Paediatric Normal Values

taken from
'Pocket Emergency Paediatric Care'
Ahmad, Shafique; Southall, David
BMJ Books

Weight: (1 kg = 2·2 lb)
Infant: 0–1 years = 3–10 kg
5 months: double birth weight
12 months: treble birth weight
After 1 year: wt in kg = 2 (age + 4)
2 years: quadruple birth weight.

Airway and breathing

(endotracheal intubation)
under 25 kg = uncuffed

Full term infant	=	3·0–3·5 mm ID
Infant < 1 year	=	4·0–4·5 mm ID
Child > 1 year	=	age/4 + 4 mm ID.

Length of tube= age/2 + 12cm oral ETT OR + 14cm nasal ETT

Circulation

(dehydration treatment: deficit in ml = % dehydration × weight in kg × 10)
Blood pressure systolic = 80 + (age year × 2)
Cuff must be two-thirds size of upper arm and the largest that will fit

Capillary refill = 2 seconds or less after 5 seconds pressure (sternum)

Drip rates for clear fluids: (standard giving set) 20 drops = 1 ml
ml/h divided by 3 = drops/min

Minimum urine output:
> 1 ml/kg/h in children,
> 2 ml/kg/h in infants

Insensible losses:
300 ml/m^2/24 h or 12 ml/kg/24 h if > 1 year
15 ml/kg/24 h if an infant
24 ml/kg/24 h if preterm
increased if in hot climate by around 50%
increased if fever by 50%

Fluid management
Blood volume is 100 ml/kg at birth falling to 80 ml/kg at 1 year.
Total body water varies from 800 ml/kg in the neonate to 600 ml/kg at one year and thereafter. Of this about two thirds (400 ml/kg) is intracellular.
Clinically, dehydration is not detectable until >5%(50 ml/kg).

Fluid requirements:

1. Replace insensible losses through sweat, respiration, gastrointestinal loss etc.

2. Replace of essential urine output, the minimal urine output to allow excretion of the products of metabolism etc.
3. Extra fluid to maintain a modest state of diuresis.
4. Fluid to replace abnormal losses such as blood loss, severe diarrhoea, diabetic polyuria losses etc.

Table 1.1 Normal fluid requirements

Body weight	Fluid requirement per day	Fluid requirement per hour
First 10 kg	100 ml/kg	4 ml/kg
Second 10 kg	50 ml/kg	2 ml/kg
Subsequent kg	20 ml/kg	1 ml/kg

Examples: 6 kg infant would require 600 ml per day
14 kg child would require 1000 + 200 = 1200 ml per day
25 kg child would require 1000 + 500 + 100 = 1600 ml per day.

Table 1.2 Electrolyte contents of body fluids

Fluid	Na (mmol/1)	K (mmol/l)	CI (mmol/l)	HCO3 (mmol/l)
Plasma	135–141	3·5–5·5	100–105	24–28
Gastric	20–80	5–20	100–150	0
Intestinal	100–140	5–15	90–130	15–65
Diarrhoea	7–96	34–150	17–164	0–75
Sweat	<40	6–15	<40	0–10

Table 1.3 Normal water, electrolyte, energy and protein requirements (provided excessive loss is not present)

Body weight	Water (ml/ kg/day)	Sodium (mmol/ kg/day)	Potassium (mmol/kg/day)	Energy (kcal/ day)	Protein (g/ day)
First 10 kg	100	2–4	1.5–2.5	110	3.00
Second 10 kg	50	1–2	0.5–1.5	75	1.50
Subsequent kg	20	0.5–1.0	0.2–0.7	30	0.75

Table 1.4 Normal values for paediatric vital signs in patients who are not crying

Age	Heart rate	Systolic blood pressure	Respiratory rate
< 1 year	120–140	70–90	30–40
2–5 years	100–120	80–90	20–30
5–12 years	80–100	90–110	15–20