

**BLOOD SCIENCES
 DEPARTMENT OF CLINICAL BIOCHEMISTRY**

Title of Document: Age-related reference ranges: Biochemistry

 Q Pulse Reference N^o: BS/CB/DCB/GEN/7

Authoriser: Peter Beresford

 Version N^o: 7

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Age Related Reference Ranges

Due to a major change in the analytical equipment within the clinical biochemistry department, a number of reference ranges changed on 14/11/22. All tests with age-related reference ranges are shown below.

Please contact the Duty Biochemist (Mon-Fri 9am-5pm) on 01174 14 8437 if you require further information.

Alkaline Phosphatase (ALP) IU/L

Gender	Age	Low	High
Both	less than 14 days	90	273
Both	14 days - <1 year	134	518
Both	1 - 9 years	156	369
Both	10 - 12 years	141	460
Male	13 - 14 years	127	517
Male	15 - 16 years	89	365
Male	17 - 18 years	59	164
Male	19+ years	30	130
Female	13 - 14 years	62	280
Female	15 - 16 years	54	130
Female	17 - 18 years	48	130
Female	19+ years	30	130

Aspartate aminotransferase (AST) IU/L

Gender	Age	Low	High
Both	0 – 14 days	0	150
Both	15 days - <1 year	0	60
Both	1 - 7 years	0	40
Male	Adult	0	50
Female	Adult	0	35

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Amino Acids (Plasma, $\mu\text{mol/L}$)

Gender	Age <4 months	Low	High
Both	Taurine	20	256
Both	Aspartic Acid	5	100
Both	Threonine	114	336
Both	Serine	94	324
Both	Glutamic acid	20	142
Both	Glutamine	530	960
Both	Proline	107	435
Both	Glycine	224	515
Both	Alanine	236	675
Both	Cystine	35	92
Both	Valine	80	370
Both	Methionine	10	96
Both	Iso-Leucine	27	105
Both	Leucine	46	230
Both	Tyrosine	42	196
Both	Phenylalanine	42	182
Both	Ornithine	49	214
Both	Lysine	114	316
Both	Histidine	49	195
Both	Arginine	22	155
Both	Citrulline	5	63

Gender	Age >4 months/Adult	Low	High
Both	Taurine	20	256
Both	Aspartic Acid	5	100
Both	Threonine	114	336
Both	Serine	94	324
Both	Glutamic acid	20	142
Both	Glutamine	530	960
Both	Proline	107	435
Both	Glycine	224	515
Both	Alanine	236	675
Both	Cystine	35	92
Both	Valine	80	370
Both	Methionine	10	96
Both	Iso-Leucine	27	105
Both	Leucine	46	230
Both	Tyrosine	42	196
Both	Phenylalanine	42	182
Both	Ornithine	49	214
Both	Lysine	114	316
Both	Histidine	49	195
Both	Arginine	22	155
Both	Citrulline	5	63

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Caeruloplasmin g/L

Gender	Age	Low	High
Female	< 4 months	0.15	0.56
Female	4 – 6 months	0.24	0.83
Female	6 – 18 months	0.27	0.91
Female	18 months – 3 years	0.28	0.9
Female	3 – 9 years	0.24	0.46
Female	9 – 12 years	0.23	0.45
Female	12 – 19 years	0.21	0.5
Female	>19 years	0.23	0.6
Male	< 4 months	0.15	0.56
Male	4 – 6 months	0.24	0.83
Male	6 – 18 months	0.27	0.91
Male	18 months – 3 years	0.28	0.9
Male	3 – 9 years	0.24	0.46
Male	9 – 12 years	0.24	0.45
Male	12 – 19 years	0.15	0.37
Male	>19 years	0.21	0.4

Creatinine (serum) $\mu\text{mol/L}$

Gender	Age	Low	High
Both	less than 2 weeks	27	77
Both	2 weeks - <1 year	14	34
Both	1 - 2 years	15	31
Both	3 - 4 years	23	37
Both	5 - 6 years	25	42
Both	7 - 8 years	30	47
Both	9 - 10 years	29	56
Both	11 years	36	64
Both	12 years	36	67
Male	13 years	38	76
Male	14 years	40	83
Male	15 years	47	98
Male	16 years	54	99
Male	17+ years	59	104
Female	13 years	38	74
Female	14 years	43	75
Female	15 years	44	79
Female	16 years	48	81
Female	17+ years	45	84

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FSH IU/L

Gender	Age	Low	High
Female	<1 year	0	16
Female	1 – 8 years	0.6	6.4
Female	9 – 11 years	0.9	7.8
Female	Follicular	3.9	8.8
Female	Mid-cycle	4.5	22.5
Female	Luteal	18	5.1
Female	Post-menopause	16	-
Male	<1 year	0	4
Male	1 – 8 years	0.2	2.3
Male	9 – 11 years	0.6	5
Male	12 – 17 years	1.3	7.4
Male	>18 years	1.3	19.3

GGT U/L

Gender	Age	Low	High
Both	0 – 14 days	0	160
Both	15 days – 1 year	0	100
Male	>1 year	0	55
Female	>1 year	0	38

Iron umol/L

Gender	Age	Low	High
Both	0 – 13 years	3	25
Both	>14 years	11	32

LDH U/L

Gender	Age	Low	High
Both	0 - 14 days	0	1020
Both	15 days - 1 year	0	380
Both	1 - <10 years	0	270
Both	>10 years	0	250

LH U/L

Gender	Age	Low	High
Female	<1 year	0	3.3
Female	1 – 8 years	0	2
Female	9 – 11 years	0	8
Female	Follicular	2.1	10.9

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Female	Mid-cycle	19.2	103
Female	Luteal	1.2	12.9
Female	Post-menopause	16	-
Male	<1 year	0	6.8
Male	1 – 8 years	0	2
Male	9 - 13 years	0	3.3
Male	>14 years	1.2	8.6

Lipase U/L

Gender	Age	Low	High
Both	0 – 9 years	0	30
Both	10 – 17 years	0	40
Both	>18 years	0	67

Free T3 pmol/L

Gender	Age	Low	High
Both	0 – 14 days	4.3	6.9
Both	15 days - <3 years	4.0	6.2
Both	>3 years	3.8	6.0

Free T4 pmol/L

Gender	Age	Low	High
Both	0 – 14 days	17	57
Both	15 days - <3 years	9.5	17.8
Both	>3 years	7.9	14.4

Galactitol μ mol/mmol creatinine

Gender	Age	Low	High
Both	less than 3 months	3	80
Both	3 - 12 months	10	65
Both	1 year	6	22
Both	2 - 5 years	3	17
Both	6 - 14 years	2	10
Both	15+ years	2	4

Galactokinase μ mol/h/g Hb

Gender	Age	Low	High
Both	0 - 6 months	3.7	9.0
Both	6+ months	1.5	4.0

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Methylmalonic acid (Urine MMA) $\mu\text{mol}/\text{mmol}$ creatinine

Gender	Age	Low	High
Both	less than 1 year	0.4	23
Both	1 - 16 years	2	5.1
Both	16+ years	0.7	3.2

Mucopolysaccharide screen: Urine Glycosaminoglycans (mg GAG/mmol creatinine)

Gender	Age	Low	High
Both	0 - 6 months	0	30
Both	6 - 12 months	0	26
Both	1 - 2 years	0	21
Both	3 - 4 years	0	14
Both	5 - 7 years	0	11
Both	8 - 15 years	0	9
Both	16+ years	0	3

Oestradiol pmol/L

Gender	Age	Low	High
Both	< 1 year	0	200
Both	1 – 11 years	0	80
Male	>12 years	0	120
Female	Follicular	80	420
Female	Mid-cycle	120	1900
Female	Luteal	130	900
Female	Post-menopause	0	110

Phenylalanine targets in PKU patients (bloodspots) $\mu\text{mol}/\text{L}$

Gender	Age	Low	High
Both	Up to 12 years	120	360
Both	12+ years	120	600
Female	Trying to conceive	120	250
Female	Pregnant	120	250

Phosphate mmol/L

Gender	Age	Low	High
Both	<1 month	1.3	2.6
Both	1 month – 1 year	1.3	2.4
Both	1 - 15 years	0.90	1.80
Both	16+ years	0.80	1.50

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Phytanic acid $\mu\text{mol/L}$ Usually measured as part of VLCFA profile

Gender	Age	Low	High
Both	<1 month	0	5.4
Both	1 month – 1 year	0	10.8
Both	>1 year	0	12.3

Potassium mmol/L

Gender	Age	Low	High
Both	Less than 4 weeks	3.4	6.0
Both	4 weeks - 1 year	3.5	5.7
Both	1 - 15 years	3.5	5.3
Both	16+ years	3.5	5.3

Progesterone nmol/L

Gender	Age	Low	High
Male	<1 year	0	20
Male	>1 year	0	5
Female	<1 year	0	30
Female	1 – 11 years	0	5
Female	Follicular	0	4
Female	Luteal	12	-
Female	Post-menopause	0	2

Testosterone nmol/L

Gender	Age	Low	High
Male	<1 year	0	10
Female	<1 year	0	2.2
Both	1 – 8 years	0	0.7
Male	9 – 12 years	0	1.7
	13 – 17 years	0	20 (pubertal stage dependent)
	<18 years	6	27
Female	9 – 11 years	0	1.7
Female	>12 years	0	2.9

Triglycerides mmol/L

Gender	Age	Low	High
Both	0 – 14 days	1	3.1
Both	15 days – 1 year	0.6	3.1
Both	1 – 14 years	0.5	2.4
Both	14+ years	0.5	1.7

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TSH mU/L

Gender	Age	Low	High
Both	0 – 14 days	0.79	5.9
Both	>15 days	0.38	5.33

Urea mmol/L

Gender	Age	Low	High
Both	< 28 days	0.8	5.5
Both	28 days – 1 year	1.0	5.5
Both	1 – 16 years	2.5	6.5
Both	>16 years	2.5	7.8

Urate (Uric acid) µmol/L

Gender	Age	Low	High
Male	< 8 years	60	240
Male	8 – 10 years	70	350
Male	11 – 15 years	120	460
Male	>6 years	200	430
Female	< 8 years	60	240
Female	8 – 10 years	130	370
Female	11 – 15 years	150	390
Female	16 – 49 years	190	360
Female	>50 years	140	360