

CLINICAL GUIDANCE NOTES

CLINICAL BIOCHEMISTRY REFERENCE RANGES HANDBOOK

**Eastbourne District General Hospital
&
Conquest Hospital, Hastings**

Written/Produced By:	Title/Directorate	Date:
Paul Eaton	Pathology	07/02/2013

Person Responsible for Monitoring Compliance & Review	Paul Eaton Lead BMS
Signature & Date	07/02/2013

Multi-disciplinary Evaluation/Approval

Title/Speciality	Date:
Lead BMS	07/02/2013
Principal Biochemist	07/02/2013
Consultant Clinical Biochemist	07/02/2013

Ratification Committee

Issue Number (Administrative use only)	Date of Issue & Version	Next Review Date	Date Ratified	Name of Committee/Board/Group
	10/11/11 V1	Nov 2012	10/11/11	Biochemistry Clinical Team
	07/02/2013 V2	Feb 2014	07/02/2013	Biochemistry Clinical Team

DEPARTMENT OF CLINICAL CHEMISTRY TESTS

KEY

Specimen Type:

S – Serum
U – Urine
BI - Whole Blood (EDTA)
PI – Plasma
F – Faeces
BS – Blood Spot

Location:

Lab - Daily routine tests
Lab* - Batches
POCT – Point of Care Testing
Ref - Referral to other hospitals
 Note turn around time for tests referred to another hospital is 4 weeks or less unless specifically stated.

N/A - Not applicable
 - Not available

TEST NAME	REFERENCE RANGES	SOURCE																		
11 deoxycortisol	8 nmol/L	Ref																		
17 Alpha Hydroxyprogesterone (S) <u>Female</u> adult Neonates <u>Male</u> Neonates	1-10 nmol/L <30.0 nmol/L <30.0 nmol/L	Ref																		
17 Beta Oestradiol (S) Post Menopausal Follicular Mid-Cycle Luteal Males	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">EDGH</td> <td style="text-align: center;">Conquest</td> <td></td> </tr> <tr> <td style="text-align: center;">0 - 145</td> <td style="text-align: center;">0 – 150</td> <td style="text-align: right;">pmol/L</td> </tr> <tr> <td style="text-align: center;">90 – 716</td> <td style="text-align: center;">40 – 330</td> <td style="text-align: right;">pmol/L</td> </tr> <tr> <td style="text-align: center;">243 – 1509</td> <td style="text-align: center;">690 – 1780</td> <td style="text-align: right;">pmol/L</td> </tr> <tr> <td style="text-align: center;">147 – 958</td> <td style="text-align: center;">330 – 1050</td> <td style="text-align: right;">pmol/L</td> </tr> <tr> <td style="text-align: center;">50 – 218</td> <td style="text-align: center;">0 – 140</td> <td style="text-align: right;">pmol/L</td> </tr> </table>	EDGH	Conquest		0 - 145	0 – 150	pmol/L	90 – 716	40 – 330	pmol/L	243 – 1509	690 – 1780	pmol/L	147 – 958	330 – 1050	pmol/L	50 – 218	0 – 140	pmol/L	Lab
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50 – 218	0 – 140	pmol/L																		
3 methoxy tyramine (U)	< 2.5 umol/24h	Ref																		
5HIAA (U)	0 – 52µmol/24h	Ref																		
ACTH (PI)	<46 ng/L (9 am) <10 ng/L (midnight)	Ref																		
Albumin (S)	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Age</td> <td style="text-align: center;">g/L</td> </tr> <tr> <td style="text-align: center;">0 - 5d</td> <td style="text-align: center;">26 - 36</td> </tr> <tr> <td style="text-align: center;">5d - 3y</td> <td style="text-align: center;">34 - 42</td> </tr> <tr> <td style="text-align: center;">3 - 6y</td> <td style="text-align: center;">35 - 52</td> </tr> <tr> <td style="text-align: center;">6 - 15</td> <td style="text-align: center;">37 - 56</td> </tr> <tr> <td style="text-align: center;">>15y</td> <td style="text-align: center;">35 - 50</td> </tr> </table>	Age	g/L	0 - 5d	26 - 36	5d - 3y	34 - 42	3 - 6y	35 - 52	6 - 15	37 - 56	>15y	35 - 50	Lab						
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6 - 15	37 - 56																			
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Albumin: creatinine ratio (U)	None given																																											
Alcohol (S) (Ethanol, C ₂ H ₅ OH)	The legal limit is 80 mg/dl. Coma ensues at 300-400 mg/dl. Death may occur at levels over 450 mg/dl.	Ref																																										
Aldosterone (PI)	<p>Adults After overnight recumbency: 100-450 pmol/L After saline suppression : <240 pmol/L Random sample on upright patient: 100-800 pmol/L</p> <p>In adults, the baseline PRA and the increment in response to changing from a supine to an upright position decline with advancing age. According to some authorities, mean values for both these indices after 60 years of age about half those of young adults.</p> <p>Infants Ref ranges for PI/S aldosterone are poorly defined in infants, but in the first few weeks of life values of up to 5000 pmol/L have been reported. These high concs. decline rapidly in the first year and then more slowly attaining, by 6 yrs, values similar to those of adults.</p> <p>These ref ranges should be considered with those quoted for PI. Renin activity.</p>	Ref																																										
Aldosterone/PRA ratio	<p><800 Conns unlikely >1000 Possible Conns >2000 Conns very likely</p>																																											
Alk Phos Isoenzymes (S)	Text report	Ref																																										
Alkaline Phosphatase (S)	<table border="0"> <thead> <tr> <th>Age</th> <th colspan="2">U/L</th> </tr> </thead> <tbody> <tr> <td>1 - 7d</td> <td colspan="2">65 - 270</td> </tr> <tr> <td>7d - 1m</td> <td colspan="2">65 - 365</td> </tr> <tr> <td>1 - 3m</td> <td colspan="2">80 - 425</td> </tr> <tr> <td>3 - 6m</td> <td colspan="2">80 - 345</td> </tr> <tr> <td>6 - 12m</td> <td colspan="2">60 - 330</td> </tr> <tr> <td>1 - 3y</td> <td colspan="2">145 - 320</td> </tr> <tr> <td>3 - 6y</td> <td colspan="2">150 - 380</td> </tr> <tr> <td>6 - 9y</td> <td colspan="2">175 - 420</td> </tr> <tr> <td></td> <td style="text-align: center;">F</td> <td style="text-align: center;">M</td> </tr> <tr> <td>9 - 11y</td> <td>130 - 560</td> <td>135 - 530</td> </tr> <tr> <td>11 - 13y</td> <td>105 - 420</td> <td>200 - 495</td> </tr> <tr> <td>13 - 15y</td> <td>70 - 230</td> <td>130 - 525</td> </tr> <tr> <td>>15y</td> <td>30 - 126</td> <td>30 - 126</td> </tr> </tbody> </table>	Age	U/L		1 - 7d	65 - 270		7d - 1m	65 - 365		1 - 3m	80 - 425		3 - 6m	80 - 345		6 - 12m	60 - 330		1 - 3y	145 - 320		3 - 6y	150 - 380		6 - 9y	175 - 420			F	M	9 - 11y	130 - 560	135 - 530	11 - 13y	105 - 420	200 - 495	13 - 15y	70 - 230	130 - 525	>15y	30 - 126	30 - 126	Lab
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Alpha 1 Antitrypsin (S)	<p>Age related reference range</p> <table border="0"> <tbody> <tr> <td>Birth</td> <td>0.9 - 2.2 g/L</td> </tr> <tr> <td>6 mths</td> <td>0.8 - 1.8</td> </tr> <tr> <td>1-5 yr</td> <td>1.1 - 2.0</td> </tr> <tr> <td>5-10 yr</td> <td>1.1 - 2.2</td> </tr> <tr> <td>10-15 yr</td> <td>1.4 - 2.3</td> </tr> </tbody> </table>	Birth	0.9 - 2.2 g/L	6 mths	0.8 - 1.8	1-5 yr	1.1 - 2.0	5-10 yr	1.1 - 2.2	10-15 yr	1.4 - 2.3	Ref																																
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	15-18yr 1.2 - 2.8 18-Adult 1.1 - 2.1	
When Alpha 1 Antitrypsin is <1.2 g/L the Ref Lab performs the Phenotype automatically.	Phenotype Text Comment	
Alpha Fetoprotein (S)	0 – 5.8 KU/L (EDGH) 0 – 9 KU/L (Conquest)	Lab
Alpha galactosidase A (BI) and (PI)	4 - 21.9 nmol/hr/ml	Ref
Aluminium (S)	0 – 0.6µmol/L	Ref
Alanine Transaminase (ALT) (S)	Age U/L 1 - 7d 6 - 40 7d - 1m 8 - 32 1 - 12m 12 - 47 1 - 3y 5 - 45 3 - 6y 10 - 25 6 - 11y 10 - 35 11 - 13y 10 - 55 13 - 15y 10 - 45 >15y F 9 - 52 M 21 - 72	Lab
Amino Acid Chromatography (PI)	Text report	Ref
Amino Acid Chromatography (U)	Text report	Ref
Amiodarone (S) Desmethyamiodarone	0.5 - 2.0 mg/L 0.5 - 2.0 mg/L	Ref
Ammonia (BI) Conquest (PI) EDGH	0 - 54 µmol/L Conquest 9 - 30 µmol/L EDGH	Lab
Amylase (Fluid)	N/A	Lab
Amylase (S)	Age U/L < 1m <30 3 - 6m <50 6 - 12m <80 1 - 19y 30 - 100 > 19y 30 - 110	Lab
Amylase (U)	32 – 641U/L	Lab
Amylobarbitone (S)	Serum concs of Amylobarbitone in therapy are usually below 5mg/L	Ref
Anaesthetic Reactions- Tryptase(P)	2 - 14 ng/mL Collect samples at 0, 3 and 24 hours after the reaction	Ref
Androstenedione (S)	Age and sex related reference range nmol/L Age/Stage Male Female Premature 2.8 – 15.6 2.8 – 15.6 1-7 day full term 0.7 – 10.1 0.7 – 10.1 1-5 months 0.2 – 1.6 0.2 - 1.2	Ref

Biotinidase Activity (PI)	4 00 - 15.00 nmol/L PABA/ml plasma/min	Ref
Blood Gases pH pO ₂ pCO ₂	7.36 - 7.44 12.0 - 15.0 kPa 4.5 - 6.1 kPa	POCT
C-Peptide (S)	An interpretation of the results will depend on the glucose result and the clinical details provided. For further clarification please contact the lab.	Ref
C-Reactive Protein (CRP)	<5 mg/L	Lab
CA 15-3 (S)	0 - 35 kU/L	Lab
CA 19-9 (S)	0 - 30 kU/L	Lab
CA 125 (S)	0 - 35 kU/L (EDGH) 0 – 21 kU/L (CONQ)	Lab
Cadmium (BI)	Normal (Smoker): <53 nmol/L Normal (Non-smoker): <27nmol/L Hazardous: >180nmol/L Hip replacements:repeat in 3/12 if > 135 nmol/L (MDA/2010/033)	Ref
Calcitonin (PI)	0 – 4.6ng/L	Lab
Calcium (S)	Age mmol/L 0 - 5d 1.96 - 2.66 5d – 3y 2.17 - 2.44 3 - 10y 2.22 - 2.51 10 - 15y 2.19 - 2.66 > 15y 2.10 - 2.55	Lab
Calcium (U)	2.50 - 7.50 mmol/24h	Lab
Calprotectin (F)	0 - 50 ug/g and text comment	Ref
Carbamazepine (S) Proprietary Name - <u>Tegretol</u> (ACD/AED)	4 – 12mg/L	Lab
Carbohydrate Def.-Transferrin	< 1.6% and Text comment	Ref
Carcino Embryonic Antigen (CEA) (S)	0 - 3.4 ng/mL (EDGH) 0 – 5.0 ug/L (CONQ) Smokers up to 10ug/L (CONQ)	Lab
Carotene (S)	0.9 – 4.7 µmol/L	Ref
Catecholamines (U) Noradrenaline Adrenaline Dopamine	0 – 0.57µmol/24h 0 – 0.10µmol/24h 0 – 2.50µmol/24h	Lab*
Chloride (S)	Age mmol/L < 1y 96 - 110	Lab

	1 - 15y > 15y	100 - 108 98 - 107	
Chloride (U)	N/A		Lab
Cholesterol (S)	mmol/L F 0 - 5.0 M 0 - 5.0		Lab
Cholinesterase & Dibucaine No. (S) Sensitivity to Scoline (Suxamethonium) Cholinest. Activity Dibucaine No. Fluoride No. R02 Genotype Phenotype	600-1400 IU/L 76 - 83 56 - 66 93 - 98 Text report Text report		Ref
Chromium (BI)	< 40 nmol/L Hip replacements:repeat in 3/12 if > 120 nmol/L (MDA/2010/033)		Ref
Citrate (U)	0.6 - 4.8 mmol/24h		Ref
Clobazam (S) Desmethyloclobazam	0 - 200 µg/L 0 - 2000 µg/L		Ref
Clonazepam (S)	25 - 85 µg/L		Ref
Copper Caeruloplasmin (S)	11 - 22 µmol/L 0.20 - 0.6 g/L		Ref
Copper (U)	0 - 0.9µmol/24h		Ref
Cortisol (S)	200 – 700 nmol/L (9 am)		Lab
Creatinine (S)	Age µmol/L 0 - 7d 40 - 82 7 - 28d 15 - 48 28 - 70d 6 - 31 70d - 1y 6 - 27 1 - 2y 7 - 30 2 - 3y 8 - 31 3 - 4y 8 - 37 4 - 6y 13 - 44 6 - 9y 18 - 51 9 - 11y 22 - 56 F M 11 - 14y 22 - 61 22 - 66 14 - 18y 22 - 75 22 - 85 >18y 46 - 92 58 - 110		Lab
Creatinine Clearance (U)	A. Male - 95 - 140 ml/min A. Female - 85 - 125 ml/min		Lab
Creatine Kinase (S)	Age U/L 0 - 1y 60 - 400 1 - 3y 60 - 305 3 - 6y 75 - 230 6 - 9y 60 - 365 F M		Lab

	<p>9 - 11y 80 - 230 55 - 215 11 - 13y 50 - 295 60 - 330 13 - 15y 50 - 240 60 - 335 15 - 19y 45 - 230 55 - 370 >19y 30 - 135 55 - 170</p>																																																													
Crosslinks NTX (U) for Hydroxyproline	<p>Premenopausal women - 5 – 65 nM BCE/mM Post menopausal women - 5 – 131 nM BCE/mM Males – Up to 51 nm BCE/mM Creatinine - µmol/L</p>	Ref																																																												
Cryoglobulins (BI)	No significant amount should be detected.	Lab																																																												
Cyclosporin (S), To King's (EDTA)	No specific reference range available. Reference ranges vary from Hospital to Hospital. Please state transplant hospital.	Ref																																																												
Cystine (U)	<500 µmol/24h	Ref*																																																												
Dehydroepiandrosterone SO4 (S)	<p>Age and sex related reference range µmol/L</p> <table border="1"> <thead> <tr> <th>Age/Stage</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>Prem 26-28 w day 4</td> <td>3.3 – 19.2</td> <td>3.3 – 19.2</td> </tr> <tr> <td>0-1 months</td> <td>0.2 – 8.6</td> <td>0.4 - 7.1</td> </tr> <tr> <td>1-6 months</td> <td>0.1 – 1.6</td> <td>0 - 2.0</td> </tr> <tr> <td>7-12 months</td> <td>0 - 0.7</td> <td>0 - 0.7</td> </tr> <tr> <td>1-3 years</td> <td>0 – 0.4</td> <td>0 - 0.6</td> </tr> <tr> <td>4-6 years</td> <td>0 - 0.7</td> <td>0 - 0.9</td> </tr> <tr> <td>7-9 yrs prepubertal</td> <td>0 - 1.6</td> <td>0 - 2.0</td> </tr> <tr> <td>10-12 yrs Tanner 1</td> <td>0.1 - 3.7</td> <td>0 - 3.0</td> </tr> <tr> <td>9.8-14.5 yrs Tanner 2</td> <td>1.1 - 3.0</td> <td>see below</td> </tr> <tr> <td>10.7-15.4 yrs Tanner 3</td> <td>1.3 - 5.4</td> <td>see below</td> </tr> <tr> <td>11.8-16.2 yrs Tanner 4</td> <td>2.8 –10.5</td> <td>see below</td> </tr> <tr> <td>12.8-17.3 yrs Tanner 5</td> <td>3.3 –10.1</td> <td>see below</td> </tr> <tr> <td>Adult 31-50 years</td> <td>3.4 –16.7</td> <td>see below</td> </tr> <tr> <td>9.2-13.7 yrs Tanner 2</td> <td></td> <td>0.9 – 3.5</td> </tr> <tr> <td>10.0-14.4 yrs Tanner 3</td> <td></td> <td>0.9 - 6.1</td> </tr> <tr> <td>10.7-15.6 yrs Tanner 4</td> <td></td> <td>1.6 - 7.1</td> </tr> <tr> <td>11.8 -18.6 yrs Tanner 5</td> <td></td> <td>1.2 - 6.7</td> </tr> <tr> <td>Adult 20-50 years</td> <td></td> <td>0.7 - 11.5</td> </tr> <tr> <td>Post menopausal</td> <td></td> <td>0.5 - 5.6</td> </tr> </tbody> </table>	Age/Stage	Male	Female	Prem 26-28 w day 4	3.3 – 19.2	3.3 – 19.2	0-1 months	0.2 – 8.6	0.4 - 7.1	1-6 months	0.1 – 1.6	0 - 2.0	7-12 months	0 - 0.7	0 - 0.7	1-3 years	0 – 0.4	0 - 0.6	4-6 years	0 - 0.7	0 - 0.9	7-9 yrs prepubertal	0 - 1.6	0 - 2.0	10-12 yrs Tanner 1	0.1 - 3.7	0 - 3.0	9.8-14.5 yrs Tanner 2	1.1 - 3.0	see below	10.7-15.4 yrs Tanner 3	1.3 - 5.4	see below	11.8-16.2 yrs Tanner 4	2.8 –10.5	see below	12.8-17.3 yrs Tanner 5	3.3 –10.1	see below	Adult 31-50 years	3.4 –16.7	see below	9.2-13.7 yrs Tanner 2		0.9 – 3.5	10.0-14.4 yrs Tanner 3		0.9 - 6.1	10.7-15.6 yrs Tanner 4		1.6 - 7.1	11.8 -18.6 yrs Tanner 5		1.2 - 6.7	Adult 20-50 years		0.7 - 11.5	Post menopausal		0.5 - 5.6	Ref
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Dothiepin (S) Desmethyldothiepin Total	µg/L µg/L µg/L (60-200)	Ref
Drug Screen (S)	Text report.	Ref
Drug Screen (U)	Text report.	Ref
Elastase (faecal)	>200µg/g and Text Comment	Ref
Ethosuximide (S) (ACD/AED)	40 - 80 mg/L	Ref
Ferritin (S)	Female 13-150 ng/ml Male 30-400 ng/ml	Roche
Folate (S)	4.6 -18.7 ng/ml	Roche
Free T4 (S)	10 – 24 pmol/L (EDGH) 10 – 23 pmol/l (CONQ)	Lab
Free T3 (S)	2.8 – 7.1 pmol/L (EDGH and Conquest)	Lab
FSH (S)	Post Menopausal 25.8 – 134.8 iu/mL (EDGH) Follicular 3.5 – 12.5 iu/mL Mid-Cycle 4.7 – 21.5 iu/mL Luteal 1.7 – 7.7 iu/mL Males 1.5 – 12.0 iu/mL Post Menopausal 43.7 - 106 iu/mL (CONQ) Follicular 1.4 – 11.6 iu/mL Mid-Cycle 7.1 – 20.7 iu/mL Luteal 2.6 – 9.1 iu/mL Males 1.8 – 8.6 iu/mL	Lab
G-1-P Uridyl Transferase (BI)	20.2 – 46.4 µmol/h/g Hb	Ref
Galactose-1-Phosphate (BI)	Normal - Non Galactosemic - <0.1 µmol/g/Hb Untreated Galactosemic - Up to 10.8 µmol/g/Hb Patient on diet when levels dropping and levels stabilized - 0.1 - 0.57 µmol/g/Hb	Ref
Gamma GT (S)	Age U/L F M 1 - 7d 23 - 156 30 - 177 7d - 1m 20 - 148 27 - 183 1 - 3m 20 - 148 20 - 155 3 - 6m 18 - 130 10 - 100 6 - 12m 12 - 64 12 - 64 1 - 4y 6 - 19 6 - 19 4 - 7y 10 - 22 10 - 22 7 - 10y 13 - 25 13 - 25 10 - 12y 17 - 28 17 - 30 12 - 14y 14 - 25 17 - 44 14 - 16y 14 - 26 12 - 33 16 - 20y 11 - 28 11 - 34 >20y 12 - 43 12 - 58	Lab
Glucose (CSF)	2.2 – 3.9 mmol/L	Lab

	21-41 13 – 50 41-61 9 – 40 >61 6 – 36	
IGFBP3 (S)	Age-related reference range Age (years) Range (mg/L) 0 - 2 0.5 - 2.9 3 - 4 0.8 - 3.4 5 - 6 1.0 - 3.8 7 - 8 1.1 - 4.3 9 - 10 1.3 - 4.6 11 - 12 1.6 - 5.0 13 - 14 2.1 - 5.3 15 - 16 2.5 - 5.4 17 - 18 2.4 - 5.4 19 - 20 2.3 - 5.3 21 - 40 1.7 - 5.2 41 - 60 1.3 - 4.8 61 - 80 0.7 - 4.4 >80 0.5 - 4.3	Ref
IgG (S)	See Immunoglobulins	Lab
IgG Albumin Ratio / Oligoclonal Bands (S & CSF) CSF	Age related reference range Age Alb g/L IgG g/L <30 0.17 0.017 31-40 0.18 0.021 41-50 0.20 0.024 51-60 0.24 0.027 61-77 0.24 0.026 <u>IgG</u> - See Immunoglobulins reference ranges	Ref
SERUM	Ignore the Albumin reference ranges from the Referral lab and use <u>our</u> albumin reference ranges in its place.	
IgG Sub-Classes (S) IgG1 IgG2 IgG3 IgG4	Adult ref. ranges (Guildford's own adult ranges) 3.8 -9.4 g/L 2.04 – 6.55 g/L 0.2 – 1.5 g/L 0 – 0.74 g/L In adults IgG3 concs. are higher in females than in males and IgG4 higher in males than females. No sex difference is seen before the age of 15 years. Age IgG1 g/L IgG2 g/L IgG3 g/L IgG4 Cord BI 3.6-8.4 1.2-4.0 0.3-1.5 <0.5 6 mths: 1.5-3.0 0.3-0.5 0.1-0.6 <0.5 2 yrs: 2.3-5.8 0.3-2.9 0.1-0.8 <0.5 5 yrs: 2.3-6.4 0.7-4.5 0.1-1.1 <0.8 10 yrs 3.6-7.3 1.4-4.5 0.3-1.1 <1.0 15 yrs 3.8-7.7 1.3-4.6 0.2-1.2 <1.1 Note: There might be a slight difference in	Ref

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IgM (S)	See Immunoglobulins	Lab																																																																
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Immunoreactive Trypsin (S)	0 - 60 µg/L	Ref																																																																
Inhibin B (S)	80 – 150pg/mL and Text comment.	Ref																																																																
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Lamotrigine (S)	1 – 15mg/L	Ref																																																																
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Lead (BI)	Normal : 0 – 0.5µmol/L	Ref
LH (S)	Post Menopausal 7.7 – 58.8 iu/mL (EDGH) Follicular 2.4 – 12.6 iu/mL Mid-Cycle 14.0 – 95.6 iu/mL Luteal 1.0 – 11.4 iu/mL Males 1.7 – 8.6 iu/mL Post Menopausal 8.8 – 53 iu/mL (CONQ) Follicular 1.4 – 11.6 iu/mL Mid - Cycle 15.8 - 38.1 iu/mL Luteal 0.6 – 13.8 iu/mL Males 0.7 – 6.0 iu/mL	Lab
Lipid profile (S) Cholesterol	mmol/L F 0 – 5.0 M 0 – 5.0	Lab
Triglycerides	mmol/L F 0 – 1.7 M 0 – 1.7	
HDL	mmo/IL F 1.2 – 1.6 M 1.0 – 1.6	
Lithium (S)	0.4 – 1.0 mmol/L	Lab
Lipase (S)	22 – 51U/L	Ref
Lp(a) (S)	> 300 mg/L – Increased CVD risk	Ref
Macro CK (S)	Text report	Ref
Manganese	0.5 - 1.5 µg/L	Ref
Magnesium (S)	Age mmol/L < 9y 0.66 - 1.00 9 - 15y 0.70 - 0.95 > 15y 0.70 - 1.00	Lab
Mercury (U) (Long term exposure or exposure to Inorganic Mercury Compounds)	Normal: <5 µmol/mol creat	Ref
Mercury (BI) (Recent exposure -few days or exposure to Organic Mercury Compounds e.g. Ethyl or Methyl Mercury)	Normal: <5 nmol/L	Ref
Metadrenaline (P) Collect through indwelling catheter after 30 minutes recumbency	<0.7 nmol/L low probability of phaeo 0.7- 1.2 nmol/L medium probability of phaeo > 1.2 nmol/L high probability of phaeo	Ref

Metadrenaline (24h urine)	< 1.2 umol/24h	Ref
Microalb/Creatinine Ratio (U)	See Albumin/Creatinine Ratio (U)	Lab
Mucopolysaccharides (U)	Text report	Ref
Neurone Specific Enolase (S)	1 – 12.5µg/L	Ref
Nitrazepam (S)	50 - 150 µg/L	Ref
Normetadrenaline (P) Collect through indwelling catheter after 30 minutes recumbency	<1.3 nmol/L low probability of phaeo 1.3 – 2.18 nmol/L medium probability of phaeo > 2.18 nmol/L high probability of phaeo	Ref
Normetadrenaline (24h urine)	< 3.3 umol/24h	Ref
Occult Blood (F)	Text report - Positive or Negative	Lab
Organic Acid Studies (U)	Text report	Ref
Osmolality (S)	285 - 300 mmol/Kg	Lab
Osmolality (U)	Normal early morning urine >600 mmol/Kg	Lab
Overdose Screen (S)	See paracetamol and salicylate	Lab
Oxalate (U)	100 - 460 µmol/24h	Ref
Paracetamol (S)	Not normally detected.	Lab
Paraproteins (S)	Text report	Lab*
Paraproteins (U)	Text report	Lab*
Paraquat (U)	Text report - Positive or Negative	Lab
Parathyroid Hormone (PTH) (S)	10 - 65 ng/L but needs to be interpreted with serum calcium. (EDGH) 10 – 72 ng/L again requires calcium for interpretation (CONQ)	Lab
Perhexiline	0.25 - 1.50 mg/L	Ref
pH (BI)	7.36 - 7.44	
Phenobarbitone (S) (ACD/AED)	10 – 30 mg/L	Ref POCT
Phenylalanine (Phenylketonuria)	34 - 110 µmol/L	Ref
Phenytoin (S) Proprietary Name - <u>Epanutin</u>	10 – 20mg/L	Lab*

(ACD/AED)		
Phosphate (S)	Age mmol/L < 5d 1.5 - 2.6 5d - 3y 1.2 - 2.1 3 - 10y 1.2 - 1.8 10 - 15y 1.1 - 1.75 > 15y 0.8 - 1.45	Lab
Phosphate (U)	N/A	Lab
Pigments (U)	Text report.	Lab
Porphobilinogen (U)	0 - 1.5 µmol/mmol creatinine	Lab*
Porphyrins (BI)	RBC free protoporphyrin: 0 – 200 nmol/L cells RBC zinc protoporphyrin: 0 – 800 nmol/L cells	Ref
Porphyrins (F)	0 – 50 mmol/g faeces	Ref
Porphyrins (U)	0 – 35 nmol/mmol creatinine	Ref
Potassium (S)	Age mmol/L < 1y 3.2 - 6.0 1 - 15y 3.5 - 5.5 >15y 3.6 - 5.0	Lab
Primidone (S) Proprietary Name - <u>Mysoline</u> (ACD/AED)	Less than 13 mg/L	Ref
Procollagen Peptide Type III	Age and sex-related (ug/L) Age Male Female 0 – 2 years 10 – 50 10 – 50 2 – 4 years 5 – 15 5 – 15 5 – 10 years 5 – 10 5 – 10 11 – 14 years 5 – 10 8 - 15 15 – 19 years 8 – 20 2 - 8 Adult 1.7 – 4.2 1.7 – 4.2	Ref
Progesterone (S)	Normal mid luteal peak: 5.8 - 86 nmol/L (EDGH) Mid Luteal peak: 30 – 80 nmol/L (CONQ) Follicular: 2 – 8 nmol/L (Conq)	Lab
Proinsulin (S)	Less than 10 pmol/L	Ref
Prolactin (S)	Male: 86 – 324mU/L (EDGH) Female: 102 – 496mU/L (EDGH) Male: 53 – 360 mU/L (CONQ) Female: 64 – 424 mU/L (CONQ)	Lab
Protein (CSF)	0.1 - 0.45 g/L	Lab
Protein (Fluid)	N/A	Lab

Protein (U)	0 – 0.12 g/L	Lab*
Protein:creatinine ratio (U)	0 – 45 mg/mmol	Lab*
Protein Electrophoresis (S)	Text report	Lab*
Protein-24 hour (U)	0.01 – 0.10 g/24h	Lab*
PSA (S)	0 - 4 ng/ml	Lab
Quinine	10 – 15mg/L	Ref
Reducing Substances (F)	Text report	Lab*
Reducing Substances (U)	Text report	Lab
Renin (PI)	<p>Adult After overnight recumbency: 1.1-2.7 pmol/mL/Hr Ambulant (30min): 2.8-4.5pmol/mL/Hr Random sample: 0.5-3.1 pmol/mL/Hr</p> <p>In adults, the baseline PRA and the increment in response to changing from a supine to an upright position decline with advancing age. According to some authorities, mean values for both these indices after 60 years of age about half those of young adults.</p> <p>Infant The ref ranges for PRA are poorly defined in infants, but, in the first few weeks of life, values of up to 50 pmol/mL/h have been reported. There is an initial rapid fall, followed by a slower decrease until normal adult levels are reached at about the age of 6 years.</p> <p>These ref ranges should be considered with those quoted for PI Aldosterone activity.</p>	Ref
Rheumatoid Factor (S)	<12 IU/ml	Lab
Salicylate (S)	mg/L. Not normally detected.	Lab
Selenium (S)	0.6 – 1.6µmol/L	Ref
Sex Hormone Binding Globulin (S)	Female - 20 - 130 nmol/L Male - 10 - 80 nmol/L	Lab
Serum free light chains (sFLCs) (S)	Kappa 3.30 – 19.4 mg/L Lambda 5.71 – 26.3 mg/L Ratio 0.26 – 1.65 (0.37-3.10 in patients on dialysis)	Ref
Sodium (S)	< 15y 133 - 146 mmol/L > 15y 137 - 145	Lab

Sodium (U)	50 - 200 mmol/L	Lab
Sodium Valproate Proprietary Name - Epilim (ACD/AED)	50 - 100 mg/L	Lab
Solvent Screen (U) (EDTA)	Text report	Ref
Squamous Cell Carcinoma (SCC) (S)	0 – 150ng/dLI	Ref
Steroid Profile (U)	Text report - based on relevant biochemical and clinical information provided.	Ref
Stone Analysis (Stone)	Weight in mg Composition in %	Ref
Sugar Chromatography (F)	All sugars <1.0 mmol/Kg faeces Ref. interval variable: not usually > 1.0 mmol/Kg	Ref
Sugar Chromatography (U)	Text report - Less than 1 month of age up to 3 mmol/L lactose or galactose, if receiving high carbohydrate diet. The sugars must be present in the diet to be detected i.e., to exclude galactosaemia the infant must be having feeds containing lactose.	Ref
Sugars (U)	Text report	Lab
Sweat Test Sweat Chloride Conductivity Testing	Normal: <40 mmol/L Borderline: 40 – 60mmol/L Fibrocystic: >60mmol/L Normal: 0 - 60 mmol/L Borderline: 60 - 90 mmol/L Fibrocystic: >90 mmol/L	Lab
Tacrolimus (FK506)	2.0 - 15 µg/L	Ref
TCO2 (S)	Renamed as bicarbonate	
Temazepam (S)	Text report	Ref
Testosterone (S)	Male - 10 - 30 nmol/L (EDGH) Female - 0.29 – 1.67 nmol/L (EDGH) Male - 15D 0 - 6.5 (CONQ) 05M 0.1 - 6.1 11M 0.1 - 0.2 05Y 0.1 - 0.9 09Y 0.1 - 1.0 17Y - - 150Y 5.5 25.1 Female 15D 0 - 0.9 (CONQ) 05M 0.1 - 0.2 11M 0.1 - 0.2 05Y 0.1 - 0.4 09Y 0.1 - 0.4 17Y - -	Lab

	50Y 0.5 - 2.5 150Y 0.5 - 1.5	
Theophylline (S)	10 - 20 mg/L	Lab
Thiamine (EDTA) (Vitamin B1)	66 – 200 nmol/L	
Thyroglobulin (Tg)(S)	NO COMMENT ON OUR REPORT Endogenous antibodies to Tg may interfere in its measurement. Interpret Tg results in Tg-Ab positive sera with caution.	Ref
Thyroid Function Tests (S) FT3 FT4 TSH FT4 TSH	2.8 – 7.1pmol/L (EDGH and CONQ) 10 - 24 pmol/L (EDGH) 0.27 - 4.2 mU/L (EDGH) 10 – 23 pmol/L (CONQ) 0.38 – 4.7 mU/L (CONQ)	Lab
TPMT (thiopurine methyl transferase (E)	26 – 50 pmol/h/mg Hb normal 10 – 25 pmol/h/mg Hb carrier <10 pmol/h/mg Hb deficiency Plus text interpretation and advice	Ref
Total Protein (S)	63 – 82g/L	Lab
Transketolase (Red Cell)	Red Cell Transketolase- 0.40-1.13 U/G Hb Transketolase activation - <27 %	Ref
Triglyceride (Fasting) (S)	F M mmol/L 0 – 1.7 0 – 1.7	Lab
Troponin T (S)	Troponin T should be measured at presentation and 6-9 hours later: Both levels <14ng/L: MI can be ruled out(unless further chest pain or ECG changes suggest further investigation is required). If at LEAST ONE Troponin T is 14ng/L or above AND <20% change: not consistent with an acute event 20-100% change: significant rise, suggest further evaluation to distinguish between other causes and chronic elevation in Troponin T. >100% change (a doubling): consistent with myocardial necrosis.	Lab
TSH (S)	0.27 - 4.2 mU/L (EDGH) 0.38 – 4.7 mU/L (CONQ)	
TSH Binding Inhibiting Ig	< 1.0 U/L negative 1.0 – 1.5 U/L borderline > 1.5 U/L positive	Ref
Urate (S)	Age μmol/L F M 0 - 1m 80 - 370 80 - 290	Lab

	1 - 3m 80 - 340 80 - 310 3 - 6m 80 - 370 90 - 370 6 - 12m 90 - 370 90 - 390 1 - 4y 105 - 300 105 - 300 4 - 7y 130 - 280 130 - 280 7 - 10y 120 - 295 120 - 295 10 - 12y 180 - 280 135 - 320 12 - 16y 180 - 345 12 - 14y 160 - 400 16 - 17y 180 - 350 14 - 16y 140 - 465 17 - 34y 149 - 369 16 - 17y 235 - 510 34 - 44y 149 - 416 >17y 208 - 506 > 44y 149 - 446 Results greater than 0.35 umol/L are above target for gout prevention	
Urate (U)	Depends on intake	Lab
Urea (S)	Age mmol/L <1y 0.7 - 5.0 1 - 13y 2.5 - 6.0 >13y 2.5 - 7.5	Lab
Urobilin (U)	Text report	Lab
Urobilinogen (U)	Text report	Lab
Valproate (S) Proprietary Name – Epilim (ACD/AED)	50 - 100 mg/L	Lab ^q
Very Long Chain Fatty Acids (VLCFA) / Phytanic (PI)	Text report	Ref
Vitamin A (S)	Age and sex related reference range Age (years) Range (µmol/L) 0 - 6 0.70 – 1.50 7 -12 0.90 – 1.70 13 - 19 0.90 – 2.50 Adult female 0.99 – 3.35 Adult male 0.77 – 3.95	Ref
Vitamin B12 (S)	191 – 663 pg/ml	Roche
Vitamin D (S)	<12.5 nmol/L deficiency 12.5 50 nmol/L insufficiency 50 -140 nmol/L adequate	Ref
Vitamin E (S)	Age-related reference range Age (years) Range (µmol/L) <1 11.5 – 24.4 2 - 6 7.0 – 21.0 7 – 12 10.0 – 21.0 13 – 19 13.0 – 24.0 Adult 9.5 – 41.5	Ref
Vitamin E/cholesterol	>/= 2.22 umol/mmol	
Warfarin	Therapeutic range: 0.7 - 3.2 mg/L (mean 1.6 mg/L) in 56 well controlled patients.	Ref

White Cell Enzyme	Text report	Ref
Xanthochromia (CSF)	Text report	Lab
Zinc (S)	11 – 24 µmol/L	Ref

NOTE: *Reference ranges are liable to change due to updates in equipment, methods, reagents and change in Referral Labs. Reference ranges are updated on our computer system as they are received.*

Please contact us if you need further information on tests or reference ranges.

Tel no.: 01323-417400 ext - 4392 / 4296 or 01424 ext 8585 / 8019