

The RCPA (Royal College of Pathologists of Australasia) have developed a thorough set of specifications for allowable error. For those not bound by the CLIA regulations, these can serve as a valuable resource. Many analytes that are non-regulated by CLIA can be found here, too. Updated for 2014

Royal College of Pathologists of Australasia Allowable Limits of Performance

The tables below contain information on quality requirements set by the Royal College of Pathologists of Australasia and the Australasian Clinical Biochemist association Quality Assurance Program. These guidelines for acceptable performance can be used as **Analytical Quality Requirements** in the QC Design and Planning process.

2010 Update: In August, the AACB Scientific and Regulatory Affairs Committee updated the guidelines, tightening the allowable limits of performance for 21 analytes, as well as loosened the limits for 8 analytes. [A bulletin with an explanation of the changes can be found here \(RCPA website\).](#)

You can skip ahead to specific areas of laboratory tests by clicking on the listed items:

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Note: Analytical Quality Requirements are a plus/minus percentage. Some browsers may not display the plus/minus character (it should appear right here, ±. If it does not, your browser does not support this character).

Alcohol/Ammonia (reviewed January 2012)		
Test or Analyte	Lower Goal	Upper Goal
Alcohol	± 2.0 mmol/L ≤ 20.0	± 10% > 20.0 mmol/L

	mmol/L	
Ammonia	$\pm 5 \text{ umol/L} \leq 50 \text{ umol/L}$	$\pm 20\% > 50 \text{ umol/L}$

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Antibiotics (reviewed April 2013)		
Test or Analyte	Lower Goal	Upper Goal
Amikacin	$\pm 3.4 \text{ umol/L} \leq 34.0 \text{ umol/L}$	$\pm 10\% > 34.0 \text{ umol/L}$
Gentamicin	$\pm 0.2 \text{ mg/L} \leq 2.0 \text{ mg/L}$	$\pm 10\% > 5.3 \text{ mg/L}$
Tobramycin	$\pm 0.5 \text{ mg/L} \leq 5.0 \text{ mg/L}$	$\pm 10\% > 5.1 \text{ mg/L}$
Vancomycin	$\pm 2.0 \text{ mg/L} \leq 20.3 \text{ mg/L}$	$\pm 10\% > 20.3 \text{ mg/L}$

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Bile Acids (reviewed January 2012)		
Test or Analyte	Lower Goal	Upper Goal
Total Bile Acids	$\pm 4 \text{ umol/L} \leq 40 \text{ umol/L}$	$\pm 10\% > 40 \text{ umol/L}$

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Biogenic Amines (Reviewed April 2012)		
Test or Analyte	Lower Goal	Upper Goal
Adrenaline	$\pm 30 \text{ nmol/L} \leq 100 \text{ nmol/L}$	$\pm 30\% > 100 \text{ nmol/L}$
Dopamine	$\pm 0.20 \text{ umol/L} \leq 2.0 \text{ umol/L}$	$\pm 20\% > 1.0 \text{ umol/L}$
5HIAA	$\pm 8 \text{ umol/L} \leq 40 \text{ umol/L}$	$\pm 20\% > 40 \text{ umol/L}$
HMMA	$\pm 6 \text{ umol/L} \leq 40 \text{ umol/L}$	$\pm 15\% > 40 \text{ umol/L}$
HVA	$\pm 6 \text{ umol/L} \leq 40 \text{ umol/day}$	$\pm 15\% > 40 \text{ umol/L}$
Metanephrine	$\pm 0.2 \text{ umol/L} \leq 1.0 \text{ umol/L}$	$\pm 20\% > 1.0 \text{ umol/L}$
Noradrenaline	$\pm 75 \text{ nmol/L} \leq 500 \text{ nmol/L}$	$\pm 15\% > 500 \text{ nmol/L}$
Normetanephrine	$\pm 0.4 \text{ umol/L} \leq 2.0 \text{ umol/L}$	$\pm 20\% > 2.0 \text{ umol/L}$
3 - Methoxytyramine	$\pm 0.3 \text{ umol/L} \leq 2.0$	$\pm 15\% > 2.0 \text{ umol/L}$

	umol/L	
Serotonin	$\pm 0.2 \text{ umol/L} \leq 1.0$ umol/L	$\pm 20\% > 1.0 \text{ umol/L}$

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Blood Gas		
Test or Analyte	Lower Goal	Upper Goal
Chloride	$\pm 3.0 \text{ mmol/L}$	
Glucose	$\pm 1.0 \text{ mmol/L} \leq 10.0$ mmol/L	$\pm 10\% > 10.0 \text{ mmol/L}$
Ionised Calcium	$\pm 0.05 \text{ mmol/L}$	
Lactate	$\pm 1.0 \text{ mmol/L} \leq 10.0$ mmol/L	$\pm 10\% > 10.0 \text{ mmol/L}$
pH	± 0.04	
pCO ₂	$\pm 2.0 \text{ mm Hg} \leq 25.0 \text{ mm}$ Hg	$\pm 8\% > 25.0 \text{ mm Hg}$
pO ₂	$\pm 5 \text{ mm Hg} \leq 100 \text{ mm Hg}$	$\pm 5\% > 100 \text{ mm Hg}$
Potassium	$\pm 0.2 \text{ mmol/L}$	
Sodium	$\pm 3.0 \text{ mmol/L}$	
Urea	$\pm 1.0 \text{ mmol/L} \leq 10.0$ mmol/L	$\pm 10\% > 10.0 \text{ mmol/L}$
Creatinine	$\pm 10 \text{ mmol/L} \leq 100.0$ mmol/L	$\pm 10\% > 100.0 \text{ mmol/L}$

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BNP (reviewed January 2012)		
Test or Analyte	Lower Goal	Upper Goal
NT-Pro BNP	$\pm 25 \text{ ng/L} \leq 125 \text{ ng/L}$	$\pm 20\% > 125 \text{ ng/L}$
BNP	$\pm 20 \text{ ng/L} \leq 100 \text{ ng/L}$	$\pm 20\% > 100 \text{ ng/L}$

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Co-oximetry		
Test or Analyte	Lower Goal	Upper Goal
Hemoglobin concentration	$\pm 3 \text{ g/L} \leq 100 \text{ g/L}$	$\pm 3\% > 100 \text{ g/L}$
Fractional Oxyhemoglobin	$\pm 3 \leq 75\%$	$\pm 4\% > 75\%$
Fractional Carboxyhemoglobin	$\pm 2.0\%$	
Fractional Methemoglobin	$\pm 1.0 \leq 10\%$	$\pm 10\% > 100\%$

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CSF		
Test or Analyte	Lower Goal	Upper Goal
Albumin	$\pm 0.02 \text{ g/L} \leq 0.45 \text{ g/L}$	$\pm 20\% > 0.45 \text{ g/L}$
Glucose	$\pm 0.2 \text{ mmol/L} \leq 2.0 \text{ mmol/L}$	$\pm 10\% > 2.0 \text{ mmol/L}$
Immunoglobulin G	$\pm 0.02 \text{ g/L} \leq 0.1 \text{ g/L}$	$\pm 20\% > 0.1 \text{ g/L}$
Lactate	$\pm 0.3 \text{ mmol/L} \leq 3.0 \text{ mmol/L}$	$\pm 10\% > 3.0 \text{ mmol/L}$
Total Protein	$\pm 0.02 \text{ g/L} \leq 0.45 \text{ g/L}$	$\pm 5\% > 0.45 \text{ g/L}$
Bilirubin Concentration	$\pm 0.12 \text{ umol/L} \leq 0.60 \text{ umol/L}$	$\pm 20\% > 0.60 \text{ umol/L}$
Xanthochromia-Bilirubin screen	$\pm 0.002 \text{ AU} \leq 0.007 \text{ AU}$	$\pm 20\% > 0.007 \text{ AU}$
Xanthochromia-Haemoglobin screen	$\pm 0.02 \text{ AU} \leq 0.10 \text{ AU}$	$\pm 20\% > 0.10 \text{ AU}$

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Endocrine (Reviewed January 2012)

Test or Analyte	Lower Goal	Upper Goal
AFP	$\pm 2 \text{ kIU/L} \leq 17 \text{ kIU/L}$	$\pm 12\% > 17 \text{ kIU/L}$
Aldosterone	$\pm 24 \text{ pmol/L} \leq 160 \text{ pmol/L}$	$\pm 15\% > 160 \text{ pmol/L}$
Androstenedione	$\pm 1.5 \text{ nmol/L} \leq 10 \text{ nmol/L}$	$\pm 15\% > 10 \text{ nmol/L}$
CA 125	$\pm 6 \text{ kU/L} \leq 50 \text{ kU/L}$	$\pm 12\% > 50 \text{ kU/L}$
CEA	$\pm 0.6 \text{ ug/L} \leq 5.0 \text{ ug/L}$	$\pm 12\% > 5.0 \text{ ug/L}$
Cortisol	$\pm 15 \text{ nmol/L} \leq 100 \text{ nmol/L}$	$\pm 15\% > 100 \text{ nmol/L}$
DHEA Sulphate	$\pm 1.2 \text{ umol/L} \leq 10 \text{ umol/L}$	$\pm 12\% > 10 \text{ umol/L}$
Ferritin	$\pm 4.0 \text{ ug/L} \leq 27.0 \text{ ug/L}$	$\pm 15\% > 27.0 \text{ ug/L}$
Folate	$\pm 1.5 \text{ nmol/L} \leq 6.0 \text{ nmol/L}$	$\pm 25\% > 6.0 \text{ nmol/L}$
FSH	$\pm 1.0 \text{ IU/L} \leq 10.0 \text{ IU/L}$	$\pm 10\% > 10.0 \text{ IU/L}$
Growth Hormone	$\pm 1 \text{ mU/L} \leq 7 \text{ mU/L}$	$\pm 15\% > 7 \text{ mU/L}$
hCG	$\pm 1 \text{ IU/L} \leq 10 \text{ IU/L}$	$\pm 10\% > 10.0 \text{ IU/L}$
Homocysteine	$\pm 1.5 \text{ umol/L} \leq 15.0 \text{ umol/L}$	$\pm 10\% > 15 \text{ umol/L}$
17-Hydroxyprogesterone	$\pm 2.0 \text{ nmol/L} \leq 10.0 \text{ nmol/L}$	$\pm 20\% > 10.0 \text{ nmol/L}$
Insulin	$\pm 0.6 \text{ mU/L} \leq 5.0 \text{ mU/L}$	$\pm 12\% > 5.0 \text{ mU/L}$
LH	$\pm 1.5 \text{ IU/L} \leq 10.0 \text{ IU/L}$	$\pm 15\% > 10.0 \text{ IU/L}$
Oestradiol	$\pm 25 \text{ pmol/L} \leq 100 \text{ pmol/L}$	$\pm 25\% > 100 \text{ pmol/L}$
Oestriol (unconjugated)	$\pm 0.9 \text{ nmol/L} \leq 6.0 \text{ nmol/L}$	$\pm 15\% > 6.0 \text{ nmol/L}$
PTH	$\pm 1.0 \text{ pmol/L} \leq 8.0 \text{ pmol/L}$	$\pm 12\% > 8.0 \text{ pmol/L}$
Progesterone	$\pm 2 \text{ nmol/L} \leq 10 \text{ nmol/L}$	$\pm 15\% > 10 \text{ nmol/L}$
Prolactin	$\pm 40 \text{ mIU/L} \leq 400 \text{ mIU/L}$	$\pm 10\% > 400 \text{ mIU/L}$
SHBG	$\pm 6 \text{ nmol/L} \leq 50 \text{ nmol/L}$	$\pm 12\% > 50 \text{ nmol/L}$
Testosterone	$\pm 0.4 \text{ nmol/L} \leq 2.7 \text{ nmol/L}$	$\pm 15\% > 2.7 \text{ nmol/L}$
TSH	$\pm 0.1 \text{ mU/L} \leq 0.5 \text{ mU/L}$	$\pm 20\% > 0.5 \text{ mU/L}$
Free T3	$\pm 0.7 \text{ pmol/L} \leq 3.5 \text{ pmol/L}$	$\pm 20\% > 3.5 \text{ pmol/L}$
Free T4	$\pm 1.5 \text{ pmol/L} \leq 12 \text{ pmol/L}$	$\pm 12\% > 12 \text{ pmol/L}$
Total T3	$\pm 0.2 \text{ nmol/L} \leq 1.3 \text{ nmol/L}$	$\pm 15\% > 1.3 \text{ nmol/L}$
Total Tyroxine	$\pm 12 \text{ nmol/L} \leq 120 \text{ nmol/L}$	$\pm 10\% > 120 \text{ nmol/L}$

	nmol/L	
Vitamin B12	$\pm 18 \text{ pmol/L} \leq 120 \text{ pmol/L}$	$\pm 15\% > 120 \text{ pmol/L}$
Vitamin D3	$\pm 9 \text{ nmol/L} \leq 60 \text{ nmol/L}$	$\pm 15\% > 60 \text{ nmol/L}$
Total PSA	$\pm 0.4 \text{ ug/L} \leq 5.0 \text{ ug/L}$	$\pm 8\% > 5.0 \text{ ug/L}$
Free PSA	$\pm 0.2 \text{ ug/L} \leq 1.4 \text{ ug/L}$	$\pm 15\% > 1.4 \text{ ug/L}$
ACE	$\pm 1.0 \text{ U/L} \leq 10.0 \text{ U/L}$	$\pm 10\% > 10.0 \text{ U/L}$
Red Cell Folate	$\pm 80 \text{ nmol/L} \leq 400 \text{ nmol/L}$	$\pm 20\% > 400 \text{ nmol/L}$

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Faecal Occult Blood (reviewed May 2012)		
Test or Analyte	Lower Goal	Upper Goal
FOB	Not detected $\leq 125 \text{ ng/mL Hb}$	Detected $> 50 \text{ ng/mL Hb}$

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General Serum Chemistry		
Test or Analyte	Lower Goal	Upper Goal
Albumin	$\pm 2.0 \text{ g/L} \leq 33.0 \text{ g/L}$	$\pm 6\% > 33.0 \text{ g/L}$
Alkaline Phosphatase	$\pm 15 \text{ U/L} \leq 125 \text{ U/L}$	$\pm 12\% > 125 \text{ U/L}$
ALT	$\pm 5 \text{ U/L} \leq 40 \text{ U/L}$	$\pm 12\% > 40 \text{ U/L}$
Amylase	$\pm 10 \text{ U/L} \leq 100 \text{ U/L}$	$\pm 10\% > 100 \text{ U/L}$
AST	$\pm 5 \text{ U/L} \leq 40 \text{ U/L}$	$\pm 12\% > 60 \text{ U/L}$
Bicarbonate	$\pm 2.0 \text{ umol/L} \leq 20 \text{ umol/L}$	$\pm 10\% > 20.0 \text{ umol/L}$
Bilirubin - Total	$\pm 3 \text{ umol/L} \leq 25 \text{ umol/L}$	$\pm 12\% > 25 \text{ umol/L}$
Bilirubin Conjugated	$\pm 3 \text{ umol/L} \leq 15 \text{ umol/L}$	$\pm 20\% > 15 \text{ umol/L}$
Calcium	$\pm 0.10 \text{ mmol/L} \leq 2.5$	$\pm 4\% > 2.5 \text{ mmol/L}$

	mmol/L	
Chloride	$\pm 3.0 \text{ mmol/L} \leq 100$ mmol/L	$\pm 3\% > 100 \text{ mmol/L}$
Cholesterol	$\pm 0.3 \text{ mmol/L} \leq 5 \text{ mmol/L}$	$\pm 6\% > 5 \text{ mmol/L}$
Cholinesterase	$\pm 500 \text{ U/L} \leq 5000 \text{ U/L}$	$\pm 10\% > 5000 \text{ U/L}$
Creatine Kinase	$\pm 15 \text{ U/L} \leq 125 \text{ U/L}$	$\pm 12\% > 125 \text{ U/L}$
CK-MB	$\pm 3 \text{ U/L} \ \& \ \text{ug/L} \leq 15 \text{ U/L}$ & ug/L	$\pm 20\% > 15 \text{ U/L} \ \& \ \text{ug/L}$
Cortisol	$\pm 30 \text{ nmol/L} \leq 150$ nmol/L	$\pm 15\% > 150 \text{ nmol/L}$
Creatinine	$\pm 8 \text{ umol/L} \leq 100 \text{ umol/L}$	$\pm 8\% > 100 \text{ umol/L}$
Ferritin	$\pm 4.0 \text{ ug/L} \leq 27.0 \text{ ug/L}$	$\pm 15\% > 27 \text{ ug/L}$
Fructosamine	$\pm 15 \text{ umol/L} \leq 250$ umol/L	$\pm 6\% > 250 \text{ umol/L}$
Glucose	$\pm 0.4 \text{ mmol/L} \leq 5.0$ mmol/L	$\pm 8\% > 5.0 \text{ mmol/L}$
GGT	$\pm 5 \text{ U/L} \leq 40 \text{ U/L}$	$\pm 12\% > 40 \text{ U/L}$
hCG-quantitative	$\pm 1.0 \text{ IU/L} \leq 10 \text{ IU/L}$	$\pm 10\% > 10 \text{ IU/L}$
hCG-qualtitative	Negative $\leq 5 \text{ IU/L}$ Equivocal $5-25 \text{ IU/L}$ Positive $> 25 \text{ IU/L}$	
HDL cholesterol	$\pm 0.1 \text{ mmol/L} \leq 0.8$ mmol/L	$\pm 12\% > 0.8 \text{ mmol/L}$
Iron	$\pm 3 \text{ umol/L} \leq 25 \text{ umol/L}$	$\pm 12\% > 25 \text{ umolL}$
Lactate Dehydrogenase	$\pm 20 \text{ U/L} \leq 250 \text{ U/L}$	$\pm 8\% > 250 \text{ U/L}$
Lactate	$\pm 0.5 \text{ mmol/L} \leq 4 \text{ mmol/L}$	$\pm 12\% > 4 \text{ mmol/L}$
Lipase	$\pm 12 \text{ U/L} \leq 60 \text{ U/L}$	$\pm 20\% > 60 \text{ U/L}$
Lithium	$\pm 0.2 \text{ mmol/L}$	
Magnesium	$\pm 0.1 \text{ mmol/L} \leq 1.25$ mmol/L	$\pm 8\% > 1.25 \text{ mmol/L}$
Osmolality	$\pm 8 \text{ mmol/kg} \leq 266$ mmol/kg	$\pm 3\% > 266 \text{ mmol/kg}$
Phosphate	$\pm 0.06 \text{ mmol/L} \leq 0.75$ mmol/L	$\pm 8\% > 0.75 \text{ mmol/L}$
Potassium	$\pm 0.2 \text{ mmol/L} \leq 4.0$ mmol/L	$\pm 5\% > 4.0 \text{ mmol/L}$
Protein (Total)	$\pm 3.0 \text{ g/L} \leq 60 \text{ g/L}$	$\pm 5\% > 60 \text{ g/L}$
Sodium	$\pm 3 \text{ mmol/L} \leq 150 \text{ mmol/L}$	$\pm 2\% > 150 \text{ mmol/L}$
Total T3	$\pm 0.2 \text{ nmol/L} \leq 1.3$ nmol/L	$\pm 15\% > 1.3 \text{ nmol/L}$
Free T3	$\pm 0.7 \text{ pmol/L} \leq 3.5$ pmol/L	$\pm 20\% > 3.5 \text{ pmol/L}$
Free T4	$\pm 1.5 \text{ pmol/L} \leq 12$ pmol/L	$\pm 12\% > 12 \text{ pmol/L}$

TSH	$\pm 0.1 \text{ mU/L} \leq 0.5 \text{ mU/L}$	$\pm 20\% > 0.5 \text{ mU/L}$
Thyroxine	$\pm 12 \text{ nmol/L} \leq 120 \text{ nmol/L}$	$\pm 10\% > 120 \text{ nmol/L}$
TIBC	$\pm 4 \text{ umol/L} \leq 50 \text{ umol/L}$	$\pm 8\% > 50 \text{ umol/L}$
Transferrin	$\pm 0.2 \text{ g/L} \leq 2.5 \text{ g/L}$	$\pm 8\% > 2.5 \text{ g/L}$
Triglyceride	$\pm 0.2 \text{ mmol/L} \leq 1.6 \text{ mmol/L}$	$\pm 12\% > 1.6 \text{ mmol/L}$
Troponin I	$\pm 0.002 \text{ ug/mL} \leq 0.010 \text{ ug/mL}$	$\pm 20\% > 0.010 \text{ ug/mL}$
Troponin T	$\pm 0.01 \text{ ug/L} \leq 0.050 \text{ ug/L}$	$\pm 20\% > 0.050 \text{ ug/L}$
Urate	$\pm 0.03 \text{ mmol/L} \leq 0.38 \text{ mmol/L}$	$\pm 8\% > 0.38 \text{ mmol/L}$
Urea	$\pm 0.5 \text{ mmol/L} \leq 4.0 \text{ mmol/L}$	$\pm 12\% > 4.0 \text{ mmol/L}$

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General Therapeutic Drugs (Reviewed August 2013)		
Test or Analyte	Lower Goal	Upper Goal
Carbamazepine	$\pm 2.0 \text{ umol/L} \leq 20.0 \text{ umol/L}$	$\pm 10\% > 20.0 \text{ umol/L}$
Digoxin	$\pm 0.2 \text{ nmol/L} \leq 2.0 \text{ nmol/L}$	$\pm 10\% > 2.0 \text{ nmol/L}$
Gentamicin	$\pm 0.2 \text{ mg/L} \leq 2.0 \text{ mg/L}$	$\pm 10\% > 5.3 \text{ mg/L}$
Paracetamol	$\pm 20 \text{ umol/L} \leq 200 \text{ umol/L}$	$\pm 10\% > 200 \text{ umol/L}$
Phenobarbitone	$\pm 3.0 \text{ umol/L} \leq 30.0 \text{ umol/L}$	$\pm 10\% > 30.0 \text{ umol/L}$
Phenytoin	$\pm 3.0 \text{ umol/L} \leq 30.0 \text{ umol/L}$	$\pm 10\% > 30.0 \text{ umol/L}$
Salicylate	$\pm 0.1 \text{ mmol/L} \leq 1.0 \text{ mmol/L}$	$\pm 10\% > 1.0 \text{ mmol/L}$
Theophylline	$\pm 3.0 \text{ umol/L} \leq 30.0 \text{ umol/L}$	$\pm 10\% > 30.0 \text{ umol/L}$
Valproate	$\pm 25 \text{ umol/L} \leq 250 \text{ umol/L}$	$\pm 10\% > 250 \text{ umol/L}$
Vancomycin	$\pm 2.0 \text{ mg/L} \leq 20.3 \text{ mg/L}$	$\pm 10\% > 20.3 \text{ mg/L}$

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Glycohaemoglobin		
Test or Analyte	Lower Goal	Upper Goal
Hemoglobin A1C (NSP) (%)	$\pm 0.5 \leq 10\%$	$\pm 5\% > 10\%$
Hemoglobin A1c (IFCC) (mmol/mol)	$\pm 4 \leq 186 \text{ mmol/mol}$	$\pm 5\% > 86 \text{ mmol/mol}$

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IGF-1 / C Peptide (Reviewed February 2012)		
Test or Analyte	Lower Goal	Upper Goal
IGF-1	$\pm 3 \text{ nmol/L} \leq 25.0 \text{ nmol/L}$	$\pm 12\% > 25.0 \text{ nmol/L}$
C Peptide	$\pm 0.15 \text{ nmol/L} \leq 1.25 \text{ nmol/L}$	$\pm 12\% > 1.25 \text{ nmol/L}$
IGFBP-3	$\pm 15.0 \text{ nmol/L} \leq 100 \text{ nmol/L}$	$\pm 15\% > 100 \text{ nmol/L}$

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Immunosuppressants (Reviewed April 2012)		
Test or Analyte	Lower Goal	Upper Goal
Cyclosporin	$\pm 10 \text{ ug/L} \leq 100 \text{ ug/L}$	$\pm 10\% > 100 \text{ ug/L}$
Sirolimus	$\pm 0.5 \text{ ug/L} \leq 5.0 \text{ ug/L}$	$\pm 10\% > 5.0 \text{ ug/L}$
Tacrolimus	$\pm 0.5 \text{ ug/L} \leq 5.0 \text{ ug/L}$	$\pm 10\% > 5.0 \text{ ug/L}$

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Near Patient Testing (Reviewed April 2012)		
Test or Analyte	Lower Goal	Upper Goal
Albumin	± 2.0 g/L ≤ 33.0 g/L	± 6% > 33.0 g/L
Alkaline Phosphatase	± 15 U/L ≤ 125 U/L	± 12% > 125 U/L
ALT	± 4 U/L ≤ 40 U/L	± 12% > 40 U/L
Amylase	± 10 U/L ≤ 100 U/L	± 10% > 100 U/L
AST	± 5 U/L ≤ 40 U/L	± 12% > 40 U/L
Bicarbonate	± 2.0 mmol/L ≤ 20.0 mmol/L	± 10% > 20.0 mmol/L
Bilirubin	± 3.0 umol/L ≤ 25.0 umol/L	± 12% > 25.0 umol/L
Calcium	± 0.1 mmol/L ≤ 2.5 mmol/L	± 4% > 2.5 mmol/L
Chloride	± 3.0 mmol/L ≤ 100 mmol/L	± 3% > 100 mmol/L
Cholesterol	± 0.50 mmol/L ≤ 5.0 mmol/L	± 6% > 5.0 mmol/L
Creatinine Kinase	± 15 U/L ≤ 125 U/L	± 12% > 125 U/L
Creatinine	± 8.0 umol/L ≤ 100.0 umol/L	± 8% > 100.0 umol/L
Glucose	± 0.4 mmol/L ≤ 5.0 mmol/L	± 8% > 5.0 mmol/L
GGT	± 5 U/L ≤ 40 U/L	± 12% > 40 U/L
HDL Cholesterol	± 0.1 mmol/L ≤ 0.80 mmol/L	± 12% > 0.80 mmol/L
Lactate Dehydrogenase	± 20 U/L ≤ 250 U/L	± 8% > 250 U/L
Magnesium	± 0.1 mmol/L ≤ 1.25 mmol/L	± 8% > 1.25 mmol/L
Potassium	± 0.2 mmol/L ≤ 4.0 mmol/L	± 5% > 4.0 mmol/L
Protein (total)	± 3 g/L ≤ 60 g/L	± 5% > 60 g/L
Sodium	± 3 mmol/L ≤ 150 mmol/L	± 2% > 150 mmol/L
Triglyceride	± 0.2 mmol/L ≤ 1.6 mmol/L	± 12% > 1.6 mmol/L
Troponin I	± 0.00 ug/L ≤ 0.01 ug/L	± 20% > 0.01 ug/L

Troponin T	Negative < 50 ng/L Low 50-100 ng/L Quantitative 100-2000 ng/L High >2000 ng/L	
Troponin (Quantitative)	$\pm 0.0 \text{ ng/L} \leq 10 \text{ ng/L}$	$\pm 20\% > 10 \text{ ng/L}$
Urate	$\pm 0.030 \text{ mmol/L} \leq 0.380 \text{ mmol/L}$	$\pm 8\% > 0.380 \text{ mmol/L}$
Urea	$\pm 0.5 \text{ mmol/L} \leq 4.0 \text{ mmol/L}$	$\pm 12\% > 4.0 \text{ mmol/L}$

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Neonatal Bilirubin (Reviewed January 2012)		
Test or Analyte	Lower Goal	Upper Goal
Total Bilirubin	$\pm 8 \text{ umol/L} \leq 80 \text{ umol/L}$	$\pm 10\% > 80 \text{ umol/L}$
Conjugated Bilirubin	$\pm 3 \text{ umol/L} \leq 15 \text{ umol/L}$	$\pm 20\% > 15 \text{ umol/L}$

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Plasma Metanephrines (Reviewed January 2012)		
Test or Analyte	Lower Goal	Upper Goal
Metanephrine	$\pm 75 \text{ pmol/L} \leq 500 \text{ pmol/L}$	$\pm 15\% > 500 \text{ pmol/L}$
Normetanephrine	$\pm 200 \text{ pmol/L} \leq 1000 \text{ pmol/L}$	$\pm 20\% > 1000 \text{ pmol/L}$
Methoxytyramine	$\pm 36 \text{ pmol/L} \leq 120 \text{ pmol/L}$	$\pm 30\% > 120 \text{ pmol/L}$

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character).

Porphyrins (Reviewed December 2012)		
Test or Analyte	Lower Goal	Upper Goal
Urine ALA	$\pm 8 \text{ umol/L} \leq 32 \text{ umol/L}$	$\pm 25\% > 32.0 \text{ umol/L}$
Urine Porphobilinogen (Quantitative)	$\pm 5 \text{ umol/L} \leq 20 \text{ umol/L}$	$\pm 25\% > 20 \text{ umol/L}$
Urine Porphobilinogen (Qualitative)	neg $\leq 10 \text{ umol/L}$	+ 10-50 umol/L ++ 51-100 umol/L +++ > 100 umol/L
Urine Total Porphyrin	$\pm 60 \text{ nmol/L} \leq 300 \text{ nmol/L}$	$\pm 20\% > 300 \text{ nmol/L}$
Faecal Percent Dry Weight	$\pm 2 \leq 20\%$	$\pm 10\% > 20\%$
Faecal Total Porphyrin	$\pm 40 \text{ umol/kg} \leq 200 \text{ umol/kg}$	$\pm 20\% > 200 \text{ umol/kg}$
Plasma Total Porphyrin	$\pm 4 \text{ nmol/L} \leq 20 \text{ nmol/L}$	$\pm 20\% > 20 \text{ nmol/L}$
RBC Total Porphyrin	$\pm 0.4 \text{ umol/Lrc} \leq 2.0 \text{ umol/L rc}$	$\pm 20\% > 2.0 \text{ umol/L rc}$

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Special lipids (Reviewed April 2012)		
Test or Analyte	Lower Goal	Upper Goal
Cholesterol	$\pm 0.30 \text{ mmol/L} \leq 5.0 \text{ mmol/L}$	$\pm 6\% > 5.0 \text{ mmol/L}$
HDL Cholesterol	$\pm 0.10 \text{ mmol/L} \leq 0.80 \text{ mmol/L}$	$\pm 12\% > 0.80 \text{ mmol/L}$
LDL Cholesterol	$\pm 0.20 \text{ mmol/L} \leq 2.0 \text{ mmol/L}$	$\pm 10\% > 2.0 \text{ mmol/L}$
Triglyceride	$\pm 0.20 \text{ mmol/L} \leq 1.6 \text{ mmol/L}$	$\pm 12\% > 1.6 \text{ mmol/L}$
Apolipoprotein A1	$\pm 0.2 \text{ g/L} \leq 2.0 \text{ g/L}$	$\pm 10\% > 2.0 \text{ g/L}$
Apolipoprotein B	$\pm 0.2 \text{ g/L} \leq 2.0 \text{ g/L}$	$\pm 10\% > 2.0 \text{ g/L}$
Lipoprotein(a)	$\pm 0.2 \text{ g/L} \leq 2.0 \text{ g/L}$	$\pm 10\% > 2.0 \text{ g/L}$

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Special Therapeutic Drugs (Reviewed April 2013)		
Test or Analyte	Lower Goal	Upper Goal
Amiodarone	± 0.2 umol/L ≤ 2.0 umol/L	± 10% > 2.0 umol/L
Amitriptyline	± 10 nmol/L ≤ 100 nmol/L	± 10% > 100 nmol/L
Clozapine	± 10 ug/L ≤ 100 ug/L	± 10% > 100 ug/L
Methotrexate	± 0.1 umol/L ≤ 1.0 umol/L	± 10% > 1.0 umol/L
Mycophenylate	± 0.1 mg/L ≤ 1.00 mg/L	± 10% > 1.00 mg/L
Nortriptyline	± 10 nmol/L ≤ 100 nmol/L	± 10% > 100 nmol/L

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Sweat Electrolytes		
Test or Analyte	Lower Goal	Upper Goal
Sodium	± 2 mmol/L ≤ 20 mmol/L	± 10% > 20 mmol/L
Chloride	± 2 mmol/L ≤ 20 mmol/L	± 10% > 20 mmol/L
Sweat Conductivity	± 2 mmol/L ≤ 20 mmol/L	± 10% > 20 mmol/L

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Trace Elements (Reviewed April 2012)		
Test or Analyte	Lower Goal	Upper Goal
Serum		
Aluminum	± 0.08 umol/L ≤ 0.40	± 20% > 0.40 umol/L

	umol/L	
Chromium	$\pm 3 \text{ nmol/L} \leq 25 \text{ nmol/L}$	$\pm 12\% > 25 \text{ nmol/L}$
Cobalt	$\pm 1 \text{ nmol/L} \leq 10 \text{ nmol/L}$	$\pm 10\% > 10 \text{ nmol/L}$
Copper	$\pm 1.6 \text{ umol/L} \leq 20.0$ umol/L	$\pm 8\% > 20.0 \text{ umol/L}$
Manganese	$\pm 3 \text{ nmol/L} \leq 25 \text{ nmol/L}$	$\pm 12\% > 25 \text{ nmol/L}$
Selenium	$\pm 0.18 \text{ umol/L} \leq 1.5$ umol/L	$\pm 12\% > 1.50 \text{ umol/L}$
Zinc	$\pm 2.0 \text{ umol/L} \leq 20.0$ umol/L	$\pm 10\% > 20.0 \text{ umol/L}$
Urine		
Aluminum	$\pm 0.1 \text{ umol/L} \leq 0.50$ umol/L	$\pm 20\% > 0.50 \text{ umol/L}$
Arsenic (Total)	$\pm 0.05 \text{ umol/L} \leq 0.50$ umol/L	$\pm 10\% > 0.50 \text{ umol/L}$
Cadmium	$\pm 3 \text{ nmol/L} \leq 20 \text{ nmol/L}$	$\pm 15\% > 20 \text{ nmol/L}$
Chromium	$\pm 3 \text{ nmol/L} \leq 25 \text{ nmol/L}$	$\pm 12\% > 25 \text{ nmol/L}$
Cobalt	$\pm 2 \text{ nmol/L} \leq 20 \text{ nmol/L}$	$\pm 10\% > 20 \text{ nmol/L}$
Copper	$\pm 0.05 \text{ umol/L} \leq 0.50$ umol/L	$\pm 10\% > 0.50 \text{ umol/L}$
Iodine	$\pm 0.08 \text{ umol/L} \leq 0.80$ umol/L	$\pm 10\% > 0.80 \text{ umol/L}$
Lead	$\pm 0.05 \text{ umol/L} \leq 0.50$ umol/L	$\pm 10\% > 0.50 \text{ umol/L}$
Manganese	$\pm 3 \text{ nmol/L} \leq 25 \text{ nmol/L}$	$\pm 12\% > 25 \text{ nmol/L}$
Mercury	$\pm 9 \text{ nmol/L} \leq 60 \text{ nmol/L}$	$\pm 15\% > 60 \text{ nmol/L}$
Nickel	$\pm 0.04 \text{ umol/L} \leq 0.40$ umol/L	$\pm 10\% > 0.40 \text{ umol/L}$
Selenium	$\pm 0.06 \text{ umol/L} \leq 0.50$ umol/L	$\pm 12\% > 0.50 \text{ umol/L}$
Thallium	$\pm 1 \text{ nmol/L} \leq 10 \text{ nmol/L}$	$\pm 10\% > 10 \text{ nmol/L}$
Vanadium	$\pm 1 \text{ nmol/L} \leq 10 \text{ nmol/L}$	$\pm 10\% > 10 \text{ nmol/L}$
Zinc	$\pm 2.0 \text{ umol/L} \leq 20.0$ umol/L	$\pm 10\% > 20.0 \text{ umol/L}$
Whole Blood		
Arsenic (Total)	$\pm 0.01 \text{ umol/L} \leq 0.10$ umol/L	$\pm 10\% > 0.10 \text{ umol/L}$
Cadmium	$\pm 3 \text{ nmol/L} \leq 20 \text{ nmol/L}$	$\pm 15\% > 20 \text{ nmol/L}$
Lead	$\pm 0.05 \text{ umol/L} \leq 0.50$ umol/L	$\pm 10\% > 0.50 \text{ umol/L}$
Manganese	$\pm 30 \text{ nmol/L} \leq 250$ nmol/L	$\pm 12\% > 250 \text{ nmol/L}$
Mercury	$\pm 9 \text{ nmol/L} \leq 60 \text{ nmol/L}$	$\pm 15\% > 60 \text{ nmol/L}$
Selenium	$\pm 0.3 \text{ umol/L} \leq 2.50$	$\pm 12\% > 2.50 \text{ umol/L}$

	umol/L	
Zinc	$\pm 6 \text{ umol/L} \leq 60 \text{ umol/L}$	$\pm 10\% > 60 \text{ umol/L}$

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Tumour Markers		
Test or Analyte	Lower Goal	Upper Goal
ACTH	$\pm 2.0 \text{ pmol/L} \leq 20 \text{ pmol/L}$	$\pm 10\% > 20 \text{ pmol/L}$
Alpha-fetoprotein	$\pm 2 \text{ kIU/L} \leq 17 \text{ kIU/L}$	$\pm 12\% > 17 \text{ kIU/L}$
Calcitonin	$\pm 2 \text{ ng/L} \leq 20 \text{ ng/L}$	$\pm 10\% > 20 \text{ ng/L}$
CEA	$\pm 0.6 \text{ ug/L} \leq 5.0 \text{ ug/L}$	$\pm 12\% > 5.0 \text{ ug/L}$
CA125	$\pm 6 \text{ kU/L} \leq 50 \text{ kU/L}$	$\pm 12\% > 50 \text{ kU/L}$
CA15-3	$\pm 3 \text{ kU/L} \leq 30 \text{ kU/L}$	$\pm 10\% > 30 \text{ kU/L}$
CA19-9	$\pm 6 \text{ kU/L} \leq 40 \text{ kU/L}$	$\pm 15\% > 40 \text{ kU/L}$
hCG	$\pm 1 \text{ IU/L} \leq 10 \text{ IU/L}$	$\pm 10\% > 10 \text{ IU/L}$
Beta-2 Microglobulin	$\pm 0.2 \text{ mg/L} \leq 2.0 \text{ mg/L}$	$\pm 10\% > 2.0 \text{ mg/L}$
NSE	$\pm 2.0 \text{ ug/L} \leq 20 \text{ ug/L}$	$\pm 10\% > 20 \text{ ug/L}$
Gastrin	$\pm 10 \text{ pmol/L} \leq 100 \text{ pmol/L}$	$\pm 10\% > 100 \text{ pmol/L}$
Prolactin	$\pm 40 \text{ mU/L} \leq 400 \text{ mU/L}$	$\pm 10\% > 400 \text{ mU/L}$
Total PSA	$\pm 0.4 \text{ ug/L} \leq 5.0 \text{ ug/L}$	$\pm 8\% > 5.0 \text{ ug/L}$
Thyroglobulin	$\pm 0.2 \text{ ug/L} \leq 1.7 \text{ ug/L}$	$\pm 12\% > 1.7 \text{ ug/L}$

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Urine Chemistry		
Test or Analyte	Lower Goal	Upper Goal

Albumin	$\pm 4.0 \text{ mg/L} \leq 20.0 \text{ g/L}$	$\pm 20\% > 20.0 \text{ g/L}$
Calcium	$\pm 0.20 \text{ mmol/L}$	
Chloride	$\pm 2.0 \text{ mmol/L} \leq 20.0 \text{ mmol/L}$	$\pm 10\% > 20.0 \text{ mmol/L}$
Cortisol	$\pm 30 \text{ mmol/L} \leq 200 \text{ mmol/L}$	$\pm 15\% > 200 \text{ mmol/L}$
Creatinine	$\pm 0.5 \text{ mmol/L} \leq 5.0 \text{ mmol/L}$	$\pm 10\% > 5.0 \text{ mmol/L}$
DPD (Free)	$\pm 15 \text{ nmol/L} \leq 80 \text{ nmol/L}$	$\pm 15\% > 80 \text{ nmol/L}$
Glucose	$\pm 1.0 \text{ mmol/L} \leq 10.0 \text{ mmol/L}$	$\pm 10\% > 10.0 \text{ mmol/L}$
hCG-qualitative	Negative $\leq 5 \text{ IU/L}$ Equivocal 5-25 UI/L Positive $> 25 \text{ IU/L}$	
hCG-quantitative	$\pm 5 \text{ IU/L} \leq 50 \text{ IU/L}$	$\pm 10\%; > 50 \text{ IU/L}$
Magnesium (serum)	$\pm 0.2 \text{ mmol/L}$	
N-Telopeptides	$\pm 80 \text{ nmolBCE/L} \leq 700 \text{ nmolBCE/L}$	$\pm 10\% > 700 \text{ nmolBCE/L}$
Osmolality	$\pm 6 \text{ mmol/kg} \leq 300 \text{ mmol/kg}$	$\pm 2\% > 300 \text{ mmol/kg}$
Potassium	$\pm 2.0 \text{ mmol/L} \leq 20.0 \text{ mmol/L}$	$\pm 10\% > 20.0 \text{ mmol/L}$
Phosphate	$\pm 2.5 \text{ mmol/L}$	
Sodium	$\pm 2.0 \text{ mmol/L} \leq 20.0 \text{ mmol/L}$	$\pm 10\% > 20.0 \text{ mmol/L}$
Total Protein	$\pm 0.1 \text{ g/L} \leq 1.0 \text{ g/L}$	$\pm 10\% > 1.0 \text{ g/L}$
Urate	$\pm 0.3 \text{ mmol/L}$	
Urea	$\pm 20 \text{ mmol/L} \leq 200 \text{ mmol/L}$	$\pm 10\% > 200 \text{ mmol/L}$
ACR	$\pm 0.5 \text{ mg/mmol} \leq 3.5 \text{ mg/mmol}$	$\pm 15\% > 3.5 \text{ mg/mmol}$

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Urine Pregnancy Testing		
Test or Analyte	Lower Goal	Upper Goal
hCG	Negative $\leq 5 \text{ IU/L}$ Equivocal 5-25 IU/L Positive $> 25 \text{ IU/L}$	

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Vitamins (Reviewed April 2013)		
Test or Analyte	Lower Goal	Upper Goal
Vitamin A	± 0.2 umol/L ≤ 1.7 umol/L	± 12% > 1.7 umol/L
Vitamin E	± 3 umol/L ≤ 25 umol/L	± 12% > 25 umol/L
Beta Carotene	± 0.4 umol/L ≤ 2.0 umol/L	± 25% > 2.0 umol/L
Total Carotenoids	± 0.8 umol/L ≤ 4.0 umol/L	± 25% > 4.0 umol/L
Vitamin B6 - Plasma (Pyridoxal Phosphate)	± 9 nmol/L ≤ 60 nmol/L	± 15% > 60 nmol/L
Vitamin B6 - Whole Blood (Pyridoxal Phosphate)	± 9 nmol/L ≤ 60 nmol/L	± 15% > 60 nmol/L
Vitamin B1 (Thiamine Pyrophosphate)	± 15 nmol/L ≤ 150 nmol/L	± 10% > 150 nmol/L
Vitamin B2	± 25 nmol/L ≤ 250 nmol/L	± 10% > 250 nmol/L
Vitamin C	± 9 umol/L ≤ 36 umol/L	± 25% > 36 umol/L

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