

NORMAL VALUES IN PAEDIATRICS

A. Vital Signs

Normal Respiratory Rate

Infant	30 - 40
Toddler	24 - 40
School Age	18 - 30
Adolescent	12 - 16

Normal Blood Pressure (from Hazinski MF 1992)¹

	Systolic	Diastolic
Day 1 (< 1000g)	39 - 59	16 - 36
Day 1 (> 3000g)	50 - 70	25 - 45
Neonate	60 - 90	20 - 60
Infant	87 - 105	53 - 66
Toddler	95 - 105	53 - 66
> 7 years	97 - 122	57 - 71
> 15 years	112 - 128	66 - 80

Normal Heart Rate (from Gillette 1989)²

Awake

	Mean	Sleeping
< 3 months	85 - 205	140
3 mo to 2 yr.	100 - 190	130
2 yr. to 10 yr.	60 - 140	80
> 10 yr.	60 - 100	75

Any age HR > 220 consider SVT.

Extra Tables for Abnormal Vital Signs:

Hypotension: Simple and rapid estimation to see if Hypotension is present:

Age	BP (Lower limit (5th centile) systolic value)
0 - 1 month	> 60
1 mo - 1 yr.	> 70
Older	> 70 + (2 x age in years)

Blood Pressure in Hypertension

	Significant Hypertension	Severe Hypertension
1 week	Systolic \geq 96	Systolic \geq 106
7d - 1 mo	Systolic \geq 104	Systolic \geq 110
Infant	Systolic \geq 112 Diastolic \geq 74	Systolic \geq 118 Diastolic \geq 82
3 - 5 years	Systolic \geq 116 Diastolic \geq 76	Systolic \geq 124 Diastolic \geq 86
6 - 9 years	Systolic \geq 122 Diastolic \geq 78	Systolic \geq 130 Diastolic \geq 86
10 - 12 years	Systolic \geq 126 Diastolic \geq 82	Systolic \geq 134 Diastolic \geq 90
13 - 15 years	Systolic \geq 136 Diastolic \geq 86	Systolic \geq 144 Diastolic \geq 92
16 - 18 years	Systolic \geq 142 Diastolic \geq 92	Systolic \geq 150 Diastolic \geq 98

B. Anthropometric Measurements

a) Head Circumference

Gestational Age	Weekly increase cm/wk (1 - 8 wk)
30 - 33 wk.	1.1
34 - 37 wk.	0.8

Rate of growth approximates that of term infant when chronological age reaches term.

Term		Increase in OFC	
< 3 mo.	2 cm per mo.	First yr.	12 cm
4 - 6 mo.	1 cm per mo.	Second yr.	2 cm
6 - 12 mo.	0.5 cm per mo.		
1 - 2 yr.	2 cm per yr.		
2 - 7 yr.	0.5 cm per yr.		
7 - 12 yr.	1/3 cm per yr.		

Age in months	1st 3 months	2nd 3 months	Next 6 months
Head growth (cm)	6	3	3

Rate of CSF production : 0.35 ml/min = 500 ml/day

b) Weight

First 7 - 10 days lose 10 - 15% body weight.

Regain birth weight by 7 - 10th day.

First 3 month weight gain 25 gm/day.

Double Birth Weight by 5 month.

Triple Birth Weight by 1 year of age.

As a rough guide:	Year	0	1	5	10
	Wt in kg	3.5	10.0	20.0	30.0

To calculate:	1 - 9 yr.	Wt (kg) = (Age in yr. + 4) x 2
	7 - 12 yr.	Wt (kg) = Age in yr. x 3

b) Length and Height

Length at birth	50 cm
6 month	68 cm
1 year	75 cm
2 yr.	85 cm
3 yr.	95 cm
4 yr.	100 cm
5-12 yr.	5 cm/yr.

C. Haematology

a) Routine Haematological Values

Age	Hb (g/dL)	PCV (%)	Retics	MCV (fL) Lowest	MCH (pg/cell). Lowest	TWBC (x1000)	Neu (Mean)	Lymp (Mean)
Cord Blood	13.7–20.1	45-65	5.0	110		9-30	61	31
2 wk	13.0–20.0	42-66	1.0		29	5-21	40	63
3 mo	9.5–14.5	31-41			27	6-18	30	48
6 mo – 6 yr	10.5–14.0	33-42		70-74	25-31	6-15	45	48
7-12 yr	11.0–16.0	34-40		76-80	26-32	4.5-13.5	55	38
Adult Male	14.0–18.0	42-52	1.6	80	27-32	5-10	55	35
Adult Female	12.0–16.0	37-47			26-34			

Eosinophils: 2-3%

Monocytes: 6-9 %

Platelets are mildly decreased in 1st few months, by 6 months have reached $250 - 300 \times 10^9$.
ESR should be < 16 in childhood provided PCV at least 35%.

b) Differential WBC

- < 7 days - neutrophils $>$ lymphocytes
- 1 w - 4 yr. - lymphocytes $>$ neutrophils
- 4 - 7 yr. - neutrophils = lymphocytes
- > 7 yr. - neutrophils $>$ lymphocytes

Hb electrophoresis – look under Thalassaemia protocol.

D. Others

$$\text{Body Surface Area (BSA) (m}^2\text{)} = \sqrt{\frac{\text{Ht (cm)} \times \text{Wt (Kg)}}{3600}}$$

Other normal values are found in the relevant chapters of the protocol.

¹ Nelson Textbook of Pediatrics 15th Edition

² Pediatric Advanced Life Support Textbook 1994.