

**APPENDIX B****Pediatric Normal Laboratory Values**

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For conversion of conventional (US) units to SI units, see:  
[www.soc-bdr.org/rds/authors/unit\\_tables\\_conversions\\_and\\_genetic\\_dictionaries/e5196/index\\_en.html](http://www.soc-bdr.org/rds/authors/unit_tables_conversions_and_genetic_dictionaries/e5196/index_en.html)

Values are reference values from Texas Children's Hospital Clinical Laboratory, current as of August 2011. All practitioners are urged to consult the normal laboratory values for their local laboratory, as these may differ from those listed below. They are also advised to continually check for updated normal ranges.

Test	Reference range (United States/conventional units)	
<b>Albumin</b> (CSF)	10–30 mg/dL	
<b>Albumin</b> (S, P)		
Age	<i>g/dL</i>	
0–30 days	2.9–5.5	
1–3 months	2.8–5.0	
4–11 months	3.9–5.1	
≥1 yr	3.7–5.5	
<b>Albumin</b> (random urine)	<37 mg/L or <3.7 mg/dL	
<b>Albumin/creatinine ratio</b> (random urine)	<16 mg/g	
<b>α1-Antitrypsin</b> (S)		
Age	<i>mg/dL</i>	
0–1 yr	92–282	
1–4 yrs	94–156	
4–13 yrs	102–159	
>14 yrs	97–203	
<b>α-Fetoprotein</b> (AFP) (S)		
Adult	<10 ng/mL	
Birth	Up to 86,000 ng/mL	
1 month or less	May be >10,000 ng/mL	
2–3 months	Up to 1000 ng/mL	
<b>Alanine aminotransferase</b> (S, P)		
Age	<i>MIF (U/L)</i>	
0–11 months	6–50	
1–3 yrs	6–45	
4–6 yrs	10–25	
7–9 yrs	10–35	
	<i>Male (U/L)</i>	<i>Female (U/L)</i>
10–11 yrs	10–35	10–30
12–13 yrs	10–55	10–30
14–15 yrs	10–45	6–30
16–18 yrs	10–40	6–35
≥19 yrs	21–72	9–52
<b>Alkaline phosphatase</b> (S, P)		
Age	<i>MIF (U/L)</i>	
0–5 days	110–300	
6 days–11 months	110–320	
1–3 yrs	145–320	
4–6 yrs	150–380	
7–9 yrs	175–420	
	<i>Male (U/L)</i>	<i>Female (U/L)</i>
10–11 yrs	135–530	130–560
12–13 yrs	200–495	105–420
14–15 yrs	130–525	70–230
16–18 yrs	65–260	50–130
> 19 yrs	38–126	38–126
<b>Ammonia</b> (P)		
Age	<i>μmol/L</i>	
0–7 days	54–94	
8–30 days	47–80	
1–12 months	15–47	
1–15 yrs	22–48	
≥16 yrs	9–26	

(Continued)

Test	Reference range (United States/conventional units)	
<b>Amylase</b> (S, P)	30–115 U/L	
<b>Amylase</b> (U) – timed	4–37 U/2 h	
<b>Amylase</b> (U) – random	No reference range	
<b>Anticardiolipin IgG</b> (S)	<23.0 GPL	
<b>Anticardiolipin IgM</b> (S)	<11.0 MPL	
<b>Anti-Dnase-B</b>		
Age		
0–5 yrs	≤1:60	
6–18 yrs	≤1:170	
≥19 yrs	≤1:85	
<b>Antistreptolysin-O (ASO)</b>	<250 IU/mL	
<b>Antithrombin (ATIII)</b> (P)	85–130%	
Normal ranges for healthy full-term infants		
Day 1	63% (39–87%)	
Day 5	67% (41–93%)	
Day 30	78% (48–108%)	
Day 90	97% (73–121%)	
Day 180	104% (84–124%)	
<b>Aspartate aminotransferase</b> (S, P)		
Age	<i>MIF (U/L)</i>	
0–5 days	35–140	
6 days–3 yrs	20–60	
4–6 yrs	15–50	
7–9 yrs	15–40	
	<i>Male (U/L)</i> <i>Female (U/L)</i>	
10–11 yrs	10–60	10–40
12–15 yrs	15–40	10–30
16–18 yrs	10–45	5–30
≥19 yrs	17–59	14–36
<b>Bilirubin</b> (S, P)		
	<i>Premature (mg/dL)</i>	<i>Full-term (mg/dL)</i>
Age	<i>Total</i>	<i>Total</i>
Up to 23 h	1–8	2–6
24–48 h	6–12	6–10
3–5 days	10–14	4–8
≥1 month	<i>mg/dL</i>	
Bc conjugated	<0.35	
Bu unconjugated	<1.0	
Total	0.2–1.0	
<b>B-hydroxybutyrate</b> (S, P)	<0.30 mmol/L(12 h fast)	
<b>Blood gases</b>		
pH		
Capillary/arterial		
Age		
Newborn	7.33–7.49	
1 day	7.25–7.43	
2–30 days	7.32–7.43	
1 month	7.34–7.43	
2 months–1 yr	7.34–7.46	
≥2 yrs		

Test	Reference range (United States/conventional units)		
Male	7.35–7.45		
Female	7.36–7.44		
Venous			
All ages	7.32–7.42		
pCO <sub>2</sub>			
Capillary/arterial			
Age	<i>mmHg</i>		
0–1 month	27–40		
2 months–1 yr	26–41		
≥2 yrs			
Male	36–46		
Female	33–43		
Venous			
All ages	40–50		
pO <sub>2</sub>	<i>mmHg</i>	<i>mmHg</i>	<i>mmHg</i>
Age	<i>Capillary</i>	<i>Arterial</i>	<i>Venous</i>
0–1 yr	60–70	65–76	25–40
≥2 yrs	80–90	88–105	40–47
Oxygen saturation	85–100%		
<b>B-type natriuretic peptide (BNP)</b> (EDTA plasma)	0–100 pg/mL		
<b>BUN</b> – see Urea nitrogen			
<b>Complement (CH<sub>50</sub>), total</b> (S)	23–46 CH <sub>50</sub> U/mL		
<b>Complement C3,C4</b> (S)			
Age	<i>C3 (mg/dL)</i>	<i>C4 (mg/dL)</i>	
0–30 days	54–128	8–28	
1 month	60–153	8–32	
2 months	66–134	10–31	
3 months	63–179	9–43	
4 months	66–171	8–41	
5 months	75–176	10–48	
6–8 months	77–170	12–42	
9–11 months	86–179	14–45	
1 yr	83–174	10–39	
2 yrs	78–176	12–41	
3–4 yrs	89–170	14–36	
5–7 yrs	90–160	14–36	
8–9 yrs	92–200	12–45	
≥10 yrs	86–182	17–51	
<b>C-reactive protein</b> (CRP)	<1.0 mg/mL		
<b>Ca<sup>2+</sup>(ionized)</b> (WB)			
Age	<i>mmol/L</i>		
0–30 days	0.90–1.45		
1–5 months	0.95–1.50		
≥6 months	1.10–1.30		
<b>Carboxyhemoglobin</b> (WB)	<1.5% of tHb		

(Continued)

Test	Reference range (United States/conventional units)	
<b>Calcium (S)</b>		
Age	<i>mg/dL</i>	
0–11 months	8.0–10.7	
1–3 yrs	8.7–9.8	
4–11 yrs	8.8–10.1	
12–13 yrs	8.8–10.6	
14–15 yrs	9.2–10.7	
≥16 yrs	8.9–10.7	
<b>Calcium (U) – timed</b>	42–353 mg/24 h	
<b>Calcium (U) – random</b>	No reference range	
<b>Ceruloplasmin (S)</b>		
Age	<i>mg/dL</i>	
0–1 month	3–25	
1–11 months	14–44	
1 yr–9 yrs	23–51	
≥10 yrs	18–46	
<b>Chloride (S, P)</b>	95–105 mmol/L	
<b>Chloride (SWT) sweat test</b>	≤6 months	>6 months
	Normal = ≤29 mmol/L	Normal = ≤39 mmol/L
	Intermediate = 30–59 mmol/L	Intermediate = 40–59 mmol/L
	Positive = ≥60 mmol/L	Positive = ≥60 mmol/L
<b>Chloride (CSF)</b>	122–132 mmol/L	
<b>Chloride (U) – timed</b>		
Age	<i>mmol/24 h</i>	
0–11 months	2–10	
1–15 yrs	15–40	
≥16 yrs	110–250	
<b>Chloride (U) – random</b>	No reference range	
<b>Cholesterol (S, P)</b>		
Age	<i>mg/dL</i>	
0–11 months	50–120	
1 yr	70–190	
2–15 yrs	135–200	
≥16 yrs	130–200	
<b>Cholesterol, HDL (S, P)</b>		
Age	<i>Male (mg/dL)</i>	<i>Female (mg/dL)</i>
6–15 yrs	38–75	35–73
≥16 yrs	30–64	35–80
<b>Cholesterol, LDL</b>		
Age	<i>Male (mg/dL)</i>	<i>Female (mg/dL)</i>
6–16 yrs	64–130	60–140
17–18 yrs	63–135	59–141
19–21 yrs	65–145	60–155
≥22 yrs	65–161	62–162
<b>CO<sub>2</sub> content (S, P)</b>		
Age	<i>mmol/L</i>	
0–15 yrs	20–28	
≥16 yrs	25–35	
<b>Cold agglutinins (S)</b>	≤1:40	
<b>Cortisol (S)</b>		
Age	<i>μg/dL</i>	
1–7 days	2–11	
1–12 months	2.8–23	

Test	Reference range (United States/conventional units)	
1–16yrs (8 am)	3–21	
≥16yrs (8 am)	8–19	
(4pm)	4–11	
<b>Creatine kinase (CPK) (S, P)</b>		
Age	<i>M/F (U/L)</i>	
0–3yrs	60–305	
4–6yrs	75–230	
7–9yrs	60–365	
	<i>Male (U/L)</i>	<i>Female (U/L)</i>
10–11yrs	55–215	80–230
12–13yrs	60–330	50–295
14–15yrs	60–335	50–240
16–18yrs	55–370	45–230
≥19yrs	55–170	30–135
<b>Creatine kinase MB band (S, P)</b>	Normal: <5 ng/mL Borderline: 5–10 ng/mL Abnormal: >10 ng/mL	
<b>Creatinine (S, P)</b>	0.12–1.06 mg/dL	
<b>Creatinine (U) – timed</b>	0.8–2.8 g/24 h	
<b>Creatinine (U) – random</b>	<500 mg/dL	
<b>Creatinine clearance (U)</b>	<i>mL/min</i>	
Age		
0–30 days	25–55	
1–5 months	50–90	
6–11 months	75–125	
≥1yr	90–150	
<b>D-dimer (P)</b>		
Adult	≤0.40 μg/mL FEU	
Neonatal reference range from cord blood	<3.40 μg/mL FEU	
<b>Diluted Russell viper venom test (DRVVT) (P)</b>		
DRVVT S/C ratio	<1.35	
DRVVT result	Negative	
<b>Factor 2 (P)</b>	50–150% normal activity	
<b>Factor 5 (P)</b>	69–132% normal activity	
<b>Factor 7 (P)</b>	58–150% normal activity	
<b>Factor 8 (P)</b>	47–169% normal activity	
<b>Factor 9 (P)</b>	67–141% normal activity	
<b>Factor 10 (P)</b>	65–142% normal activity	
<b>Factor 11 (P)</b>	48–139% normal activity	
<b>Factor 12 (P)</b>	41–140% normal activity	
<b>Ferritin (S)</b>		
Age	<i>ng/mL</i>	
1 day–6 months	36–391	
7–12 months	36–100	
1–5yrs	36–84	
>6yrs		
Male	36–311	
Female	36–92	
<b>Fibrinogen (P)</b>		
Adult	220–440 mg/dL	
Neonatal reference range from cord blood	135–283 mg/dL	

(Continued)

Test	Reference range (United States/conventional units)	
<b>Follicle-stimulating hormone (FSH) (S)</b>		
	<i>Male (mIU/mL)</i>	<i>Female (mIU/mL)</i>
Infants	<10	<50
Prepubertal	<7	<11
Adult	1.6–17.2	0.4–15.1
Follicular/luteal	–	3.5–16.9
Midcycle	–	11.9–32.7
<b>Fibrin split product (FSP) (P)</b>	1:2 Dilution = Negative (<5µg/mL)	
<b>γ-Glutamyl transferase (GGT) (S, P)</b>		
<i>Age</i>	<i>MIF (U/L)</i>	
0–5 days	34–263	
6 days–2 months	10–160	
3–11 months	11–82	
1–3 yrs	10–19	
4–6 yrs	10–22	
7–9 yrs	13–25	
	<i>Male (U/L)</i>	<i>Female (U/L)</i>
10–11 yrs	17–30	17–28
12–13 yrs	17–44	14–25
14–15 yrs	12–33	14–26
16–18 yrs	11–34	11–28
≥19 yrs	10–78	10–78
<b>Glucose (S, P)(WB):</b> glucose conversion factor for mg/dL to mmol/L: divide mg/dL value by 18		
<i>Age</i>	<i>mg/dL</i>	
1–12 h	30–65	
12–23 h	30–80	
1 day	50–58	
2 days	58–60	
≥3 days	70–110	
<b>Glucose (CSF)</b>	50–70% of serum glucose	
<b>Glucose (U) – timed</b>	<500 mg/24 h	
<b>Glucose (U) – random</b>	<30 mg/dL	
<b>Glycosylated hemoglobin (WB)</b>	Without diabetes	4.0–6.8%
	With diabetes	6.0–22.0%
<b>Haptoglobin (S)</b>		
<i>Age</i>	<i>mg/dL</i>	
0–1 yr	34–175	
2–3 yrs	30–140	
4–5 yrs	30–191	
≥6 yrs	35–181	
<b>Human chorionic gonadotropin (HCG) (S)</b>	<i>Postconception normals (mIU/mL)</i>	
	1 Week = 5–50	
	2 Weeks = 40–1,000	
	3 Weeks = 100–5000	
	4 Weeks = 600–10,000	
	5–6 Weeks = 1500–100,000	
	7–8 Weeks = 16,000–200,000	
	Second trimester = 24,000–55,000	
	Third trimester = 6000–48,000	

Test	Reference range (United States/conventional units)		
<b>Hematocrit (B)</b>			
Age	%		
0–30 days	44–70		
1 month	32–42		
2–6 months	29–41		
7 months–2 yrs	33–39		
3–6 yrs	34–40		
7–12 yrs	35–45		
13–18 yrs/female	36–45		
13–18 yrs/male	37–49		
≥19 yrs/female	36–46		
≥19 yrs/male	41–53		
<b>Hemoglobin (B)</b>			
Age	g/dL		
0–30 days	15.0–22.0		
1 month	10.5–14.0		
2–6 months	9.5–13.5		
7 months–2 yrs	10.5–14.0		
3–6 yrs	11.5–14.5		
7–12 yrs	11.5–15.5		
13–18 yrs/female	12.0–16.0		
13–18 yrs/male	13.0–16.0		
≥19 yrs/female	12.0–16.0		
≥19 yrs/male	13.5–17.5		
<b>Hemoglobin fractionation, HPLC (WB)</b>			
Age	A	A <sub>2</sub>	F
	(%)	(%)	(%)
0–30 days	10–35	–	65–90
1–3 months	30–50	–	50–70
4–5 months	>90	<4	<10
≥6 months	>90	<4	≤3
<b>Heparin level, unfractionated (P)</b>			
Treatment	0.35–0.7 U/mL		
<b>Hexagonal phase phospholipid neutralization test</b>			
Staclot Diff Tube 1–Tube 2	<8.0 sec		
Staclot result	Negative		
<b>Homocysteine</b>			
Age	MIF (μmol/L)		
2 months–10 yrs	3.3–8.3		
11–15 yrs	4.7–10.3		
16–18 yrs	4.7–11.3		
	Male	Female	
≥19 yrs	5.9–16.0	3.4–20.4	
<b>Immunoglobulin E (IgE) (S)</b>			
Age	IU/mL		
0–1 yrs	<15		
1–5 yrs	<60		
6–9 yrs	<90		
10–15 yrs	<200		
16 yrs	<100		
<b>Immunoglobulin G (IGG) (CSF)</b>			
	0.4–5.2 mg/dL (10% of total protein)		

(Continued)



Test	Reference range (United States/conventional units)			
<b>IGG subclasses (S)</b>	<i>IgG1</i>	<i>IgG2</i>	<i>IgG3</i>	<i>IgG4</i>
Age	(mg/dL)	(mg/dL)	(mg/dL)	(mg/dL)
0–1 month	240–1060	87–410	14–55	4–55
1–4 months	180–670	38–210	14–70	3–36
4–6 months	180–700	34–210	15–80	3–23
6–12 months	200–770	34–230	15–97	3–43
1–1.5 yrs	250–820	38–240	15–107	3–62
1.5–2 yrs	290–850	45–260	15–113	3–79
2–3 yrs	320–900	52–280	14–120	3–106
3–4 yrs	350–940	63–300	13–126	3–127
4–6 yrs	370–1000	72–340	13–133	3–158
6–9 yrs	400–1080	85–410	13–142	3–189
9–12 yrs	400–1150	98–480	15–149	3–210
12–18 yrs	370–1280	106–610	18–163	4–230
18 yrs	490–1140	150–640	20–110	8–140
<b>International normalized ratio (INR) (P)</b>				
Adult	0.8–1.2			
Neonatal reference range from cord blood	1.0–1.4			
<b>Immunoglobins (S)</b>	<i>IgG</i>	<i>IgA</i>	<i>IgM</i>	
Age	(mg/dL)	(mg/dL)	(mg/dL)	
0–30 days	252–909	0.83–50	18–80	
1 month	207–904	2–45	15–96	
2 months	177–583	5–43	22–82	
3 months	196–560	4–69	25–93	
4 months	173–817	7–80	30–99	
5 months	216–706	7–65	32–94	
6–8 months	218–907	10–85	31–116	
9–11 months	346–1217	13–100	40–159	
1 yr	425–1054	13–116	44–155	
2 yrs	442–1139	21–150	43–184	
3–4 yrs	464–1240	22–146	40–180	
5–7 yrs	635–1284	32–191	44–190	
8–9 yrs	610–1577	42–223	48–222	
≥10 yrs	641–1353	66–295	40–180	
<b>Iron, total (S, P)</b>	55–150 µg/dL			
<b>Lactate (P, WB, CSF)</b>	<i>Mmol/L</i>			
Plasma (venous)	0.2–2.0			
Plasma (arterial)	0.3–0.8			
CSF	0.6–2.2			
Whole blood	0.2–1.7			
<b>Lactate dehydrogenase (LDH) (S, P)</b>				
Age	<i>MIF (U/L)</i>			
0–5 days	934–2150			
6 days–3 yrs	500–920			
4–6 yrs	470–900			
7–9 yrs	420–750			
	<i>Male (U/L)</i>		<i>Female (U/L)</i>	
10–11 yrs	432–700		380–770	
12–13 yrs	470–750		380–640	
14–15 yrs	360–730		390–580	
16–18 yrs	340–670		340–670	
≥19 yrs	313–618		313–618	

Test	Reference range (United States/conventional units)	
<b>LDH (CSF)</b>		
Age		
0–30 days	2.3–8.4 U/L	
≥1 month	Approximately 10% of serum value	
<b>Lovenox level (P)</b>		
Prophylactic	0.20–0.40 U/mL	
Treatment:	0.50–1.00 U/mL	
<b>Luteinizing hormone (S)</b>		
	<i>Male (mIU/mL)</i>	<i>Female (mIU/mL)</i>
Infants	<3	<3
Prepubertal	<7	<7
Adult	0.9–10.6	–
Follicular	–	1.1–11.1
Midcycle	–	17.5–72.9
Luteal	–	0.4–15.1
Postmenopausal	–	6.8–46.6
<b>Lipase (S, P)</b>		
Age	<i>U/L</i>	
0–9 yrs	25–120	
10–13 yrs	15–110	
14–18 yrs	25–110	
≥19 yrs	23–300	
<b>Magnesium (S, P)</b>		
Age	<i>mg/dL</i>	
0–6 days	1.2–2.6	
7–30 days	1.6–2.4	
1 month–1 yr	1.6–2.6	
2–5 yrs	1.5–2.4	
6–9 yrs	1.6–2.3	
10–13 yrs	1.6–2.2	
≥14 yrs	1.5–2.3	
<b>Magnesium (U) – timed</b>	12.4–191.9 mg/24 h	
<b>Magnesium (U) – random</b>	No reference range	
<b>Mean corpuscular hemoglobin (MCH)</b>		
Age	<i>pg</i>	
0–30 days	33.0–39.0	
1 month	28.0–40.0	
2–6 months	25.0–35.0	
7 months–2 yrs	23.0–31.0	
3–6 yrs	25.0–30.0	
7–12 yrs	26.0–30.0	
13–18 yrs	26.0–32.0	
>19 yrs	27.0–31.0	
<b>Mean corpuscular hemoglobin concentration (MCHC)</b>		
Age	<i>g/dL</i>	
0–30 days	32.0–36.0	
1 month	33.0–38.0	
2–6 months	28.0–36.0	
7 months–2 yrs	30.0–34.0	
3–6 yrs	32.0–36.0	
7–12 yrs	32.0–36.0	

(Continued)

Test	Reference range (United States/conventional units)
13–18 yrs	32.0–36.0
>19 yrs	32.0–36.0
<b>Mean corpuscular volume (MCV)</b>	
<i>Age</i>	<i>fL</i>
0–30 days	86.0–115.0
1 month	72.0–88.0
2–6 months	72.0–82.0
7 months–2 yrs	76.0–90.0
3–6 yrs	76.0–90.0
7–12 yrs	76.0–90.0
13–18 yrs	78.0–95.0
>19 yrs	78.0–100.0
<b>Methemoglobin (WB)</b>	<2% of tHb
<b>Microalbumin (random urine)</b>	0–37 mg/L or 0–3.7 mg/dL
<b>Microalbumin (U) – timed</b>	<20 µg/min <30 mg/24 h
<b>Osmolality (S, P)</b>	275–295 mOsm/kg H <sub>2</sub> O
<b>Osmolality (U)</b>	300–1000 mOsm/kg H <sub>2</sub> O
<b>Phosphorus, inorganic (S, P)</b>	
<i>Age</i>	<i>mg/dL</i>
Premature	5.6–8.0
Term	5.0–7.8
0–3 months	4.8–8.1
4–11 months	3.8–6.7
1–4 yrs	3.5–6.8
5–7 yrs	3.1–6.3
8–11 yrs	3.0–6.0
12–16 yrs	2.5–5.0
≥17 yrs	2.3–4.8
<b>Phosphorus, inorganic (U) – timed</b>	0.9–1.3 g/24 h
<b>Phosphorus, inorganic (U) – random</b>	No reference range
<b>Plasma hemoglobin (P)</b>	≤4 mg/dL
<b>Plasma hemoglobin (U)</b>	None detected
<b>Plasminogen activity</b>	56–148%
<b>Platelet count (B)</b>	150,000–450,000/µL
<b>Platelet function assay (WB)</b>	
Collagen/epinephrine	84–183 sec
Collagen/ADP	69–126 sec
<b>Potassium (S, P)</b>	
<i>Age</i>	<i>mmol/L</i>
0–30 days	4.5–7.0 (venous or arterial) 4.5–7.5 (heel stick)
1–2 months	4.0–6.2
3–11 months	3.7–5.6
≥1 yr	3.5–5.5
<b>Potassium (U) – timed</b>	40–80 mmol/24 h
<b>Potassium (U) – random</b>	No reference range
<b>Potassium (WB)</b>	
<i>Age</i>	<i>mmol/L</i>
Premature	4.5–7.0

Test	Reference range (United States/conventional units)
0–11 months	5.0–5.7
≥1 yr	3.5–5.5
<b>Pre-albumin (S)</b>	
Age	mg/dL
0–6 days	4–20
7–41 days	8–25
≥42 days	18–44
<b>Prolactin (S)</b>	ng/mL
Newborn	>10 x adult levels
Nursing female	<40
Follicular female	<23
Luteal female	5–40
Pregnancy	
1st trimester	<84
2nd trimester	18–306
3rd trimester	34–386
<b>Protein, total (S, P)</b>	
Age	g/dL
0–30 days	4.4–7.6
1–3 months	4.2–7.4
4–11 months	5.6–7.2
≥1 yr	6.0–8.0
<b>Protein (CSF)</b>	
Age	mg/dL
Premature	40–300
0–30 days	<100
≥1 month	15–45
<b>Protein C (P)</b>	80–175%
<i>Normal ranges for healthy full-term infants:</i>	
Day 1	35% (17–53%)
Day 5	42% (20–64%)
Day 30	43% (21–65%)
Day 90	54% (28–80%)
Day 180	59% (37–81%)
(Am J Pediatr Hematol Oncol 1990;12:95–104)	
Please note that these ranges were not established using the current reagent and analyzer at TCH Coagulation Lab	
<b>Protein S (P)</b>	51–157%
<i>Normal ranges for healthy full-term infants</i>	
Day 1	36% (12–60%)
Day 5	50% (22–78%)
Day 30	63% (33–93%)
Day 90	86% (54–118%)
Day 180	87% (55–119%)
(Am J Pediatr Hematol Oncol 1990;12:95–104)	
Please note that these ranges were not established using the current reagent and analyzer at TCH Coagulation Lab	
<b>Protein, total (U) – timed</b>	28–141 mg/24 h
<b>Protein, total (U) – random</b>	No reference range
<b>Prothrombin time (PT) (P)</b>	
Adult	12.2–15.5 sec
Neonatal reference range from cord blood	12.9–16.9 sec

(Continued)

Test	Reference range (United States/conventional units)
<b>Partial thromboplastin time (PTT) (P)</b>	
Adult	26.5–35.5 sec
Neonatal reference range from cord blood	28.7–53.7 sec
<b>Red blood cell count (RBC) (B)</b>	
Age	$\times 10^6/\mu\text{L}$
0–30 days	4.1–6.7
1 month	3.0–5.4
2–6 months	2.7–4.5
7 months–2 yrs	3.7–5.3
3–6 yrs	3.9–5.3
7–12 yrs	4.0–5.2
13–18 yrs /female	4.1–5.1
13–18 yrs /male	4.5–5.3
≥19 yrs/female	4.2–5.4
≥19 yrs/male	4.7–6.0
<b>Red cell distribution width – coefficient of variation (RDWCV)</b>	
Age	%
0–30 days	13.0–18.0
1 month	13.0–18.0
2–6 months	13.0–18.0
7 months–2 yrs	11.5–16.0
3–6 yrs	11.5–15.0
7–12 yrs	11.5–14.0
13–18 yrs	11.5–14.0
>19 yrs	11.5–14.0
<b>Red cell distribution width – standard deviation (RDWSD)</b>	
Age	fL
0–30 days	38.5–49.0
1 month	38.5–49.0
2–6 months	38.5–49.0
7 months–2 yrs	38.5–49.0
3–6 yrs	38.5–49.0
7–12 yrs	38.5–49.0
13–18 yrs	38.5–49.0
>19 yrs	38.5–49.0
<b>Reticulocyte count % (B)</b>	
Age	%
0–2 days	3.0–7.0
3–4 days	1.0–3.0
>4 days	0.5–1.5
<b>Reticulocyte count absolute (B)</b>	
Age	$\times 10^6/\mu\text{L}$
0–2 days	0.140–0.220
3–4 days	0.040–0.110
>4 days	0.020–0.080
<b>Reticulocyte hemoglobin content (B)</b>	
Age	pg
<2 years	24.5–35.2
≥2 yrs	27.1–35.4
<b>Sedimentation rate (B)</b>	0–20 mm/h

Test	Reference range (United States/conventional units)
<b>Sirolimus/rapamycin (P)</b>	3–12 ng/mL
<b>Sodium (S, P) (WB)</b>	
Age	<i>mmol/L</i>
Premature	132–140
0–11 months	133–142
≥1 yr	136–145
<b>Sodium (U) – timed</b>	
Age	<i>mmol/24 h</i>
0–11 months	0.3–3.5
1–15 yrs	40–180
≥16 yrs	80–200
<b>Sodium (U) – random</b>	No normals
<b>Free thyroxine (T4) (S)</b>	1.0–2.5 ng/dL
<b>T4 (S)</b>	
Age	<i>µg/dL</i>
Cord blood	8.0–13
0–7 days	11.5–24
8 days–4 yrs	7.0–15
5 yrs–9 yrs	6.4–13.3
≥10 yrs	5.0–12
<b>Free thyroxine index (T7) (S)</b>	
Age	
0–7 days	9.1–26.6
8 days–4 yrs	5.5–16.6
5–9 yrs	5.1–14.7
≥10 yrs	4.0–13.3
<b>Thromboelastogram (TEG ) with kaolin</b>	
Reaction time	4.4–11.0 min
Angle	49.1–74.7°
Max amplitude	53.6–70.3 mm
Fibrinolysis	0.0–7.5%
Clot strength	5.2–11.3
Thrombin time	15.0–19.0 sec
<b>Thyroid stimulating hormone (TSH) (S)</b>	
Age	<i>µIU/mL</i>
Cord blood	3–22
0–7 days	<40.00
8 –14 days	<25.00
≥15 days	0.32–5.00
<b>Tri-iodothyronine (T3) uptake (S)</b>	25–35%
Age	<i>ng/dL</i>
Cord blood	30–70
0–7 days	65–275
8 days–9 yrs	90–260
10–14 yrs	80–210
≥15 yrs	115–195
<b>Transferrin (S)</b>	169–300 mg/dL
<b>Transferrin saturation (S)</b>	
Age	%
0–11 yrs	15–39

(Continued)

Males 12–17yrs	16–44						
Females 12–17yrs	11–44						
Males >18yrs	21–52						
Females >18yrs	11–44						
<b>Triglycerides (S, P)</b>	20–150 mg/dL						
<b>Troponin I (S, P)</b>	<0.15 ng/mL						
<b>Urea nitrogen (S, P)</b>							
Age	<i>mg/dL</i>						
0–1 yr	8–28						
2–15yrs	5–25						
≥16yrs	5–20						
<b>Urea nitrogen (U) – timed</b>	12–20 mg/24 h						
<b>Urea nitrogen (U) – random</b>	No reference range						
<b>Uric acid (S, P)</b>	2.0–6.2 mg/dL						
<b>Uric acid (U) – timed</b>	250–750 mg/24 h						
<b>Uric acid (U) – random</b>	No reference range						
<b>Urinalysis (U)</b>							
Specific gravity	1.001–1.035						
pH	4–9						
Protein	Neg						
Glucose	Neg						
Ketone	Neg						
Bilirubin	Neg						
Urobilinogen	<2.0						
WBC	0–4/HPF						
RBC	0–4/HPF						
EPI (epithelial cells)	0–4/LPF						
<b>Von Willebrand ristocetin coactor activity (P)</b>	48–142%						
<b>Von Willebrand factor antigen (P)</b>	56–176%						
<b>White blood cell count (WBC) (B)</b>							
Age	$\times 10^3/\mu\text{L}$						
0–30 days	9.1–34.0						
1 month	5.0–19.5						
2–11 months	6.0–17.5						
1–6yrs	5.0–14.5						
7–12yrs	5.0–14.5						
13–18yrs	4.5–13.5						
≥19yrs	4.5–11.0						
Age	<i>Seg (%)</i>	<i>Band (%)</i>	<i>Lymphs (%)</i>	<i>Monos (%)</i>	<i>EOS (%)</i>	<i>BASO (%)</i>	<i>ANC</i>
0–30 days	32–67	0–8	25–37	0–9	0–2	0–1	6.0–23.5
1 month	20–46	0–4.5	28–84	0–7	0–3	0–1	1.0–9.0
2–11 months	20–48	0–3.8	34–88	0–5	0–3	0–1	1.0–8.5
1–6yrs	37–71	0–1.0	17–67	0–5	0–3	0–1	1.5–8.0
7–12yrs	33–76	0–1.0	15–61	0–5	0–3	0–1	1.5–8.0
13–18yrs	33–76	0–1.0	15–55	0–4	0–3	0–1	1.8–8.0
≥19yrs	33–76	0–0.7	14–54	0–4	0–3	0–1	1.8–7.7

A, arterial; ADP, adenosine diphosphate; ANC, absolute neutrophil count; B, blood; band, banded neutrophils; BASO, basophils; C, capillary; CSF, cerebrospinal fluid; EOS, eosinophils; F, female; FEU, fibrinogen equivalent units; GPL, gG phospholipid units/mL; HPF, high power field; IU, international units; lymphs, lymphocytes; LPF, low power field; M, male; monos, monocytes; MPL, IgM phospholipid units/mL; P, plasma; S, serum; seg, segmented neutrophils; SWT, sweat; U, urine; WB, whole blood.