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| TEST | CODE | UNIT | GENDER | AGE (from-to) | RANGE | Reference | Method in Use |
|---|---|---|---|---|---|---|---|
| **Albumin** | BALB | g/L | M/F | 0D - <5D | 28 - 44 | Tietz 4th Edition 2006 | 37°C Architect / Integra / Beckman/ H912 |
| | | | | 5D - <15Y | 38 - 54 | | |
| | | | | 15Y - <19Y | 32 - 45 | | |
| | | | | 19Y - <61Y | 35 - 52 | | |
| | | | | 61Y - 90Y | 32 - 46 | | |
| | | | | >90Y | 29 - 45 | | |
| | | | | If no age supplied | 35 - 52 | | |
| **Alkaline Phosphatase** | BALP | IU/L | M | 0D - <1M | 75 - 316 | Soldin 4th Edition 2003 | 37°C IFCC Architect / Integra / Beckman/ H912 |
| | | | F | 0D - <1M | 48 - 406 | | |
| | | | M | 1M - <1Y | 82 - 383 | | |
| | | | F | 1M - <1Y | 124 - 341 | | |
| | | | M | 1Y - <4Y | 104 - 345 | | |
| | | | F | 1Y - <4Y | 108 - 317 | | |
| | | | M | 4Y - <7Y | 93 - 309 | | |
| | | | F | 4Y - <7Y | 96 - 297 | | |
| | | | M | 7Y - <10Y | 86 - 315 | | |
| | | | F | 7Y - <10Y | 69 - 325 | | |
| | | | M | 10Y - <13Y | 42 - 362 | | |
| | | | F | 10Y - <13Y | 51 - 332 | | |
| | | | M | 13Y - <16Y | 74 - 390 | | |
| | | | F | 13Y - <16Y | 50 - 162 | | |
| | | | M | 16Y - <19Y | 52 - 171 | | |
| | | | F | 16Y - <19Y | 47 - 119 | | |
| | | | M | 19Y - 60Y | 53 - 128 | Tietz 4th Edition 2006 | 37°C IFCC Architect / Integra / Beckman/ H912 |
| | | | F | 19Y - 60Y | 42 - 98 | | |
| | | | M | >60Y | 56 - 119 | | |
| | | | F | >60Y | 53 - 141 | | |

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| TEST | CODE | UNIT | GENDER | AGE (from-to) | RANGE | Reference | Method in Use |
|---|---|---|---|---|---|---|---|
| **Alanine Transaminase ALT/SGPT** | BSGPT | IU/L | M | 0D - <1Y | 13 - 45 | Clinical Guide to Laboratory Tietz 2006 | 37°C Architect / Integra / Beckman/ H912 |
| | | | F | 1D - <1Y | 13 - 45 | | |
| | | | M | 1Y - <61Y | 10 - 40 | | |
| | | | F | 1Y - <61Y | 7 - 35 | | |
| | | | M | 61Y - 90Y | 13 - 40 | | |
| | | | F | 61Y - 90Y | 10 - 28 | | |
| | | | M | >90Y | 6 - 38 | | |
| | | | F | >90Y | 5 - 24 | | |
| **Amylase** | BAMY | IU/L | M/F | All Ages | 28 - 100 | Kit Insert, Tietz 4th Edition, 2006 | 37°C IFCC Architect / Integra / Beckman/ H912 |
| **APO a** | BAPOa | mg/L | M/F | 0D - 108Y | 1 - 300 | Architect Kit Insert | Architect |
| **APO A1** | BAPOA1 | g/L | M | 18Y - 108Y | 0.81 - 1.66 | Clinical Guide to Laboratory Tietz 1996 | Architect |
| | | | F | 18Y - 108Y | 0.80 - 2.14 | | |
| | | | *If age related ranges required, see Clinical Guide to Laboratory Tietz 1996, for details.* | | | | |
| | | g/L | M | 18Y - 108Y | 1.04 - 2.02 | Roche Integra - Kit Insert | Integra |
| | | | F | 18Y - 108Y | 1.08 - 2.25 | | |
| **APO B** | BAPOB | g/L | M | 18Y - 108Y | 0.46 - 1.74 | Clinical Guide to Laboratory Tietz 1996 | Architect |
| | | | F | 18Y - 108Y | 0.46 - 1.42 | | |
| | | | *If age related ranges required, see Clinical Guide to Laboratory Tietz 1996, for details.* | | | | |
| | | g/L | M | 18Y - 108Y | 0.66 - 1.33 | Roche Integra - Kit Insert | Integra |
| | | | F | 18Y - 108Y | 0.60 - 1.17 | | |
| **Aspartate Transaminase AST/SGOT** | BSGPT | IU/L | M/F | 0D - <11D | 47 - 150 | Clinical Guide to Laboratory Tietz 2006 | 37°C IFCC Architect / Integra / Beckman/ H912 |
| | | | M/F | 11D - <2Y | 9 - 80 | | |
| | | | M | 2Y - <61Y | 15 - 40 | | |
| | | | F | 2Y - <61Y | 13 - 35 | | |
| | | | M | 61Y - 90Y | 19 - 48 | | |
| | | | F | 61Y - 90Y | 9 - 36 | | |
| | | | M | >90Y | 11 - 38 | | |
| | | | F | >90Y | 18 - 30 | | |
| **Bicarbonate** | BCO2 | mmol/L | M/F | 0D - 108Y | 21 - 29 | Clinical Guide to Laboratory Tietz 2006, Venous blood | 37°C Integra / Beckman/ H912 |

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|---|---|---|---|---|---|---|---|
| **Bilirubin Direct** | BDBIL | umol/L | M/F | 0D - <1M | 2 - 7 | Soldin 4th Edition 2003 | 37°C Architect / Integra / Beckman/ H912 |
| | | | | 1M - 108Y | <3.4 | Tietz 4th Edition 2003 | |
| **Bilirubin Total** | BTBIL | umol/L | M/F | 0D - <1D | 24 - 149 | Clinical Guide to Laboratory Tietz 2006 | 37°C Architect / Integra / Beckman/ H912 |
| | | | | 1D - <3D | 58 - 197 | | |
| | | | | 3D - 5D | 26 - 205 | | |
| | | | | >5D - <61Y | 2 - 21 | | |
| | | | | 61Y - 90Y | 2 - 19 | | |
| | | | | >90Y | 2 - 15 | | |
| **Calcium** | ZBCAL | mmol/L | M/F | 0D - <11D | 1.90 - 2.60 | Clinical Guide to Laboratory Tietz 2006 | 37°C Colourmetric Architect / Integra / Beckman/ H912 |
| | | | | 11D - <2Y | 2.25 - 2.75 | | |
| | | | | 2Y - <13Y | 2.20 - 2.70 | | |
| | | | | 13Y - <18Y | 2.10 - 2.55 | | |
| | | | | 18Y - <61Y | 2.15 - 2.50 | | |
| | | | | 61Y - 90Y | 2.20 - 2.55 | | |
| | | | | >90Y - 108Y | 2.05 - 2.40 | | |
| **Chloride** | BCHL | mmol/L | M/F | 0D - <1M | 98 - 113 | Tietz 4th Edition 2006 | 37°C Colourmetric ISE Architect / Integra / Beckman/ H912 |
| | | | | 1M - 90Y | 98 - 107 | | |
| | | | | >90Y - 108Y | 98 - 111 | | |
| **Cholesterol** | ZBCHOL | mmol/L | M/F | 0D - 108Y | <5.18 | NCEP Guidelines, Feb 2005, Vol 6, No 2 | 37°C Architect / Integra / Beckman/ H912 |
| **Creatinine** | ZBCR | umol/L | M/F | 0D - <5D | 27 - 88 | Clinical Guide to Laboratory Tietz 2006 | 37°C Jaffe Kinetic Enzymatic Method, Architect / Integra / Beckman/ H912 |
| | | | | 5D - <1Y | 18 - 35 | | |
| | | | | 1Y - <10Y | 27 - 62 | | |
| | | | | 10Y - <18Y | 44 - 88 | | |
| | | | M | 18Y - <61Y | 62 - 106 | Roche Integra Package Insert | |
| | | | F | 18Y - <61Y | 44 - 80 | | |
| | | | M | 61Y - 90Y | 71 - 115 | Clinical Guide to Laboratory Tietz 2006 | |
| | | | F | 61Y - 90Y | 53 - 106 | | |
| | | | M | >90Y | 88 - 150 | | |
| | | | F | >90Y | 53 - 115 | | |

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| TEST | CODE | UNIT | GENDER | AGE (from-to) | RANGE | Reference | Method in Use |
|---|---|---|---|---|---|---|---|
| **Creatine Kinase CK/CPK, total** | BCPK | IU/L | M | 5D - 108Y | 46 - 171 | Tietz 4th Edition 2006 | 37°C IFCC Architect / Integra / Beckman/ H912 |
| | | | F | 5D - 108Y | 34 - 145 | | |
| | | | *No range available for <5 Days* | | | | |
| **CKMB Quant (Mass) JHB/PTA** | BCKMB | ng/mL | M/F | ≥ 0D | 0.8 - 5.1 | Package Insert | VIDAS |
| **CKMB (Wet) JHB/PTA** | BCKMBV | IU/L | M/F | 0D - 108Y | 7 - 25 | Kit Insert, IFCC | Immunoinhibition Method at 37ºC, Integra |
| **CKMB (Wet) KZN/CPT** | | IU/L | M/F | 0D - 108Y | 0 - 37 | Kit Insert, IFCC | Method-substrate start -at 37ºC Olympus |
| **CRP - JHB/KZN/CPT** | BCRP | mg/L | M/F | 0D - 108Y | 2.0 - 8.2 | Architect Kit Insert | 37°C Architect |
| | | mg/L | M/F | 0D - <1D | <0.71 | Roche Integra Package Insert | Integra |
| | | | | 1D - <7D | <3.2 | | |
| | | | | 7D | <1.6 | | |
| | | | | 18Y - 108Y | <5 | | |
| **CRP - PTA** | BCRP | mg/L | M/F | 0D - 108Y | 2.0 - 10.0 | Beckman - Kit Insert | Beckman LX20 |
| **GGT** | BGGT | IU/L | M | 0D - <6M | 12 - 122 | Soldin 4th Edition 2003 | 37°C IFCC Architect / Integra / Beckman/ H912 |
| | | | F | 0D - <6M | 15 - 132 | | |
| | | | M/F | 6M - <1Y | 1 - 39 | | |
| | | | M | 1Y - <13Y | 3 - 22 | | |
| | | | F | 1Y - <13Y | 4 - 22 | | |
| | | | M | 13Y - <18Y | 2 - 42 | | |
| | | | F | 13Y - <18Y | 4 - 24 | | |
| | | | M | 18Y - 108Y | 0 - 55 | Tietz 4th Edition 2006 | |
| | | | F | 18Y - 108Y | 0 - 38 | | |
| **Glucose (Fasting)** | BGLUF | mmol/L | M/F | 0D - <1D | 2.2 - 3.3 | Clinical Guide to Laboratory Tietz 2006 | 37°C Colourmetric Enzymatic Method, Architect / Integra / Beckman/ H912 |
| | | | | 1D - <1Y | 2.8 - 4.4 | | |
| | | | | 1Y - <18Y | 3.3 - 5.6 | | |
| | | | | 18Y - <61Y | 4.1 - 5.9 | | |
| | | | | 61Y - 90Y | 4.6 - 6.4 | | |
| | | | | >90Y | 4.2 - 6.7 | | |
| **Glucose (Random)** | BGLUR | mmol/L | M/F | 1Y - 108Y | 3.3 - 7.8 | Clinical Guide to Laboratory Tietz 2006 | 37°C Colourmetric Enzymatic Method, Architect / Integra / Beckman/ H912 |
| | | | *Reference Range only from 1 Year onwards* | | | | |

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| TEST | CODE | UNIT | GENDER | AGE (from-to) | RANGE | Reference | Method in Use |
|---|---|---|---|---|---|---|---|
| **HBA1C** | ZBHA1C | % | M/F | 0D - 108Y | <6 (Non-diabetic) | Biorad - Kit Insert | BIORAD D10 |
| **HBA1C– JHB/KZN/CPT** | | % | M/F | 0 - 108Y | 4.3 - 6.1 | Kit Insert - HPLC | VARIANT II (HPLC) BIORAD |
| **HBA1C – PTA** | | % | M/F | 0 - 108Y | 4.3 - 6.1 | Kit Insert - HPLC | VARIANT II (HPLC) BIORAD |
| **HBA1C - PTA** | | % | M/F | 0D - 108Y | 4.1 - 6.5 | Roche Integra - Kit Insert | Integra 400 |
| **HDL** | ZBHDL | mmol/L | M/F | 0D - 108Y | >1.0 | NCEP Guidelines, Feb 2005, Vol 6, No 2 | Architect / Integra / Beckman/ H912 |
| **Iron** | BIRON | µmol/L | M/F | 0D - <1M | 17.9 - 44.8 | Clinical Guide to Laboratory Tietz 2006 | 37°C Colourmetric Architect / Integra / Beckman/ H912 |
| | | | | 1M - <1Y | 7.2 - 17.9 | | |
| | | | | 1Y - <18Y | 9.0 - 21.5 | | |
| | | | M | 18Y - 108Y | 11.6 - 31.3 | | |
| | | | F | 18Y - 108Y | 9.0 - 30.4 | | |
| **Lactate** | BLAC | mmol/L | M/F | 0D - 108Y | 0.5 - 2.2 | Clinical Guide to Laboratory Tietz 2006 - 4th Edition | Architect / Integra / Beckman LX20 |
| **LDH** | BLDH | IU/L | M/F | 0D - <4D | 290 - 775 | Clinical Guide to Laboratory Tietz 2006 | 37°C Lactate to pyruvate Architect / Integra / Beckman/ H912 |
| | | | | 4D - <11D | 545 - 2000 | | |
| | | | | 11D - <2Y | 180 - 430 | | |
| | | | | 2Y - <12Y | 110 - 295 | | |
| | | | | 12Y - 60Y | 140 - 280 | | |
| | | | | >60Y - 90Y | 110 - 210 | | |
| | | | | >90Y | 99 - 284 | | |
| **LDL** | ZBDLDL | mmol/L | M/F | 18Y - 108Y | <3.4 | NCEP Guidelines, Feb 2005, Vol 6, No 2 | Architect / Integra / Beckman/ H912 |
| | | | | *Paediatric reference ranges will be supplied if required* | | | |
| **Lipase - JHB/KZN/CPT** | BLIP | IU/L | M/F | 0D - 108Y | 13 - 60 | Method Dependant. Integra Kit Insert | Integra 400 |
| **Lipase – JHB /KZN/CPT** | | IU/L | M/F | 0 - 108Y | 8 - 78 | Method dependant - Architect kit insert | Architect |
| **Lipase - PTA** | | IU/L | M/F | 0D - 108Y | 22 - 51 | Method dependant, see kit insert | Beckman LX20, Dilauryl glycerol glutaric acid to Methyl-resorufin at 37°C |

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| TEST | CODE | UNIT | GENDER | AGE (from-to) | RANGE | Reference | Method in Use |
|---|---|---|---|---|---|---|---|
| **Magnesium** | BMG | mmol/L | M/F | 0D - <5M | 0.62 - 0.91 | Tietz 4th Edition 2006 | Colourmetric Architect / Integra / Beckman / H912 |
| | | | | 5M - <6Y | 0.70 - 0.95 | | |
| | | | | 6Y - <12Y | 0.70 - 0.86 | | |
| | | | | 12Y - <20Y | 0.70 - 0.91 | | |
| | | | | 20Y - <61Y | 0.66 - 1.07 | | |
| | | | | 61Y - 90Y | 0.66 - 0.99 | | |
| | | | | >90Y | 0.70 - 0.95 | | |
| **Phosphate** | BPO4 | mmol/L | M/F | 0D - <10D | 1.45 - 2.91 | Tietz 2nd Edition, 1994, Clinical Guide to Laboratory Tietz 2006 | Architect / Integra / Beckman / H912 |
| | | | | 10D - <3Y | 1.29 - 2.10 | | |
| | | | | 3Y - <10Y | 1.03 - 1.87 | | |
| | | | | 10Y - <16Y | 1.07 - 1.74 | | |
| | | | | 16Y - <60Y | 0.78 - 1.42 | | |
| | | | M | 60Y - 89Y | 0.74 - 1.20 | | |
| | | | F | 60Y - 89Y | 0.90 - 1.26 | | |
| | | | M | >89Y | 0.71 - 1.26 | | |
| | | | F | >89Y | 0.81 - 1.36 | | |
| **Potassium** | BPOT | mmol/L | M/F | 0D - <1M | 3.7 - 5.9 | Tietz 4th Edition 2006 | ISE for Architect / Integra / Beckman / H912 |
| | | | | 1M - <1Y | 4.1 - 5.3 | | |
| | | | | 1 Y - <12Y | 3.4 - 4.7 | | |
| | | | | 12Y - 108Y | 3.5 - 5.1 | | |
| **Sodium** | BSOD | mmol/L | M/F | 0D - <1M | 133 - 146 | Tietz 4th Edition 2006 | ISE for Architect / Integra / Beckman / H912 |
| | | | | 1M - <1Y | 139 - 146 | | |
| | | | | 1Y - <12Y | 138 - 145 | | |
| | | | | 12Y - <90Y | 136 - 145 | | |
| | | | | 90Y - 108Y | 132 - 146 | | |
| **Total Protein** | BTP | g/L | M/F | 0D - <7D | 46 - 70 | Clinical Guide to Laboratory Tietz 2006 | Architect / Integra / Beckman / H912 |
| | | | | 7D - <7M | 44 - 76 | | |
| | | | | 7M - <1Y | 51 - 73 | | |
| | | | | 1Y - 2Y | 56 - 75 | | |
| | | | | >2Y | 60 - 80 | | |

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|---|---|---|---|---|---|---|---|
| **Transferrin** | BTRF | µmol/L | M/F | 3M - <17Y | 22.5 - 40.0 | Tietz 4th Edition 2006 | |
| | | | M | 17Y - <61Y | 23.9 - 40.5 | | |
| | | | F | 17Y - <61Y | 27.8 - 42.2 | | |
| | | | M/F | 61Y - <91Y | 21.1 - 41.6 | | |
| | | | | 91Y - 108Y | 20.6 - 38.5 | | |
| | | | | *No reference range available under 3 Months* | | | |
| **Troponin T - JHB/KZN/CPT** | BTNTC | ng/mL | M/F | 0D - 108Y | <0.03 | Method dependant, Roche Kit Insert | Roche - CARDIAC T |
| **Troponin T - PTA** | | ng/mL | M/F | 0D - 108Y | <0.03 | Method dependant, Roche Elecsys | Roche-Elecsys - Troponin T STAT |
| **Triglyceride** | ZBTRIG | mmol/L | M/F | 0D - 108Y | <1.70 | NCEP Guidelines, Feb 2005, Vol 6, No 2 | Architect / Integra / Beckman / H912 |
| **Urea** | BUREA | mmol/L | M | 0D - <1M | 1.4 - 4.3 | Soldin 2003 | Architect / Integra / Beckman / H912 |
| | | | F | 0D - <1M | 1.1 - 6.1 | | |
| | | | M | 1M - <1Y | 0.7 - 4.6 | | |
| | | | F | 1M - <1Y | 1.4 - 5.0 | | |
| | | | M | 1Y - <4Y | 1.1 - 4.3 | | |
| | | | F | 1Y - <4Y | 1.1 - 5.0 | | |
| | | | M | 4Y - <7Y | 1.1 - 5.7 | | |
| | | | F | 4Y - <7Y | 1.4 - 5.0 | | |
| | | | M | 7Y - <10Y | 1.4 - 5.7 | | |
| | | | F | 7Y - <10Y | 1.4 - 5.7 | | |
| | | | M | 10Y - <13Y | 1.8 - 6.4 | | |
| | | | F | 10Y - <13Y | 1.8 - 5.7 | | |
| | | | M | 13Y - <16Y | 2.5 - 6.4 | | |
| | | | F | 13Y - <16Y | 1.4 - 5.4 | | |
| | | | M | 16Y - <18Y | 1.8 - 7.1 | | |
| | | | F | 16Y - <18Y | 1.4 - 5.4 | | |
| | | | M/F | 18Y - <61Y | 2.1 - 7.1 | Tietz 4th Edition 2006 | |
| | | | M/F | 61Y - 108Y | 2.9 - 8.2 | | |

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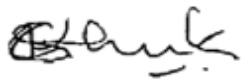
|---|---|---|---|---|---|---|---|
| **Uric Acid** | BUA | mmol/L | M/F | 0D - <12Y | 0.12 - 0.32 | Uricase Method, Tietz 4th Edition 2006 | Architect / Integra / Beckman / H912 |
| | | | M | 12Y - 108Y | 0.2 - 0.42 | | |
| | | | F | 12Y - 108Y | 0.15 - 0.35 | | |
| **Urine Microalbumin** | ZBMUALB-R | mg/L | M/F | 0D - 108Y | 0 - 30 | KDOQI Guidelines | Nephelometry (IMMAGE) |
| **Creatinine Clearance** | – | mL/min | M | 0D - <41Y | 90 - 139 | – | Caluculated, Cockkroft and Gault 1976 |
| | | | F | 0D - <41Y | 80 - 125 | | |
| | | | M | 41Y - <51Y | 80 - 129 | | |
| | | | F | 41Y - <51Y | 70 - 115 | | |
| | | | M | 51Y - <61Y | 70 - 119 | | |
| | | | F | 51Y - <61Y | 60 - 105 | | |
| | | | M | 61Y - 100Y | 60 - 109 | | |
| | | | F | 61Y - 100Y | 50 - 95 | | |

**Creatinine Clearance Formula**
**(Cockkroft and Gault 1976)**

| Creatinine Clearance Formula (Cockkroft and Gault 1976) | |
|---|---|
| **Male** | $\frac{(140 - \text{age}) \times \text{Weight (Kg)}}{\text{Serum Creatinine (mg/dL)} \times 72}$ = mL/min |
| **Female** | $\frac{(140 - \text{age}) \times \text{Weight (Kg)}}{\text{Serum Creatinine (mg/dL)} \times 72}$ = mL/min x 0.85 |
| **Serum Creatinine conversion factors:**<br>Creatinine (mg/dL) = Creatinine (µmol/L) / 88.4<br>or<br>Creatinine (mg/dL) = Creatinine (mmol/L) / 88.4) x 1000 | |



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