



## Chemistry Reference Ranges and Critical Values

TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
<b>Alanine Aminotransferase (ALT, SGPT)</b>	Male	0 - 1 month 1 month - 1 year 1 - 3 years 3 - 9 years 9 - 18 years ≥ 18 years	10-25 U/L 10-35 U/L 10-30 U/L 10-25 U/L 10-30 U/L 10-35 U/L	None defined	None defined
	Female	0 - 1 month 1 month - 1 year 1 - 9 years 9 - 18 years ≥ 18 years	10-25 U/L 10-35 U/L 10-25 U/L 10-20 U/L 10-35 U/L		
<b>Albumin</b>	M/F	0 - 6 days 6 days - 37 months 37 months - 7 years 7 - 20 years ≥ 20 years	2.6-3.6 g/dL 3.4-4.2 g/dL 3.5-5.2 g/dL 3.7-5.6 g/dL 3.5-5.0 g/dL	None defined	None defined
<b>Alkaline Phosphatase</b>	Male	0 - 1 month 1 month - 1 year 1 - 3 years 3 - 6 years 6 - 9 years 9 - 12 years 12 - 15 years 15 - 18 years 18 - 59 years ≥ 59 years	75-316 U/L 82-383 U/L 104-345 U/L 93-309 U/L 86-315 U/L 42-362 U/L 74-390 U/L 52-171 U/L 53-128 U/L 56-119 U/L	None defined	None defined
	Female	0 - 1 month 1 month - 1 year 1 - 3 years 3 - 6 years 6 - 9 years 9 - 12 years 12 - 15 years 15 - 18 years 18 - 59 years ≥ 59 years	48-406 U/L 124-341 U/L 108-317 U/L 96-297 U/L 69-325 U/L 51-332 U/L 50-162 U/L 47-119 U/L 42-98 U/L 53-141 U/L		
<b>Ammonia</b>	M/F	0 - 1 day 1 day - 2 weeks 2 weeks - 18 years ≥ 18 years	64-107 µmol/L 56-92 µmol/L 21-50 µmol/L 11-32 µmol/L	None defined	>107 µmol/L >99 µmol/L >99 µmol/L >99 µmol/L



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<b>Amylase</b>	M/F	0 - 1 month 1 - 6 months 6 months - 1 year 1 - 3 years 3 - 9 years 9 - 18 years ≥ 18 years	0-10 U/L 0-17 U/L 0-44 U/L 10-79 U/L 16-91 U/L 19-76 U/L 10-200 U/L	None defined	None defined
<b>Aspartate Amino-Transferase (AST, SGOT)</b>	M/F  Male  Female	0 - 6 days 6 days - 3 years 3 - 7 years 7 - 10 years  10 - 12 years 12 - 16 years 16 - 20 years ≥ 20 years  10 - 12 years 12 - 16 years 16 - 20 years ≥ 20 years	35-140 U/L 20-60 U/L 15-50 U/L 15-40 U/L  10-60 U/L 10-45 U/L 10-45 U/L 14-50 U/L  10-50 U/L 10-30 U/L 5-30 U/L 8-39 U/L	None defined	None defined
<b>Bilirubin, Direct</b>	M/F	0 - 1 month ≥ 1 month	0.0-0.6 mg/dL 0.0-0.2 mg/dL	None defined	None defined
<b>Bilirubin, Total</b>	M/F	0 - 1 day 1 - 2 days 2 - 5 days 5 days - 20 years ≥ 20 years	0.0-8.0 mg/dL 3.4-11.5 mg/dL 1.5-12.0 mg/dL 0.6-1.4 mg/dL 0.3-1.2 mg/dL	None defined	>14.9 mg/dL >14.9 mg/dL >14.9 mg/dL >14.9 mg/dL >14.9 mg/dL
<b>Blood Urea Nitrogen (BUN)</b>	M/F	0 - 6 days 6 days - 20 years 20 - 60 years ≥ 60 years	4-12 mg/dL 5-18 mg/dL 6-20 mg/dL 8-23 mg/dL	None defined	>104 mg/dL >104 mg/dL >104 mg/dL >104 mg/dL
<b>Calcium, Ionized, Plasma and Whole Blood (Inpatient/ED/Surgery)</b>	M/F	0 - 1 day 1 - 2 days ≥ 2 days	1.08-1.28 mmol/L 1.00-1.18 mmol/L 1.14-1.33 mmol/L	<0.76 mmol/L <0.76 mmol/L <0.76 mmol/L	>1.49 mmol/L >1.49 mmol/L >1.49 mmol/L
<b>Calcium, Ionized, Serum (Outreach)</b>	M/F	0 - 1 day 1 - 2 days ≥ 2 days	1.08-1.28 mmol/L 1.00-1.18 mmol/L 1.14-1.40 mmol/L	<0.76 mmol/L <0.76 mmol/L <0.76 mmol/L	>1.49 mmol/L >1.49 mmol/L >1.49 mmol/L
<b>Calcium, Total</b>	M/F	0 - 10 days 10 days - 2 years 2 - 12 years ≥ 12 years	7.6-10.4 mg/dL 9.0-11.0 mg/dL 8.8-10.8 mg/dL 8.6-10.3 mg/dL	<6.0 mg/dL <6.0 mg/dL <6.0 mg/dL <6.0 mg/dL	>13.0 mg/dL >13.0 mg/dL >13.0 mg/dL >13.0 mg/dL



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<b>Carbon Dioxide, Total (CO<sub>2</sub>, Bicarbonate)</b>	M/F	0 - 1 week 1 week - 1 month 1 month - 6 months 6 months - 1 year 1 - 2 years 2 - 60 years ≥ 60 years	17-26 mmol/L 17-27 mmol/L 17-29 mmol/L 18-29 mmol/L 20-31 mmol/L 22-28 mmol/L 23-31 mmol/L	None defined	None defined
<b>Chloride</b>	M/F	0 - 1 month 1 month - 90 years ≥ 90 years	98-113 mmol/L 98-107 mmol/L 98-111 mmol/L	<76 mmol/L <76 mmol/L <76 mmol/L	>125 mmol/L >125 mmol/L >125 mmol/L
<b>Cholesterol, Total</b>	M/F	Cardiac Risk <i>ADULTS</i>	<b>Desirable:</b> <200 mg/dL <b>Borderline High:</b> 200-239 mg/dL <b>High Risk:</b> ≥240 mg/dL <b>Very High:</b> >280 mg/dL	None defined	None defined
		Cardiac Risk <i>CHILDREN &amp; ADOLESCENTS</i>	<b>Desirable:</b> <170 mg/dL <b>Borderline High:</b> 170-199 mg/dL <b>High Risk:</b> ≥200 mg/dL		
<b>Cholesterol, HDL</b>	M/F	Cardiac Risk <i>ADULTS</i>	<b>Desirable:</b> ≥60 mg/dL <b>High Risk:</b> <40 mg/dL	None defined	None defined
<b>Cholesterol/HDL Ratio</b>	M/F	All Ages	0.0-5.0	None defined	None defined
<b>Cholesterol, LDL</b>	M/F	Cardiac Risk <i>ADULTS</i>	<b>Desirable:</b> <100 mg/dL <b>Near Optimal:</b> 100-129 mg/dL <b>Borderline High:</b> 130-159 mg/dL <b>High Risk:</b> 160-189 mg/dL <b>Very High:</b> ≥190 mg/dL	None defined	None defined
		Cardiac Risk <i>CHILDREN &amp; ADOLESCENTS</i>	<b>Desirable:</b> <110 mg/dL <b>Borderline High:</b> 110-129 mg/dL <b>High Risk:</b> ≥130 mg/dL		
<b>C-Reactive Protein (CRP)</b>	M/F	All Ages	0.0-10.0 mg/L	None defined	None defined
<b>C-Reactive Protein, High Sensitivity (hsCRP)</b>	M/F	All Ages	0.0-3.0 mg/L	None defined	None defined





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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
<b>Creatine Kinase, Total (CK, CPK)</b>	M/F	0 - 3 years	60-305 U/L	None defined	None defined
		3 - 7 years	75-230 U/L		
		7 - 10 years	60-365 U/L		
	Male	10 - 12 years	55-215 U/L		
		12 - 14 years	60-330 U/L		
		14 - 16 years	60-335 U/L		
Female	16 - 20 years	55-370 U/L			
	≥ 20 years	35-232 U/L			
	10 - 12 years	80-230 U/L			
		12 - 14 years	50-295 U/L		
		14 - 16 years	30-240 U/L		
		16 - 20 years	45-230 U/L		
		≥ 20 years	21-215 U/L		
<b>Creatine Kinase-MB (CK-MB)</b>	M/F	All ages	0-6 ng/mL CK-MB Index: 0-4%	None defined	None defined
<b>Creatinine</b>	M/F	0 - 3 days	0.30-1.00 mg/dL	None defined	>7.3 mg/dL
		4 days - 1 month	0.20-0.40 mg/dL		>7.3 mg/dL
		2 months - 9 years	0.30-0.70 mg/dL		>7.3 mg/dL
		10 - 17 years	0.50-1.00 mg/dL		>7.3 mg/dL
	Male	≥ 18 years	0.70-1.30 mg/dL		>7.3 mg/dL
	Female	≥ 18 years	0.60-1.10 mg/dL		>7.3 mg/dL
<b>Creatinine Clearance (U CRC)</b>	Male	0 - 19 years	Not established	None defined	None defined
		20 - 29 years	94-140 mL/min/1.73m <sup>2</sup>		
		30 - 39 years	88-134 mL/min/1.73m <sup>2</sup>		
		40 - 49 years	81-127 mL/min/1.73m <sup>2</sup>		
		50 - 59 years	75-121 mL/min/1.73m <sup>2</sup>		
		60 - 69 years	68-114 mL/min/1.73m <sup>2</sup>		
		70 - 79 years	62-108 mL/min/1.73m <sup>2</sup>		
	80 - 89 years	56-102 mL/min/1.73m <sup>2</sup>			
	≥ 90 years	50-96 mL/min/1.73m <sup>2</sup>			
	Female	0 - 19 years	Not established		
		20 - 29 years	72-110 mL/min/1.73m <sup>2</sup>		
		30 - 39 years	66-104 mL/min/1.73m <sup>2</sup>		
		40 - 49 years	59-97 mL/min/1.73m <sup>2</sup>		
		50 - 59 years	53-91 mL/min/1.73m <sup>2</sup>		
60 - 69 years		46-84 mL/min/1.73m <sup>2</sup>			
70 - 79 years		40-78 mL/min/1.73m <sup>2</sup>			
80 - 89 years	34-72 mL/min/1.73m <sup>2</sup>				
≥ 90 years	28-66 mL/min/1.73m <sup>2</sup>				



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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
<b>Ferritin</b>	Male	0 - 1 month 1 - 7 months 7 months - 1 year 1 - 6 years 6 - 19 years ≥ 19 years	36-381 ng/mL 36-391 ng/mL 36-100 ng/mL 36-84 ng/mL 36-311 ng/mL 22-322 ng/mL	None defined	None defined
	Female	0 - 1 month 1 - 7 months 7 months - 1 year 1 - 6 years 6 - 19 years ≥ 19 years	36-483 ng/mL 36-329 ng/mL 36-70 ng/mL 36-84 ng/mL 36-92 ng/mL 10-291 ng/mL		
<b>Gamma Glutamyl Transferase (Gamma GT, GGT)</b>	Male	0 - 6 months 6 months - 1 year 1 - 12 years 12 - 18 years ≥ 18 years	12-122 U/L 1-39 U/L 3-22 U/L 2-42 U/L 2-30 U/L	None defined	None defined
	Female	0 - 6 months 6 months - 1 year 1 - 12 years 12 - 18 years ≥ 18 years	15-132 U/L 1-39 U/L 4-22 U/L 4-24 U/L 2-24 U/L		
<b>Glucose</b>	M/F	0 - 1 day 1 day - 1 month 1 month - 1 year 1 - 60 years 60 - 90 years ≥ 90 years	40-60 mg/dL 50-80 mg/dL 60-100 mg/dL 74-100 mg/dL 82-115 mg/dL 75-121 mg/dL	<31 mg/dL <31 mg/dL <51 mg/dL <51 mg/dL <51 mg/dL <51 mg/dL	>299 mg/dL >299 mg/dL >499 mg/dL >499 mg/dL >499 mg/dL >499 mg/dL
<b>Glucose, CSF</b>	M/F	0 - 2 years ≥ 2 years	60-80 mg/dL 40-70 mg/dL	<40 mg/dL <40 mg/dL	None defined
<b>Iron</b>	M/F	0 - 2 days 2 days - 2 years 2 - 6 years ≥ 6 years	100-250 µg/dL 40-100 µg/dL 35-140 µg/dL 35-140 µg/dL	None defined	>299 µg/dL >299 µg/dL >299 µg/dL >499 µg/dL
<b>Iron Binding Capacity, Total (TIBC)</b>	M/F	All Ages	220-390 µg/dL	None defined	None defined
<b>Unsaturated Iron Binding Capacity</b>	M/F	All Ages	130-300 µg/dL	None defined	None defined
<b>% Iron Saturation</b>	M/F	All Ages	15-50%	None defined	None defined
<b>Lactate, CSF</b>	M/F	All Ages	1.1-2.4 mmol/L	None defined	>3.0 mmol/L
<b>Lactate, Plasma</b>	M/F	All Ages	Venous: 0.5-2.0 mmol/L Arterial: 0.5-1.6 mmol/L	None defined	>2.0 mmol/L



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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
<b>Lactate Dehydrogenase (LDH)</b>	Male	0 - 1 month 1 month - 1 year 1 - 6 years 6 - 9 years 9 - 12 years 12 - 15 years 15 - 18 years 18 - 90 years ≥ 90 years	125-735 U/L 170-450 U/L 155-345 U/L 145-300 U/L 120-325 U/L 120-290 U/L 105-235 U/L 100-190 U/L 99-284 U/L	None defined	None defined
	Female	0 - 1 month 1 month - 1 year 1 - 3 years 3 - 6 years 6 - 9 years 9 - 12 years 12 - 15 years 15 - 18 years 18 - 90 years ≥ 90 years	145-765 U/L 190-240 U/L 165-395 U/L 135-345 U/L 140-280 U/L 120-260 U/L 100-275 U/L 105-230 U/L 100-190 U/L 99-284 U/L		
<b>Lipase</b>	M/F	All Ages	7-59 U/L	None defined	None defined
<b>Magnesium</b>	M/F	0 - 6 days	1.6-2.7 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		6 days - 1 month	1.8-2.4 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		1 month - 2 years	1.6-2.6 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		2 - 7 years	1.5-2.4 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		7 - 10 years	1.6-2.3 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		10 - 14 years	1.6-2.2 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		14 - 20 years	1.5-2.3 mg/dL	<1.1 mg/dL	>4.8 mg/dL
		≥ 20 years	1.7-2.2 mg/dL	<1.1 mg/dL	>4.8 mg/dL
<b>Magnesium, OB</b>	Female	All Ages	4.0-7.9 ng/dL	<1.1 mg/dL	>7.9 mg/dL





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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE		
				LOW	HIGH	
Phosphorus	Male	0 - 1 month	3.9-6.9 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		1 month - 1 year	3.5-6.6 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		1 - 4 years	3.1-6.0 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		4 - 7 years	3.3-5.6 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		7 - 10 years	3.0-5.4 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		10 - 13 years	3.2-5.7 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		13 - 16 years	2.9-5.1 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		16 - 18 years	2.7-4.9 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		18 - 60 years	2.7-4.5 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
	≥ 60 years	2.3-3.7 mg/dL	<1.2 mg/dL	>8.8 mg/dL		
	Female	0 - 1 month	4.3-7.7 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		1 month - 1 year	3.7-6.5 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		1 - 4 years	3.4-6.0 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
		4 - 7 years	3.2-5.5 mg/dL	<1.2 mg/dL	>8.8 mg/dL	
7 - 10 years		3.1-5.5 mg/dL	<1.2 mg/dL	>8.8 mg/dL		
Potassium	M/F	0 - 1 year	3.7-5.9 mmol/L	<2.9 mmol/L	>7.4 mmol/L	
		> 1 year	3.6-5.0 mmol/L	<2.9 mmol/L	>6.1 mmol/L	
	Protein, CSF	M/F	All Ages	15-45 mg/dL	None defined	>188 mg/dL
	Protein, Total	M/F	0 - 1 week	3.6-6.0 g/dL	None defined	None defined
			1 week - 7 months	4.6-7.0 g/dL		
7 months - 1 year			5.1-7.3 g/dL			
1 - 3 years			5.6-7.5 g/dL			
3 - 18 years			6.0-8.0 g/dL			
18 - 60 years			6.0-8.3 g/dL			
≥ 60 years	5.8-8.1 g/dL					
Sodium	M/F	0 - 1 year	133-146 mmol/L	<126 mmol/L	>149 mmol/L	
		1 - 12 years	138-145 mmol/L	<121 mmol/L	>159 mmol/L	
		≥ 12 years	136-145 mmol/L	<121 mmol/L	>159 mmol/L	
Triglyceride	M/F	Cardiac Risk <i>ADULTS</i>	<b>Desirable:</b> <150 mg/dL <b>Borderline High:</b> 150-199 mg/dL <b>High Risk:</b> 200-499 mg/dL <b>Very High:</b> ≥500 mg/dL	None defined	None defined	
Troponin I	M/F	All Ages	<b>No detectable cardiac injury:</b> ≤0.03 ng/mL <b>Possible cardiac muscle injury (8 hours post symptom onset: 86% sensitivity and 94% specificity for MI):</b> 0.04 to 0.49 ng/mL <b>Myocardial infarction (MI):</b> ≥0.50 ng/mL	None defined	≥0.50 ng/mL	



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				LOW	HIGH
<b>Uric Acid</b>	M/F	0 - 6 days	1.9-7.9 mg/dL	None defined	None defined
		6 days - 3 years	1.8-5.0 mg/dL		
		3 - 7 years	2.2-4.7 mg/dL		
		7 - 10 years	2.0-5.0 mg/dL		
	Male	10 - 12 years	2.3-5.4 mg/dL		
		12 - 14 years	2.7-6.7 mg/dL		
		14 - 16 years	2.4-7.8 mg/dL		
		16 - 20 years	4.0-8.6 mg/dL		
	Female	≥ 20 years	3.5-7.2 mg/dL		
		10 - 12 years	3.0-4.7 mg/dL		
		12 - 16 years	3.0-5.8 mg/dL		
		16 - 20 years	3.0-5.9 mg/dL		
≥ 20 years	2.6-6.0 mg/dL				

Reference ranges are subject to update. Refer to the individual test listed on the Legacy web site or the patient chart for reference ranges at time of testing.