Paediatric Normal Values - Anaesthesia 2010

All codes listed in green are Intersurgical product codes

INTERSURGICAL® COMPLETE RESPIRATORY SYSTEMS

Age	Weight (kg)	Height or length (cm)	Anaesthetic facemask size	Oropharyngeal airway size (ISO) *	LM size	LM cuff maximum inflation value (ml)	i-gel size	Tracheal tube internal diameter (mm) **	Heart rate (per min)	Systolic blood pressure (mm Hg)	Respiratory rate (per min)	Tidal volume (ml)	Intravenous maintenance fluid (ml/hr) ***	Blood volume (ml)	Acceptable haematocrit	Breathing system HMEF	Anaesthetic circuit	Age
Newborn	3	49	0 1127	00 (5.0) 1110050	1 8001	< 4	1 8201	3 uncuffed	110 to 160	70 to 90	30 to 40	21	12	300	≥0.35	N/A	Jackson-Rees T-piece with 0.5 litre reservoir bag (2121, 2122 - with APL valve) in anaesthetic room and theatre (alternatively use a 15 mm circle system [2142] in theatre)	Newborn
Newborn	3.5	50						3.5 uncuffed				25	14	350				Newborn
3 weeks	4	53										28	16	380				3 weeks
5 weeks	4.5	55										32	18	420	≥0.30	Clear-Therm Micro 1441		5 weeks
8 weeks	5	57	1 1128	0 (5.5) 1110055	1½ 8015	< 7	1½ 8215	3.5 uncuffed	110 to 160	70 to 90	30 to 40	35	20	450				8 weeks
3 months	6	60						4 uncuffed				42	24	480	≥0.25			3 months
5 months	7	65										49	28	560				5 months
7 months	8	68										56	32	640				7 months
10 months	9	74										63	36	720				10 months
1 year	10	78	2 1129	1 (6.5) 1111065	2 8002	< 10	1½ / 2	4 uncuffed	100 to 150	80 to 95	25 to 35	70	40	800	≥0.2			1 year
1½ years	11	83						4.5 uncuffed				77	42	880		Clear-Therm Mini 1831		1½ years
2 years	12	87					2 8202		95 to 140	80 to 100	25 to 30	84	44	960				2 years
2½ years	13	91						5 uncuffed				91	46	1040				2½ years
3 years	14	95										98	48	1120				3 years
3½ years	15	99										105	50	1200				3½ years
4 years	16	103						5.5 uncuffed				112	52	1280				4 years
4½ years	17	106										119	54	1360				4½ years
5 years	18	109							80 to 120	90 to 110	20 to 25	126	56	1440				5 years
5½ years	19	112										133	58	1520				5½ years
6 years	20	116	3 1123	1.5 (7.0) 1111570	2½ 8025	< 14	2 8202	6 uncuffed	80 to 120	90 to 110	20 to 25	140	60	1550	≥0.2		Mapleson C (2108 or 2102) in anaesthetic room, adult circle system in theatre (2010)	6 years
7 years	23	122										161	63	1725				7 years
8 years	26	128					2½ 8225	6.5 uncuffed				182	66	1950				8 years
9 years	29	133						6.5 cuffed				203	69	2175		Clear-Therm 3 1541		9 years
10 years	32	139			3 8003	< 20	2½ / 3	7 cuffed				224	72	2400				10 years
11 years	35	144										245	75	2625				11 years
12 years	39	149	4 1124	2 (8.0) 1112080	3 8003	< 20	3 8203	7.5 cuffed	60 to 100	100 to 120	15 to 20	273	79	2730	≥0.2			12 years
13 years	44	155										308	84	3080				13 years
14 years	50	161			4 8004	< 30		8 cuffed				350	90	3500				14 years
15 years	54	165										378	94	3780				15 years
16 years	58	168										406	98	4060				16 years

Ambient theatre temperature to be a minimum of 21 degrees Celsius. For young children and babies undergoing surgery or resuscitation, additional warming with a Bair Hugger® or similar device is essential.

*** The correct size of a Guedel oropharyngeal airway should lie from the centre of the incisors to the angle of the mandible. ** When using an uncuffed tracheal tube, ensure there is a small audible leak present at 20 cm H_2O positive airway pressure.**

***** 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, APLS manual and other appropriate resources.

References
Recommendations correct at time of publication.

Children's weights and length/height
- Child Growth Foundation (Charity Reg No 274325). Boys and Girls Growth Charts (Birth-18 years). London: 2 Mayfield Avenue, London. W4 1PW, 1996
- UK-WHO Growth Charts: Early Years (http://www.rcpch.ac.uk/Research/UK-WHO-Growth-Charts)

Sizes of anaesthetic facemasks, Guedel (OP) airways, i-gel, LM, and filters, LM maximum inflation value
- Intersurgical product information

Guedel (OP) airway sizing, tracheal tube size and audible leak information, temperature recommendation
- Basic techniques for anaesthesia. In Sumner E and Hatch DJ, eds. Paediatric Anaesthesia. London: Arnold, a member of the Hodder Headline Group 2000:179, 182, 194

Normal heart rate, systolic blood pressure, respiratory rate and tidal volume
- Why treat children differently? In Mackway-Jones K, Molyneux E, Phillips B, Wieteska S, eds. Advanced Paediatric Life Support. The Practical Approach, Fourth Edition. Oxford. Blackwell Publishing Ltd 2005:7-13

Blood volume and acceptable haematocrit
- Cunliffe M. Fluid and electrolyte management in children. BJA CEPD reviews 2003; 3(1): 1-4
- Practical Aspects of Fluid and Electrolyte Therapy. In Berry FA, ed. Anaesthetic Management of Difficult and Routine Pediatric Patients, 2nd edition. New York: Churchill Livingstone Inc 1990: 89-120
- Appendix 1. In Sumner E and Hatch DJ, eds. Paediatric Anaesthesia. London: Arnold, a member of the Hodder Headline Group 2000: 617

Intravenous maintenance fluid rate, choice of fluid recommendations and method of delivery
- National Patient Safety Agency. Reducing the risk of hyponatraemia when administering intravenous infusions to children. London: NPSA 2007. www.npsa.nhs.uk/patientsafety/alerts-and-directives/alerts/intravenous-infusions/ (accessed February 2008)
- Royal College of Anaesthetists, Guidance on the provision of Paediatric Anaesthetic Services 2009 (http://www.rcoa.ac.uk/docs/GPAS-Paeds.pdf)

Anaesthetic circuit recommendation
- Intersurgical product information
- Basic techniques for anaesthesia. In Sumner E and Hatch DJ, eds. Paediatric Anaesthesia. London: Arnold, a member of the Hodder Headline Group 2000, 170-3

Disclaimer
Whilst every care has been taken to ensure that doses and recommendations are correct, the responsibility for final checking must rest with the practitioner. The authors cannot accept any responsibility for errors in this publication.
Equipment sizes are based upon Intersurgical recommendations.

Accreditation
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