

Title: Blood Sciences Test Repertoire - Alphanumeric

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Version	Summary of change
4.8	Changes to several reference ranges Cl24, K,K24, NA24,ALT, ALB, AMM, AST, ACAL, CK, CBIL, CREA, CR24, GTT, LACT, LDH, MG, UP, TG, HAPT, TRF, DIG, VALP, BILE, FER, FOL, LH, FSH, OE2, PROL, SHBG, TEST, TEF, ALP Changes to location for Conjugated Bilirubin, Drugs of abuse confirmation, Phenobarbitone, TPMT, B2, Alcohol, Troponin I
4.9	Removed Carotene(Vitamin A) as incorrect
4.10	Amendments to BHCH, Amioderone, Clomipramine, Elastase, Calprotectin, Flecainide, Lamotrigene, phenobarbitone, UDS, NTX, Oxalate, VGKC, CRP
4.11	TDM sample times added Atellica assays added

NOTE: Adult blood sample tubes and urine bottles typically provide an excess volume of sample for measurement if full. If a high number of tests are required, please contact the laboratory prior to venepuncture for advice on sample type and number.

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
α -1-Antitrypsin	Brown	0.3 – 0.6 g/L	4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
α -2-Macroglobulin	Brown	Male 1.3 – 3.5 g/L Female 1.4 – 4.0 g/L	4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
α -Foetoprotein (AFP)	Brown	0 - 10 kU/L	3 days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
α -Galactosidase	Blood Spot	Narrative Report	3 Weeks	Referred to Willink, Manchester	Chemical Pathology
γ -Glutamyl Transferase (γ -GT/GGT)	Brown	Male 0 – 73 U/L Female 0 – 38 U/L	< 1 Day		Chemical Pathology
β -HCG	Brown	Pregnancy >25 U/L Tumour marker <5 U/L	< 1 Day 3 Days		Chemical Pathology
17 α -Hydroxyprogesterone	Brown	Male 2.0 – 9.0 nmol/L Female < 12 nmol/L Babies should be over 48 hours old before testing	3 Weeks	Referred to SAS Centre for Steroid Hormones, Leeds	Chemical Pathology
5- α -Dihydrotestosterone	Brown	Male 0.9 – 2.9 nmol/L Female 0.2 – 1 nmol/L	4 Weeks	Referred to SAS Centre for Steroid Hormones, Leeds	Chemical Pathology
5-Hydroxyindole acetic acid (5-HIAA)	24 hour acid urine (glacial acetic acid)	05 – 40 μ mol/24 hours	2 Weeks		Chemical Pathology
Acetylcholine Receptor Antibodies	Brown	0 – 0.2 nmol/L	3 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Acyl Carnitine Profile	Brown	Narrative Report	4 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Acute Kidney Injury score (AKI calculation included as part of an U/E profile)	Brown	Calculated score of 0-3 indicating possible severity	<1 day		Chemical Pathology
Adrenocorticotrophic hormone (ACTH)	EDTA Frozen tube from Laboratory required. Must be back to lab ASAP.	9 am <46 ng/L Midnight <15 ng/L	2 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Alanine Aminotransferase (ALT)	Brown	10 - 49 U/L Patients receiving sulfasalazine may show falsely depressed results by up to 26%. Suggest establishing baseline prior to commencing treatment if possible.	< 1 Day		Chemical Pathology
Albumin	Brown	< 1 yr: 30 - 45 g/L 1- 16 yrs: 30 - 50 g/L Adult: 35 - 50 g/L	< 1 Day		Chemical Pathology
Alcohol	Brown	Mild intoxication 50 mg/dL Severe intoxication >300 mg/dL NB. Much inter-individual variation Enzymatic assay used – satisfactory for clinical purposes but not for medico – legal purposes	< 1 Day	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Aldosterone	Li heparin (Orange) Or Brown	Following overnight recumbency 100 – 450 pmol/L When randomly taken during the day 100 – 850 pmol/L	2 Weeks	Referred to SAS Centre, Leeds	Chemical Pathology
Alkaline Phosphatase (ALP)	Brown	30 – 130 U/L Age related ranges are available. Please contact the Laboratory if required.	< 1 Day		Chemical Pathology
Alkaline Phosphatase Isoenzymes	Brown	Available only after discussion with the Chemical Pathologist	4 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Aluminium	Brown or Alu free	<10 ug/L	4 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Amino Acids - Plasma	Li heparin (Orange)	Narrative Report	3 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Amino Acids – Urine	Universal (≥ 5 mL)	Narrative Report	3 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Amiodarone	Brown	0.6 – 2.5 mg/L	4 Weeks	Referred to QMC, Nottingham	Chemical Pathology
Ammonia	Li heparin (Orange)	Adult $\mu\text{mol/l}$ <40 Neonate $\mu\text{mol/l}$ <100 Premature $\mu\text{mol/l}$ <150 Infant/child $\mu\text{mol/l}$ <40	< 1 Hour	Inform laboratory Send sample directly to laboratory. Do not send via POD	Chemical Pathology
Amyloid	Brown		4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Anabolic Steroids – Urine	Plain 24hr Urine		4 Weeks	Referred to SAS Steroid Profiling Laboratory, London	Chemical Pathology
Anafranil (Clomipramine)	Brown	20 – 70 ug/L	4 Weeks	Referred to Toxicology Laboratory, Penarth	Chemical Pathology
Androstendione	Brown	Pre-pubertal male and female <1.4 nmol/L Provisional adult male 1.3 – 5.8 nmol/L Provisional adult female without PCO in early follicular phase: 1.1 – 5.7 nmol/L	3 Weeks	Referred to SAS Centre, Leeds	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Angiotensin converting enzyme (ACE)	Brown	Too 21 years 29 - 112 U/L > 21 years 20 – 70 U/L	1 Week	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Anti-Myelin Associated Glycoprotein Antibodies (anti-MAG)	Brown		4 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Anti-Neuronal (paraneoplastic) Antibodies	Brown		4 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Anti-TNF	Brown	Refer to external report	4 weeks	Referred to Purine Research Laboratory, London	Chemical Pathology
Anti-Thyroglobulin			4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Ascorbic Acid (Vitamin C)	Li heparin (Orange) (Protect from light, MPS preserved)	26.0 – 85.0 umol/L	Contact the lab	Discuss with Chemical Pathologist prior to requesting	Chemical Pathology
Aspartate aminotransferase (AST)	Brown	0 – 34 U/L	< 1 Day		Chemical Pathology
Beta-2-Microglobulin	Brown	1.2-2.4 mg/L		Performed Twice Weekly	Chemical Pathology
Bicarbonate	Brown	22 – 29 mmol/L	< 1 Hour		Chemical Pathology
Bile Acids	Brown	<10 umol/L	< 1 Day		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Bilirubin - Conjugated	Brown	0 – 5 umol/L	< 3 Hours		Chemical Pathology
Bilirubin - Total	Brown	< 21 umol/L	< 3 Hours		Chemical Pathology
Biotinidase	Li heparin (Orange)	2.5 – 10.5 U/L	4 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Blood Gases	Arterial blood	pH 7.35 - 7.45 pCO2 4.5 - 6.1 kPa pO2 12.0 - 15.0 kPa Bicarbonate 24 - 32 mmol/L	< 1 Hour Contact the lab	Please send directly to the laboratory	Chemical Pathology
Bone Alkaline Phosphatase	Brown		3 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology
Brain Natriuretic Peptide (BNP)	EDTA (Separate EDTA required from FBC/ESR/HbA1c)	Heart failure (HF) very improbable <100 pg/mL If clinical suspicion of HF then HF probable 100 – 500 pg/mL HF very probable >500 pg/mL	3 Days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Bromide	Brown	0 – 0.25 mmol/L	4 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
C-Peptide	Brown (Sep immed)	Fasting adults 298 – 2350 pmol/L	Referred	Referred to Royal Hallamshire Hospital, Sheffield Or The Clinical Laboratory, Guildford	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Caffeine	Li heparin (Orange)	On high dose regime 27 – 40 mg/L	4 Weeks	Assayed on Tuesday Referred to Sheffield Children's Hospital	Chemical Pathology
Calcitonin	Li heparin (Orange – on ice)	With report	2 Weeks	Discuss with Chemical Pathologist before requesting Referred to SAS Laboratories, London	Chemical Pathology
Calcium – Urine	24 hour acid urine (HCl)	2.5 – 7.5 mmol/24 hours	< 1 Day		Chemical Pathology
Calcium Profile	Brown	Albumin 35 - 50 g/L Alkaline Phosphatase (ALP) 30 - 130 IU/L Adult range. Please contact the Laboratory if age related ranges required. Adult Corrected Calcium 2.20 - 2.60 mmol/L Phosphate 0.80 - 1.50 mmol/L Adult range. Please contact the Laboratory if age related ranges required.	< 1 Day		Chemical Pathology
Calculi – renal	Calculus	Narrative report	4 Weeks	Referred to Calculi Assay Laboratory, Leicester	Chemical Pathology
Calprotectin	Faeces		2 Weeks		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Carbamazepine	Brown Taken immediately before oral dose (trough)	Therapeutic 4 - 12 mg/L	< 1 Day		Chemical Pathology
Carbohydrate Antigen 125 (CA 125)	Brown	0 - 35 kU/L	3 Days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Carbohydrate Antigen 153 (CA 153)	Brown	0 - 30 kU/L	2 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Carbohydrate Antigen 199 (CA 199)	Brown	0 - 35 kU/L	3 Days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Carbohydrate Deficient Transferrin	Brown	With report	4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Carboxyhaemoglobin	Arterial blood	Non-smokers up to 1.5% Smokers up to 6.0% Heavy smokers up to 9.0%	When required (Inform the lab)		Chemical Pathology
Carcinoembryonic Antigen (CEA)	Brown	0 - 5.0 ug/L	3 Days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Carnitine	Li heparin	Total 23 – 60 umol/L Free 15 – 53 umol/L	4 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Catecholamines – Urine	Overnight acidified urine (HCl)	24 Hr Collections: Adrenaline 0 – 150 nmol/24 hours Noradrenaline 0 – 570 nmol/24 hours Dopamine 0 – 3240 nmol/24 hours Overnight : Adrenaline 0 – 10 nmol/mmol creatinine Noradrenaline 0 – 48 nmol/mmol creatinine Dopamine 0 – 300 nmol/mmol creatinine	2 Weeks		Chemical Pathology
Catecholamines – Neuroblastoma HMMA 4-hydroxy-3-methoxy-mandelate / (VMA) Vanilylmandelic acid HVA Homovanilic acid	Random Plain urine to laboratory in < 1 hour	HMMA (VMA) Age dependent ranges – stated on report HVA Age dependent ranges – stated on report	2 Weeks – if required urgently please contact the laboratory		Chemical Pathology
Chloride – Serum	Brown	95 – 108 mmol/L	< 1 Day – if requested		Chemical Pathology
Chloride – Urine	24 hour	110 – 250 mmol/24 hours	< 1 Day		Chemical Pathology
Cholesterol (Random)	Brown	See fasting lipid profile	< 1 Day		Chemical Pathology
Cholinesterase (see Pseudocholinesterase)	Brown	With report Details of anaesthetic sensitivity required	4 Weeks	Referred to Cholinesterase Investigation Unit, Bristol	Chemical Pathology
Chromogranin A	Brown	0 – 6 nmol/L - Sheffield units and reference range	3 Weeks	Referred to Protein Reference Unit, Sheffield Unless part of GUT hormone screen SAS Laboratories, London	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Chromogranin B	Trasylol (From Lab)		4 Weeks	Referred to SAS Laboratories, London	Chemical Pathology
Cholinesterase – Acetyl (pesticide exposure)	2x EDTA		4 Weeks	Referred to Health Sciences Group, Buxton	Chemical Pathology
Cholinesterase – Pseudo (scoline sensitivity)	EDTA		4 Weeks	Referred to Cholinesterase Investigation Unit, Bristol	Chemical Pathology
Chromium	EDTA		4 Weeks	Referred to Trace Elements Laboratory, Birmingham	Chemical Pathology
Chymotrypsin – Faecal	Faeces	With report	Referred	Referred to Department of Clinical Biochemistry, Leeds	Chemical Pathology
CKMB (Mass)	Brown		4 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology
Copper	Brown	Male 12.1 – 25.8 µmol/L Female 14.2 – 35.0 µmol/L	2 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology
Cortisol – Serum	Brown	Morning = 140 - 500 nmol/L	< 1 Day		Chemical Pathology
Cortisol – Urine	24 hour	<147 nmol/24 hours	Referred	Referred to SAS Centre for Steroid	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
				Hormones, Leeds	
Covid Antibody (Total)	Brown	Absent/ Present	1 week		Chemical Pathology
C-Reactive Protein (CRP)	Brown	0 - 5 mg/L	< 1 Day		Chemical Pathology
Creatine Kinase (CK)	Brown	Male 40 - 320 U/L Female 25 - 200 U/L	< 1 Day		Chemical Pathology
Creatinine	Brown	Male 53 - 97 µmol/L Female 44 - 71 µmol/L	< 1 Day		Chemical Pathology
Creatinine Clearance	Brown + 24 h urine	70 - 170 mL/min	< 1 Day		Chemical Pathology
CSF – Oligoclonal Bands	CSF in Universal Brown blood sample		4 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
CSF – Xanthochromia screen	CSF in Universal (Min 0.5ml) Sample in Dark		3 Days	Sample must be protected from natural light and transported by hand immediately to laboratory	Chemical Pathology
Cyclosporin	EDTA	Depends on clinical indication	4 Weeks	Referred to Northern General Hospital, Sheffield (under normal circumstances) Or Royal Hallamshire Hospital, Sheffield	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.		
				Or Department of Transplant Immunology, Leeds			
Cysteine – White Cell/Leucocyte	Heparin		4 Weeks	Referred to Department of Chemical Pathology, Leeds	Chemical Pathology		
Cytogenetics (including basic chromosome analysis, karyotyping and FISH)	EDTA	Refer to external report	8-12 weeks				
	Heparin						
Dehydroepiandrosterone Sulphate (DHEAS)	Brown	Pre adrenarche (1 –5yr) <1 µmol/L	Referred	Referred to SAS Centre for Steroid Hormones, Leeds	Chemical Pathology		
						Female	Male
		Post puberty – 24yr				2.7 –11.0	3.6 – 13.0
		25 – 34yr				2.1 – 10.0	2.9 – 12.0
		35 – 49yr				1.3 – 8.5	1.7 – 10.0
		50 – 59yr				1.0 – 7.0	1.0 – 8.0
		60 – 69yr				<6.0	<7.0
>70yr	<5.0	<6.0					
Digoxin	Brown Taken 6-8 hours after dose (trough)	Therapeutic = 0.5 - 1.00 µg/L	Daily		Chemical Pathology		
Downs Screening (Double Test)	Brown			Request to be ordered only on specific Downs Screening stationary. Referred to Department of Immunology, Sheffield	Contact Immunology directly.		

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Drugs of Abuse – Confirmation & Identification of Opiates - Urine	Universal Container	Referred only when specifically requested following positive identification of opiates within urine drug screen.	2 Weeks	Referred to Black Country Pathology Services	Chemical Pathology
Drugs of Abuse Screen - Urine	Universal Container	Negative Positive	< 1 Week	Referred to Chemical Pathology, Barnsley General Hospital	Chemical Pathology
Electrophoresis - Protein	Brown	Narrative report	1 Week		Immunology
Enhanced Liver Fibrosis (ELF)	Brown	<7.7 can be considered “normal” and suggest no fibrosis 7.7-9.8 corresponds to moderate fibrosis 9.8-11.3 is advanced fibrosis >11.3 is indicative of cirrhosis and above this level the risk of serious complications increases	4 Weeks	Referred to LGI, Leeds	Chemical Pathology
Endomysial Antibodies (IgA)	Brown	Negative	2 Weeks		Immunology
Endomysial Antibodies (IgG)	Brown	Negative – usually laboratory initiated test	3 Weeks		Immunology
Erythropoitin (EPO)	Brown	5.5 – 2.84 mIU/ml	< 5 days	Performed twice weekly	Biochemistry
Ethylene Glycol	Brown		< 2 Days	Referred to Toxicology Department, Northern General Hospital	Chemical Pathology
Ethosuximide	Brown Taken immediately before oral dose (trough)		4 Weeks	Referred to TDM Laboratory, Epilepsy Society	Chemical Pathology
Fabry’s (α – galactosidase)	Blood Spot	Narrative report	4 Weeks	Referred to Willink, Manchester	Chemical Pathology
Faecal Calprotectin	Faeces	Narrative report	2 Weeks		Chemical Pathology
Faecal Elastase	Faeces – small sample	200 - 500 ug/g	Referred	Referral to Royal Hallamshire, Sheffield	Chemical Pathology
Ferritin	Brown	Male 22-322 ug/L Female 10 - 291 ug/L	< 1 Day		Haematology
Fish Odour Syndrome (Trimethylaminuria)	24 Hour collection containing HCl			Referred to Sheffield	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
				Children's Hospital	
Flecainide	Brown Taken immediately before dose (trough)	200 – 800 ug/L	4 Weeks	Referred to Leicester Royal Infirmary	Chemical Pathology
Folate (Serum)	Brown	> 5.4 ug/L	< 1 Day		Haematology
Follicle Stimulating Hormone (FSH)	Brown	F, Follicular Phase: 2.5–10.2 mIU/mL (IU/L) F, Midcycle: 3.4–33.4 mIU/mL (IU/L) F, Luteal Phase: 1.5–9.1 mIU/mL (IU/L) F, Postmenopausal: 23.0–116.3 mIU/mL (IU/L) Male: 1.4 – 18.1 mIU/mL (IU/L)	< 1 Day		Chemical Pathology
Free Androgen Index (Calculated from testosterone and SHBG)	Brown	Male 20 – 39 Yr 40 – 100 Male 40 – 59 Yr 30 – 90 Male 60 – 79 Yr 20 – 70 Female > 20 Yr 0 – 5.0	3 Days	Referred to Chemical Pathology, Barnsley General Hospital	Chemical Pathology
Free Fatty Acids	Fluoride	See Hypoglycaemia Screen			
Free Light Chains (serum)	Brown	Free Kappa 3.3 – 19.4 mg/L Free Lambda 5.7 – 26.3 mg/L Kappa /lambda ratio 0.26 – 1.65	3 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Free Light Chains (urine)	Random Urine		3 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Free Thyroxine (fT4)	Brown	10.0 – 18.7 pmol/L Adult range. Please contact laboratory if age related ranges required.	< 1 Day		Chemical Pathology
Free Tri-iodothyronine (fT3)	Brown	3.5 – 6.5 pmol/L Adult range. Please contact laboratory if age related ranges required.	< 1 Day		Chemical Pathology
Fructosamine	Brown		4 Weeks	Referred to Department of Clinical Biochemistry, Middlesex	Chemical Pathology
Galactosaemia Screen	Li heparin (Orange)	Negative	3 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Gamma-Glutamyl		Male < 73 U/L	< 1 Day		Chemical

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Transpeptidase (GTT)	Brown	Female < 38 U/L			Pathology
Gastrin	BDGastrin Vacutainer (from lab)	0 – 40 pmol/L (Part of gut hormone screen)	4 Weeks	Referred to SAS Laboratories, London	Chemical Pathology
Glucagon	BDGastrin Vacutainer (from lab)	0 – 50 pmol/L (Part of gut hormone screen)	Referred	Referred to SAS Laboratories, London	Chemical Pathology
Gentamicin (trough)	Brown	(Refer to Pharmacy for interpretation)	Daily		Chemical Pathology
Glucose	Brown	Normal fasting <7.0 mmol/L Fasting indicative of Diabetes Mellitus ≥7.0 mmol/L Random indicative of Diabetes Mellitus ≥11.1 mmol/L	< 1 Day		Chemical Pathology
Glycated Haemoglobin (HbA1c)	EDTA	In diabetes aim for <53 mmol/mol	3 Days	Referred to Chemical Pathology, Barnsley General Hospital	Chemical Pathology
Growth Hormone	Brown	0 – 4.3 ug/L	3 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Gut Hormones	BDGastrin Vacutainer (from lab)	Gastrin <40 pmol/L Glucagon <50 pmol/L Neurotensin (specific request) <100 pmol/L Pancreatic Polypeptide <300 pmol/L Somatostatin <150 pmol/L VIP <30 pmol/L	Referred	Referred to SAS Laboratories, London	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
		Chromogranin A <60 pmol/L Chromogranin B <150 pmol/L			
Haptoglobin	Brown	0.4 – 2.8 g/L	1 Week		Immunology
Homocysteine	EDTA Separate within 1 hour	Male 0 – 18 umol/L Female 0 – 16 umol/L	1 Week	Referred to Sheffield Children's Hospital	Chemical Pathology
Immunoreactive Trypsin	Blood spot	With report	4 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Insulin	Brown	17.8 – 173 pmol/L	3 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Insulin Antibodies (IgG)	Brown	Negative <5 mg/L Equivocal 5 – 10 mg/L Positive >10 mg/L	4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Insulin-like Growth Factor (IGF-1)	Brown	Age and sex related ranges. Contact laboratory or see report.	3 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Intermediary Metabolites (Part of hypoglycaemia screen)	Yellow	Includes: Glucose Lactate Free fatty acids 3-Hydroxybutyrate Comment issued with report	2 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Iron	Brown	Male 12 - 31 µmol/L Female 9 - 30 µmol/L	< 1 Day		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Iron Transferrin		Male 2.2 – 3.7 g/L Female 2.5 – 3.8 g/L	< 1 Day		
Transferrin saturation		Male 20 – 50% Female 15 – 50%	< 1 Day		
Lactate	Yellow Fluoride	0.6 - 2.5 mmol/L	< 1 Day		Chemical Pathology
Lactate Dehydrogenase (LDH)	Brown	120 – 246 U/L	< 1 Day		Chemical Pathology
Lamotrigine	Brown Taken immediately before oral dose (trough)	2 – 5 mg/L Some patients may tolerate >10 mg/L without clinical toxicity	4 Weeks	Referred to Toxicology NGH, Sheffield	Chemical Pathology
Lead	EDTA (Pink) Whole blood	1.0– 35.0 ug/dL In the absence of lead exposure, blood lead levels rarely exceed 10 ug/dL. Values greater than this require investigation to identify and remove the source of the lead.	4 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology
Luteinising Hormone	Brown	F, Follicular Phase: 1.9 – 12.5 mIU/mL (IU/L) F, Midcycle: 8.7 – 76.3 mIU/mL (IU/L) F, Luteal Phase: 0.5 – 16.9 mIU/mL (IU/L) F, Postmenopausal: 7.9 – 53.8 mIU/mL (IU/L) Male: 1.4 – 18.1 mIU/mL (IU/L)			
Lipase	Brown	12 – 53 U/L	< 1 Day		Chemical Pathology
Lipid Profile (Fasting - 12hours)					
Total Cholesterol	Brown	Desirable <4.0 mmol/L	< 1 Day		Chemical Pathology
HDL Cholesterol		Desirable >0.90 mmol/L			
Total:HDL Cholesterol Ratio					
LDL Cholesterol (calculated)		Desirable <2.0 mmol/L			
Triglycerides		<1.7 mmol/L			

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
		NB. Consider non-lipid factors in cardio-vascular risk assessment i.e. family history of CHD, hypertension, smoking, diabetes mellitus and male gender.			
Lithium	Brown (Taken at 12 hours post dose)	Therapeutic 0.4 - 1.0 mmol/L	< 1 Day		Chemical Pathology
Magnesium	Brown	Neonate: 0.6 - 1.0 mmol/L >1 month : 0.7 - 1.0 mmol/L	< 1 Day		Chemical Pathology
Metanephrines – Urine	Overnight acidified urine (HCl)	24hr Collection; Metanephrine creatinine 0 – 1.62 µmol/24 hours Normetanephrine creatinine 0 – 2.13 µmol/24 hours Overnight Collection Metanephrine < 0.25 µmol/ mmol Normetanephrine < 0.4 µmol/ mmol	2 Weeks		Chemical Pathology
Microalbumin – Urine (Albumin:creatinine ratio)	Universal – random	Male <2.5 mg/mmol creatinine Female <3.5 mg/mmol creatinine	3 Days	Referred to Chemical Pathology, Barnsley General Hospital	Chemical Pathology
Myelin Associated Glycoprotein Antibodies	Brown	With report	4 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Neurone Specific Enolase (NSE)	Brown	<12.5 ug/L	4 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Neurotensin	BD Gastrin Bottle (from lab)	See Gut Hormones	4 Weeks	Referred to SAS Laboratories, London	Chemical Pathology
Oestradiol	Brown	Follicular 72 - 529 pmol/L Mid-cycle 235 - 1309 pmol/L Luteal 205 - 786 pmol/L Post-menopausal < 118 pmol/L Male < 146 pmol/L	3 Days	Referred to Chemical Pathology, Barnsley General Hospital	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Oligoclonal bands (CSF)	CSF + Brown	Narrative report NB. Blood and CSF required for full interpretation	3 Weeks	Referred to Protein Reference Unit, Sheffield	Immunology
Organic Acids – Urine	Universal – ≥5mL (Freeze immediately)	Narrative report	4 Weeks	Referred to Sheffield Children's Hospital	Chemical Pathology
Osmolality – Serum	Brown	275 - 295 mmol/kg	< 1 Day		Chemical Pathology
Osmolality – Urine	Universal – random	50 – 1200 mmol/kg	< 1 Day		Chemical Pathology
P1NP	Brown	26 – 110 µg/L	3 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology
Pancreatic Polypeptide	BDGastrin Vacutainer (from lab)	See Gut Hormones	4 Weeks	Referred to SAS Laboratories, London	Chemical Pathology
Paracetamol	Brown	Significant toxicity likely: >200 mg/L at 4h >50 mg/L at 12h Treatment indicated if above treatment line. See BNF.	< 1 Day		Chemical Pathology
Parathyroid Hormone	EDTA	20 – 75 ng/L	3 Days		Chemical Pathology
Phenobarbitone	Brown	Therapeutic 10 - 40 mg/L	3 Days	Referred to NGH, Sheffield	Chemical Pathology
Phenytoin	Brown Directly before next dose (i.e. trough level)	Therapeutic 5 - 20 mg/L	< 1 Day		Chemical Pathology
Phosphate – Serum	Brown	0.80 - 1.50 mmo/L Adult range stated. Please contact lab for age related ranges.	< 1 Day		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Phosphate – Urine	24 hour acid (HCl)	15 – 50 mmol/24 hours	< 1 Day		Chemical Pathology
Placental Alkaline Phosphatase (PLAP)	Brown	Non-smokers Cigarette smokers	<500 mU/L <1500 mU/L	4 Weeks Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Placental Like Growth Factor (PLGF)	Brown	Narrative report	1 day	Referred to DRI, Doncaster	Chemical Pathology
Porphyryns/Porphyria – full screen	Blood 2 x EDTA Urine: fresh random sample Faeces: small portion*	*Protect all samples from light Reference ranges and comment with report	3 Weeks	Referred to Department of Medical Biochemistry, Cardiff	Chemical Pathology
Potassium	Brown	Adult: 3.5–5.3 mmol/L Neonate: 3.4 - 6.0 mmol/L Infant: 3.5 - 5.7 mmol/L 1-16yrs: 2.5 - 6.5 mmol/L	< 1 Day		Chemical Pathology
Pregnancy Test – Urine	Universal container – early morning collection	Negative Positive (3 – 7 days after first missed menstrual period)	< 1 Day		Chemical Pathology
Progesterone	Brown	Follicular Luteal Mid-luteal Post-menopausal Pre-pubertal children Male	1.2 – 2.9 nmol/L 24.7 – 85.9 nmol/L 30.1 – 86.8 nmol/L <0.6 – 1.6 nmol/L <0.6 – 1.6 nmol/L <0.6 – 1.6 nmol/L	< 1 Day	Chemical Pathology
Proinsulin	Brown (On ice and separated promptly)	With report	4 Weeks	Discuss with Chemical Pathologist Referred to The Clinical Laboratory, Guildford	Chemical Pathology
Prolactin	Brown	Male: 45–375 mIU/mL Female nonpregnant: 59–619 mIU/mL	< 1 Day		Chemical Pathology
Prostate Specific Antigen (PSA)	Brown	50 – 59 yr 60 – 69 yr >70 yr	<3.0 ug/L <4.0 ug/L <5.0 ug/L	< 1 Day PSA is raised in Ca. prostate and in 25 – 30% of patients with BPH.	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
		Ranges quoted from National Prostate Cancer Risk Management Programme (2002)		<p>PSA samples should not be taken from men who have:</p> <ul style="list-style-type: none"> - an active UTI - ejaculated in the previous 48 hours - exercised vigorously in the previous 48 hours - had a prostate biopsy in the previous 6 weeks. - had a DRE in the previous week. <p>N.B PSA is not tumour specific and is elevated in benign prostatic hypertrophy, prostatitis etc.</p>	
Protein – Urine	EMU is now preferred or 24 hour	Protein:creatinine ratio (PCR) <50 mg/mmol creatinine Albumin:creatinine ratio (ACR) <30mg/mmol creatinine 24hr urine protein <0.1 g/24 hours	< 1 Day		Chemical Pathology
Protein (Total) – Serum	Brown	60 - 80 g/L	< 1 Day		Chemical Pathology
Protein Electrophoresis	Brown	Narrative report	1 Week		Immunology
Pseudocholinesterase (for scoline apnoea)	EDTA	With report Details of anaesthetic sensitivity required	4 Weeks	Referred to Cholinesterase Investigation Unit, Bristol	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Quinine	Brown	Therapeutic 3 – 7 mg/L	4 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Renal Calculi	Calculi	Narrative report	4 Weeks	Referred to Calculi Assay Laboratory, Leicester	Chemical Pathology
Renin (PRA - plasma renin activity)	Li heparin (Orange)	After overnight recumbency 1.1 – 2.7 nmol/L/h After 30 min upright 2.8 – 4.5 nmol/L/h When taken at random during the day 0.5 – 3.5 nmol/L h	2 Weeks	Referred to SAS Centre for Steroid Hormones, Leeds	Chemical Pathology
Salicylate	Brown	Therapeutic <250 mg/L Toxicity likely if >500 mg/L Patients receiving sulfasalazine may show falsely elevated results by up to 25% and patients receiving sulfapyridine may show falsely depressed results by up to 25%. Suggest establishing baseline prior to commencing treatment if possible.	< 1 Day		Chemical Pathology
Selenium	Brown	0.61 – 1.24 umol/L	4 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology
Sex Hormone Binding Globulin (SHBG)	Brown	Female 1.08 - >180 nmol/L Male < 50yrs 14.6 – 94.6 nmol/L	3 Days	Referred to Chemical Pathology, Barnsley General Hospital	Chemical Pathology
Sodium	Brown	133 - 146 mmol/L	< 1 Day		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Tacrolimus	EDTA Taken immediately before oral dose (trough)	Dependent on clinical indication. Please specify transplant type and Unit	4 Weeks	Referred to Northern General Hospital, Sheffield Or to appropriate Transplant Unit (where possible)	Chemical Pathology
Temazepam	Brown	400 – 850 µg/L	4 Weeks	Referred to Royal Hallamshire Hospital, Sheffield	Chemical Pathology
Testosterone	Brown	Female Premenopausal: 0.4 – 2.1 nmol/L Female Postmenopausal: <0.2 – 1.7 nmol/L Male: 9.3 – 32.2 nmol/L	3 Days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Theophylline	Brown 4-6 hours after last theophylline dose taken for patients on slow release oral preparations.	Therapeutic 16 – 20 mg/L Neonatal Apnoea 6 – 11 mg/L	< 1Day		Chemical Pathology
Thiamine (Vitamin B1)	EDTA (Protect from light)	66.5 - 200 nmol/L	2 weeks		Chemical Pathology
Thiopurine Methyltransferase (TPMT)	EDTA	Deficient <10 mU/L Low 20 - 67 mU/L Normal 68 - 150 mU/L High > 150 mU/L With comment on report	4 weeks	Referred to Black Country Pathology Services	Chemical Pathology
Thyroglobulin	Brown	<60mg/L	4 Weeks	Referred to Protein Reference Unit, Sheffield	Chemical Pathology
Thyroid Profile	Brown	See TSH fT4 and fT3	< 1 Day		Chemical Pathology
TPO (Thyoid Peroxidase Ab)	Brown	0- 60 IU/ml	Tested Twice Weekly		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Total Iron Binding Capacity (TIBC)	Brown	45 – 81 umol/L	< 1 Day	Part of Iron Profile	Chemical Pathology
Total Protein	Brown	60 - 80 g/L	< 1 Day		Chemical Pathology
Transferrin	Brown	Male 2.2 – 3.7 g/L Female 2.5 – 3.8 g/L	< 1 Day		Chemical Pathology
Transferrin Receptor	Brown	Refer to the original report.	4 Weeks	Samples should not be taken on Fridays. Referred to Biochemistry Department of Clinical Biochemistry, London.	Chemical Pathology
Transferrin Saturation	Brown	Male 20 – 50% Female 15 – 50%	< 1 Day	Part of Iron Profile	Chemical pathology
Triglycerides (patient should be fasting)	Brown	<1.7 mmol/L	< 1 Day	Minimum fast 14 hours	Chemical Pathology
Tri-iodothyronine (Free T3)	Brown	3.5 – 6.5 pmol/L Adult range. Age related ranges available, please contact the laboratory if required.	< 1 Day		Chemical Pathology
hs Troponin I	Brown	Refer to local cardiac pain pathway.	< 1 Day		Chemical Pathology
TSH	Brown	0.38 – 5.50 mU/L	< 1 Day		Chemical Pathology
Urea	Brown	2.5 – 7.8 mmol/L Adult range. Age related ranges available if required. Please contact the laboratory.	< 1 Day		Chemical Pathology
Urea & Electrolytes (U&Es)					
Creatinine	Brown	Male 53 - 97 µmol/L Female 44 - 71 µmol/L	< 1 Day		Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Potassium		3.5 - 5.3 mmol/L			
Sodium		133 - 146 mmol/L			
Urea		Male 2.5 – 7.8 mmol/L Adult range. Age related ranges available if required. Please contact the laboratory if required.			
Uric acid	Brown	Male 200 - 430 µmol/L Female 140 - 360 µmol/L	< 1 Day		Chemical Pathology
Urine Calcium	24 hour acid urine (HCl)	2.5 – 7.5 mmol/24 hours	< 1 Day		Chemical Pathology
Urine Drugs of Abuse Screen	Universal	Negative Positive Confirmation or drug identification available on specific request	< 2 days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology
Urine Urea & Electrolytes					
Random = very variable – interpret in conjunction with serum U&Es					
Creatinine	Universal – Random or 24 hour (Plain)	Male 7.1 – 17.7 mmol/24 hours Female 5.3 – 15.9 mmol/24 hours	< 1 Day		Chemical Pathology
Potassium		25 - 125 mmol/24hr			
Sodium		40 – 220 mmol/24hr			
Urea		250 – 600 mmol/ 24hr			
Urine Free Cortisol	24 hour urine (Plain)	10 - 147 nmol/24hr	Referred	Referred to SAS Centre for Steroid Hormones, Leeds	Chemical Pathology
Urine Magnesium	24 hour urine (Plain)	2.4 – 6.5 mmol/24hr	As required		Chemical Pathology
Urine NTX	Second morning void	Pre-menopausal 15 – 114 nM BCE/mmol creatinine Post-menopausal 29 – 148 nM BCE/mmol creatinine Males 16 – 90 nM BCE/mmol creatinine	Referred	Referred to Norfolk and Norwich Hospital	Chemical Pathology
Urine Oxalate	24 hour acid urine (HCl)	100 – 411 mmol/24hr	Referred	Referred to Wythenshaw Hospital, Manchester	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
Urine Phosphate	24 hour acid urine (HCl)	15 – 50 mmol/24hr			Chemical Pathology
Urine Protein			< 1 Day		Chemical Pathology
Urine Urate	24hour urine (plain)	1.5 – 4.5 mmol/24hr	< 1 Day		Chemical Pathology
Valproate	Brown Taken immediately before oral dose (trough)	No therapeutic range available	< 1 Day		Chemical Pathology
Vasoactive Intestinal Peptide (VIP)	BD Gastrin Tube. Please contact the laboratory	See Gut Hormones	Referred	Referred to Clinical Biochemistry & Medical Oncology Charing Cross Hospital, London	Chemical Pathology
Very Long Chain Fatty Acids	Li heparin (Orange)	With report	Referred	Referred to Sheffield Children's Hospital	Chemical Pathology
Vitamin A	Brown (Protect from light)	0.84 –3.6 µmol/L Adult range given. Please contact laboratory for age related ranges	2 Weeks		Chemical Pathology
Vitamin B1 (Thiamine)	EDTA (Protect from light)	66.5 - 200 nmol/L	2 Weeks		Chemical Pathology
Vitamin B12	Clotted Gel (brown) 4.9ml	211-911 ng/L	< 1 Day		Chemical Pathology
Vitamin B2	EDTA	1.0 – 3.4 nmol / g Hb	4 Weeks	Referred to Scottish trace element and vitamin service	Chemical Pathology
Vitamin B6	EDTA (Protect from light)	35 - 110 nmol/L	2 Weeks		Chemical Pathology
Vitamin D	Brown	<25 nmol/L Vitamin D deficiency. Give supplementation. 25 – 50 nmol/L Vitamin D insufficiency, increase safe sun exposure and give supplementation.	3 Days	Referred to Chemical Pathology, Barnsley Hospital	Chemical Pathology

Test	Sample Requirements	Reference Ranges (adult unless otherwise stated)	Turnaround Times	Comments & Special Requirements	Discipline to refer to for clinical advice.
		<p>>50 nmol/L Vitamin D level may be sufficient</p> <p>>75 nmol/L Vitamin D level may be optimal</p> <p>>150 nmol/L Vitamin D excess. Potential adverse effects. Suggest review</p>			
Vitamin E	Brown (Protect from light)	<p>11.6 – 35.5 µmol/L Adult range given. Please contact laboratory for age related ranges</p>	2 Weeks		Chemical Pathology
Voltage Gated K Channel Antibodies	Clotted Gel (brown) 4.9ml	0-69 pM	Referred	Referred to Churchill Hospital, Oxford	Chemical Pathology
White Cell Enzymes (other than Fabry's and Pope's)	2x EDTA	With report	Referred	Referred to Willink, Manchester	Chemical Pathology
White Cell Cystine	Li heparin (Orange) Only available Mon to Thurs. Must be received by 11am	With report	Referred	Referred to Specialist Laboratory Medicine, Genetics, St James, Leeds	Chemical pathology
Xanthochromia	CSF (protect from light)	Narrative report	3 Days		Chemical Pathology
Zinc	Brown	7.2 – 20.43 µmol/L	3 Weeks	Referred to Northern General Hospital, Sheffield	Chemical Pathology