Paediatric Normal Values – Anaesthesia

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COMPLETE RESPIRATORY SYSTEMS

Age	Weight (kg)	Height or length (cm)	Anaesthetic facemask size	Oropharyngeal airway size (ISO) *	i-gel size	LM size	LM cuff maximum inflation value (ml)	Tracheal tube uncuffed internal diameter (mm) **	Tracheal tube cuffed internal diameter (mm)	Awake heart rate (per minute)	Systolic blood pressure (mm Hg)	Respiratory rate (per minute)	Estimated tidal volume (ml)	Approximate blood volume (ml)	Acceptable haematocrit	Intravenous maintanance fluid (ml/hr) ***	Breathing system HMEF	Anaesthetic circuit
< 1 month	3.5	50	0 7290000	00 (5.0) 1110050	1 8201000	1 8001000	< 4	3.0		85 - 205	60	30 - 40	21	315	≥ 0.30	14		Jackson-Rees T-piece with 0.5 litre reservoir bag (2121000, 2122000 - with APL valve) in anaesthetic room and 15 mm paediatric circle system (2142000) in theatre
1 month	4	54						3.0 - 3.5	3.0		80		24	360		16	Clear-Therm Micro (1441000)	
3 months	5	60	1 7291000	0 (5.5) 1110055	1.5 8215000	1.5 8015000	< 7	3.5	3.0	100 - 180	80	30 - 40	30	400	≥ 0.25	20		
6 months	7	67											42	560		28		
1 year	10	78	2 7292000 7292001	1 (6.5) 1111065	1.5 / 2	2 8002000	< 10	4.0	3.5	100 - 180	92	26 - 34	60	800	≥ 0.2	40		
2 years	12	87			2 8202000			4.5	4.0	60 - 140	94	24 - 30	72	900		44	Clear-Therm Mini (1831000)	
3 years	14	95						4.5 - 5.0	4.0 - 4.5		96		84	1050		48		
4 years	16	103						5.0	4.5		98		96	1200		52		
5 years	18	109						5.0 - 5.5	4.5 - 5.0		100	20 - 24	108	1350		56		
6 years	20	116	3 7293000 7293001	1.5 (7.0) 1111570	2 8202000	2.5 8025000	< 14	5.5	5.0	60 - 140	102	20 - 24	120	1500	≥ 0.2	60	Clear-Therm Mini (1831000)	Mapleson C in anaesthetic room (2108000 or 2102000), adult circle system in theatre (2010000)
7 years	22	122						5.5 - 6.0	5.0 - 5.5		104		132	1650		62		
8 years	26	128			2.5 8225000				6.0 - 6.5		106		156	1820		66		
10 years	30	139			2.5 / 3	3 8003000	< 20		7.0		110	20 - 24	180	2100		70		
12 years	38	149		2 (8.0) 1112080	3 8203000				7.0 - 7.5	60 - 100	114	12 - 20	228	2660	≥ 0.2	78	Clear-Therm 3 (1541000)	
Adolescent	50	161				4 8004000	< 30		7 - 8		118		300	3500		90		
Reference	1	2	3	3	3	3	3	1	1	1	1	1	1	4	4	6	3	3

Ambient temperature to be a minimum of 21 degrees Celsius. For smaller children and neonates undergoing surgery or resuscitation, additional warming with a Bair Hugger® or similar device is recommended (5).
*** The correct size of an oropharyngeal airway is one that, when laid against the side of the face, has a length equal to the distance between the level of the patient's incisors (or where they will be) to the angle of the jaw (1).**
**** A correctly sized uncuffed tracheal tube should have a small audible leak around the tube when 20 cm of water pressure is applied from the breathing system (5).**

***** Intravenous maintenance fluid recommendations for previously well children aged from one month to 16 years old**

The majority of children may be safely administered sodium chloride 0.45% with glucose (2.5 or 5%). Do not use sodium chloride 0.18% with glucose 4%.

Some children at high risk of hyponatraemia should only receive isotonic fluids (see list opposite).

Some acutely ill children with increased anti-diuretic hormone (ADH) secretion (e.g. post-operative patients or those with intracranial infections or head injuries) may benefit from their maintenance fluid being restricted to two-thirds normal recommended volume.

To avoid dangerous hypo or hypernatraemia, monitor the child's weight and calculate fluid balance. Use a volumetric pump. Check plasma electrolyte and glucose concentration before and regularly throughout intravenous therapy.

Consider adding potassium 40 mmol/l to maintenance fluids once plasma potassium levels are known.

Children requiring both maintenance fluids and replacement of ongoing losses should receive a single isotonic fluid.

Children who should only receive isotonic fluids include those who:

- are peri- or post-operative
- have low plasma sodium
- have CNS infection or a head injury
- have sepsis
- have a self-wasting syndromes
- require the replacement of ongoing losses
- have intravascular volume depletion or hypotension
- have bronchiolitis
- have excessive gastrointestinal losses
- have a chronic condition such as diabetes, cystic fibrosis or a pituitary deficit

Examples of isotonic fluids are: sodium chloride 0.9%, sodium chloride 0.9% *with* 5% glucose or Hartmann's solution.

For further information regarding the treatment of shock and the replacement of pre-existing fluid deficit, consult the NPSA website, EPALS manual and other appropriate resources.

References
1. European Paediatric Life Support, 4th Edition, 2016; p3-4, 37, 149. Reproduced with the kind permission of the Resuscitation Council (UK).
2. Child Growth Foundation (Charity Reg No 274325). Boys and Girls Growth Charts (Birth-18 years). London: 2 Mayfield Avenue, London. W4 1PW, 1996.
3. Intersurgical product information http://www.intersurgical.co.uk/). Accessed June 2017.
4. Cunliffe M. Fluid and electrolyte management in children. BJA CEPD reviews 2003; 3(1): p1-4.
5. Basic techniques for anaesthesia. In Sumner E and Hatch DJ, eds. Paediatric Anaesthesia. London: Arnold, a member of the Hodder Headline Group 2000; p182, 194.
6. Reducing the risk of hyponatraemia when administering intravenous infusions to children, March 2007; p11. http://www.nrls.npsa.nhs.uk/resources/?EntryId45=59809. Accessed June 2017.

Accreditation
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