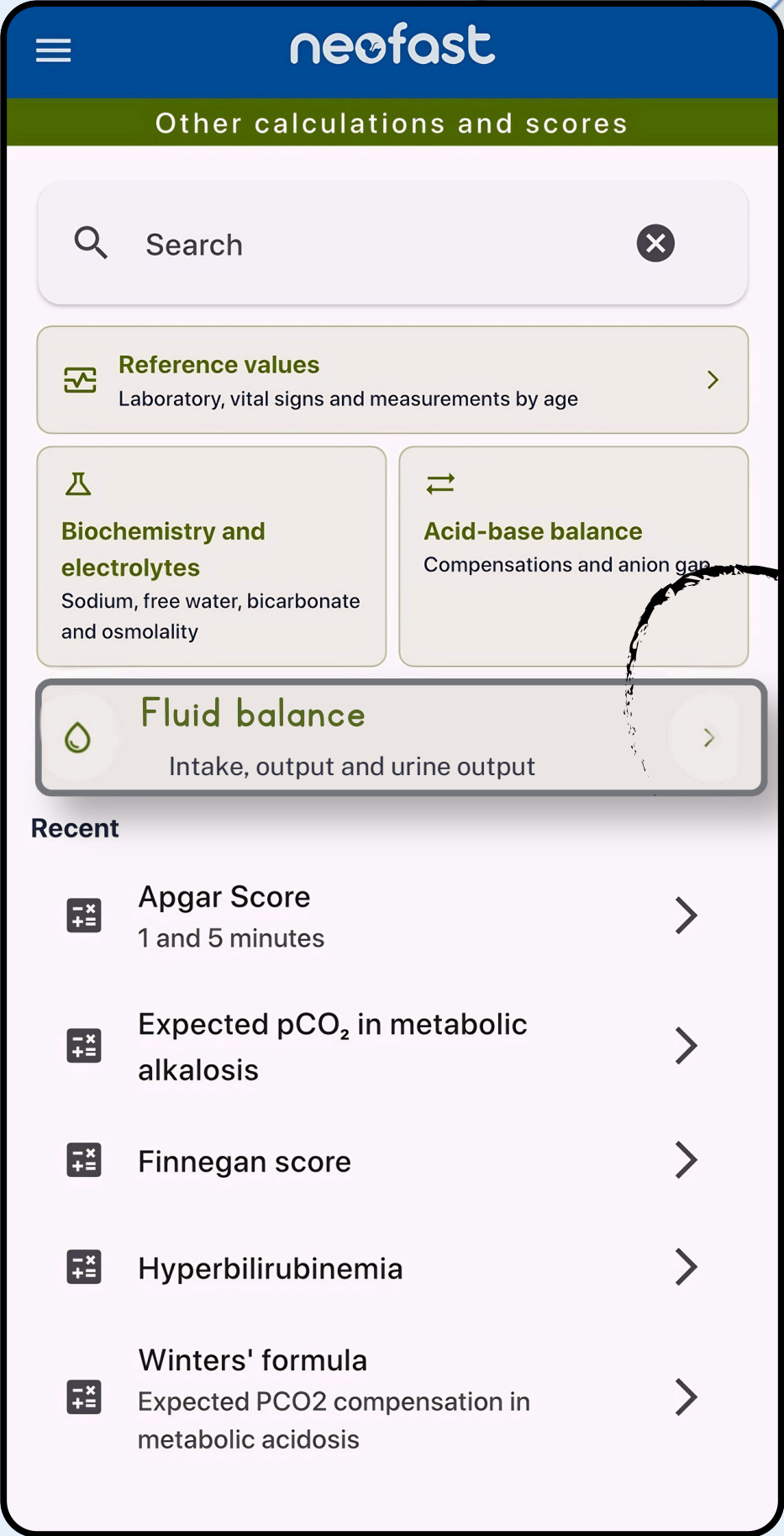
Total 160 mL → 6.7 mL/h

D10W 132 mL +
D5W 24 mL + GluCa
10% 4 mL

Access type checked
for glucose and
potassium
concentration

KEY TAKEAWAYS

Individualize, monitor, recalculate

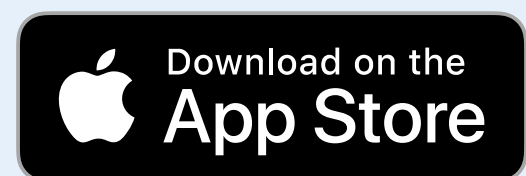


All in one
app
check it
out!

KEY TAKEAWAYS

Individualize, monitor, recalculate

- Let the physiological weight loss happen
- Delay Na and K until diuresis begins
- Track % cumulative fluid balance
- Prefer isotonic maintenance in term infants
- Guide preterm sodium by losses and growth



Calculate it in NeoFast

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