

# Pediatric 101 – Vital Signs

DCAM Pediatric Clinic, the University of Chicago  
Emergency Room, the La Rabida Children Hospital

## Temperature (T)

### Normal:

Rectal T: < 100.4F

Axial/oral T: < 99.5F

### Celsius to Fahrenheit Conversion

°C 35 36 37 38 39 40 41 42  
°F 95.0 96.8 98.6 100.4 102.2 104.0 105.8 107.6

## Heart Rate/Pulse & Respiratory Rate

### Normal Values:

Age	P (at rest) Beats/min	RR (at rest) Breaths/min
Newborn	100 - 180	30 - 60
6 mo	80 - 160	25 - 40
<b>1-5 yr</b>	<b>80 - 130</b>	<b>20 - 30</b>
6 yr	75 - 115	18 - 25
8 yr	70 - 110	18 - 25
10 yr	70 - 110	15 - 20
12 yr	F 70 - 110 M 65 - 105	12 - 20
14 yr	F 65 - 105 M 60 - 100	12 - 20
16 yr	F 60 - 100 M 55 - 95	12 - 20
18 yr	F 55 - 95 M 50 - 90	12 - 20

### Measure in 6 seconds (multiple by 10) or in 15 seconds (multiple by 4)

Assess these vital signs when the child is resting quietly or sleeping if possible, if agitated or crying make a note.

Use a stethoscope to measure HR in kids less than 2yrs old

## Vital Sign – Oxygen Saturation

Normal Values: 95% and above at room air

## Vital Sign – Pain Perception

Wong-Baker Pain Scale can be used in children >3yrs old



Be sure to note how many points the assessment is out of (ex. 3 out of 5 = 3/5)

## Basic Vital Sign – Blood Pressure (BP)

Age	BP (at rest) 90 <sup>th</sup> percentile (systolic/diastolic)	
	F	M
Newborn	76 / 68	87 / 68
6 mo	106 / 65	105 / 66
1 yr	105 / 67	105 / 69
2 yr	105 / 69	106 / 68
4 yr	107 / 69	108 / 69
6 yr	111 / 70	111 / 70
8 yr	114 / 72	114 / 73
10 yr	117 / 75	117 / 75
12 yr	122 / 78	121 / 77
14 yr	125 / 81	126 / 78
16 yr	127 / 81	131 / 81
18 yr	127 / 80	136 / 84

Hold forearm at the level of the heart.

Assess BP when the child is resting quietly if possible, if agitated or crying make a note

Use the correct cuff size: The width should be approximately 40 % of the circumference of the upper arm. The length should encircle 100 percent of the circumference of the upper arm. A cuff that is too small falsely elevates BP.

If BP cannot be measure in the arms, can measure on the thigh using an adult cuff, listening in the popliteal fossa. This measurement averages 10mmHg higher than BP taken in the arm

## DCAM Nurse Triage

### Well- Child Visit Triage (pending)

Children <=2 yrs: Wt, Lt, HC, Temp

Children ≥ 3 yrs: Wt, Ht, BP, Temp

### Sick- Child Visit Triage

Wt, Temp

### Blood Pressure Measurement only for

Well Check-Up: ≥ 3 years

Sick Visits: only for children with headache and chest pain  
ADHD management

**Oxygen Saturation Measurement** only for patients with wheezing or difficult breathing

# Pediatric 101 – Measurements

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## Measurements – Weight (Wt)

Normal Values: Weight		
	Kg	Pounds (lbs)
At birth	<b>3.25</b>	<b>7</b>
2mo	<b>5</b>	<b>11</b> (2 lb/mo)
5mo	<b>6.5</b> (2x birth wt)	<b>14</b> (2x birth wt)
1yr	<b>10</b>	<b>22</b>
Tip: > 1 yr <b>rule 5</b> (gain 5-6 pounds/yr)		

**Kilograms to pounds conversion: 1kg = 2.2lbs**

## Body Mass Index (BMI)

**Calculation:** Weight (lbs) x 703/Height (inch)<sup>2</sup>  
Weight (kg) / Height (meter)<sup>2</sup>

### Normal Values:

For girls: age + 13

For boys: age + 12

Can use children's BMI table to estimate

### Overweight

**BMI** between 85<sup>th</sup> and 90<sup>th</sup> of the upper age range for children and teenagers

### Obesity

**BMI** over 27 for adults and over 90<sup>th</sup> of the upper age range for children and teenagers

**Body weight** exceeds 120% (95<sup>th</sup> percentile) of that expected for their age, height, and gender

## Measurements – Length/Height (Lt/Ht)

Normal Values: Length/Height		
	Cm	Inches
At birth	<b>50</b>	<b>20</b>
1yr	<b>75</b>	<b>30</b>
Tip: > 1yr <b>rule half of 5</b> (2.5 inches/yr)		

**Centimeter to inches conversion: 1inch = 2.54cm**

**Length** is measured with the child lying down

**Height** is measured with the child standing

Measure length until 3yrs old and plot on 0 to 36 mo. growth chart. After 3, measure height and plot of 2 to 18yr growth chart.

## Head Circumference (HC)

Measure from occipital prominence to just above the eyebrows

### at birth 34-35cm

0-3mo grows 2.0cm/month

4-6mo grows 1.0cm/month

7-12mo grows 0.5cm/month

**1yr 46-47cm**

12 cm increase for the 1<sup>st</sup> yr

**Adult 55-58cm**

Another 9-11 cm increase for whole life.

## Kilogram to Pounds Conversion Table

kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.	Kg	Lb.
1	2.2	11	24.2	21	46.2	31	68.3	41	90.3	51	112.4	61	134.4	71	156.5	81	178.5	91	200.6
2	4.4	12	26.4	22	48.5	32	70.5	42	92.5	52	114.6	62	136.6	72	158.7	82	180.7	92	202.8
3	6.6	13	28.6	23	50.7	33	72.7	43	94.7	53	116.8	63	138.8	73	160.9	83	182.9	93	205.0
4	8.8	14	30.8	24	52.9	34	74.9	44	97.0	54	119.0	64	141.0	74	163.1	84	185.1	94	207.2
5	11.0	15	33.0	25	55.1	35	77.1	45	99.2	55	121.2	65	143.3	75	165.3	85	187.3	95	209.4
6	13.2	15	35.2	26	57.3	36	79.3	46	101.4	56	123.4	66	145.5	76	167.5	86	189.5	96	211.6
7	15.4	17	37.4	27	59.5	37	81.5	47	103.6	57	125.6	67	147.7	77	169.7	87	191.8	97	213.8
8	17.6	18	39.6	28	71.7	38	83.7	48	105.8	58	127.8	68	149.9	78	171.9	88	194.0	98	216.0
9	19.8	19	41.8	29	63.9	39	85.9	49	108.0	59	130.0	69	152.1	79	174.1	89	196.2	99	218.2
10	22.0	20	44.0	30	66.1	40	88.1	50	110.2	60	132.2	70	154.3	80	176.3	90	198.4	100	220.4

## Inches to Centimeter Conversion

Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm
1	2.54	11	27.9	21	53.3	31	78.7	41	104.1	51	129.5	61	154.9	71	180.3
2	5.08	12	30.4	22	55.8	32	81.2	42	106.6	52	132.0	62	157.4	72	182.8
3	7.62	13	33.0	23	58.4	33	83.8	43	109.2	53	134.6	63	160.0	73	185.4
4	10.1	14	35.5	24	60.9	34	86.3	44	111.7	54	137.1	64	162.5	74	187.9
5	12.7	15	38.1	25	63.5	35	88.9	45	114.3	55	139.7	65	165.1	75	190.5
6	15.2	16	40.6	26	66.0	36	91.4	46	116.8	56	142.2	66	167.6	76	193.0
7	17.7	17	43.1	27	68.5	37	93.9	47	119.3	57	144.7	67	170.1	77	195.5
8	20.3	18	45.7	28	71.1	38	96.5	48	121.9	58	147.3	68	172.7	78	198.1
9	22.8	19	48.2	29	73.6	39	99.0	49	124.4	59	149.8	69	175.2	79	200.6
10	25.4	20	50.8	30	76.2	40	101.6	50	127.0	60	152.4	70	177.8	80	203.2