Hematology Reference Ranges

HEMATOLOGY REFERENCE RANGES (PERIPHERAL BLOOD)

WBC (10^9/L)		
Age	**Male**	**Female**
0 d to <4 d	7.7-13.1	7.5-15.8
4 d to <8 d	6.5-12.3	5.9-12.2
8 d to <15 d	7.7-14.0	7.5-14.6
15 d to <31 d	8.9-16.7	8.6-15.7
31 d to <61 d	8.4-13.7	7.3-12.3
61 d to <181 d	7.9-13.4	6.8-12.8
181 d to <2 y	7.7-13.1	7.0-13.0
2 y to <6 y	6.0-10.5	6.0-10.8
6 y to <12 y	5.7-9.9	5.4-9.7
12 y to <18 y	5.2-9.7	5.5-9.3
18 y to adult	3.7-9.7	3.9-11.7

RBC (10^{12}/L)		
Age	**Male**	**Female**
0 d to <4 d	3.69-4.75	3.79-4.76
4 d to <8 d	3.98-5.08	4.05-4.83
8 d to <15 d	3.75-4.93	4.01-4.73
15 d to <31 d	3.61-4.46	3.70-4.59
31 d to <61 d	3.24-4.08	3.55-4.57
61 d to <181 d	3.67-4.61	3.63-4.61
181 d to <2 y	3.81-4.74	3.83-4.67
2 y to <6 y	3.92-4.72	3.89-4.67
6 y to <12 y	3.85-4.75	3.88-4.72
12 y to <18 y	3.74-4.93	3.79-4.61
18 y to adult	4.54-5.78	3.85-5.16

HGB (g/dL)		
Age	**Male**	**Female**
0 d to <4 d	12.5-16.6	12.7-16.4
4 d to <8 d	12.5-16.3	12.6-15.3
8 d to <15 d	11.9-15.7	12.7-14.9

HGB (g/dL)		
Age	**Male**	**Female**
15 d to <31 d	11.6-14.2	11.6-14.3
31 d to <61 d	10.2-12.7	11.1-13.7
61 d to <181 d	10.5-13.0	10.7-13.4
181 d to <2 y	10.4-12.5	10.8-12.6
2 y to <6 y	11.0-12.8	11.1-12.9
6 y to <12 y	11.0-13.3	11.3-13.4
12 y to <18 y	11.0-14.3	11.3-13.4
18 y to adult	13-3.-17.2	12.0-15.0

HCT %		
Age	**Male**	**Female**
0 d to <4 d	36.4-47.4	36.5-47.7
4 d to <8 d	35.9-46.6	36.1-44.0
8 d to <15 d	34.4-45.4	36.6-43.2
15 d to <31 d	33.6-41.0	34.1-41.8
31 d to <61 d	29.1-36.6	32.0-39.9
61 d to <181 d	30.5-37.7	30.5-38.6
181 d to <2 y	30.5-36.4	30.9-36.4
2 y to <6 y	31.5-36.8	31.8-37.0
6 y to <12 y	31.5-38.0	32.3-38.3
12 y to <18 y	31.4-41.0	32.1-38.7
18 y to adult	38.9-50.9	34.8-45.0

MCV (fL)		
Age	**Male**	**Female**
0 d to <4 d	94.0-106.3	89.7-105.4
4 d to <8 d	87.1-96.5	86.5-93.8
8 d to <15 d	87.1-94.8	87.4-92.2
15 d to <31 d	88.0-95.2	88.4-93.3
31 d to <61 d	86.5-92.1	85.7-91.6
61 d to <181 d	79.6-86.3	82.0-87.0
181 d to <2 y	75.6-83.1	76.6-83.2
2 y to <6 y	76.8-83.3	77.7-84.1
6 y to <12 y	78-2-83.9	79.5-85.2
12 y to <18 y	80.8-86.6	82.1-87.7

MCV (fL)		
Age	**Male**	**Female**
18 y to adult	81.2-94.0	78-5.-96.4

MCH (pg)		
Age	**Male**	**Female**
0 d to <4 d	32.8-36.4	31.7-36.3
4 d to <8 d	30.9-33.4	30.6-32.3
8 d to <15 d	30.4-33.0	30.5-31.9
15 d to <31 d	30.6-32.6	30.5-32.0
31 dv<61 d	30.0-32.0	29.8-31.7
61 d to <181 d	27.6-29.9	28.5-30.4
181 d to <2 y	26.0-29.0	26.5-29.3
2 y to <6 y	26.8-29.4	27.0-29.6
6 y to <12 y	27.5-29.7	27.8-30.0
12 y to <18 y	28.2-30.5	28.4-30.7
18 y to adult	27.1-32.5	26.4-33.2

MCHC (g/dL)		
Age	**Male**	**Female**
0 d to <4 d	34.0-35.3	33.9-35.4
4 d to <8 d	34.3-35.7	34.3-35.7
8 d to <15 d	34.0-35.6	33.9-35.3
15 d to <31 d	33.9-35.3	33.7-35.1
31 d to <61 d	34.0-35.5	34.1-35.4
61 d to <181 d	33.9-35.4	34.1-35.6
181 d to <2 y	33.6-35.2	34.1-35.6
2 y to <6 y	34.2-35.7	34.0-35.6
6 y to <12 y	34.4-35.8	34.3-35.8
12 y to <18 y	34.2-35.6	33.9-35.4
18 y to adult	32-5-36.7	31.8-35.9

CHCM (g/dL)		
Age	**Male**	**Female**
0 d to <4 d	34.0-35.3	33.9-35.4
4 d to <8 d	34.3-35.7	34.3-35.7
8 d to <15 d	34.0-35.6	33.9-35.3
15 d to <31 d	33.9-35.3	33.7-35.1

CHCM (g/dL)		
Age	**Male**	**Female**
31 d to <61 d	34.0-35.5	34.1-35.4
61 d to <181 d	33.9-35.4	34.1-35.6
181 d to <2 y	33.6-35.2	34.1-35.6
2 y to <6 y	34.2-35.7	34.0-35.6
6 y to <12 y	34.4-35.8	34.3-35.8
12 y to <18 y	34.2-35.6	33.9-35.4
18 y to adult	32.6-37.7	32.2-35.9

RDW %		
Age	**Male**	**Female**
0 d to <4 d	16.3-18.2	15.8-17.8
4 d to <8 d	15.0-17.6	14.7-16.6
8 d to <15 d	14.9-16.3	14.8-16.3
15 d to <31 d	14.6-16.4	15.0-16.7
31 d to <61 d	14.7-16.2	14.2-15.6
61 d to <181 d	13.5-15.3	13.6-14.8
181 d to <2 y	13.6-15.5	13.3-14.8
2 y to <6 y	13.2-14.5	13.0-14.2
6 y to <12 y	13.0-14.2	12.8-13.9
12 y to <18 y	13.0-14.6	12.8-14.4
18 y to adult	11.5-14.1	11.3-14.7

HDW (g/dL)		
Age	**Male**	**Female**
0 d to <4 d	3.17-3.63	3.18-3.58
4 d to <8 d	2.99-3.41	3.00-3.37
8 d to <15 d	2.89-3.40	2.89-3.46
15 d to <31 d	2.85-3.31	3.00-3.61
31 d to <61 d	2.97-3.45	2.88-3.48
61 d to <181 d	2.84-3.35	2.80-3.39
181 d to <2 y	2.76-3.36	2.69-3.17
2 y to <6 y	2.75-3.21	2.69-3.17
6 y to <12 y	2.69-3.15	2.63-3.06
12 y to <18 y	2.65-3.15	2.56-3.05
18 y to adult	2.38-3.15	2.00-2.98

PLT (10^9/L)		
Age	**Male**	**Female**
0 d to <4 d	140-238	133-255
4 d to <8 d	129-271	95-230
8 d to <15 d	120-297	106-294
15 d to <31 d	157-406	114-364
31 d to <61 d	221-471	184-430
61 d to <181 d	215-448	147-423
181 d to <2 y	185-399	211-408
2 y to <6 y	211-370	190-365
6 y to <12 y	227-350	219-339
12 y to <18 y	180-299	192-307
18 y to adult	179-373	172-440

MPV (fL)		
Age	**Male**	**Female**
0 d to <4 d	7.8-8.5	7.9-8.5
4 d to <8 d	8.0-8.9	8.2-9.1
8 d to <15 d	8.1-9.1	8.3-9.4
15 d to <31 d	8.0-9.3	8.4-9.9
31 d to <61 d	7.8-8.9	7.8-8.8
61 d to <181 d	7.5-8.3	7.5-8.3
181 d to <2 y	7.3-8.1	7.3-8.0
2 y to <6 y	7.2-7.9	7.3-8.0
6 y to <12 y	7.4-8.1	7.4-8.1
12 y to <18 y	7.5-8.3	7.5-8.3
18 y to adult	6.1-8.9	6.3-9.1

# NEU 10^9/L		
Age	**Male**	**Female**
0 d to <4 d	4.3-9.1	4.4-11.4
4 d to <8 d	3.3-6.6	3.2-7.2
8 d to <15 d	3.7-8.4	3.9-8.3
15 d to <31 d	3.5-9.4	3.8-9.4
31 d to <61 d	2.2-6.4	2.5-6.3
61 d to <181 d	2.6-7.5	2.2-7.1
181 d to <2 y	2.5-6.4	2.3-6.4

# NEU 10 ^{9}/L		
Age	**Male**	**Female**
2 y to <6 y	2.5-6.0	2.3-6.4
6 y to <12 y	2.8-6.3	2.6-6.0
12 y to <18 y	2.7-6.7	3.0-6.1
18 y to adult	2.0-6.7	1.9-7.9

# LYMPH 10 ^{9}/L		
Age	**Male**	**Female**
0 d to <4 d	1.8-3.6	1.7-2.8
4 d to <8 d	1.5-4.1	1.2-3.4
8 d to <15 d	1.4-3.9	1.5-3.8
15 d to <31 d	1.7-5.2	1.6-5.0
31 d to <61 d	2.2-5.6	2.2-5.1
61 d to <181 d	2.3-5.4	1.9-5.4
181 d to <2 y	2.3-5.5	2.0-5.7
2 y to <6 y	1.3-3.5	1.5-3.8
6 y to <12 y	1.2-2.7	1.2-2.8
12 y to <18 y	1.0-2.2	1.2-2.3
18 y to adult	1.1-3.3	1.3-3.6

# MONO 10 ^{9}/L		
Age	**Male**	**Female**
0 d to <4 d	0.2-1.8	0.2-2.2
4 d to <8 d	0.2-2.2	0.2-2.2
8 d to <15 d	0.3-3.0	0.1-2.9
15 d to <31 d	0.2-3.5	0.2-5.0
31 d to <61 d	0.3-2.7	0.2-2.1
61 d to <181 d	0.5-1.9	0.6-1.9
181 d to <2 y	0.4-2.0	0.3-1.5
2 y to <6 y	0.3-1.2	0.5-1.1
6 y to <12 y	0.3-0.9	0.4-0.9
12 y to <18 y	0.4-1.3	0.4-0.9
18 y to adult	0.2-0.7	0.2-0.5

# EOS 10 ^{9}/L		
Age	**Male**	**Female**
0 d to <4 d	0.1-0.4	0.0-0.3

# EOS 10^9/L		
Age	**Male**	**Female**
4 d to <8 d	0.1-0.4	0.0-0.4
8 d to <15 d	0.1-0.4	0.0-0.3
15 d to <31 d	0.1-0.5	0.0-0.4
31 d to <61 d	0.1-0.4	0.1-0.3
61 d to <181 d	0.0-0.4	0.0-0.3
181 d to <2 y	0.0-0.3	0.0-0.2
2 y to <18y	0.0-0.2	0.0-0.2
18 y to adult	0.0-0.4	0.0-0.4

# BASO 10^9/L		
Age	**Male**	**Female**
0 d to adult	0.0-0.1	0.0-0.1

Retic %		
Age	**Male**	**Female**
0 d to <4 d	2.2-4.8	2.1-3.7
4 d to <31 d	0.4-2.7	0.4-2.0
31 d to <61 d	0.9-3.8	1.5-3.2
61 d to <181 d	0.9-3.1	1.1-2.9
181 d to <2 y	0.8-2.0	0.9-2.0
2 y to <6 y	0.8-2.0	0.8-2.1
6 y to <12 y	0.7-2.2	0.8-2.8
12 y to <18 y	0.8-2.2	0.8-2.2
18 y to adult	1.1-2.7	0.9-2.4

Retic ABS 10^9/L		
Age	**Male**	**Female**
0 d to <181 d	37.0-104.0	52.0-120.0
181 d to <2 y	29.0-89.0	35.0-92.0
2 y to <6 y	29.0-80.0	43.0-83.0
6 y to <12 y	39.0-106.0	37.0-93.0
12 y to <18 y	39.0-100.0	40.0-102.0
18 y to adult	55.1-140.7	40.6-111.8

CHr (pg)		
Age	**Male**	**Female**

CHr (pg)		
Age	**Male**	**Female**
0 d to <2 y	22.5-31.8	23.9-30.9
2 y to <6 y	25.1-32.0	26.4-32.1
6 y to <12 y	23.6-33.9	25.1-33.3
12 y to <18 y	27.0-33.2	28.2-33.9
18 y to adult	29.0-35.3	27.5-34.2

ESR (mm in 1 hour)		
Age	**Male**	**Female**
0 d to <13 y	0-10	0-10
13 y to adult	0-15	0-20

CBC and Automated Differential and Reticulocyte parameters:

1. Reference for Pediatric Values: *Pediatric Reference Intervals*, Fifth Ed, AACC Press, 2005.
2. Adult values established by reference range studies performed by VCU Medical Center Hematology Laboratory.

CSF AND BODY FLUID REFERENCE RANGES

CSF	RBCs:	<1 month	0-800 μ/L
		1-3 months	0-50 μ/L
		>3 months -18ur.	0-5 μ/L
		18 - 150 yr.	0-5 μ/L
	TNC	0-1 month	0-27 μ/L
		1 month - 18yrs	0-7 μ/L
		18 - 150 yr.	0-5 μ/L
	% Lymphs	0- 18yr.	< 38%
		18 - 150 yr.	< 99%
	% Monocytes (includes Macrophages in reporting)	0- 18yr.	< 94%
		18 - 150 yr.	< 45%
	% Neutrophils	0- 18yr.	< 8%
		18 - 150 yr.	< 2%

Pleural (Serous - including pleural, pericardial and peritoneal fluid) Reference Ranges:

RBCs=	<100,000 μ/L
TNC	1395-3734 μ/L
Macrophages	< 80%
Lymphocytes	< 36%
Neutophils	<50%
Mesothelial	< 2%

Synovial Fluid Reference Ranges:

RBCs=	0 -2,000 μ/L
TNC	<200 μ/L
Lymphocytes %	< 78 %
Neutophils%	< 25%
Mononuclear % (includes synoviocytes)	< 71 %
Macrophages%	< 26%

Pertoneal Dialysate (Dialysate) Reference Ranges:

RBCs=	< 35 μ/L
TNC	< 43 μ/L
Lymphocytes %	< 47 %
Neutophils%	< 21 %
Macrophages% (includes Monocytes)	< 40%
Eosinophils%	<9 %
Basophils %	< 4%

BAL

RBCs=	<1 μ/L
TNC	10.1 - 18.2 μ/L
Macrophages	83 - 95 %
Lymphocytes	7.5 - 12.5 %
Neutophils	1 - 2 %
Eosinophils%	<1 %
Basophils %	< 1 %

Cyst, Drainage and Wound Reference Ranges:

Cyst, Drainage and Wound fluids constitue abnormal conditions; therefore normal reference ranges are not applicable.

Amniotic Fluid:

Examination for RBCs and TNCs in amniotic fluid is of limited clinical value; Reference range values are not applicable.