

Wellington Regional Reference Intervals Group - Biochemistry (WRRIG-B)

Attendees: **Dr Michael Crooke (WPH/Aotea)**

Filipo Faiga (WPH)

Barbara Dallas (Hutt)

Andrew Crooke (IT Aotea)

Alison Sinclair (Aotea)

Max Reed (Aotea)

OUTCOME SUMMARY

- Alignment of reference intervals where possible, with consistency of units, test names and paediatric ranges where appropriate
- Alignment of notation of age ranges where appropriate
- Alignment of comments where appropriate
- Standardisation of units to RCPA recommended units where possible

NOTE: Oestradiol is not included in this document, as it is not able to be harmonised in the Wellington region.

TABLE OF CONTENTS

Terms of Reference	11
Purpose.....	11
Term	11
Membership*	11
Roles and responsibilities	11
Meetings.....	12
Amendment, Modification or Variation	12
Principles	12
Appendix One	13
Sodium.....	14
Test / Analyte Information	14
Laboratory information	14
Reference intervals.....	14
Reference Intervals Justification	14
National and International trends.....	14
Potassium	15
Test / Analyte Information	15
Laboratory information	15
Reference intervals.....	15
Reference Intervals Justification	15
National and International trends.....	15
Chloride	16
Test / Analyte Information	16
Laboratory information	16
Reference intervals.....	16
Reference Intervals Justification	16
National and International trends.....	16
Urea	17
Test / Analyte Information	17
Laboratory information	17
Reference intervals.....	17
Reference Intervals Justification	17
National and International trends.....	18
Creatinine	19
Test / Analyte Information	19
Laboratory information	19
Reference intervals.....	19
Reference Intervals Justification	19
National and International trends.....	20
Uric Acid.....	21
Test / Analyte Information	21
Laboratory information	21
Reference intervals.....	21
Reference Intervals Justification	21
National and International trends.....	22
Bilirubin	23
Test / Analyte Information	23
Laboratory information	23
Reference intervals.....	23

Reference Intervals Justification	23
National and International trends	24
Direct Bilirubin	25
Test / Analyte Information	25
Laboratory information	25
Reference intervals.....	25
Reference Intervals Justification	25
National and International trends	25
Alkaline phosphatase	26
Test / Analyte Information	26
Laboratory information	26
Reference intervals.....	26
Reference Intervals Justification	26
National and International trends	27
GGT	28
Test / Analyte Information	28
Laboratory information	28
Reference intervals.....	28
Reference Intervals Justification	28
National and International trends	29
ALT	30
Test / Analyte Information	30
Laboratory information	30
Reference intervals.....	30
Reference Intervals Justification	30
National and International trends	30
AST	31
Test / Analyte Information	31
Laboratory information	31
Reference intervals.....	31
Reference Intervals Justification	31
National and International trends	32
Total Protein	33
Test / Analyte Information	33
Laboratory information	33
Reference intervals.....	33
Reference Intervals Justification	33
National and International trends	34
Albumin	35
Test / Analyte Information	35
Laboratory information	35
Reference intervals.....	35
Reference Intervals Justification	35
National and International trends	36
Amylase	37
Test / Analyte Information	37
Laboratory information	37
Reference intervals.....	37
Reference Intervals Justification	37
National and International trends	37

Amylase (pancreatic)	38
Test / Analyte Information	38
Laboratory information	38
Reference intervals.....	38
Reference Intervals Justification	38
National and International trends	38
CK.....	39
Test / Analyte Information	39
Laboratory information	39
Reference intervals.....	39
Reference Intervals Justification	39
National and International trends	39
LDH	40
Test / Analyte Information	40
Laboratory information	40
Reference intervals.....	40
Reference Intervals Justification	40
National and International trends	40
Adjusted Calcium.....	41
Test / Analyte Information	41
Laboratory information	41
Reference intervals.....	41
Reference Intervals Justification	41
National and International trends.....	42
Phosphate.....	43
Test / Analyte Information	43
Laboratory information	43
Reference intervals.....	43
Reference Intervals Justification	43
National and International trends	44
Magnesium	45
Test / Analyte Information	45
Laboratory information	45
Reference intervals.....	45
Reference Intervals Justification	45
National and International trends	45
Iron	46
Test / Analyte Information	46
Laboratory information	46
Reference intervals.....	46
Reference Intervals Justification	46
National and International trends	47
Ferritin	48
Test / Analyte Information	48
Laboratory information	48
Reference intervals.....	48
Reference Intervals Justification	48
National and International trends	49
Transferrin	50
Test / Analyte Information	50

Laboratory information	50
Reference intervals.....	50
Reference Intervals Justification	50
National and International trends	50
Iron Saturation.....	51
Test / Analyte Information	51
Laboratory information	51
Reference intervals.....	51
Reference Intervals Justification	51
National and International trends	51
Fasting Glucose.....	52
Test / Analyte Information	52
Laboratory information	52
Reference intervals.....	52
Reference Intervals Justification	52
National and International trends	52
Random Glucose.....	53
Test / Analyte Information	53
Laboratory information	53
Reference intervals.....	53
Reference Intervals Justification	53
National and International trends	53
HCG.....	54
Test / Analyte Information	54
Laboratory information	54
Reference intervals.....	54
Reference Intervals Justification	54
National and International trends	54
FT4	55
Test / Analyte Information	55
Laboratory information	55
Reference intervals.....	55
Reference Intervals Justification	55
National and International trends	55
TSH.....	56
Test / Analyte Information	56
Laboratory information	56
Reference intervals.....	56
Reference Intervals Justification	56
National and International trends	57
FT3	58
Test / Analyte Information	58
Laboratory information	58
Reference intervals.....	58
Reference Intervals Justification	58
National and International trends	59
hs Troponin.....	60
Test / Analyte Information	60
Laboratory information	60
Reference intervals.....	60

Reference Intervals Justification	60
National and International trends	60
LH	61
Test / Analyte Information	61
Laboratory information	61
Reference intervals.....	61
Reference Intervals Justification	61
National and International trends	62
FSH	63
Test / Analyte Information	63
Laboratory information	63
Reference intervals.....	63
Reference Intervals Justification	63
National and International trends	64
Prolactin.....	65
Test / Analyte Information	65
Laboratory information	65
Reference intervals.....	65
Reference Intervals Justification	65
National and International trends	65
Macroprolactin	66
Test / Analyte Information	66
Laboratory information	66
Reference intervals.....	66
Reference Intervals Justification	66
National and International trends	66
Progesterone	67
Test / Analyte Information	67
Laboratory information	67
Reference intervals.....	67
Reference Intervals Justification	67
National and International trends	67
Testosterone.....	68
Test / Analyte Information	68
Laboratory information	68
Reference intervals.....	68
Reference Intervals Justification	68
National and International trends	68
Cortisol.....	69
Test / Analyte Information	69
Laboratory information	69
Reference intervals.....	69
Reference Intervals Justification	69
National and International trends	69
AFP.....	70
Test / Analyte Information	70
Laboratory information	70
Reference intervals.....	70
Reference Intervals Justification	70
National and International trends	70

CEA.....	71
Test / Analyte Information	71
Laboratory information	71
Reference intervals.....	71
Reference Intervals Justification	71
National and International trends	71
Ca125.....	72
Test / Analyte Information	72
Laboratory information	72
Reference intervals.....	72
Reference Intervals Justification	72
National and International trends	72
Parathyroid hormone	73
Test / Analyte Information	73
Laboratory information	73
Reference intervals.....	73
Reference Intervals Justification	73
National and International trends	73
Insulin	74
Test / Analyte Information	74
Laboratory information	74
Reference intervals.....	74
Reference Intervals Justification	74
National and International trends	74
Valproate.....	75
Test / Analyte Information	75
Laboratory information	75
Reference intervals.....	75
Reference Intervals Justification	75
National and International trends	75
Phenytoin	76
Test / Analyte Information	76
Laboratory information	76
Reference intervals.....	76
Reference Intervals Justification	76
National and International trends	76
Carbamazepine.....	77
Test / Analyte Information	77
Laboratory information	77
Reference intervals.....	77
Reference Intervals Justification	77
National and International trends	77
Lithium.....	78
Test / Analyte Information	78
Laboratory information	78
Reference intervals.....	78
Reference Intervals Justification	78
National and International trends	78
Digoxin.....	79
Test / Analyte Information	79

Laboratory information	79
Reference intervals.....	79
Reference Intervals Justification	79
National and International trends	79
IgG.....	80
Test / Analyte Information	80
Laboratory information	80
Reference intervals.....	80
Reference Intervals Justification	80
National and International trends	80
IgA.....	81
Test / Analyte Information	81
Laboratory information	81
Reference intervals.....	81
Reference Intervals Justification	81
National and International trends	81
IgM.....	82
Test / Analyte Information	82
Laboratory information	82
Reference intervals.....	82
Reference Intervals Justification	82
National and International trends	82
Albumin/Creatinine ratio.....	83
Test / Analyte Information	83
Laboratory information	83
Reference intervals.....	83
Reference Intervals Justification	83
National and International trends	83
Vitamin B12	84
Test / Analyte Information	84
Laboratory information	84
Reference intervals.....	84
Reference Intervals Justification	84
National and International trends	84
Folate.....	85
Test / Analyte Information	85
Laboratory information	85
Reference intervals.....	85
Reference Intervals Justification	85
National and International trends	85
Bicarbonate	86
Test / Analyte Information	86
Laboratory information	86
Reference intervals.....	86
Reference Intervals Justification	86
National and International trends	86
Ionised Calcium	87
Test / Analyte Information	87
Laboratory information	87
Reference intervals.....	87

Reference Intervals Justification	87
National and International trends	87
CRP	88
Test / Analyte Information	88
Laboratory information	88
Reference intervals.....	88
Reference Intervals Justification	88
National and International trends	88
24 hour Urine Calcium	89
Test / Analyte Information	89
Laboratory information	89
Reference intervals.....	89
Reference Intervals Justification	89
National and International trends	89
24 hour Urine Magnesium.....	90
Test / Analyte Information	90
Laboratory information	90
Reference intervals.....	90
Reference Intervals Justification	90
National and International trends	90
24 hour Urine Creatinine	91
Test / Analyte Information	91
Laboratory information	91
Reference intervals.....	91
Reference Intervals Justification	91
National and International trends	92
24 hour Urine Phosphate	93
Test / Analyte Information	93
Laboratory information	93
Reference intervals.....	93
Reference Intervals Justification	93
National and International trends	93
24 hour Urine Potassium.....	94
Test / Analyte Information	94
Laboratory information	94
Reference intervals.....	94
Reference Intervals Justification	94
National and International trends	94
24 hour Urine Sodium	95
Test / Analyte Information	95
Laboratory information	95
Reference intervals.....	95
Reference Intervals Justification	95
National and International trends	95
24 hour Urine Urate	96
Test / Analyte Information	96
Laboratory information	96
Reference intervals.....	96
Reference Intervals Justification	96
National and International trends	96

24 hour Urine Protein.....	97
Test / Analyte Information	97
Laboratory information	97
Reference intervals.....	97
Reference Intervals Justification	97
National and International trends	97
24 hour Urine Urea.....	98
Test / Analyte Information	98
Laboratory information	98
Reference intervals.....	98
Reference Intervals Justification	98
National and International trends	98
Creatinine Clearance	99
Test / Analyte Information	99
Laboratory information	99
Reference intervals.....	99
Reference Intervals Justification	99
National and International trends	99
PSA.....	100
Test / Analyte Information	100
Laboratory information	100
Reference intervals.....	100
Reference Intervals Justification	100
National and International trends	100
Free/Total PSA ratio	101
Test / Analyte Information	101
Laboratory information	101
Reference intervals.....	101
Reference Intervals Justification	101
National and International trends	101
Analytes covered by Guideline documents	102
Reference Table for non-harmonised analytes	103

Terms of Reference

Purpose

To review and ensure the on-going harmonisation of Biochemistry reference intervals between laboratory providers in the Wellington Region, for the purpose of clinical governance and linking databases.

Term

This Terms of Reference is effective from 23 November 2013 and continues until terminated by agreement between the membership.

Membership*

Michael Crooke	Chemical Pathologist	Wellington Hospital/Aotea Pathology
Filipo Faiga	HOD	Wellington Hospital
Barbara Dallas	HOD	Hutt Hospital
Max Reed (Chair)	HOD	Aotea Pathology
Ian Tompson	IT representative	Wellington Hospital
Andrew Hunter	IT representative	Hutt Hospital
Roger Chapman	IT Representative	Aotea Pathology
Alison Sinclair	Senior Technician	Aotea Pathology

*Contact emails Appendix One

Roles and responsibilities

- The Wellington Regional Reference Intervals Biochemistry Group will look at the comparability of Biochemistry tests in the Health PAC schedule and any other tests identified by this group.
- For each test/analyte, the adult, antenatal and paediatric reference intervals will be reviewed, along with what analysers/methods are used to perform the test, units of measurement and test names used for reporting results, how many decimal places results should be reported to and the use of Logical Observation Identifiers Name and Codes (LOINC) to allow cumulating in the "Clinical Record".
- To maintain the Wellington Regional Biochemistry Reference Interval document which details what tests are deemed comparable, current agreed reference intervals/units/test names/LOINC codes(where possible) and the analysers used to perform these tests at each of the laboratory service providers. This document will be maintained by the incumbent Chairperson and it is the responsibility of all group members to ensure it is kept current.
- To maintain consistency of reporting by alignment of the notation of age ranges where possible and appropriate.
- To maintain consistency of reporting by alignment of report comments, where possible and appropriate.
- To maintain a standard handling process for the reporting of non-harmonised assays (e.g. Oestradiol), clearly, safely and appropriately into the "Clinical Record".
- To be proactive in reviewing the comparability of reference intervals wherever possible with a focus on agreeing reference intervals nationally where possible.

- To run comparative studies using patient samples to confirm comparability and in line with the Clinical and Laboratory Standards Institute (CLSI) guidelines ‘Verification of comparability of patient results within one health care system; approved guideline” [C54-A-IR Vol.32 No. 11]
- To facilitate discussion with other relevant external groups as appropriate with a view to promoting the use of agreed reference intervals.

Meetings

- All meetings will be chaired by incumbent chairperson
- A meeting quorum will be at least one member from each Laboratory
- Decisions made by consensus (i.e. members are satisfied with the decision even though it may not be their first choice). If not possible, WRRIG-B chair makes final decision
 - Meeting agendas minutes will be provided by Aotea Pathology, this includes: preparing agendas and supporting papers
 - preparing meeting notes and information.
- Meetings will be held annually for 2 hours at Aotea Pathology.
- If required subgroup meetings will be arranged outside of these times at a time convenient to subgroup members.

Amendment, Modification or Variation

This Terms of Reference may be amended, varied or modified in writing after consultation and agreement by WRRIG-B members.

Principles

The foundation of our terms of reference is a commitment to act in good faith to reach consensus decisions on the basis of “best for patient, best for system”.

- Support clinical leadership, and in particular clinically-led service development;
- Conduct ourselves with honesty and integrity, and develop a high degree of tolerance and trust;
- Promote an environment of high quality, performance and accountability, and low bureaucracy;
- Strive to resolve disagreements co-operatively, and wherever possible achieve consensus decisions;
- Adopt a patient-centred, whole-of-system approach and make decisions on a Best for System basis;
- Seek to make the best use of finite resources in planning health services to achieve improved health outcomes for our populations;
- Adopt and foster an open and transparent approach to sharing information;
- Encourage courageous conversations and open debate of issues;
- Respect the diverse range of opinion around the table and commit to listening to each other and seeking to understand the others viewpoint.

Appendix One

Michael Crooke	Michael.Crooke@ccdhb.org.nz
Filipo Faig	Filipo.Faiga@ccdhb.org.nz
Barbara Dallas	barbara.dallas@hvh.co.nz
Max Reed (Chair)	mreed@apath.co.nz
Ian Thompson	Ian.Tompson@ccdhb.org.nz
Andrew Hunter	Andrew.Hunter@huttvalley.dhb.org.nz
Roger Chapman	rchapman@apath.co.nz
Alison Sinclair	asinclair@apath.co.nz

Sodium

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	2591-2
Reported to (no DP)	0	Units	mmol/L
Paed Range Needed	No	Sample Type	Serum
Pregnancy Range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Indirect ISE
Hutt Analyser	Roche Cobas	Hutt Method	Indirect ISE
Aotea Analyser	Roche ISE Module	Aotea Method	Indirect ISE

Reference intervals

Age Range	Reference Interval
0 – Adult	135 – 145

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus nationally and with AACB harmonisation group and post review of patient data

National and International trends

	Range details (As at 20/3/12)	
ARQAG	Neonate	134 – 148 mmol/L
	Adult	135 – 145 mmol/L
SIQAG	Adult	135 – 145 mmol/L
SONIC Australia (As at March 2011)	Adult	135 – 145 mmol/L
	Pregnancy	134 – 142 mmol/L
	Paediatric 1wk – <12mths	132 – 147 mmol/L
	≥12mths – 15 yrs	132 – 145 mmol/L
NORIP	Unisex ≥18y SERUM	137 – 145 mmol/L
	Unisex ≥18y PLASMA	137 – 144 mmol/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Adult	135 – 145 mmol/L
	Paediatric Birth - <7days	132 – 147 mmol/L
	≥7days - <2yrs	133 – 145 mmol/L
	≥2yrs - <12yrs	134 – 145 mmol/L
	≥12yrs – Adult	135 – 145 mmol/L
UK Harmony	Adult	133 – 146 mmol/L

Potassium

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	2823-3
Reported to (no DP)	1	Units	mmol/L
Paed Range Needed	No	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Indirect ISE
Hutt Analyser	Roche Cobas	Hutt Method	Indirect ISE
Aotea Analyser	Roche ISE Module	Aotea Method	Indirect ISE

Reference intervals

Age Range	Reference Interval
0 - Adult	3.5 – 5.2

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and consensus nationally and with AACB harmonisation group

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Neonate 4.5 – 6.0 mmol/L
	Adult 3.5 – 5.2 mmol/L
SIQAG	Adult 3.5 – 5.2 mmol/L
SONIC Australia (As at March 2011)	Adult 3.5 – 5.5 mmol/L
	Pregnancy 3.4 – 4.8 mmol/L
	Paediatric 1wk – 4wks 3.6 – 6.1 mmol/L
	≥4wks – 12mths 3.6 – 5.8 mmol/L
NORIP	≥12mths – 15yrs 3.5 – 5.5 mmol/L
	Unisex Adult SERUM 3.6 – 4.6 mmol/L
NHANES	Unisex Adult PLASMA 3.5 – 4.4 mmol/L
Aussie Norms	
AACB Harmonisation Group	Adult 3.5 – 5.2 mmol/L
	Pregnancy 3.5 – 4.8 mmol/L
	Paediatric Birth - <3mths 3.3 – 6.5 mmol/L
	≥3mths - <1yr 3.3 – 6.0 mmol/L
UK Harmony	≥1 yr – Adult 3.5 – 5.2 mmol/L
	Adult 3.5 – 5.3 mmol/L
	Paediatric Neonate 3.4 – 6.0 mmol/L
	Infant 3.5 – 5.7 mmol/L
	1 – 16 yrs 3.5 – 5.0 mmol/L

Chloride

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	2075-0
Reported to (no DP)	0	Units	mmol/L
Paed Range Needed	No	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Indirect ISE
Hutt Analyser	Roche Cobas	Hutt Method	Indirect ISE
Aotea Analyser	Roche ISE Module	Aotea Method	Indirect ISE

Reference intervals

Age Range	Reference Interval
0 – Adult	95 – 110

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and consensus nationally and with AACB harmonisation group.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Adult	95 – 110 mmol/L
SIQAG	Adult	95 – 105 mmol/L
SONIC Australia (As at March 2011)	Adult	95 – 110 mmol/L
	Pregnancy	95 – 108 mmol/L
	Paediatric	95 – 110 mmol/L
NORIP		
NHANES		
Aussie Norms		
AACB Harmonisation Group	Adult	95 – 110 mmol/L
	Pregnancy	97 – 108 mmol/L
	Paediatric All ages	95 – 110 mmol/L
UK Harmony	Adult	95 – 108 mmol/L

Urea

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	22664-7
Reported to (no DP)	1	Units	mmol/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Urease -Kinetic
Hutt Analyser	Roche Cobas	Hutt Method	Urease
Aotea Analyser	Roche P Module	Aotea Method	Urease

Reference intervals

Age Range	Reference Interval
0 days – 1 month	1.1 – 6.1
> 1 month – 2 years	0.7 – 5.0
>2 years – 4 years	1.1 – 5.0
>4 years – 6 years	1.1 – 5.7
>6 years – 10 years	1.4 – 5.7
>10 years - 16 years	1.8 – 6.4
>16years – Adult	2.4 – 7.5

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, all current trends and clinical utility of analyte

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Neonate	1.0 – 4.0 mmol/L
	1 month – 1 year	1.4 – 5.4 mmol/L
	1 year – 4 years	1.8 – 5.4 mmol/L
	Adult	3.2 – 7.7 mmol/L
SIQAG	Adult	3.5 – 7.7 mmol/L
	0 days – 1 month	1.1 – 6.1 mmol/L
	>1 month – 2 years	0.7 – 5.0 mmol/L
	>2 years – 4 years	1.1 – 5.0 mmol/L
	>4 years – 6 years	1.1 – 5.7 mmol/L
	>6 years – 10 years	1.4 – 5.7 mmol/L
	>10 years – 13 years	1.8 – 6.4 mmol/L
SONIC Australia (As at March 2011)	Female 16 – 29 years	2.5 – 6.5 mmol/L
	30 – 49 years	2.5 – 7.0 mmol/L
	50 – 59 years	3.0 – 8.0 mmol/L
	60 – 69 years	3.0 – 8.5 mmol/L
	70 – 79 years	3.5 – 9.5 mmol/L
	80 – 89 years	3.5 – 10.0 mmol/L
	90+ years	4.0 – 10.0 mmol/L
	Male 18 – 29 years	3.0 – 7.5 mmol/L
	30 – 49 years	3.0 – 8.0 mmol/L
	50 – 59 years	3.5 – 8.5 mmol/L
	60 – 69 years	3.5 – 9.0 mmol/L
	70 – 79 years	3.5 – 9.5 mmol/L
	80 – 89 years	4.0 – 10.0 mmol/L
	90+ years	4.5 – 10.0 mmol/L
	Pregnancy	1.5 – 5.5 mmol/L
	Paediatric 1wk – 12mths	1.5 – 5.5 mmol/L
	≥12mths – 2yrs	2.0 – 6.5 mmol/L
	≥2yrs – 11yrs	2.5 – 6.5 mmol/L
	≥11yrs – 15yrs	2.5 – 6.0 mmol/L
NORIP	Male 18 – 49 years	3.2 – 8.1 mmol/L
	≥50 years	3.5 – 8.1 mmol/L
	Female 18 – 49 years	2.6 – 6.4 mmol/L
	≥50 years	3.1 – 7.9 mmol/L
NHANES		
Aussie Norms		
AACB Harmonisation	No proposed Adult range at this time	
	Pregnancy	2.0 – 5.5 mmol/L
UK Harmony	Adult	2.5 – 7.8 mmol/L
	Paediatric Neonate	0.8 – 5.5 mmol/L
	Infant	1.0 – 5.5 mmol/L
	1 – 16 yrs	2.5 – 6.5 mmol/L

Creatinine

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	14682-9
Reported to (no DP)	0	Units	umol/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Rate blanked, compensated Jaffe
Hutt Analyser	Roche Cobas	Hutt Method	Rate blanked, compensated Jaffe
Aotea Analyser	Roche P Module	Aotea Method	Rate blanked, compensated Jaffe

Reference intervals

Age Range	Reference Interval	
0 days – 31 days	18 – 48	
>1 month – 11 months	13 – 38	
12 months – 23 months	20 – 44	
2 years – 3 years	20 – 48	
4 years – 5 years	25 – 56	
6 years – 9 years	25 – 66	
10 years – 14 years	38 – 72	
	Female	Male
15 years – Adult	45 – 90	60 – 110

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from study conducted in conjunction with clinical audit by Paediatric department at WPH. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and aligned with AACB harmonisation group.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	7 days – 1 month	20 – 60 umol/L
	1 month – 2 years	20 – 50 umol/L
	2 years – 4 years	20 – 60 umol/L
	4 years – 6 years	25 – 65 umol/L
	6 years – 10 years	25 – 75 umol/L
	10 years – 15 years	40 – 80 umol/L
	Males >15 years	60 – 105 umol/L
	Females >15 years	45 – 90 umol/L
SIQAG	0 days – 1 month	20 – 60 umol/L
	>1 month – 2 years	20 – 50 umol/L
	>2 years – 4 years	20 – 60 umol/L
	>4 years – 6 years	25 – 65 umol/L
	>6 years – 10 years	25 – 65 umol/L
	>10 years – 15 years	40 – 80 umol/L
	Males >15 years	50 – 110 umol/L
	Females >15 years	45 – 90 umol/L
SONIC Australia (As at March 2011)	Female 16 – 69 years	45 – 85 umol/L
	70 – 79 years	45 – 90 umol/L
	80 – 89 years	45 – 95 umol/L
	90+ years	45 – 100 umol/L
	Male 18 – 69 years	60 – 110 umol/L
	70 – 79 years	60 – 115 umol/L
	80 – 89 years	60 – 120 umol/L
	90+ years	60 – 125 umol/L
	Pregnancy	30 – 70 umol/L
	Paediatrics 1wk – 2wks	20 – 75 umol/L
	≥2wks – 3yrs	20 – 35 umol/L
	≥3yrs – 5yrs	20 – 40 umol/L
	≥5yrs – 7yrs	20 – 50 umol/L
	≥7yrs – 9yrs	20 – 55 umol/L
	≥9yrs – 11yrs	20 – 65 umol/L
	≥11yrs – 13yrs	30 – 70 umol/L
	≥13yrs – 15 yrs	40 – 75 umol/L
NORIP	Male	60 – 100 umol/L
	Female	20 - 90 umol/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Female	45 – 90 umol/L
	Male	60 – 110 umol/L
	Pregnancy	40 – 70 umol/L
UK Harmony	No proposed range at this time	

Uric Acid

Alternative name: (Urate)

Test / Analyte Information

Health Pac Number		LOINC Code (Urate)	14933-6
Reported to (no DP)	2	Units	mmol/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Uricase/peroxidase
Hutt Analyser	Roche Cobas	Hutt Method	Uricase
Aotea Analyser	Roche P Module	Aotea Method	Uricase

Reference intervals

Age Range	Reference Interval	
0 - 12 years	0.08 – 0.34	
	Female	Male
>12 years – Adult	0.15 – 0.36	0.20 – 0.42
Comment to be added to all UA's ≥ 0.36 mmol/L "For patients on therapy for gout, the target for uric acid should be less than 0.36 mmol/L"		

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and aligned with SIQAG.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Males	0.20 – 0.42 mmol/L
	Females	0.14 – 0.36 mmol/L
SIQAG	0 – 12 years	0.08 – 0.34 mmol/L
	Males >12 years	0.20 – 0.42 mmol/L
	Females >12 years	0.15 – 0.36 mmol/L
SONIC Australia (As at March 2011)	Males	0.20 – 0.50 mmol/L
	Females	0.15 – 0.40 mmol/L
	Pregnancy 6 – 30 wks	0.10 – 0.30 mmol/L
	≥30 – 31 wks	<0.31 mmol/L
	≥31 – 32 wks	<0.32 mmol/L
	≥32 – 33 wks	<0.33 mmol/L
	≥33 – 34 wks	<0.34 mmol/L
	≥34 – 35 wks	<0.35 mmol/L
	≥36 wks	<0.36 mmol/L
	Paediatrics 1wk – 6yrs	0.10 – 0.30 mmol/L
	≥6yrs – 9yrs	0.12 – 0.33 mmol/L
	≥9yrs – 12yrs	0.15 – 0.35 mmol/L
	≥12yrs – 15yrs	0.15 – 0.38 mmol/L
NORIP	Unisex	155 – 350 umol/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed Adult range at this time	
	Pregnancy Up to 30 weeks	<0.30 mmol/L
	30 – 38 weeks	<0.36 mmol/L
UK Harmony	Males	0.20 – 0.43 mmol/L
	Females	0.14 – 0.36 mmol/L

Bilirubin

Alternative name: (Total Bilirubin)

Test / Analyte Information

Health Pac Number		LOINC Code	14631-6
Reported to (no DP)	0	Units	umol/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Diazonium Salt
Hutt Analyser	Roche Cobas	Hutt Method	Diazonium Salt
Aotea Analyser	Roche P Module	Aotea Method	Diazonium salt

Reference intervals

Age Range	Reference Interval
0 days (For specimens same as dob)	2 – 49
1 day (For specimens taken day after dob)	2 – 99*
2 days (For specimens taken 2 days after dob)	2 – 139**
3 days (For specimens taken 3 days after dob)	2 – 199***
4 days – 14 days	2 – 169****
15 days - 6 weeks	2 – 23*****
6 weeks – Adult	2 – 20
Comments to be added as above: * Consider Investigation and treatment for Bilirubin over 100 ** Consider Investigation and treatment for Bilirubin over 250 *** Consider Investigation and treatment for Bilirubin over 300 **** Consider Investigation and treatment for Bilirubin over 340 ***** Consider investigation for prolonged jaundice for Bilirubin over 150	

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins and for IT compatibility. Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)		
ARQAG	0 – 1 day (<i>Cord blood</i>)	≤ 50	umol/L
	< 24 hrs	≤ 150	
	1-2 days	≤ 200	
	2-3 days	≤ 250	
	3-7 days	≤ 300	
	1-3 weeks	≤ 100	
	3-4 weeks	≤ 50	
	> 4 weeks	<25	
SIQAG	0 days (For specimens same day as dob)	< 50	
	1 day (For specimens taken day after dob)	< 100	Consider Investigation and treatment for Bilirubin over 100
	2 days (For specimens taken 2 days after dob)	< 140	Consider Investigation and treatment for Bilirubin over 250
	3 days (For specimens taken 3 days after dob)	< 200	Consider Investigation and treatment for Bilirubin over 300
	4-14 days	< 170	Consider Investigation and treatment for Bilirubin over 340
	>2 weeks – 6 weeks	3 – 23	Consider investigation for prolonged jaundice for Bilirubin over 150
	> 6 weeks – Adult	2 – 20	
SONIC Australia (As at March 2011)	Males	4 – 20 umol/L	
	Females	3 – 15 umol/L	
	Pregnancy 1 st Trimester	2 – 15 umol/L	
	2 nd & 3 rd Trimester	2 – 10 umol/L	
	Paediatric 1wk – 2wks	<200 umol/L	
	≥2wks – 4wks	<100 umol/L	
	≥4wks – 3mths	<20 umol/L	
	≥3mths – 12mths	2 – 10 umol/L	
	≥12mths – 10yrs	2 – 12 umol/L	
≥10yrs – 15yrs	3 – 15 umol/L		
NORIP	Unisex	5 – 25 umol/L	
NHANES			
Aussie Norms			
AACB Harmonisation Group	No proposed Adult range at this time Pregnancy 1 st trimester < 15 umol/L 2 nd & 3 rd trimester < 10 umol/L		
UK Harmony	Adult	< 20 umol/L	
	Paediatric 14d – 16yrs	<21 umol/L	

Direct Bilirubin

Alternative name: (Conjugated Bilirubin/Bilirubin (conj))

Test / Analyte Information

Health Pac Number		LOINC Code	14629-0
Reported to (no DP)	0	Units	umol/L
Paed Range Needed	No	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Diazotised Sulphanilic acid
Hutt Analyser	Roche Cobas	Hutt Method	Diazotised Sulphanilic acid
Aotea Analyser	Roche P Module	Aotea Method	Diazotised sulphanilic acid

Reference intervals

Age Range	Reference Interval
0 years – Adult	0 – 5
Comment to be added to all Direct Bilirubins: Direct bilirubin is not equivalent to conjugated bilirubin. Direct bilirubin is a mixture of mono- & di-conjugated plus the Delta Fraction, in proportions which may vary widely. We cannot quantitate these fractions separately, and their clinical significance is unclear.	

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and aligned nationally.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Neonate <20 umol/L or <10 % Adult <5 umol/L
SIQAG	0 – Adult 0 – 5 umol/L
SONIC Australia (As at March 2011)	Adult 0 – 7 umol/L Pregnancy 1 st Trimester <7 umol/L 2 nd & 3 rd Trimester <5 umol/L Paediatrics <7 umol/L
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

Alkaline phosphatase

Alternative name: (ALP)

Test / Analyte Information

Health Pac Number		LOINC Code	6768-6
Reported to (no DP)	0	Units	U/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	AMP buffer rate - IFCC
Hutt Analyser	Roche Cobas	Hutt Method	AMP (IFCC)
Aotea Analyser	Roche P Module	Aotea Method	AMP (IFCC)

Reference intervals

Age Range	Reference Interval	
0 – 1 year	60 – 500	
> 1 year – 11 years	80 – 360	
	Female	Male
>11 years – 16 years	80 – 400	90 -450
>16 years – 18 years	50 – 200	60 – 300
>18 years – 50 years	20 – 90	
>18 years – 65 years		20 – 110
>50 years - 65 years	20 – 110	
>65years	30 – 150	
Comment to be added to all ALP's on patients ≤16 years: During periods of very rapid growth, levels may exceed the limits shown		

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Males <10 years	80 – 350 IU/L
	Males 10 years – 14 years	45 – 400 IU/L
	Males 15 years – 19 years	45 – 250 IU/L
	Males 20 years – 48 years	40 – 110 IU/L
	Males 49 years – 59 years	40 – 120 IU/L
	Males ≥60 years	40 – 130 IU/L
	Females <10 years	80 – 350 IU/L
	Females 10 years – 14 years	45 – 300 IU/L
	Females 15 years – 19 years	45 – 250 IU/L
	Females 20 years – 48 years	40 – 100 IU/L
	Females 49 years – 59 years	40 – 120 IU/L
	Females ≥60 years	40 – 130 IU/L
SIQAG	0 – 1 year	60 – 500 U/L
	>1 year – 11 years	80 – 360 U/L
	Males >11 years – 16 years	90 – 450 U/L
	Males >16 years – 18 years	60 – 300 U/L
	Females >11 years – 16 years	80 – 400 U/L
	Females >16 years – 18 years	50 – 200 U/L
	Adults >18 years	30 – 150 U/L
SONIC Australia (As at March 2011)	Male	35 – 110 U/L
	Female 16 – 49 years	20 – 105 U/L
	50 – 90+ years	30 – 115 U/L
	Pregnancy 1 st & 2 nd trimester	30 – 100 U/L
	3 rd trimester	60 – 300 U/L
	Paediatrics	
	Females 1wk – 3yrs	120 – 350 U/L
	≥3yrs – 6yrs	120 – 300 U/L
	≥6yrs – 9yrs	120 – 350 U/L
	≥10yrs – 12yrs	100 – 400 U/L
	≥12yrs – 13yrs	90 – 300 U/L
	≥13yrs – 14yrs	70 – 225 U/L
	≥14yrs – 15yrs	50 – 200 U/L
	Males 1wk – 3yrs	120 – 350 U/L
	≥3yrs – 6yrs	120 – 300 U/L
	≥6yrs – 12yrs	120 – 350 U/L
	≥12yrs – 14yrs	100 – 450 U/L
	≥14yrs – 15yrs	90 – 350 U/L
NORIP	Unisex ≥18 years	35 – 105 U/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Adult	30 – 110 U/L
	Pregnancy 1 st & 2 nd Trimester	30 – 100 U/L
	3 rd Trimester	60 – 300 U/L
UK Harmony	Adult	30 – 130 U/L
	Paediatric Neonate	70 – 380U/L
	Infant – 16yrs	60 – 425 U/L

GGT

Alternative name: (Gamma Glutamyl transferase)

Test / Analyte Information

Health Pac Number		LOINC Code	2324-2
Reported to (no DP)	0	Units	U/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	g-Glutamyl-3-carboxy-nitro, IFCC
Hutt Analyser	Roche Cobas	Hutt Method	IFCC
Aotea Analyser	Roche P Module	Aotea Method	IFCC

Reference intervals

Age Range	Reference Interval	
0 – 6 months	5 – 150	
> 6 months – 1 year	5 - 50	
>1 year – 12 years	5 – 30	
	Female	Male
>12 years – Adult	10 – 35	10– 50

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and in line with SIQAG.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	<6 months	0 – 150 IU/L
	Male	0 – 60 IU/L
	Female	0 – 50 IU/L
SIQAG	0 – 6 months	<150 U/L
	>6 months – 1 year	<50 U/L
	>1 year – 12 years	<30 U/L
	Males > 12 years	10 – 50 U/L
	Females >12 years	10 – 35 U/L
SONIC Australia (As at March 2011)	Male	5 – 50 U/L
	Female	5 – 35 U/L
	Pregnancy 1 st & 2 nd trimester	5 – 30 U/L
	3 rd trimester	3 – 30 U/L
	Paediatrics	
	Males 1wk – 4wks	5 – 150 U/L
	≥4wks – 3mths	5 – 120 U/L
	≥3mths – 6mths	5 – 60 U/L
	≥6mths – 12mths	5 – 40 U/L
	≥12mths – 11yrs	5 – 20 U/L
	≥11yrs – 14yrs	5 – 30 U/L
	≥14yrs – 15yrs	5 – 40 U/L
	Females 1wk – 4wks	5 – 150 U/L
	≥4wks – 3mths	5 – 120 U/L
	≥3mths – 6mths	5 – 60 U/L
	≥6mths – 12mths	5 – 40 U/L
	≥12mths – 11yrs	5 – 20 U/L
	≥11yrs – 15yrs	5 – 30 U/L
NORIP	Male 18 – 39 years	10 – 80 U/L
	≥40 years	15 – 115 U/L
	Females 18 – 39 years	10 – 45 U/L
	≥40 years	10 – 45 U/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed Adult range at this time	
	Pregnancy	<30 U/L
UK Harmony	No proposed range at this time	

ALT

Alternative name: (Alanine Aminotransferase)

Test / Analyte Information

Health Pac Number		LOINC Code	1742-6
Reported to (no DP)	0	Units	U/L
Paed Range Needed	No	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	IFCC (without pyridoxal phosphate)
Hutt Analyser	Roche Cobas	Hutt Method	IFCC (without pyridoxal phosphate)
Aotea Analyser	Roche P Module	Aotea Method	IFCC (without pyridoxal phosphate)

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 – Adult	5 – 30	5 – 40

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	0 – 45 IU/L	
SIQAG	Males	0 – 40 U/L
	Females	0 – 30 U/L
SONIC Australia (As at March 2011)	Male	5 – 40 U/L
	Female	5 – 30 U/L
	Pregnancy	5 – 30 U/L
	Paediatrics	
	Females 1wk – 1yr	5 – 35 U/L
	≥1yr – 15yrs	5 – 30 U/L
	Males 1wk – 1yr	5 – 35 U/L
	≥1yr – 14yrs	5 – 30 U/L
	≥14yrs – 15yrs	5 – 40 U/L
NORIP	Males >18y	<70 U/L
	Females >18y	<45 U/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Male	< 40 U/L
	Female	< 30 U/L
	Pregnancy	< 30 U/L
UK Harmony	No proposed range at this time	

AST

Alternative name: (Aspartate Aminotransferase)

Test / Analyte Information

Health Pac Number		LOINC Code	1920-8
Reported to (no DP)	0	Units	U/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	IFCC (without pyridoxal phosphate)
Hutt Analyser	Roche Cobas	Hutt Method	IFCC (without pyridoxal phosphate)
Aotea Analyser	Roche P Module	Aotea Method	IFCC (without pyridoxal phosphate)

Reference intervals

Age Range	Reference Interval	
0 – 1 month	20 – 200	
>1 month – 2 years	20 – 80	
>2 years – 5 years	15 – 60	
	Female	Male
>5 years – Adult	10 – 30	10 – 35

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	<2 years	0 – 80 IU/L
	2 years – 10 years	0 – 60 IU/L
	>10 years	0 – 45 IU/L
SIQAG	0 – 1 month	20 – 200 U/L
	>1 month – 2 years	20 – 80 U/L
	>2 years – 5 years	15 – 60 U/L
	Adults >5 years	10 – 50 U/L
SONIC Australia (As at March 2011)	Male	10 – 40 U/L
	Female	10 – 35 U/L
	Pregnancy 1 st & 2 nd trimester	8 – 30 U/L
	3 rd trimester	8 – 35 U/L
	Paediatrics	
	Females ≤1wk	20 - 100 U/L
	≥1wk – 12mths	20 – 65 U/L
	≥12mths – 2yrs	20 – 55 U/L
	≥2yrs – 6yrs	15 – 45 U/L
	≥6yrs – 10yrs	15 – 40 U/L
	≥10yrs – 15yrs	10 – 35 U/L
	Males ≤1wk	20 - 100 U/L
	≥1wk – 12mths	20 – 65 U/L
	≥12mths – 2yrs	20 – 55 U/L
	≥2yrs – 10yrs	15 – 45 U/L
	≥11yrs – 15yrs	5 – 30 U/L
NORIP	Male ≥18 yrs	< 45 U/L
	Female ≥18 yrs	15 – 35 U/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Male	< 40 U/L
	Female	< 35 U/L
	Pregnancy	< 35 U/L
UK Harmony	No proposed range at this time	

Total Protein

Alternative name: (Protein)

Test / Analyte Information

Health Pac Number		LOINC Code	2885-2
Reported to (no DP)	0	Units	g/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Biuret
Hutt Analyser	Roche Cobas	Hutt Method	Biuret
Aotea Analyser	Roche P Module	Aotea Method	Biuret

Reference intervals

Age Range	Reference Interval
0 – 2 months	45 – 70
>2 months – 1 year	50 – 80
>1 year – 6 years	55 – 80
>6 years – 11 years	60 – 83
>11 years – Adult	65 – 80

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	0 – 30 days	45 – 75 g/L
	30 – 60 days	45 – 65 g/L
	60 – 180 days	50 – 75 g/L
	6 – 12 months	55 – 80 g/L
	1 year – 70 years	66 – 84 g/L
	>70 years	64 – 82 g/L
SIQAG	0 – 2 months	45 – 70 g/L
	>2 months – 1 year	50 – 80 g/L
	>1 year – 6 years	55 – 80 g/L
	>6 years – 11 years	60 – 83 g/L
	>11 years – Adult	64 – 83 g/L
SONIC Australia (As at March 2011)	Male 18 – 39 years	66 – 83 g/L
	40 – 79 years	63 – 80 g/L
	80 – 90+ years	61 – 78 g/L
	Female 16 – 49 years	64 – 81 g/L
	50 – 79 years	63 – 80 g/L
	80 – 90+ years	61 – 78 g/L
	Pregnancy 1 st trimester	63 – 80 g/L
	2 nd trimester	60 – 75 g/L
	3 rd trimester	55 – 72 g/L
	Paediatrics	
	Male 1 wk – 4mths	50 – 67 g/L
	≥4mths – 8mths	50 – 70 g/L
	≥8mths – 12mths	57 – 73 g/L
	≥12mths – 2yrs	59 – 75 g/L
	≥2yrs – 3yrs	61 – 75 g/L
	≥3yrs – 4yrs	62 – 77 g/L
	≥4yrs – 8yrs	63 – 79 g/L
	≥8yrs – 13yrs	65 – 80 g/L
	≥13yrs – 15yrs	66 – 82 g/L
	Female 1 wk – 4mths	50 – 67 g/L
	≥4mths – 8mths	50 – 70 g/L
	≥8mths – 12mths	57 – 73 g/L
	≥12mths – 2yrs	57 – 75 g/L
	≥2yrs – 3yrs	59 – 75 g/L
	≥3yrs – 4yrs	61 – 75 g/L
	≥4yrs – 5yrs	62 – 77 g/L
	≥5yrs – 8yrs	63 – 79 g/L
	≥8yrs – 13yrs	65 – 80 g/L
	≥13yrs – 15yrs	65 – 81 g/L
NORIP		
NHANES		
Aussie Norms		
AACB Harmonisation Group	Adult	60 – 80 g/L
	Pregnancy 1 st Trimester	63 – 80 g/L
	2 nd Trimester	60 – 75 g/L
	3 rd Trimester	55 – 72 g/L
UK Harmony	Adult	60 – 80 g/L

Albumin

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	61152-5
Reported to (no DP)	0	Units	g/L
Paed Range Needed	Yes	Sample Type	Serum
Pregnancy range	No		

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	BCP
Hutt Analyser	Roche Cobas	Hutt Method	BCP
Aotea Analyser	Roche P Module	Aotea Method	BCP

Reference intervals

Age Range	Reference Interval
0 – 1 year	30 – 45
>1 year – Adult	34 – 48

Reference Intervals Justification

Date of change	Justification
19/3/12	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and of current patient data.
1/2/13	Range reviewed in light of BCP change, based on patient data from Aotea, moving from 36-50g/L to 34-48g/L, approved by M.Crooke

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	0 – 3 months	30 – 45 g/L
	3 months – 12 months	35 – 50 g/L
	1 year – 70 years	38 – 52 g/L
	>70 years	36 – 50 g/L
SIQAG	0 – 1 year	30 – 45 g/L
	>1 year – Adult	35 – 50 g/L
SONIC Australia (As at March 2011)	Male 18 – 39 years	39 – 50 g/L
	40 – 79 years	36 – 47 g/L
	80 – 90+ years	34 – 45 g/L
	Female 16 – 49 years	37 – 48 g/L
	50 – 79 years	36 – 47 g/L
	80 – 90+ years	34 – 45 g/L
	Pregnancy 1 st Trimester	35 – 48 g/L
	2 nd Trimester	32 – 43 g/L
	3 rd Trimester	28 – 40 g/L
	Paediatrics 1wk – 2years	35 – 48 g/L
	≥2yrs – 5years	37 – 48 g/L
	≥5yrs – 8years	38 – 48 g/L
	≥8yrs – 15years	38 – 49 g/L
NORIP	Adult 18 – 39 years	36 – 48 g/L
	40 – 69 years	36 – 45 g/L
	≥70 years	34 – 45 g/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed Adult range at this time	
	Pregnancy 1 st Trimester	35 – 48 g/L
	2 nd Trimester	32 – 43 g/L
	3 rd Trimester	28 – 40 g/L
UK Harmony	Adult	35 – 50 g/L
	Paediatric Neonate	30 – 45 g/L
	Infant	30 – 45 g/L
	1 – 16 yrs	30 – 50 g/L

Amylase

Alternative name: (Total Amylase)

Test / Analyte Information

Health Pac Number		LOINC Code	1798-8
Reported to (no DP)	0	Units	U/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	-	WPH Method	-
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche P Module	Aotea Method	G7-PNP

Reference intervals

Age Range	Reference Interval
0 – Adult	0 – 100

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, and aligned with SIQAG.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)		
ARQAG	25 – 135 U/L		
SIQAG	< 100 U/L		
SONIC Australia (As at March 2011)	Male	18 – 49 years	20 – 100 U/L
		50 – 69 years	20 – 110 U/L
		70 – 90 + years	20 – 120 U/L
	Female	16 – 49 years	20 – 100 U/L
		50 – 69 years	20 – 110 U/L
		70 – 90 + years	20 – 120 U/L
	Pregnancy		20 – 100 U/L
	Paediatrics 1wk – 4wks		0 – 10 U/L
	≥4wks – 3mths		0 – 20 U/L
	≥3mths – 12mths		5 – 50 U/L
	≥12mths – 3yrs		10 – 80 U/L
	≥3yrs – 9yrs		15 – 90 U/L
≥9yrs – 15yrs		20 – 100 U/L	
NORIP			
NHANES			
Aussie Norms			
AACB Harmonisation Group	No proposed range at this time		
UK Harmony	No proposed range at this time		

Amylase (pancreatic)

Alternative name: (Pancreatic Amylase)

Test / Analyte Information

Health Pac Number		LOINC Code	1805-1
Reported to (no DP)	0	Units	U/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	G7PNP (EPS)
Hutt Analyser	Roche Cobas	Hutt Method	EPS
Aotea Analyser	-	Aotea Method	-

Reference intervals

Age Range	Reference Interval
0 – Adult	8 – 53

Reference Intervals Justification

Date of change	Justification
23/11/2013	From Roche package insert and aligned with SIQAG and ARQAG.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	8 – 53 U/L
SIQAG	8 – 53 U/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

CK

Alternative name: (Creatine kinase/Creatine phosphokinase/CPK)

Test / Analyte Information

Health Pac Number		LOINC Code	2157-6
Reported to (no DP)	0	Units	U/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	IFCC-Imidazole buffer
Hutt Analyser	Roche Cobas	Hutt Method	UV/IFCC/DGKC
Aotea Analyser	Roche P Module	Aotea Method	IFCC 2 part/Imidazole buffer

Reference intervals

Age Range	Reference Interval
0 – Adult	Males 40 – 320 U/L Females 25 – 200 U/L

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adoption of UK Harmony range, in conjunction with local clinical observation

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Males 60 – 220 IU/L Females 30 – 180 IU/L
SIQAG	Males 60 – 220 U/L Females 30 – 180 U/L
SONIC Australia (As at March 2011)	Males 18 – 59 years 45 – 250 IU/L 60 – 89 years 40 – 200 IU/L 90+ years 30 – 150 IU/L Females 30 – 150 IU/L Pregnancy 30 – 150 IU/L
NORIP	Males 18 – 49 years 50 – 400U/L 50+ years 40 - 280 U/L Females 35 – 210 U/L
NHANES	
Aussie Norms	Males 49 - 291 U/L [Interim data] Females 36 – 241 U/L [Interim data]
AACB Harmonisation Group	No proposed range at this time
UK Harmony	Males 40 – 320 U/L Females 25 – 200 U/L

LDH

Alternative name: (Lactate dehydrogenase)

Test / Analyte Information

Health Pac Number		LOINC Code	14805-6
Reported to (no DP)	0	Units	U/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	P → L
Hutt Analyser	Roche Cobas	Hutt Method	P → L
Aotea Analyser	Roche P Module	Aotea Method	P → L

Reference intervals

Age Range	Reference Interval
0 – Adult	240 – 480

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus (20/06/12) From Roche pack insert, decision for Wellington laboratories to remain P → L at this time

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	L → P 120 – 250 IU/L P → L 170 – 430 IU/L
SIQAG	L → P 110 – 220 U/L
SONIC Australia (As at March 2011)	L → P Adults 120 – 250 IU/L L → P Pregnancy 1 st & 2 nd trimester 100 – 200 IU/L 3 rd trimester 100 – 220 IU/L
NORIP	L → P 18 – 69 years 105 – 205 U/L 70+ years 115 – 255 U/L
NHANES	
Aussie Norms	L → P 125 – 244 U/L [Interim data]
AACB Harmonisation Group	Adult L → P 120 – 250 U/L Pregnancy L → P 100 – 220 U/L
UK Harmony	No proposed range at this time

Adjusted Calcium

Alternative name: (Calcium/Corrected Calcium)

Test / Analyte Information

Health Pac Number		LOINC Code (Adjusted)	29265-6
Reported to (no DP)		Units	mmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Cresolphthalein complex
Hutt Analyser	Roche Cobas	Hutt Method	Cresolphthalein complex
Aotea Analyser	Roche P Module	Aotea Method	Cresolphthalein complexone

Reference intervals

Age Range	Reference Interval
0 – Adult	2.15 – 2.55 mmol/L

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins, Roche insert and AACB Harmonisation committee. Name change to Adjusted Calcium (aligns with LOINC)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	1 day – 3 days	1.80 – 2.80 mmol/L
	4 days – 1 year	2.10 – 2.80 mmol/L
	1 year – Adult	2.10 – 2.55 mmol/L
SIQAG	0 – Adult	2.2 – 2.6 mmol/L
SONIC Australia (As at March 2011)	Adult (Total)	2.15 – 2.55 mmol/L
	Corrected Males	2.15 – 2.55 mmol/L
	Females 16 – 49 years	2.15 – 2.55 mmol/L
	50 – 90+ years	2.20 – 2.60 mmol/L
	Pregnancy 1 st trimester	2.15 – 2.55 mmol/L
	2 nd trimester	2.20 – 2.60 mmol/L
	3 rd trimester	2.25 – 2.65 mmol/L
	Paediatric 1wk – 6mths	2.30 – 2.80 mmol/L
	>6mth – 12mths	2.30 – 2.75 mmol/L
	>12mth – 2yrs	2.30 – 2.70 mmol/L
	>2yrs – 3yrs	2.30 – 2.65 mmol/L
	>3yrs – 15 yrs	2.25 – 2.60 mmol/L
NORIP	18 – 49 years	2.17 – 2.47 mmol/L
	≥50 years	2.17 – 2.53 mmol/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Adult	2.15 – 2.55 mmol/L
	Pregnancy 1 st Trimester	2.15 – 2.55 mmol/L
	2 nd Trimester	2.20 – 2.60 mmol/L
	3 rd Trimester	2.25 – 2.65 mmol/L
	Paediatric Birth - <1wk	1.80 – 2.70 mmol/L
	≥1wk - <4wks	2.00 – 2.60 mmol/L
	≥4wks - <4yrs	2.15 – 2.65 mmol/L
UK Harmony	≥4yrs – Adult	2.25 – 2.55 mmol/L
	Adjusted calcium	2.2 – 2.6 mmol/L Use adjustment equations normalised to mean calcium of 2.4 mmol/L
	Paediatric Neonate	2.0 – 2.7 mmol/L Actual not adjusted
	Infant – 16yrs	2.2 – 2.7 mmol/L Actual not adjusted

Phosphate

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	14879-1
Reported to (no DP)	2	Units	mmol/L
Paed Range Needed	Yes	Sample Type	Yes

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Phosphomolybdate complex
Hutt Analyser	Roche Cobas	Hutt Method	Phosphomolybdate complex
Aotea Analyser	Roche P Module	Aotea Method	Phosphomolybdate complex

Reference intervals

Age Range	Reference Interval
0 – 1 month	1.3 – 2.5
>1 month – 1 year	1.2 – 2.2
>1 year – 4 years	1.1 – 2.0
>4 years – 11 years	1.0 – 2.0
>11 years – 16 years	0.9 – 1.9
>16 years – Adult	0.8 – 1.50

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins. Aligned with UK Harmony

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	0 – 1 year	1.00 – 2.50 mmol/L
	>1 year – 6 years	1.00 – 2.00 mmol/L
	7 years – 11 years	1.00 – 1.85 mmol/L
	12 years – 16 years	0.90 – 1.80 mmol/L
	>16 years	0.70 – 1.50
SIQAG	0 – 1 month	1.3 – 2.5 mmol/L
	>1 month – 1 year	1.2 – 2.2 mmol/L
	>1 year – 4 years	1.1 – 2.0 mmol/L
	>4 years – 11 years	1.0 – 2.0 mmol/L
	>11 years – 16 years	0.9 – 1.9 mmol/L
	>16 years – Adult	0.8 – 1.5 mmol/L
SONIC Australia (As at March 2011)	Adult	0.8 – 1.5 mmol/L
	Pregnancy	0.8 – 1.5 mmol/L
	Paediatric 1wk – 4wks	1.0 – 2.3 mmol/L
	>4wks – 12mths	1.0 – 2.1 mmol/L
	>12mths – 3yrs	1.0 – 2.0 mmol/L
	>3yrs – 12yrs	1.0 – 1.9 mmol/L
	>12yrs – 15yrs	1.0 – 1.7 mmol/L
NORIP	Unisex ≥18 years	0.71 – 0.94 mmol/L
NHANES		
Aussie Norms		
AACB Harmonisation Group	Adult	0.75 – 1.50 mmol/L
	Pregnancy	0.75 – 1.50 mmol/L
	Paediatric Birth - <4wks	1.40 – 2.60 mmol/L
	≥4wks - <1yr	1.20 – 2.40 mmol/L
	≥1yr – <4 yrs	1.20 – 2.10 mmol/L
	≥4yrs - <12yrs	1.10 – 1.90 mmol/L
	≥12yrs - <14yrs	0.90 – 1.70 mmol/L Fall in PO4 during puberty
	≥14yrs - Adult	0.85 – 1.50 mmol/L
UK Harmony	Adult	0.8 – 1.5 mmol/L
	Paediatric Neonate	1.3 – 2.6 mmol/L
	Infant	1.3 – 2.4 mmol/L
	1 – 16 yrs	0.9 – 1.8 mmol/L

Magnesium

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	2601-3
Reported to (no DP)	2	Units	mmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Chlorophosphonaze
Hutt Analyser	Roche Cobas	Hutt Method	Chlorophosphonazo 111
Aotea Analyser	Roche Cobas	Aotea Method	Xylidyl Blue

Reference intervals

Age Range	Reference Interval
0 – Adult	0.70 – 1.10

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins. Aligned with AACB Harmonisation group

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0.70 – 1.00 mmol/L Results ≤1.00 mmol/L report to 2 decimal places Results >1.00 mmol/L report to 1 decimal place
SIQAG	0 – Adult 0.6 – 1.2 mmol/L
SONIC Australia (As at March 2011)	Adult 0.8 - 1.5 mmol/L Pregnancy All trimesters 0.8 - 1.5 mmol/L Paed 1 - 4w 1.0 - 2.3 mmol/L >4w - 12m 1.0 - 2.1 mmol/L >12m - 3y 1.0 - 2.0 mmol/L >3y - 12y 1.0 - 1.9 mmol/L >12y - 15y 1.0 - 1.7 mmol/L
NORIP	Unisex ≥18y 0.71 – 0.94 mmol/L
NHANES	
Aussie Norms	
AACB Harmonisation Group	Adult 0.7 – 1.1 mmol/L Paediatric Birth - <1wk 0.60 – 1.00 mmol/L ≥1wk – Adult 0.70 – 1.10 mmol/L
UK Harmony	Adult 0.7 – 1.0 mmol/L Paediatric Neonate 0.6 – 1.0 mmol/L Infant – 16yrs 0.7 – 1.0 mmol/L

Iron

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	14798-3
Reported to (no DP)		Units	umol/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Ferrozine without deproteinisation
Hutt Analyser	Roche Cobas	Hutt Method	Ferrozine without deproteinisation
Aotea Analyser	Roche P Module	Aotea Method	Ferrozine without deproteinisation

Reference intervals

Age Range	Reference Interval
0 – 2 months	10 – 31
>2 months – 1 year	4 – 27
>1 year – 3 years	5 – 23
>3 years – 10 years	6 – 25
>10 years – 18 years	8 – 32
>18 years – Adult	10 – 30

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG and ARQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins and aligned nationally

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	0 – 2 months	10 – 31 umol/L
	2 months – 1 year	4 – 27 umol/L
	1 year – 3 years	5 – 23 umol/L
	3 years – 10 years	6 – 25 umol/L
	10 – 18 years	8 – 32 umol/L
	>18 years – Adult	10 – 30 umol/L
SIQAG	0 – 2 months	10 – 31 umol/L
	2 months – 1 year	4 – 27 umol/L
	1 year – 3 years	5 – 23 umol/L
	3 years – 10 years	6 – 25 umol/L
	10 – 18 years	8 – 32 umol/L
	>18 years – Adult	10 – 30 umol/L
SONIC Australia (As at March 2011)	Adult	5 – 30 umol/L
	Pregnancy	5 – 30 umol/L
	Paediatric 1wk – 13yrs	5 – 25 umol/L
	≥13yrs – 15yrs	5 – 30 umol/L
NORIP	Unisex ≥18y	9 – 34 umol.L
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed range at this time	
UK Harmony	No proposed range at this time	

Ferritin

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	2276-4
Reported to (no DP)		Units	ug/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
0 – 15 years	15 – 150	
	Female	Male
>15 years – 30 years		20 – 350
>15 years – 50 years	20 – 200	
>30 years		30 – 500
>50 years	20 – 350	

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range consensus based on review of data (19/3/12) from the Reference interval study by R.Tomkins and aligned with SIQAG.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Males <6 months 15 – 400 ug/L Males 6 months – 1 year 15 – 80 ug/L Males 1 year – 12 years 15 – 150 ug/L Males 12 years – 20 years 15 – 170 ug/L Males 20 years – 30 years 20 – 320 ug/L Males 30 years – 40 years 20 – 400 ug/L Males >40 years 20 – 450 ug/L
SIQAG	0 – 15 years 15 – 150 ug/L Males >15 years – 30 years 20 – 350 ug/L Males >30 years 20 – 500 ug/L Females >15 years – 50 years 20 – 200 ug/L Females >50 years 20 – 350 ug/L
SONIC Australia (As at March 2011)	Males 30 – 500 ug/L Females 16 years – 39 years 30 – 200 ug/L 40 years – 49 years 30 – 300 ug/L 50 years – 90+ years 30 – 500 ug/L Pregnancy 1 st trimester 20 – 200 ug/L 2 nd trimester 20 – 150 ug/L 3 rd trimester 15 – 100 ug/L Paediatrics 20 – 200 ug/L
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

Transferrin

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	3034-6
Reported to (no DP)	1	Units	g/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Immunoturbidimetric
Hutt Analyser	Roche Cobas	Hutt Method	Immunoturbidimetric
Aotea Analyser	Roche P Module	Aotea Method	Immunoturbidimetric

Reference intervals

Age Range	Reference Interval								
0 – 2 months	1.3 – 2.3								
>2 months – 3 years	1.6 – 3.3								
>3 years – Adult	<table> <tr> <td>Males</td><td>2.0 – 3.2 g/L</td></tr> <tr> <td>Females 3 – 15 years</td><td>2.0 – 3.2 g/L</td></tr> <tr> <td>>15 – 49 years</td><td>2.0 – 3.6 g/L</td></tr> <tr> <td>>49 – 90+ years</td><td>2.0 – 3.2 g/L</td></tr> </table>	Males	2.0 – 3.2 g/L	Females 3 – 15 years	2.0 – 3.2 g/L	>15 – 49 years	2.0 – 3.6 g/L	>49 – 90+ years	2.0 – 3.2 g/L
Males	2.0 – 3.2 g/L								
Females 3 – 15 years	2.0 – 3.2 g/L								
>15 – 49 years	2.0 – 3.6 g/L								
>49 – 90+ years	2.0 – 3.2 g/L								

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from paediatric workgroup set-up by Dr Richard Mackay (6/11/08) adopted in line with SIQAG. Adult range from consensus based on package insert, review of patient data.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)														
ARQAG	1.7 – 3.4 g/L														
SIQAG	<table> <tr> <td>0 – 2 months</td><td>1.3 – 2.3 g/L</td></tr> <tr> <td>>2 months – 3 years</td><td>1.6 – 3.3 g/L</td></tr> <tr> <td>>3 years – Adult</td><td>2.0 – 3.5 g/L</td></tr> </table>	0 – 2 months	1.3 – 2.3 g/L	>2 months – 3 years	1.6 – 3.3 g/L	>3 years – Adult	2.0 – 3.5 g/L								
0 – 2 months	1.3 – 2.3 g/L														
>2 months – 3 years	1.6 – 3.3 g/L														
>3 years – Adult	2.0 – 3.5 g/L														
SONIC Australia (As at March 2011)	<table> <tr> <td>Males</td><td>2.0 – 3.2 g/L</td></tr> <tr> <td>Females 16 – 49 years</td><td>2.0 – 3.6 g/L</td></tr> <tr> <td>50 – 90+ years</td><td>2.0 – 3.2 g/L</td></tr> <tr> <td>Pregnancy 1st trimester</td><td>2.0 – 3.8 g/L</td></tr> <tr> <td>2nd trimester</td><td>2.0 – 4.8 g/L</td></tr> <tr> <td>3rd trimester</td><td>3.0 – 4.8 g/L</td></tr> <tr> <td>Paediatrics</td><td>2.0 – 3.5 g/L</td></tr> </table>	Males	2.0 – 3.2 g/L	Females 16 – 49 years	2.0 – 3.6 g/L	50 – 90+ years	2.0 – 3.2 g/L	Pregnancy 1 st trimester	2.0 – 3.8 g/L	2 nd trimester	2.0 – 4.8 g/L	3 rd trimester	3.0 – 4.8 g/L	Paediatrics	2.0 – 3.5 g/L
Males	2.0 – 3.2 g/L														
Females 16 – 49 years	2.0 – 3.6 g/L														
50 – 90+ years	2.0 – 3.2 g/L														
Pregnancy 1 st trimester	2.0 – 3.8 g/L														
2 nd trimester	2.0 – 4.8 g/L														
3 rd trimester	3.0 – 4.8 g/L														
Paediatrics	2.0 – 3.5 g/L														
NORIP															
NHANES															
Aussie Norms															
AACB Harmonisation Group	No proposed range at this time														
UK Harmony	No proposed range at this time														

Iron Saturation

Alternative name: (% Saturation/Transferring Saturation)

Test / Analyte Information

Health Pac Number		LOINC Code	14801-5
Reported to (no DP)		Units	%
Paed Range Needed		Sample Type	Serum

Laboratory information

WPH Analyser	Calculated parameter	WPH Method	Fe x 4.3 Transferrin
Hutt Analyser	Calculated parameter	Hutt Method	Fe x 4.3478 Transferrin
Aotea Analyser	Calculated parameter	Aotea Method	Fe x 4.3 Transferrin

Reference intervals

Age Range	Reference Interval
0 – Adult	16 – 45%

Reference Intervals Justification

Date of change	Justification
23/11/2013	Aligned with literature and CHL

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0 – 2 months 0.35 – 0.94 2 months – 1 year 0.10 – 0.46 1 year – 3 years 0.10 – 0.42 3 years – 10 years 0.14 – 0.45 10 years – 18 years 0.15 – 0.50 >18 years 0.15 – 0.50
SIQAG	Not stated in SIQAG documentation
CHL website	Transferrin Saturation 16 – 45 %
SONIC Australia (As at March 2011)	Adult 10 – 45 % Pregnancy 1 st trimester 5 – 45 % 2 nd & 3 rd trimester 5 – 35% Paediatrics 1wk – 13yrs 5 – 35 % 13 yrs – 15yrs 5 – 40 %
NORIP	0.10 – 0.50 [No units given]
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

Fasting Glucose

Alternative name: (Glucose (fasting))

Test / Analyte Information

Health Pac Number		LOINC Code	14771-0
Reported to (no DP)		Units	mmol/L
Paed Range Needed		Sample Type	Serum/Plasma

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Hexokinase
Hutt Analyser	Roche Cobas	Hutt Method	Hexokinase
Aotea Analyser	Roche P Module	Aotea Method	Hexokinase

Reference intervals

Age Range	Reference Interval
0 – Adult	3.5 – 6.0
Comment codes added to fasting glucose results in the following settings: Fasting glucose 3.0 – 5.4 Normal fasting glucose Fasting glucose 5.5 – 6.0 Fasting glucose is probably normal but does not completely exclude the possibility of diabetes in high risk subjects. In such cases recommend diet/lifestyle changes and assess all cardiovascular risk factors. Repeat annually (or HbA1c annually) unless symptomatic in interim. Fasting glucose 6.1 – 6.9 If patient is not known to have diabetes there is impaired fasting glycaemia. Suggest HbA1c &/or fasting glucose within 6 months. In the interim, lifestyle measures and cardiovascular risk assessment are strongly recommended with active management according to NZGG guidelines. Fasting glucose ≥7.0 The fasting glucose value is abnormal. A diagnosis of diabetes would be confirmed by a further diagnostic level e.g. HbA1c ≥50 mmol/mol or fasting glucose ≥7.0 mmol/L in 3 months. In the interim, lifestyle measures and cardiovascular risk assessment are strongly recommended with active management according to NZGG guidelines.	

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus and NZGG criteria. Comments to be added to all fasting glucose results.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	3.5 – 5.4 mmol/L
SIQAG	3.5 – 6.0 mmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

Random Glucose

Alternative name: (Glucose (Random))

Test / Analyte Information

Health Pac Number		LOINC Code	14749-6
Reported to (no DP)		Units	mmol/L
Paed Range Needed	No	Sample Type	Serum/Plasma

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Hexokinase
Hutt Analyser	Roche Cobas	Hutt Method	Hexokinase
Aotea Analyser	Roche P Module	Aotea Method	Hexokinase

Reference intervals

Age Range	Reference Interval
0 – Adult	Report comment: <i>Random glucose is not a preferred sample for diagnosis of diabetes</i>

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus and expert opinion.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	3.5 – 7.7 mmol/L
LabPlus website	No range given
SONIC Australia (As at March 2011)	No range given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

HCG

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	19080-1
Reported to (no DP)	0	Units	U/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 – Adult	<i>Entered as a comment code</i> 0 – 5 Non pregnant 0 – 14 Post menopausal 5 – 25 Retest in 2-3 days to confirm pregnancy >25 Pregnant	0 - 2

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus based on Roche package insert and LabPlus comment.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	0 – Adult 0 – 2 IU/L
LabPlus website	<5 non pregnant (pre-menopausal) <14 post menopausal 5 – 25 equivocal, repeat in 48 hours >25 consistent with conception
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

FT4

Alternative name: (T4 (free)/Thyroxine)

Test / Analyte Information

Health Pac Number		LOINC Code	14920-3
Reported to (no DP)	1	Units	pmol/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
4 days – 30 days	10.6 - 40
1 month – 11 months	6.2 – 30.1
1 year – 7 years	11 – 22.5
8 years – 11 years	11.6 – 21.5
12 years – Adult	12.8 – 20.4

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult ranges from Roche study, Paed values from study by Russell Cook in conjunction with Paediatric department at WPH.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Architect 9 – 19 pmol/L Centaur 10 – 20 pmol/L
SIQAG	0 – 6 days 17 – 42 pmol/L >6 days – 1 year 14 – 23 pmol/L > 1 year – Adult 10 – 24 pmol/L
SONIC Australia (As at March 2011)	Adult 11.0 – 21.0 pmol/L Pregnancy 1 st trimester 12.0 – 19.5 pmol/L 2 nd trimester 9.5 – 17.0 pmol/L 3 rd trimester 8.5 – 15.5 pmol/L Paediatrics 0 – 1 week 11.0 – 32.0 pmol/L >1 week – 3 months 11.5 – 28.5 pmol/L >3 months – 12 months 12.0 – 25.5 pmol/L >12 months – 6 years 12.5 – 23.0 pmol/L >6 years – 11 years 12.5 – 21.5 pmol/L >11 years – 15 years 11.0 – 21.0 pmol/L
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

TSH

Alternative name: (Thyroid Stimulating Hormone)

Test / Analyte Information

Health Pac Number		LOINC Code	11580-8
Reported to (no DP)	2	Units	mU/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
4 days - 30 days	0.4 – 16.1
1 month – 12 months	0.6 – 8.0
1 year – 6 years	0.5 – 4.5
>6 years – 12 years	0.7 – 4.1
>12 years – Adult	0.4 – 3.8

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult ranges from Roche study, Paed values from study by Russell Cook in conjunction with Paediatric department at WPH.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Not stated in ARQAG documentation	
SIQAG	0 – 4 days	1 – 20 mIU/L
	>4 days – 1 month	0.7 – 16 mIU/L
	>1 month – 6 months	0.5 – 6.0 mIU/L
	>6 months – Adult	0.4 – 4.0 mIU/L
LabPlus website	4 days – 1 month	0.4 – 16.0 mU/L
	1 month – 1 year	0.6 – 8.0 mU/L
	1 year – 19 years	0.5 – 4.5 mU/L
	19 years – Adult	0.27 – 4.2 mU/L
SONIC Australia (As at March 2011)	Adult 16 – 49 years	0.5 – 5.0 IU/L
	50 – 69 years	0.5 – 5.5 IU/L
	70 – 90+ years	0.5 – 6.0 IU/L
	Pregnancy 1 st trimester	0.03 – 2.6 IU/L
	2 nd trimester	0.4 – 4.8 IU/L
	3 rd trimester	0.2 – 4.8 IU/L
	Paediatrics	
	0 – 1 week	0.7 – 15.0 IU/L
	>1 week – 3 months	0.7 – 11.0 IU/L
	>3 months – 12 months	0.7 – 8.5 IU/L
	>12 months – 6 years	0.7 – 6.0 IU/L
	>6 years – 11 years	0.6 – 5.0 IU/L
	>11 years – 15 years	0.5 – 5.0 IU/L
NORIP		
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed range at this time	
UK Harmony	No proposed range at this time	

FT3

Alternative name: (T3 (Free)/Tri-iodothyronine)

Test / Analyte Information

Health Pac Number		LOINC Code	14928-6
Reported to (no DP)	1	Units	pmol/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
4 days – 30 days	3 – 8.0
1 month – 11 months	2.4 – 9.8
1 year – 7 years	3.0 – 9.1
>7 years – 12 years	4.1 – 7.9
>12 years – 19 years	3.5 – 7.7
>19 years – Adult	4.0 – 6.8

Reference Intervals Justification

Date of change	Justification
23/11/2013	Adult ranges from Roche study, Paed values from study by Russell Cook in conjunction with Paediatric department at WPH.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Architect	2.5 – 6.0 pmol/L
	Centaur	3.0 – 6.0 pmol/L
SIQAG	0 – 1 year	4.5 – 10.5 pmol/L
	>1 year – 12 years	3.8 – 8.6 pmol/L
	>12 years – 18 years	3.7 – 7.7 pmol/L
	>18 years	2.5 – 6.0 pmol/L
SONIC Australia (As at March 2011)	Males	3.2 – 6.4 pmol/L
	Females	3.1 – 6.0 pmol/L
	Pregnancy 1 st trimester	3.8 – 6.0 pmol/L
	2 nd trimester	3.2 – 5.5 pmol/L
	3 rd trimester	3.1 – 5.0 pmol/L
	Paediatrics	
	0 – 1 week	0.7 – 15.0 IU/L
	>1 week – 3 months	0.7 – 11.0 IU/L
	>3 months – 12 months	0.7 – 8.5 IU/L
	>12 months – 6 years	0.7 – 6.0 IU/L
	>6 years – 11 years	0.6 – 5.0 IU/L
	>11 years – 15 years	0.5 – 5.0 IU/L
NORIP		
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed range at this time	
UK Harmony	No proposed range at this time	

hs Troponin

Alternative name: ()

Test / Analyte Information

Health Pac Number		LOINC Code	6598-7
Reported to (no DP)	0	Units	ng/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	Comment code: <i>Reference interval <5 – 13 ng/L</i>

Reference Intervals Justification

Date of change	Justification
8/06/10	National consensus following introduction of new assay 8 th June 2010

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	0 – 14 ng/L
LabPlus website	Less than 14 ng/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed range at this time
UK Harmony	No proposed range at this time

LH

Alternative name: (Luteinising Hormone)

Test / Analyte Information

Health Pac Number		LOINC Code	10501-5
Reported to (no DP)	1	Units	U/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 - Adult	Comment code: <i>Follicular 2 – 13 U/L</i> <i>Midcycle 14 – 95 U/L</i> <i>Luteal 1 – 12 U/L</i> <i>Post menopause >20 U/L</i>	1 - 10

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus from Roche package insert

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0 – 9 years 0 – 2.5 IU/L 10 years – 15 years <i>Levels rise during puberty towards adult range.</i> Males 2 – 9 IU/L Female Follicular 2 – 8 IU/L Female Mid cycle 10 – 75 IU/L Female Luteal 2 – 8 IU/L Female Post menopausal >15 IU/L Female Pregnant <1 IU/L
SIQAG	0 – 10 years 0 – 2.5 IU/L >10 years – 15 years <i>Prepubertal range 0 – 2.5 IU/L. Levels rise during puberty towards adult range.</i> Males >15 years – Adult 2 – 9 IU/L Females >15 years – Adult Follicular 2 – 8 IU/L Females >15 years – Adult Mid Cycle 10 – 75 IU/L Females >15 years – Adult Luteal 2 – 8 IU/L Females >15 years – Adult Post menopause >15 IU/L Females >15 years – Adult Antenatal <1 IU/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

FSH

Alternative name: (Follicle Stimulating Hormone)

Test / Analyte Information

Health Pac Number		LOINC Code	15067-2
Reported to (no DP)	1	Units	U/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 - Adult	Comment code: <i>Follicular 3 – 12 U/L</i> <i>Mid cycle 5 – 22 U/L</i> <i>Luteal 2 – 8 U/L</i> <i>Post menopause 26 – 134 U/L</i>	Comment code: <i>Male 1 – 12 U/L</i>

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus from Roche package inserts

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0 – 9 years 0 – 6.5 IU/L 10 years – 15 years <i>Levels rise during puberty towards adult range.</i> Males 2 – 12 IU/L Female Follicular 3 – 10 IU/L Female Mid cycle 4 – 25 IU/L Female Luteal 2 – 8 IU/L Female Post menopausal >20 IU/L Female Pregnant <1 IU/L
SIQAG	0 – 10 years 0 – 6.5 IU/L >10 years – 15 years <i>Prepubertal range 0 – 6.5 IU/L. Levels rise during puberty towards adult range.</i> Males >15 years – Adult 2 – 12 IU/L Females >15 years – Adult Follicular 3 – 10 IU/L Females >15 years – Adult Mid Cycle 4 – 25 IU/L Females >15 years – Adult Luteal 2 – 8 IU/L Females >15 years – Adult Post menopause >20 IU/L Females >15 years – Adult Antenatal <1 IU/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Prolactin

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	20434-7
Reported to (no DP)	0	Units	mU/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 – Adult	100 - 500	85 - 400
Pregnant	Comment added to all Antenatal samples: <i>Prolactin is elevated in pregnancy with no defined upper limit.</i>	

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus from Roche package insert for non-pregnant ranges

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Male Immulite 53 – 360 mIU/L
	Architect 50 – 450 mIU/L
	Female Immulite 40 – 530 mIU/L
	Architect 50 – 650 mIU/L
SIQAG	Male 0 – Adult 50 – 350 mIU/L
	Female 0 – Adult 50 – 550 mIU/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Macroprolactin

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	56972-3
Reported to (no DP)	0	Units	mU/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	PEG precipitation + ECLIA
Hutt Analyser		Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	PEG precipitation + ECLIA

Reference intervals

Age Range	Reference Interval	
	Post PEG precipitation results	
	Female	Male
0 – Adult	60 - 245	75 - 381
Reporting Comments:		
1	<i>The Prolactin level post-PEG treatment for Macroprolactin remains elevated suggesting NO significant Macroprolactin interference in the initial Prolactin measurement.</i>	
2	<i>The Prolactin level post-PEG treatment for Macroprolactin has corrected into the reference range suggesting Macroprolactin interference in the initial Prolactin measurement.</i>	

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus and literature (Fahie-Wilson article)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	At LabPlus, all samples with a raised prolactin concentration are routinely tested for the presence of macroprolactin. The level of monomeric (biologically active) prolactin is reported, as well as the total prolactin (monomeric prolactin + macroprolactin). If the monomeric prolactin is normal, no further investigations for prolactinoma are necessary.
CHL website	Free Prolactin: Female 80 – 530 mIU/L Male 80 – 350 mIU/L Macroprolactin reported as High, Low or Undetectable
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Progesterone

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	14890-8
Reported to (no DP)	0	Units	nmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 - Adult	Comment code: <i>Follicular 0 – 1.0 nmol/L</i> <i>Luteal 8 – 70 nmol/L</i> <i>Post menopause 0 – 2.0 nmol/L</i>	0 - 2

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus from Roche package insert

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Not indicative of ovulation	0 – 6 nmol/L
	Ovulation possible	7 – 25 nmol/L
	Ovulation confirmed	>25 nmol/L
SIQAG	Males 0 – Adult	0 – 1 nmol/L
	Females Follicular	1 – 4 nmol/L
	Females Luteal	15 – 100 nmol/L
	Females Post menopausal	<4 nmol/L
SONIC Australia (As at March 2011)	No ranges given	
NORIP		
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed ranges at this time	
UK Harmony	No proposed ranges at this time	

Testosterone

Alternative name: ()

Test / Analyte Information

Health Pac Number		LOINC Code	14913-8
Reported to (no DP)	1	Units	nmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas- males Siemens –RIA for females	WPH Method	ECLIA - for female RIA for male Testo
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 – Adult	0.5 – 2.5	9 - 25

Reference Intervals Justification

Date of change	Justification
23/11/2013	Laboratory Test referral draft guidelines, Feb 2013 V2, aligned with LabPlus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Free Testosterone Males 20 years – 50 years 198 – 619 pmol/L Males >50 years 163 – 473 pmol/L Females 20 years – 50 years <35 pmol/L Females >50 years <23 pmol/L
SIQAG	Not stated in SIQAG documentation
CHL website	Total Testosterone Males 9 – 38 nmol/L Females 0.3 – 2.7 nmol/L Free Testosterone Males 250 – 800 pmol/L Females <50 pmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Cortisol

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	14675-3 (Not time specific) 24394-9 Dexamethasone 24390-7 30m post Synacthen 24391-5 1hr post Synacthen
Reported to (no DP)	0	Units	nmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	250 – 700 Comment code: <i>Reference Interval only applies to specimens taken between 8.00 am and 9.15 am</i>

Reference Intervals Justification

Date of change	Justification
23/11/2013	Historic range

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	0800 hours 250 – 800 nmol/L
LabPlus website	Early morning sample normal range (diurnal peak): 200 – 700 nmol/L
SONIC Australia (As at March 2011)	
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	
UK Harmony	

AFP

Alternative name: (Alphafetoprotein)

Test / Analyte Information

Health Pac Number		LOINC Code	19176-7
Reported to (no DP)		Units	KU/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	0 – 10

Reference Intervals Justification

Date of change	Justification
23/11/2013	Roche Pack insert and historical

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	Adult (non-pregnant) < 10 ug/L
CHL website	0 – 16 ug/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

CEA

Alternative name: (Carcinoembryonic Antigen)

Test / Analyte Information

Health Pac Number		LOINC Code	2039-6
Reported to (no DP)	1	Units	ug/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	0 – 3.4

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consistency/ check pack insert

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	< 3.0 ug/L (non smokers)
CHL website	0 – 3.0 ug/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Ca125

Alternative name: (Carbohydrate antigen 125/CA-125)

Test / Analyte Information

Health Pac Number		LOINC Code	10334-1
Reported to (no DP)	0	Units	KU/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	0 – 35

Reference Intervals Justification

Date of change	Justification
23/11/2013	International consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	< 35 U/mL
CHL website	0 – 35 kIU/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Parathyroid hormone

Alternative name: (PTH)

Test / Analyte Information

Health Pac Number		LOINC Code	14866-8
Reported to (no DP)	1	Units	pmol/L
Paed Range Needed	No	Sample Type	Serum/Plasma

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	1.5 – 6

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	1.7 – 7.3 pmol/L
CHL website	1.6 – 7.2 pmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Insulin

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	25447-4
Reported to (no DP)	0	Units	pmol/L
Paed Range Needed	No	Sample Type	Serum/plasma

Laboratory information

WPH Analyser	-	WPH Method	-
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	10 - 80

Reference Intervals Justification

Date of change	Justification
23/11/2013	National consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	Performed at CHL
CHL website	10 – 80 pmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Valproate

Alternative name: (Valproic acid/Epilim)

Test / Analyte Information

Health Pac Number		LOINC Code	14946-8
Reported to (no DP)	0	Units	umol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ONLINE-Enzyme Immunoassay
Hutt Analyser	Roche Cobas	Hutt Method	On-Line
Aotea Analyser	Roche P Module	Aotea Method	CEDIA

Reference intervals

Age Range	Reference Interval
0 – Adult	Likely to be clinically suboptimal < 350 umol/L Potentially Hepatotoxic > 700 umol/L Likely to be Hepatotoxic > 800 umol/L

Reference Intervals Justification

Date of change	Justification
23/11/2013	Clinically based comment

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	Poor control < 350 umol/L Hepatotoxic > 700 umol/L
CHL website	Not stated
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No range should be quoted

Phenytoin

Alternative name: (Dilantin)

Test / Analyte Information

Health Pac Number		LOINC Code	14877-5
Reported to (no DP)	0	Units	umol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ONLINE-Enzyme Immunoassay
Hutt Analyser	Roche Cobas	Hutt Method	On-Line
Aotea Analyser	Roche P Module	Aotea Method	On-Line

Reference intervals

Age Range	Reference Interval
0 – Adult	40 - 80

Reference Intervals Justification

Date of change	Justification
23/11/2013	National consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	40 – 80 umol/L
CHL website	40 – 80 umol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	5 -20 mg/L (19.8 – 79.2 umol/L)

Carbamazepine

Alternative name: (Tegretol)

Test / Analyte Information

Health Pac Number		LOINC Code	14639-9
Reported to (no DP)	0	Units	umol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	CEDIA
Hutt Analyser	Roche Cobas	Hutt Method	CEDIA
Aotea Analyser	Roche P Module	Aotea Method	On-Line

Reference intervals

Age Range	Reference Interval
0 – Adult	16-50

Reference Intervals Justification

Date of change	Justification
23/11/2013	In line with pack insert, and literature for monotherapy

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	16 – 40 umol/L
LabPlus website	16 – 40 umol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	4 – 12 mg/L (16.92 – 50.76 umol/L)

All drug levels, attach comment - *Therapeutic interval supplied refers to monotherapy*

Lithium

Alternative name: (NA)

Test / Analyte Information

Health Pac Number		LOINC Code	14334-7
Reported to (no DP)	1	Units	mmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Colorimetric
Hutt Analyser	Roche Cobas	Hutt Method	Colorimetric
Aotea Analyser	Roche P Module	Aotea Method	Trinity Biotech Colorimetric

Reference intervals

Age Range	Reference Interval
0 – Adult	0.6 – 1.2

Reference Intervals Justification

Date of change	Justification
23/11/2013	Literature based

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
LabPlus website	Therapeutic range: 0.5 – 1.0 mmol/L Toxicity possible: 1.0 – 1.5 mmol/L Toxicity common: > 1.5 mmol/L
CHL website	0.4 – 1.2 mmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	0.4 – 1.0 mmol/L

Digoxin

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	14698-5
Reported to (no DP)	1	Units	nmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	On-Line
Hutt Analyser	Roche E Module	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	0.6 – 2.0

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus from LINQAG meeting 31/08/05, National QAG consensus.

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0.6 – 2.0 nmol/L
SIQAG	0.6 – 2.0 nmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	0.5 – 1.0 ug/L (0.64 – 1.28 nmol/L)

IgG

Alternative name: ()

Test / Analyte Information

Health Pac Number		LOINC Code	2465-3
Reported to (no DP)		Units	g/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Immunoturbidimetric
Hutt Analyser	Roche Cobas	Hutt Method	Immunoturbidimetric
Aotea Analyser	Roche P Module	Aotea Method	Immunoturbidimetric

Reference intervals

Age Range	Reference Interval
0 – 14 days	6 – 16
15 days – 42 days	2 – 6
43 days – 210 days	2 – 7
7 months – 23 months	3 – 10.5
2 years – 5 years	4.5 – 11.5
6 – 10 years	6 – 13
11 – 16 years	6 – 15
17 – 70 years	7 – 16
>71 years	6 – 15

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus with ARQAG ranges

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	7 – 16 g/L
SIQAG	Not stated in SIQAG documentation
CHL website	Not stated
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

IgA

Alternative name: ()

Test / Analyte Information

Health Pac Number		LOINC Code	2458-8
Reported to (no DP)		Units	g/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Immunoturbidimetric
Hutt Analyser	Roche Cobas	Hutt Method	Immunoturbidimetric
Aotea Analyser	Roche P Module	Aotea Method	Immunoturbidimetric

Reference intervals

Age Range	Reference Interval
0 – 14 days	0 – 0.1
15 days – 42 days	0 – 0.5
43 days – 210 days	0 – 0.8
7 months – 23 months	0.1 – 1.12
2 years – 5 years	0.3 – 1.6
6 – 10 years	0.4 – 2.2
11 – 16 years	0.7 – 2.3
17 years – Adult	0.8 – 4

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus with ARQAG ranges

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0.8 – 4.0 g/L
SIQAG	Not stated in SIQAG documentation
CHL website	Not stated
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

IgM

Alternative name: ()

Test / Analyte Information

Health Pac Number		LOINC Code	2472-9
Reported to (no DP)		Units	g/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Immunoturbidimetric
Hutt Analyser	Roche Cobas	Hutt Method	Immunoturbidimetric
Aotea Analyser	Roche P Module	Aotea Method	Immunoturbidimetric

Reference intervals

Age Range	Reference Interval
0 – 14 days	0.1 – 0.6
15 days – 42 days	0.2 – 0.8
43 days – 210 days	0.2 – 1
7 months – 23 months	0.3 – 1.5
2 years – 5 years	0.5 – 1.9
6 – 10 years	0.5 – 2.1
11 – 16 years	0.5 – 2.2
17 – 70 years	0.4 – 2.5
>71 years	0.4 – 2.4

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus with ARQAG ranges

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0.4 – 2.5 g/L
SIQAG	Not stated in SIQAG documentation
CHL website	Not stated
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Albumin/Creatinine ratio

Alternative name: (Microalbumin/Creatinine ratio)

Test / Analyte Information

Health Pac Number		LOINC Code	32294-1
Reported to (no DP)	1	Units	
Paed Range Needed	No	Sample Type	Urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Tina-Quant/ Alkaline picrate; Rate- blanking, compensated
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche P Module	Aotea Method	Tina-Quant/ Jaffe - Rate-blanking, compensated

Reference intervals

Age Range	Reference Interval	
	Female	Male
0 – Adult	<3.5	<2.5

Reference Intervals Justification

Date of change	Justification
23/11/2013	International consensus, 2012 NZ Primary Care Handbook

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Males < 2.5 mg/mmol Females < 3.5 mg/mmol
SIQAG	Not stated in SIQAG documentation
CHL website	Albumin/Creatinine ratio < 3.5g/molL
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Vitamin B12

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	14685-2
Reported to (no DP)	0	Units	pmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser		Hutt Method	
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	170 – 800

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional alignment and national alignment of normal range for ECLIA methodology

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Analyser specific ranges quoted for ARQAG Borderline – Elecsys 110 – 170 pmol/L Architect 70 – 130 pmol/L Centaur 110 – 170 pmol/L Normal – Elecsys 170 – 800 pmol/L Architect 130 – 800 pmol/L Centaur 170 – 600 pmol/L
SIQAG	Not stated in SIQAG documentation
CHL website	Adults 130 – 650 pmol/L Grey zone < 250 pmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Folate

Alternative name: (Folic Acid)

Test / Analyte Information

Health Pac Number		LOINC Code	14732-2
Reported to (no DP)	0	Units	nmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser		Hutt Method	
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	9 – 45
	Borderline 7 – 9

Reference Intervals Justification

Date of change	Justification
23/11/2013	National analyser specific consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Analyser specific ranges quoted for ARQAG Borderline – Elecsys 7 – 9 nmol/L Architect 5 – 7 nmol/L Centaur 7 – 10 nmol/L Normal – Elecsys 9 – 45 nmol/L Architect 7 – 45 nmol/L Centaur > 10 nmol/L
SIQAG	Adult > 8 nmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Bicarbonate

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	1959-6
Reported to (no DP)	0	Units	mmol/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Radiometer ABL	WPH Method	Calculated
Hutt Analyser		Hutt Method	
Aotea Analyser	Radiometer ABL	Aotea Method	Calculated

Reference intervals

Age Range	Reference Interval
0 – Adult	22 – 29

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus from manufactures information (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Venous plasma < 2 years 17 – 27 mmol/L > 2 years 22 – 31 mmol/L
SIQAG	Not stated in SIQAG documentation
CHL website	Venous Adults 22 – 28 mmol/L 0 – 2 years 19 – 24 mmol/L
SONIC Australia (As at March 2011)	Adults 20 – 32 mmol/L Pregnancy 18 – 28 mmol/L Paediatrics 0 – 1 wk 17 – 26 mmol/L ≥1wk – 4wks 17 – 27 mmol/L ≥4wks – 6mths 17 – 29 mmol/L ≥6mths – 12mths 18 – 29 mmol/L ≥12mths – 15yrs 21 – 31 mmol/L
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	Adult 22 – 32 mmol/L Pregnancy 19 – 29 mmol/L Paediatric Birth – <3mths 17 – 27 mmol/L ≥3mths – <2yrs 18 – 29 mmol/L ≥2yrs – <16yrs 21 – 31 mmol/L ≥16yrs – Adult 22 – 32 mmol/L
UK Harmony	22 – 29 mmol/L

Ionised Calcium

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	1995-0
Reported to (no DP)	2	Units	mmol/L
Paed Range Needed	Yes	Sample Type	Serum

Laboratory information

WPH Analyser	Radiometer ABL	WPH Method	Direct ISE
Hutt Analyser	Radiometer ABL	Hutt Method	Direct ISE
Aotea Analyser	Radiometer ABL	Aotea Method	Direct ISE

Reference intervals

Age Range	Reference Interval
0 – 1 day	1.05 – 1.37 mmol/L
2 – 4 days	1.10 – 1.42 mmol/L
5 – 7 days	1.20 – 1.48 mmol/L
1 week – 18 years	1.20 – 1.38 mmol/L
19 years – Adult	1.15 – 1.29 mmol/L

Reference Intervals Justification

Date of change	Justification
23/11/2013	Paediatric ranges from Tietz 5 th Edition, Adult ranges from Radiometer

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	1 day – 1 year 1.10 – 1.45 mmol/L >1 year – Adult 1.15 – 1.30 mmol/L
SIQAG	Not stated in SIQAG documentation
CHL website	1.11 – 1.25 mmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

CRP

Alternative name: (C-reactive protein)

Test / Analyte Information

Health Pac Number		LOINC Code	1988-5
Reported to (no DP)	0	Units	mg/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Latex Particles immunoturbidimetric
Hutt Analyser	Roche Cobas	Hutt Method	Immunoturbidimetric
Aotea Analyser	Roche P Module	Aotea Method	Immunoturbidimetric

Reference intervals

Age Range	Reference Interval
0 – Adult	0 - 5

Reference Intervals Justification

Date of change	Justification
23/11/2013	National consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	0 – 5 mg/L
SIQAG	<5 mg/L
CHL website	1.11 – 1.25 mmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

24 hour Urine Calcium

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	14637-3
Reported to (no DP)	1	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Cresolphthalein complexone
Hutt Analyser	Roche Cobas	Hutt Method	Cresolphthalein complexone
Aotea Analyser	Roche P Module	Aotea Method	Cresolphthalein complexone

Reference intervals

Age Range	Reference Interval
0 – Adult	2.5 – 7.5 mmol/24 hour

Reference Intervals Justification

Date of change	Justification
23/11/2013	National consensus, and aligned with UK Harmony

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	2.5 – 7.5 mmol/24 hour
LabPlus website	2.5 – 7.5 mmol/24 hour
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	2.5 – 7.5 mmol/24 hours

24 hour Urine Magnesium

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	2599-9
Reported to (no DP)	1	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Chlorophosphonaze
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche P Module	Aotea Method	Xylidyl Blue

Reference intervals

Age Range	Reference Interval
0 – Adult	2.5 – 7.0 mmol/24 hour

Reference Intervals Justification

Date of change	Justification
23/11/2013	Consensus (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	2.5 – 7.0 mmol/24 hour
LabPlus website	2.5 – 8.0 mmol/24 hour
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	2.4 – 6.5 mmol/24 hours

24 hour Urine Creatinine

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	14684-5
Reported to (no DP)	1	Units	mmol/24 hours
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Alkaline picrate; Rate-blanking, compensated
Hutt Analyser	Roche Cobas	Hutt Method	Rate blanked, compensated Jaffe
Aotea Analyser	Roche P Module	Aotea Method	Rate blanked, compensated Jaffe

Reference intervals

Age Range	Reference Interval	
	Female	Male
>15 years – Adult	4.0 – 17.0	7.0 – 24.0
	0 – 6 months	0.2 – 1.6 mmol/24 hours
	6 months – 2 years	0.2 – 2.0 mmol/24 hours
	2 years – 6 years	0.5 – 6.0 mmol/24 hours
	6 years – 10 years	1.5 – 12.6 mmol/24 hours
	10 years – 15 years	2.0 – 20.0 mmol/24 hours

Reference Intervals Justification

Date of change	Justification
23/11/2013	Aligned with LabPlus ranges 19/03/12, national consensus of paediatric ranges

National and International trends

Other NZ ranges	Range details (As at 20/3/12)	
ARQAG	Not stated in ARQAG documentation	
SIQAG	Not stated in SIQAG documentation	
CHL website	0 – 6 months	0.2 – 1.6 mmol/24 hours
	7 months – 2 years	0.2 – 2.0 mmol/24 hours
	3 years – 6 years	0.5 – 6.0 mmol/24 hours
	7 years – 10 years	1.5 – 12.6 mmol/24 hours
	11 years – 15 years	2.0 – 20.0 mmol/24 hours
	>16 years Male	9.0 – 18.0 mmol/24 hours
	>16 years Female	7.0 – 12.5 mmol/24 hours
LabPlus website	0 – 6 months	0.2 – 1.6 mmol/24 hours
	6 months – 2 years	0.2 – 2.0 mmol/24 hours
	2 years – 6 years	0.5 – 6.0 mmol/24 hours
	6 years – 10 years	1.5 – 12.6 mmol/24 hours
	10 years – 15 years	2.0 – 20.0 mmol/24 hours
	Adult Female	4.0 – 17.0 mmol/24 hours
	Adult Male	7.0 – 24.0 mmol/24 hours
SONIC Australia (As at March 2011)	No ranges given	
NORIP		
NHANES		
Aussie Norms		
AACB Harmonisation Group	No proposed ranges at this time	
UK Harmony	No proposed ranges at this time	

24 hour Urine Phosphate

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	14881-7
Reported to (no DP)	0	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Phosphomolybdate
Hutt Analyser	Roche Cobas	Hutt Method	Phosphomolybdate complex
Aotea Analyser	Roche P Module	Aotea Method	Phosphomolybdate complex

Reference intervals

Age Range	Reference Interval
0 – Adult	13 - 40

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Note stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	16 – 48 mmol/24 hours
LabPlus website	10 – 40 mmol/24 hours (Varies greatly with intake)
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	15 – 50 mmol/24 hours

24 hour Urine Potassium

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	2829-0
Reported to (no DP)	0	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Indirect ISE
Hutt Analyser	Roche Cobas	Hutt Method	Indirect ISE
Aotea Analyser	Roche ISE Module	Aotea Method	Indirect ISE

Reference intervals

Age Range	Reference Interval
0 – Adult	25 – 125

Reference Intervals Justification

Date of change	Justification
19/03/12	Regional consensus (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	35 – 100 mmol/24 hours
LabPlus website	The output of potassium depends on the intake, physiological state, and drugs.
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

24 hour Urine Sodium

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	2956-1
Reported to (no DP)	0	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Indirect ISE
Hutt Analyser	Roche Cobas	Hutt Method	Indirect ISE
Aotea Analyser	Roche ISE Module	Aotea Method	Indirect ISE

Reference intervals

Age Range	Reference Interval
0 – Adult	20 - 200

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	100 – 250 mmol/24 hours
LabPlus website	The output of sodium in the urine depends on the sodium intake, if the patient is in a steady state. Less than 100 mmol/24 hours: low sodium intake 100 – 200 mmol/24 hours: average sodium intake >200 mmol/24 hours: high sodium intake
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

24 hour Urine Urate

Alternative name: (24 hour Urine Uric acid)

Test / Analyte Information

Health Pac Number		LOINC Code	14935-1
Reported to (no DP)	1	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Uricase/peroxidase
Hutt Analyser	Roche Cobas	Hutt Method	Uricase
Aotea Analyser	Roche P Module	Aotea Method	Uricase

Reference intervals

Age Range	Reference Interval
0 – Adult	1.5 – 4.5

Reference Intervals Justification

Date of change	Justification
19/03/12	Regional consensus (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	1.5 – 4.5 mmol/24 hours
LabPlus website	2 – 5 mmol/24 hours
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	1.5 – 4.5 mmol/24 hours

24 hour Urine Protein

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	2889-4
Reported to (no DP)	2	Units	g/24 hours
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Turbidimetric
Hutt Analyser	Roche Cobas	Hutt Method	Turbidometric, benzethonium chloride
Aotea Analyser	Roche P Module	Aotea Method	Turbidometric, benzethonium chloride

Reference intervals

Age Range	Reference Interval
0 – Adult	0 – 0.15

Reference Intervals Justification

Date of change	Justification
23/11/2013	

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	<0.14 g/24 hours
LabPlus website	<0.15 g/24 hours
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

24 hour Urine Urea

Alternative name: ()

Test / Analyte Information

Health Pac Number		LOINC Code	14939-3
Reported to (no DP)	0	Units	mmol/24 hour
Paed Range Needed	No	Sample Type	24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Urease -Kinetic
Hutt Analyser	Roche Cobas	Hutt Method	Urease
Aotea Analyser	Roche P Module	Aotea Method	Urease

Reference intervals

Age Range	Reference Interval
0 – Adult	170 - 580

Reference Intervals Justification

Date of change	Justification
19/03/12	Regional consensus (19/03/12)

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	165 – 580 mmol/24 hours
LabPlus website	420 – 720 mmol/24 hours
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Creatinine Clearance

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	2164-2 (not corrected for SA) 58446-6 (corrected for SA)
Reported to (no DP)	2	Units	
Paed Range Needed	No	Sample Type	Serum + 24 hour urine

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	Calculated
Hutt Analyser		Hutt Method	Rate blanked, compensated Jaffe
Aotea Analyser	Roche P Module	Aotea Method	Rate blanked, compensated Jaffe

Reference intervals

Age Range	Reference Interval
0 – Adult	1.57 – 2.23 ml/sec

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	>1.5 mL/sec
LabPlus website	90 – 140 mL/min
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

PSA

Alternative name: (TPSA/PSA (Total))

Test / Analyte Information

Health Pac Number		LOINC Code	2857-1
Reported to (no DP)	1	Units	ug/L
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	Roche Cobas	Hutt Method	ECLIA
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	0-50 yrs 0-2.5 ng/mL 50-60 yrs 0-3.5 ng/mL 60-70 yrs 0-4.5 ng/mL >70 yrs 0-6.5 ng/mL

Reference Intervals Justification

Date of change	Justification
23/11/2013	National consensus based on literature

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Confirmed reporting as: Results < 0.05 ug/L report as < 0.05 ug/L Results between 0.05 – 0.26 report to 2 decimal places Results ≥ 0.30 report to 1 decimal place Results > 30 report to no decimal places
SIQAG	Adult < 4.0 ug/L
CHL website	0.0 – 4.0 ug/L
LabPlus website	0 – 50 years 0 – 2.5 ug/L >50 – 60 years 0 – 3.5 ug/L >60 – 70 years 0 – 4.5 ug/L >70 years 0 – 6.5 ug/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Free/Total PSA ratio

Alternative name: (N/A)

Test / Analyte Information

Health Pac Number		LOINC Code	12841-3
Reported to (no DP)		Units	-
Paed Range Needed	No	Sample Type	Serum

Laboratory information

WPH Analyser	Roche Cobas	WPH Method	ECLIA
Hutt Analyser	-	Hutt Method	-
Aotea Analyser	Roche E Module	Aotea Method	ECLIA

Reference intervals

Age Range	Reference Interval
0 – Adult	Comment code: <i>The ratio of Free:Total PSA tends to be lower in prostatic malignancy than in benign hyperplasia. When Total PSA is in the borderline range of 4-10 ng/ml, ratios below about 0.24 define patients in whom biopsy should be considered. A ratio below 0.1 is strongly associated with malignancy.</i>

Reference Intervals Justification

Date of change	Justification
23/11/2013	Regional consensus

National and International trends

Other NZ ranges	Range details (As at 20/3/12)
ARQAG	Not stated in ARQAG documentation
SIQAG	Not stated in SIQAG documentation
CHL website	When the total PSA is modestly raised a % free PSA of under 20% suggests a higher probability of carcinoma.
LabPlus website	Test referred to Medlab Central
CHL website	1.11 – 1.25 mmol/L
SONIC Australia (As at March 2011)	No ranges given
NORIP	
NHANES	
Aussie Norms	
AACB Harmonisation Group	No proposed ranges at this time
UK Harmony	No proposed ranges at this time

Analytes covered by Guideline documents

Test	LOINC code
Cholesterol	14647-2
Triglycerides – Fasting	30524-3
Triglycerides – Random	14927-8
HDL Cholesterol	14646-4
LDL Cholesterol	39469-2
HbA1c	XNZ0436
Chol/HDL ratio	32309-7
Glucose – 1hr Post Challenge	14754-6
Glucose – 2hr Post 75g load	14995-5
eGFR – CKD EPI equation	62238-1

Reference Table for non-harmonised analytes

Test name	Method	LOINC code	Site(s) using this code
Oestradiol	Immunoassay	14715-7	Aotea Pathology Wellington Hospital
Oestradiol	High sensitivity method	72873-3	Wellington Hospital
Testosterone	Immunoassay	14913-8	Aotea Pathology Wellington Hospital
Testosterone	RIA	70239-9	Wellington Hospital