



Chemistry Reference Ranges and Critical Values

TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
Alanine Aminotransferase (ALT, SGPT)	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		
Albumin	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
Alkaline Phosphatase	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		
Ammonia	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
Amylase	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



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				LOW	HIGH
Aspartate Amino-Transferase (AST, SGOT)	M/F	0 - 6 days	35-140 U/L	None defined	None defined
		6 days - 3 years	20-60 U/L		
		3 - 7 years	15-50 U/L		
		7 - 10 years	15-40 U/L		
	Male	10 - 12 years	10-60 U/L		
		12 - 16 years	10-45 U/L		
	16 - 20 years	10-45 U/L			
	≥ 20 years	14-50 U/L			
	Female	10 - 12 years	10-50 U/L		
		12 - 16 years	10-30 U/L		
		16 - 20 years	5-30 U/L		
		≥ 20 years	8-39 U/L		
Bilirubin, Direct	M/F	0 - 1 month	0.0-0.6 mg/dL	None defined	None defined
		≥ 1 month	0.0-0.2 mg/dL		
Bilirubin, Total	M/F	0 - 1 day	0.0-8.0 mg/dL	None defined	>14.9 mg/dL
		1 - 2 days	3.4-11.5 mg/dL		
		2 - 5 days	1.5-12.0 mg/dL		
		5 days - 20 years	0.6-1.4 mg/dL		
		≥ 20 years	0.3-1.2 mg/dL		
Blood Urea Nitrogen (BUN)	M/F	0 - 6 days	4-12 mg/dL	None defined	>104 mg/dL
		6 days - 20 years	5-18 mg/dL		
		20 - 60 years	6-20 mg/dL		
		≥ 60 years	8-23 mg/dL		
Calcium, Ionized, Whole Blood (Inpatient/ED/Surgery)	M/F	0 - 1 day	1.08-1.28 mmol/L	<0.76 mmol/L	>1.49 mmol/L
		1 - 2 days	1.00-1.18 mmol/L		
		≥ 2 days	1.12-1.26 mmol/L		
Calcium, Ionized, Serum (Outreach)	M/F	0 - 1 day	1.08-1.28 mmol/L	<0.76 mmol/L	>1.49 mmol/L
		1 - 2 days	1.00-1.18 mmol/L		
		≥ 2 days	1.12-1.30 mmol/L		
Calcium, Total	M/F	0 - 10 days	7.6-10.4 mg/dL	<6.0 mg/dL	>13.0 mg/dL
		10 days - 2 years	9.0-11.0 mg/dL		
		2 - 12 years	8.8-10.8 mg/dL		
		≥ 12 years	8.6-10.3 mg/dL		
Carbon Dioxide, Total (CO₂, Bicarbonate)	M/F	0 - 1 week	17-26 mmol/L	<11 mmol/L	>39 mmol/L
		1 week - 1 month	17-27 mmol/L		
		1 month - 6 months	17-29 mmol/L		
		6 months - 1 year	18-29 mmol/L		
		1 - 2 years	20-31 mmol/L		
		2 - 60 years	22-28 mmol/L		
		≥ 60 years	23-31 mmol/L		



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				LOW	HIGH			
Chloride	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			
Cholesterol, Total	M/F	Cardiac Risk <i>ADULTS</i>	Desirable: <200 mg/dL Borderline High: 200-239 mg/dL High Risk: ≥240 mg/dL Very High: >280 mg/dL	None defined	None defined			
		Cardiac Risk <i>CHILDREN & ADOLESCENTS</i>	Desirable: <170 mg/dL Borderline High: 170-199 mg/dL High Risk: ≥200 mg/dL					
Cholesterol, HDL	M/F	Cardiac Risk <i>ADULTS</i>	Desirable: ≥60 mg/dL High Risk: <40 mg/dL	None defined	None defined			
Cholesterol/HDL Ratio	M/F	All Ages	0.0-5.0	None defined	None defined			
Cholesterol, LDL	M/F	Cardiac Risk <i>ADULTS</i>	Desirable: <100 mg/dL Near Optimal: 100-129 mg/dL Borderline High: 130-159 mg/dL High Risk: 160-189 mg/dL Very High: ≥190 mg/dL	None defined	None defined			
		Cardiac Risk <i>CHILDREN & ADOLESCENTS</i>	Desirable: <110 mg/dL Borderline High: 110-129 mg/dL High Risk: ≥130 mg/dL					
C-Reactive Protein (CRP)	M/F	All Ages	0.0-10.0 mg/L	None defined	None defined			
C-Reactive Protein, High Sensitivity (hsCRP)	M/F	All Ages	0.0-3.0 mg/L	None defined	None defined			
Creatine Kinase, Total (CK, CPK)	M/F	0 - 3 years 3 - 7 years 7 - 10 years	60-305 U/L 75-230 U/L 60-365 U/L	None defined	None defined			
	Male	10 - 12 years 12 - 14 years 14 - 16 years 16 - 20 years ≥ 20 years	55-215 U/L 60-330 U/L 60-335 U/L 55-370 U/L 35-232 U/L					
		Female	10 - 12 years 12 - 14 years 14 - 16 years 16 - 20 years ≥ 20 years			80-230 U/L 50-295 U/L 30-240 U/L 45-230 U/L 21-215 U/L		
			M/F			All ages	0-6 ng/mL CK-MB Index: 0-4%	None defined



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				LOW	HIGH
Creatinine	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		
		2 months - 9 years	0.30-0.70 mg/dL		
		10 - 17 years	0.50-1.00 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
Creatinine Clearance (U CRC)	Male	0 – 19 years	Not established	None defined	None defined
		20 – 29 years	94-140 mL/min/1.73m ²		
		30 – 39 years	88-134 mL/min/1.73m ²		
		40 – 49 years	81-127 mL/min/1.73m ²		
		50 – 59 years	75-121 mL/min/1.73m ²		
		60 – 69 years	68-114 mL/min/1.73m ²		
		70 – 79 years	62-108 mL/min/1.73m ²		
	Female	80 – 89 years	56-102 mL/min/1.73m ²		
		≥ 90 years	50-96 mL/min/1.73m ²		
		0 – 19 years	Not established		
		20 – 29 years	72-110 mL/min/1.73m ²		
		30 – 39 years	66-104 mL/min/1.73m ²		
		40 – 49 years	59-97 mL/min/1.73m ²		
		50 – 59 years	53-91 mL/min/1.73m ²		
60 – 69 years	46-84 mL/min/1.73m ²				
70 – 79 years	40-78 mL/min/1.73m ²				
80 – 89 years	34-72 mL/min/1.73m ²				
≥ 90 years	28-66 mL/min/1.73m ²				
Ferritin	Male	0 - 1 month	36-381 ng/mL	None defined	None defined
		1 - 7 months	36-391 ng/mL		
		7 months - 1 year	36-100 ng/mL		
		1 - 6 years	36-84 ng/mL		
		6 - 19 years	36-311 ng/mL		
	Female	≥ 19 years	22-322 ng/mL		
		0 - 1 month	36-483 ng/mL		
		1 - 7 months	36-329 ng/mL		
		7 months - 1 year	36-70 ng/mL		
		1 - 6 years	36-84 ng/mL		
6 - 19 years	36-92 ng/mL				
≥ 19 years	10-291 ng/mL				
Gamma Glutamyl Transferase (Gamma GT, GGT)	Male	0 - 6 months	12-122 U/L	None defined	None defined
		6 months - 1 year	1-39 U/L		
		1 - 12 years	3-22 U/L		
		12 - 18 years	2-42 U/L		
		≥ 18 years	2-30 U/L		
	Female	0 - 6 months	15-132 U/L		
		6 months - 1 year	1-39 U/L		
		1 - 12 years	4-22 U/L		
		12 - 18 years	4-24 U/L		
		≥ 18 years	2-24 U/L		



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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
Glucose	M/F	0 - 1 day	40-60 mg/dL	<31 mg/dL	>299 mg/dL
		1 day - 1 month	50-80 mg/dL	<31 mg/dL	>299 mg/dL
		1 month - 1 year	60-99 mg/dL	<51 mg/dL	>499 mg/dL
		1 - 60 years	74-99 mg/dL	<51 mg/dL	>499 mg/dL
		60 - 90 years	82-99 mg/dL	<51 mg/dL	>499 mg/dL
		≥ 90 years	75-99 mg/dL	<51 mg/dL	>499 mg/dL
Glucose, CSF	M/F	0 - 2 years	60-80 mg/dL	<40 mg/dL	None defined
		≥ 2 years	40-70 mg/dL	<40 mg/dL	None defined
Iron	M/F	0 - 2 days	100-250 µg/dL	None defined	>299 µg/dL
		2 days - 2 years	40-100 µg/dL		>299 µg/dL
		2 - 6 years	35-140 µg/dL		>299 µg/dL
		≥6 years	35-140 µg/dL		>499 µg/dL
Iron Binding Capacity, Total (TIBC)	M/F	All Ages	233-397 µg/dL	None defined	None defined
Unsaturated Iron Binding Capacity	M/F	All Ages	153-308 µg/dL	None defined	None defined
% Iron Saturation	M/F	All Ages	15-50%	None defined	None defined
Lactate, CSF	M/F	All Ages	1.1-2.4 mmol/L	None defined	>3.0 mmol/L
Lactate, Plasma	M/F	All Ages	Venous: 0.5-2.0 mmol/L Arterial: 0.5-1.6 mmol/L	None defined	>2.0 mmol/L
Lactate Dehydrogenase (LDH)	Male	0 - 1 month	125-735 U/L	None defined	None defined
		1 month - 1 year	170-450 U/L		
		1 - 6 years	155-345 U/L		
		6 - 9 years	145-300 U/L		
		9 - 12 years	120-325 U/L		
		12 - 15 years	120-290 U/L		
		15 - 18 years	105-235 U/L		
		18 - 90 years	100-190 U/L		
	≥ 90 years	99-284 U/L			
	Female	0 - 1 month	145-765 U/L		
		1 month - 1 year	190-240 U/L		
		1 - 3 years	165-395 U/L		
		3 - 6 years	135-345 U/L		
		6 - 9 years	140-280 U/L		
		9 - 12 years	120-260 U/L		
		12 - 15 years	100-275 U/L		
15 - 18 years		105-230 U/L			
18 - 90 years	100-190 U/L				
≥ 90 years	99-284 U/L				
Lipase	M/F	All Ages	7-59 U/L	None defined	None defined



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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
Magnesium	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
Magnesium, OB	Female	All Ages	4.0-7.9 ng/dL	<1.1 mg/dL	>7.9 mg/dL
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
		10 - 13 years	3.3-5.3 mg/dL	<1.2 mg/dL	>8.8 mg/dL
		13 - 16 years	2.8-4.8 mg/dL	<1.2 mg/dL	>8.8 mg/dL
		16 - 18 years	2.5-4.8 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	2.8-4.1 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>	Desirable: <150 mg/dL Borderline High: 150-199 mg/dL High Risk: 200-499 mg/dL Very High: ≥500 mg/dL	None defined	None defined



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TEST	SEX	AGE	REFERENCE RANGE	CRITICAL VALUE	
				LOW	HIGH
Troponin I	M/F	All Ages	No detectable cardiac injury: ≤ 0.03 ng/mL Possible cardiac muscle injury (8 hours post symptom onset: 86% sensitivity and 94% specificity for MI): 0.04 to 0.49 ng/mL Myocardial infarction (MI): ≥ 0.50 ng/mL	None defined	≥ 0.50 ng/mL
Uric Acid	M/F	0 - 6 days 6 days - 3 years 3 - 7 years 7 - 10 years Male 10 - 12 years 12 - 14 years 14 - 16 years 16 - 20 years ≥ 20 years Female 10 - 12 years 12 - 16 years 16 - 20 years ≥ 20 years	1.9-7.9 mg/dL 1.8-5.0 mg/dL 2.2-4.7 mg/dL 2.0-5.0 mg/dL 2.3-5.4 mg/dL 2.7-6.7 mg/dL 2.4-7.8 mg/dL 4.0-8.6 mg/dL 3.5-7.2 mg/dL 3.0-4.7 mg/dL 3.0-5.8 mg/dL 3.0-5.9 mg/dL 2.6-6.0 mg/dL	None defined	None defined

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.