



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 | | >14.9 mg/dL |
| | | 2 - 5 days | 1.5-12.0 mg/dL | | >14.9 mg/dL |
| | | 5 days - 20 years | 0.6-1.4 mg/dL | | >14.9 mg/dL |
| | | ≥ 20 years | 0.3-1.2 mg/dL | | >14.9 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 | | >104 mg/dL |
| | | 20 - 60 years | 6-20 mg/dL | | >104 mg/dL |
| | | ≥ 60 years | 8-23 mg/dL | | >104 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 | <0.76 mmol/L | >1.49 mmol/L |
| | | ≥ 2 days | 1.12-1.26 mmol/L | <0.76 mmol/L | >1.49 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 | <0.76 mmol/L | >1.49 mmol/L |
| | | ≥ 2 days | 1.12-1.30 mmol/L | <0.76 mmol/L | >1.49 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 | <6.0 mg/dL | >13.0 mg/dL |
| | | 2 - 12 years | 8.8-10.8 mg/dL | <6.0 mg/dL | >13.0 mg/dL |
| | | ≥ 12 years | 8.6-10.3 mg/dL | <6.0 mg/dL | >13.0 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 | <11 mmol/L | >39 mmol/L |
| | | 1 month - 6 months | 17-29 mmol/L | <11 mmol/L | >39 mmol/L |
| | | 6 months - 1 year | 18-29 mmol/L | <11 mmol/L | >39 mmol/L |
| | | 1 - 2 years | 20-31 mmol/L | <11 mmol/L | >39 mmol/L |
| | | 2 - 60 years | 22-28 mmol/L | <11 mmol/L | >39 mmol/L |
| | | ≥ 60 years | 23-31 mmol/L | <11 mmol/L | >39 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 | 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 | | | | |



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|---|--------|---|--|----------------|--|
| | | | | LOW | HIGH |
| Creatinine | M/F | 0 - 3 days 4 days - 1 month 2 months - 9 years 10 - 17 years | 0.30-1.00 mg/dL 0.20-0.40 mg/dL 0.30-0.70 mg/dL 0.50-1.00 mg/dL | None defined | >7.3 mg/dL >7.3 mg/dL >7.3 mg/dL >7.3 mg/dL |
| | Male | ≥ 18 years | 0.70-1.30 mg/dL | | |
| | Female | ≥ 18 years | 0.60-1.10 mg/dL | | |
| Creatinine Clearance (U CRC) | Male | 0 – 19 years 20 – 29 years 30 – 39 years 40 – 49 years 50 – 59 years 60 – 69 years 70 – 79 years 80 – 89 years ≥ 90 years | Not established 94-140 mL/min/1.73m ² 88-134 mL/min/1.73m ² 81-127 mL/min/1.73m ² 75-121 mL/min/1.73m ² 68-114 mL/min/1.73m ² 62-108 mL/min/1.73m ² 56-102 mL/min/1.73m ² 50-96 mL/min/1.73m ² | None defined | None defined |
| | Female | 0 – 19 years 20 – 29 years 30 – 39 years 40 – 49 years 50 – 59 years 60 – 69 years 70 – 79 years 80 – 89 years ≥ 90 years | Not established 72-110 mL/min/1.73m ² 66-104 mL/min/1.73m ² 59-97 mL/min/1.73m ² 53-91 mL/min/1.73m ² 46-84 mL/min/1.73m ² 40-78 mL/min/1.73m ² 34-72 mL/min/1.73m ² 28-66 mL/min/1.73m ² | | |
| Ferritin | 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 | | |
| Gamma Glutamyl Transferase (Gamma GT, GGT) | 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 | | |



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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 10 - 12 years 12 - 14 years 14 - 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 | None defined | None defined |
| | Male | 10 - 12 years 12 - 14 years 14 - 16 years 16 - 20 years ≥ 20 years | 3.0-4.7 mg/dL 3.0-5.8 mg/dL 3.0-5.9 mg/dL | | |
| | Female | 10 - 12 years 12 - 16 years 16 - 20 years ≥ 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.