

USEFUL FORMULAS AND HELPFUL HINTS

In the following formulas, s = serum, u = urine

Body Mass Index (BMI) =
weight (kg) / height² (m²) *or*
weight (lbs) x 703 / height² (inches²)

Body Surface Area (BSA) =
square root of [(height in cm x weight in kg) / 3600]
Approximate BSA: infant 0.3, 30 kg child 1, adult 1.73

Corrected calcium =
total calcium + [0.8 x (4 – albumin)]

Ionized calcium:
In alkalosis, more calcium bound to protein & ionized Ca decreases (total Ca unchanged)
In acidosis, less calcium bound to protein & ionized Ca increases (total Ca unchanged)

Ca clearance ratio =
[Ca_u x Cr_s] / [Cr_u x Ca_s] (first morning sample or 24-hour collection preferred)
< 0.01 indicative of Familial hypocalciuric hypercalcemia (FHH)

Ca_u/Cr_u > 0.2 (generally higher and more variable in infants*) predisposition to nephrocalcinosis
95th percentile for different age groups (Sargent JD *et al.* J Pediatr 1993;123(3):393-7):
<7 months: 0.86
7 – 18 months: 0.6
19 months – 6 years: 0.42
Adults: 0.22

Corrected sodium =
sodium + {1.6 x [(glucose – 100)/100]}

Fractional excretion of sodium (FENa) =
100 x [(Na_u x Cr_s) ÷ (Na_s x Cr_u)]

Free water deficit (liters) =
(0.6 x kg) x [(Na_s/Na_{target}) – 1]
Use 1/2 to 1/3 this volume in SIADH

Glucocorticoid anti-inflammatory equivalence:
1 mg Prednisone = 4 mg Hydrocortisone
1 mg Dexamethasone = 27 – 50 mg Hydrocortisone

Glucose infusion rate (GIR) in mg/kg/min =
[(% dextrose solution) x (IV rate in ml)] ÷ [weight in kg) x 6]

LDL cholesterol =
total cholesterol – HDL – (triglycerides ÷ 5)

Mid parental height (MPH) =

- Boy
 - Inches: (Father's Height + Mother's Height + 5) / 2
 - Cm: (Father's Height + Mother's Height + 13) / 2
- Girl
 - Inches: (Father's Height - 5 + Mother's Height) / 2
 - Cm: (Father's Height - 13 + Mother's Height) / 2

Osmolality =(2 x Na) + (glucose ÷ 18) + (BUN ÷ 2.8)

SI Conversion Calculator: <http://www.amamanualofstyle.com/page/si-conversion-calculator>

Transtubular potassium gradient = $K_u/K_p \div \text{osm}_u/\text{osm}_p$
Formula only valid if $\text{osm}_u > 300$ and $K_u > 25$
<7 in the setting of hyperkalemia indicates mineralocorticoid deficiency

Tubular reabsorption of phosphate (TRP) = $1 - [(\text{phos}_u \times \text{creat}_s) \div (\text{Phos}_s \times \text{creat}_u)]$
<0.85 suggests excess phosphorus wasting/hyperparathyroidism