

Trial Specific Reference Ranges 2023

Department:	Issued to Austin Pathology Website
Clinical Trial Number:	N/A
Protocol number:	N/A
Austin Pathology Reference Ranges	
Applicable from:	1st January 2023
Signed:	
Issued By:	Jennifer Horvath
Date:	10 th May 2023
Austin Pathology, Clinical Trials Department	

Test	Units	Adult Reference Range	Gender	Notes
Haematology				
WCC	x 10 ⁹ /L	4.0 – 12.0	M/F	
RCC	x 10 ¹² /L	4.20 – 5.90	M	16-60 Years Old
RCC	x 10 ¹² /L	3.80 – 5.70	M	>60 Years Old
RCC	x 10 ¹² /L	3.60 – 5.20	F	>16 Years Old
Hb	g/L	130 – 170	M	16-60 Years Old
Hb	g/L	120 -170	M	>60 Years Old
Hb	g/L	115 – 155	F	>16 Years Old
HCT	L/L	0.36 – 0.50	M	16-60 Years Old
HCT	L/L	0.33 – 0.45	F	16-60 Years Old
HCT	L/L	0.36 – 0.50	M	>60 Years
HCT	L/L	0.33 – 0.45	F	>60 Years
MCV	fL	80 - 99	M/F	
MCH	pg	26.0 – 34.0	M/F	
MCHC	g/L	315 - 365	M/F	
RDW	%	11.6 - 14.0	M/F	
Platelet Count	x 10 ⁹ /L	150 - 400	M/F	
MPV	fL	7.0 – 12.0	M/F	
Neutrophils	x 10 ⁹ /L	2.0 – 8.0	M/F	
Band Forms	x 10 ⁹ /L	0.0 – 0.5	M/F	
Lymphocytes	x 10 ⁹ /L	1.0 – 3.5	M/F	
Monocytes	x 10 ⁹ /L	0.2 – 1.0	M/F	
Eosinophils	x 10 ⁹ /L	0.0 – 0.5	M/F	
Basophils	x 10 ⁹ /L	0.0 – 0.2	M/F	
Reticulocytes	x 10 ⁹ /L	20 - 100	M/F	
Coagulation				
INR (International Normalised Ratio)	ratio	2.0 - 3.0	M/F	For the majority of indications on Warfarin therapy.
PT (prothrombin time)	secs	11 -15	M/F	Not on anticoagulant therapy
APTT (activated partial thromboplastin time)	secs	22 - 38	M/F	Not on anticoagulant therapy
Fibrinogen	g/L	2.0 - 4.0	M/F	
D Dimer	ng/ml	<500	M/F	

Test	Units	Adult Reference Range	Gender	Notes
Biochemistry				
Sodium	mmol/L	135 - 145	M/F	>18 Years Old
Potassium	mmol/L	3.5 - 5.2	M/F	>18 Years Old
Chloride	mmol/L	95 - 110	M/F	>18 Years Old
Bicarbonate	mmol/L	22 - 32	M/F	>18 Years Old
Urea	mmol/L	1.8-6.4	M/F	1 Month -19 Years Old
Urea	mmol/L	3.0 - 7.0	F	19 - 49 Years Old
Urea	mmol/L	3.5 - 8.0	F	50 - 69 Years Old
Urea	mmol/L	4.0 - 9.0	F	>70 Years Old
Urea	mmol/L	3.5 - 8.0	M	19 - 49 Years Old
Urea	mmol/L	4.0 - 9.0	M	50 - 69 Years Old
Urea	mmol/L	4.5 - 10	M	>70 Years Old
Creatinine	umol/L	50 - 110	M	15 - 19 Years Old
Creatinine	umol/L	60 - 110	M	>19 Years Old
Creatinine	umol/L	38 – 82	F	15-19 Years Old
Creatinine	umol/L	45 - 90	F	>19 Years Old
Estimated GFR	mL/min/1.73m ²	>90	M/F	
Alkaline Phosphatase (ALP)	U/L	50 - 220	M	17 - <19 Years Old
Alkaline Phosphatase (ALP)	U/L	45 - 150	M	19 - 22 Years Old
Alkaline Phosphatase (ALP)	U/L	45 - 170	F	17 - <19 Years Old
Alkaline Phosphatase (ALP)	U/L	35 - 140	F	19 - 22 Years Old
Alkaline Phosphatase (ALP)	U/L	30 - 110	M/F	>22 Years Old
Alanine Amino Transferase (ALT)	U/L	5 - 40	M	13 -19 Years Old
Alanine Amino Transferase (ALT)	U/L	10 - 24	M	>19 Years Old
Alanine Amino Transferase (ALT)	U/L	9 - 22	F	13-19 Years Old
Alanine Amino Transferase (ALT)	U/L	5 - 35	F	>19 Years Old
Gamma Glutamyl Transferase (GGT)	U/L	5 - 50	M	>18 Years Old
Gamma Glutamyl Transferase (GGT)	U/L	5 - 35	F	>18 Years Old
Total Bilirubin	umol/L	<21	M/F	Adults >28 Days Old
Albumin	g/L	35 - 52	M/F	>19 Years Old
Total Protein	g/L	60 - 80	M/F	Adults>4 Years Old
Globulins (calculated)	g/L	25 - 40	M/F	
Indirect Bilirubin (unconjugated)	umol/L	<18	M/F	
Direct Bilirubin (conjugated)	umol/L	<3.0	M/F	
Aspartate Transaminase (AST)	U/L	5 - 35	M	>19 Years Old
Aspartate Transaminase (AST)	U/L	5 – 30	F	>19 Years Old
Lactate Dehydrogenase (LD)	U/L	120 – 250	M/F	>12 Years Old
Amylase	U/L	28 - 100	M/F	
Lipase	U/L	10-60	M/F	>18 Years Old
Calcium	mmol/L	2.10 - 2.60*	M/F	>18 Years Old * Adjusted calcium: approximate value (adjusted to a standard 40g/L albumin). Note: only corrected if Alb 30 -50 g/L.
Phosphate	mmol/L	0.75 - 1.65		18 - 20 Years Old
Phosphate	mmol/L	0.75 - 1.50	M/F	>20 Years Old
Magnesium	mmol/L	0.70 - 1.10	M/F	>18 Years Old
Lactate	mmol/L	0.5 - 2.2	M/F	
C-Reactive Protein	mg/L	<5.0	M/F	
Uric Acid	mmol/L	0.21 - 0.42	M	
Uric Acid	mmol/L	0.15 - 0.35	F	
Creatinine Kinase	U/L	45 – 250	M	<60 Years Old
Creatinine Kinase	U/L	40 – 200	M	>60 Years Old
Creatinine Kinase	U/L	30 – 150	F	
Troponin I	ng/L	<10	F	
Troponin I	ng/L	<20	M	

Glucose – Random	mmol/L	3.3 - 7.7	M/F	
Glucose – Fasting	mmol/L	3.3 - 6.0	M/F	
Glycated Haemoglobin (HbA1c) Non Diabetic-diagnostic cut off for diabetes	%	<6.5	M/F	DCCT/NGSP Units
	mmol/mol	<48	M/F	IFCC Units
Glycated Haemoglobin (HbA1c) Diabetic-(target for good glycaemic control	%	<7.0	M/F	DCCT/NGSP Units
	mmol/mol	<53	M/F	IFCC Units
Prostate Specific Antigen (PSA)	ug/L	<2.5	M	<49 Years Old
Prostate Specific Antigen (PSA)	ug/L	<3.5	M	50-59 Years Old
Prostate Specific Antigen (PSA)	ug/L	<4.5	M	60-64 Years Old
Prostate Specific Antigen (PSA)	ug/L	<5.5	M	65-69 Years Old
Prostate Specific Antigen (PSA)	ug/L	<6.5	M	>70 Years Old
CA19-9	U/mL	<35	M/F	
CA-125	U/mL	<35	M/F	
CA15-3	U/mL	<25	M/F	
CEA	ug/L	<5	M/F	No longer quoting a "smokers RI"
Alphafoetoprotein (AFP)	kU/L	<7.4	M/F	
Alpha-1-Antitrypsin	g/L	0.9 - 2.0	M/F	
Beta- Human Chorionic Gonadotropin	IU/L	<5	F	Negative pregnancy
Beta- Human Chorionic Gonadotropin	IU/L	5-25	F	Equivocal pregnancy
Beta- Human Chorionic Gonadotropin	IU/L	>25	F	Positive pregnancy
Beta- Human Chorionic Gonadotropin	IU/L	<2.6	M	Tumour marker
Beta- Human Chorionic Gonadotropin	IU/L	<8.3	F	Tumour marker
Thyroid Stimulating Hormone	mIU/L	0.38 - 5.3	M/F	>19 Years Old
Thyroid Stimulating Hormone	mIU/L	0.68 - 3.4	M/F	12 - <19 Years Old
Free Thyroxine (FT4)	pmol/L	8.0 - 16.5	M/F	>19 Years Old
Free Thyroxine (FT4)	pmol/L	7.9 - 13.6	M/F	3 - <19 Years Old
Free Tri-iodothyronine (FT3)	pmol/L	3.3 - 6.8	M/F	>19 Years Old changed Aug 14 2020
Free Tri-iodothyronine (FT3)	pmol/L	3.8 - 5.7	M	15 -<19 Years Old
Free Tri-iodothyronine (FT3)	pmol/L	3.5 – 5.3	F	15 -<19 Years Old
Vitamin B12	pmol/L	156-698	M/F	
Serum Folate	nmol/L	>10.0	M/F	
Copper	umol/L	11.8 - 22.8	M/F	≥ 11 Years
Caeruloplasmin	g/L	0.2 - 0.6	M/F	
Vitamin D (25OH)	nmol/L	>50	M/F	The level of 25 OH Vit D regarded as desirable for general health is >75 nmol/L
Iron Studies				
Iron	umol/L	13-32	M	>18 Years Old
Iron	umol/L	11 – 32	F	>18 Years Old
Transferrin	g/L	2.0 - 3.6	M/F	
Transferrin Saturation	%	15 – 45	M/F	
Ferritin	ug/L	30 - 340	M	
Ferritin	ug/L	30 - 400	F	
Serum Protein Electrophoresis Studies				
Alpha 1 Globulin	g/L	2.1 - 3.5	M/F	
Alpha 2 Globulin	g/L	5.1 - 8.5	M/F	
Beta 1 Globulin	g/L	3.4 - 5.2	M/F	
Beta 2 Globulin	g/L	2.3 - 4.7	M/F	
Free Light Chains - SLC				
Kappa Free LC	mg/L	3.3 - 19.4	M/F	
Lambda Free LC	mg/L	5.7 - 26.3	M/F	
K/L Ratio		0.26 - 1.65	M/F	
Haptoglobin	g/L	0.3 - 2.0	M/F	
IgE	kU/L	<114	M/F	>18 Years Old
ACTH - Adrenocorticotrophic Hormone	ng/L	7.2 - 63.3	M/F	

		See comment	M/F	As of 20th January 2018, paracetamol concentrations are reported in mg/L. In the case of single acute ingestions treatment should be considered for concentrations of 150mg/l or greater at 4 hours post-ingestion.
Paracetamol (Acetaminophen)	mg/L			
Apolipoprotein A1	g/L	1.05-2.05	M/F	
Apolipoprotein B	g/L	0.55-1.30	M/F	
Lipoprotein (a)	nmol/L	<32	M/F	
N Terminal pro-BNP	ng/L	<125	M/F	
Chromogranin A	ug/L	27 - 94	M/F	
Beta 2 Microglobulin (B2M)	mg/L	0.8 – 2.4	M/F	<60 Years Old
Beta 2 Microglobulin (B2M)	mg/L	0.8 – 3.0	M/F	>60 Years Old
Anti Nuclear Antibodies	Titre	<80	M/F	
Methaemoglobin	%	<1.5	M/F	
Glucose 6 Phosphate Dehydrogenase (G6PD)	U/g/Hb	10.1 – 14.2	M/F	>1 Year Old
Immunoglobulin Levels				
IgG	g/L	7 - 16	M/F	>19 Years Old
IgG	g/L	5.5 – 14.4	M/F	10-<19 Years
IgA	g/L	0.7 – 4.0	M/F	>19 Years Old
IgA	g/L	0.5 – 3.0	M/F	14 - <19 Years Old
IgM	g/L	0.4 – 3.0	M/F	>19 Years Old
IgM	g/L	0.4 – 1.3	M/F	1 - <19 Years Old
Lipids				
The Following are targets for patients on lipid lowering therapy.				
Cholesterol (Total)	mmol/L	<4.0	M/F	Treatment target for patients on lipid lowering therapy
Triglycerides	mmol/L	<2.0	M/F	Treatment target for patients on lipid lowering therapy
HDL Cholesterol	mmol/L	>1.0	M/F	Treatment target for patients on lipid lowering therapy
LDL Cholesterol (calculated result)	mmol/L	<2.0	M/F	Treatment target for patients on lipid lowering therapy
Non-HDL Cholesterol	mmol/L	<2.5	M/F	Treatment target for patients on lipid lowering therapy

Total Cholesterol: HDL Ratio - Consult CVD Risk Assessment Charts, NHF

For guidance on CVD risk assessment, please view the Heart Foundation website:

[www.heartfoundation.org.au/SiteCollectionDocuments/A AR QRG FINAL%20FOR%20WEB.pdf](http://www.heartfoundation.org.au/SiteCollectionDocuments/A%20AR%20QRG%20FINAL%20FOR%20WEB.pdf)

Serology				
HIV 1, 2 Serology		Negative	M/F	
Hepatitis C Antibody		Negative	M/F	
Hepatitis B Surface Antigen		Negative	M/F	
Hepatitis B Core Antibody (Total)		Negative	M/F	
Hepatitis B Surface Antibody		>10 IU/ml	M/F	Protective level of antibody
Hepatitis B Viral Load (PCR)	IU/ml	Negative	M/F	
Hepatitis C Viral Load (PCR)	IU/ml	Negative	M/F	
Hormones				
C-Peptide	nmol/L	0.24 – 1.46	M/F	Fasting
Cortisol - Serum	nmol/L	185 – 624	M/F	6am - 10am
Follicle Stimulating Hormone (FSH)	IU/L	3.85 – 8.78	F	Mid-Follicular
Follicle Stimulating Hormone (FSH)	IU/L	4.54 - 22.5	F	Mid Cycle-Peak
Follicle Stimulating Hormone (FSH)	IU/L	1.79 - 5.12	F	Mid-Luteal
Follicle Stimulating Hormone (FSH)	IU/L	16.7 – 113.6	F	Post-Menopausal
Follicle Stimulating Hormone (FSH)	IU/L	1.3 – 19.3	M	>19 Years Old
Insulin	mIU/L	1.9 - 23.0	M/F	

Luteinising Hormone (LH)	IU/L	2.12 - 10.89	F	Mid-Follicular
Luteinising Hormone (LH)	IU/L	19.2 – 103.0	F	Mid Cycle-Peak
Luteinising Hormone (LH)	IU/L	1.2 - 12.86	F	Mid-Luteal
Luteinising Hormone (LH)	IU/L	10.9 - 58.6	F	Post-Menopausal
Luteinising Hormone (LH)	IU/L	1.2 – 8.6	M	>19 Years Old
Oestradiol	pmol/L	98 - 422	F	Follicular
Oestradiol	pmol/L	118 – 1898	F	Mid-Cycle
Oestradiol	pmol/L	134 – 903	F	Luteal
Oestradiol	pmol/L	<92	F	Post-Menopausal
Oestradiol	pmol/L	<116	M	>19 Years Old
Progesterone	nmol/L	1.0 - 4.8	F	Follicular
Progesterone	nmol/L	16.4 – 59.0	F	Luteal
Progesterone	nmol/L	<2.5	F	Post-Menopausal
Progesterone	nmol/L	0.6 – 5.2	M	>19 Years Old
Prolactin	mIU/L	69 - 392	M/F	1 – <19 Years Old
Prolactin	mIU/L	56 – 278	M	>19 Years Old
Prolactin	mIU/L	71 – 566	F	19 – <50 Years Old
Prolactin	mIU/L	58 - 416	F	>50 Years Old
Parathyroid Hormone	pmol/L	1.6-6.0	M/F	16 - 50 Years Old
Sex Hormone Binding Globulin	nmol/L	13 - 90	M	>19 Years Old
Sex Hormone Binding Globulin	nmol/L	11 - 75	M	13-<19 Years Old
Sex Hormone Binding Globulin	nmol/L	17 - 125	F	>50 Years Old
Sex Hormone Binding Globulin	nmol/L	18 – 135	F	19 -<50 Years Old
Sex Hormone Binding Globulin	nmol/L	18 – 96	F	13-<19 Years Old
Testosterone	nmol/L	9.0 – 28.3	M	>19 Years Old
Testosterone	nmol/L	<2.6	F	>19 Years Old
Testosterone	nmol/L	0.4 – 19.6	M	12 – <19 Years Old
Testosterone	nmol/L	0.6 – 3.0	F	15 - <19 Years Old
Urine - Dipstick				
Glucose		Negative	M/F	
Protein		Negative	M/F	
PH		5.0- 8.5	M/F	
Specific Gravity		1.005 - 1.030	M/F	
Leucocytes		Negative	M/F	
Ketones		Negative	M/F	
Nitrites		Negative	M/F	
Bilirubin		Negative	M/F	
Urobilinogen	umol/L	3.2-16.0	M/F	
Blood/HB		Negative	M/F	
Urine				
Leucocytes	Cells x 10 x 10 ⁶ /L	<10 x 10 ⁶ /L	M/F	
Erythrocytes	Cells x 10 x 10 ⁶ /L	<13 x 10 ⁶ /L	M/F	
Glucose		Normal	M/F	
Test	Units	Adult Reference Range	Gender	Notes
24 Hour Urine Protein	g/day	<0.15	M/F	
Protein / Creatinine Clearance	mg/mmol	<30.0	M/F	
24 Hour Urine Creatinine	mmol/day	6.5 - 14.0	F	
24 Hour Urine Creatinine	mmol/day	8.5 - 22.0	M	
Creatinine Clearance	mL/sec	1.50 - 2.50	M/F	
Creatinine Clearance	mL/min	>90 - 150	M/F	
Spot Urine Creatinine	mmol/L	3.0 - 24	M/F	>16 Years Old

Urine Albumin (Microalbumin) Albumin / Creatinine Ratio	mg/mmol	<2.5	M	
Urine Albumin (Microalbumin) Albumin / Creatinine Ratio	mg/mmol	<3.5	F	
Cerebrospinal Fluid (CSF)				
WBC	x10 ⁶ /L	<5	M/F	
RBC	x10 ⁶ /L	Not Detected	M/F	
Protein	g/L	<0.45	M/F	
Glucose	mmol/L	2.2 - 3.9	M/F	