

The Department of Clinical Biochemistry.

Departmental Controlled Document

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The following reference data provides guidance to clinicians; however additional advice can be obtained through discussion with the Duty Biochemist on bleep 1718. For information regarding order of draw/tube colour guides, pre-analytical variables, interferences/cross-reactivity or further interpretative guidance please refer to our webpage (<https://www.ouh.nhs.uk/biochemistry/default.aspx>).

Analyte	Reference Range	Sampling
25-hydroxyvitamin D	Oxford Adult 25-hydroxyvitamin D Guidelines: Greater than 50 nmol/L - vitamin D sufficiency 30-50 nmol/L - vitamin D deficiency Less than 30 nmol/L - severe vitamin D deficiency	Serum - SST
Adrenocorticotrophic hormone (ACTH)	0-46 ng/L	Plasma - EDTA The specimen must be collected into a plastic Vacutainer and must not come into contact with glass (syringe or tube). ACTH is unstable; record the time of sampling on the request form and send the sample to the lab ASAP.
Alanine Aminotransaminase (ALT)	10-45 IU/L	Plasma – PST Heparin
Albumin	32-50 g/L	Plasma – PST Heparin
Albumin (urinary)	Males: 0-2.5 mg/mmol creatinine Females: 0-3.5 mg/mmol creatinine	Random urine (plain bottle – early morning sample preferred.
Aldosterone	Random <200 pmol/L Interpretative comments provided. Renin should also be requested.	Plasma - EDTA
Alkaline Phosphatase (ALP)	Age and gender dependent: Males: 0-<1yr: 150-507 IU/L 1-5yrs: 152-767 IU/L 6-10 yrs: 135-557 IU/L 11-14yrs: 92-549 IU/L	Plasma – PST Heparin

	15-19yrs: 62-369 IU/L >19yrs: 30-130 IU/L Females: 0-<1yr: 150-507 IU/L 1-5yrs: 152-767 IU/L 6-10yrs: 135-557 IU/L 11-14yrs: 50-415 IU/L 15-19yrs: 47-175 IU/L >19yrs: 30-130 IU/L	
Alpha fetoprotein (AFP)	0-7 IU/mL	Serum - SST
Amino acids	Available on request	Plasma – PST Heparin Urine (plain bottle) CSF (plain bottle)
Ammonia	Premature neonate <150 µmol/L Term neonate <100 µmol/L Infant/child/adult <40 µmol/L	Plasma – EDTA Specimen must be received in the laboratory within 30 minutes of collection
Amylase	25-125 IU/L	Plasma – PST Heparin
Androstenedione	Males: <10 years: 0.0-1.0 nmol/L >10 years: 3.0-8.0 nmol/L Females: <10 years: 0.0-1.0 nmol/L >10 years: 3.0-8.0 nmol/L	Serum - SST
Angiotensin Converting Enzyme (ACE)	18-55 IU/L Stable for 1 week when refrigerated. ACE activity is inhibited by EDTA or heavy metals	Serum – SST or Plasma – PST Heparin
Aspartate Aminotransferase (AST)	15-42 IU/L	Plasma – PST Heparin AST is not offered as part of the routine liver function panel
Beta-hydroxybutyrate	0-0.27 mmol/L	Serum - SST
Bicarbonate	0-1 month: 13-22 mmol/L 1month – 15yrs: 20-28 mmol/L 16-59yrs: 22-29 mmol/L >59yrs: 23-31 mmol/L	Plasma – PST Heparin

Bile Acids	0-10 µmol/L	Plasma – PST Heparin For diagnosis of cholestasis of pregnancy only
Bilirubin (total)	0-21 µmol/L	Plasma – PST Heparin
Bilirubin (conjugated)	0-5 µmol/L	Plasma – PST Heparin
B-type natriuretic peptide (BNP)	0.6-28.9 pmol/L	Plasma – EDTA Samples need to be received by the laboratory within 4 hours of collection
C-peptide	A fasting C-peptide of <80 pmol/L or a stimulated C-peptide of <200 pmol/L suggests absolute insulin deficiency. In insulin-treated diabetic patients, a stimulated C-peptide of <600 pmol/L suggests marked insulin deficiency and type 1 DM. C-peptide values close to thresholds should be interpreted with great caution and may not assist clinical decision. C-peptide increases and is uninterpretable in renal impairment.	Serum - SST
C-reactive protein (CRP)	0-5 mg/L	Plasma – PST Heparin
Calcitonin	0-10 ng/L	Plasma – PST Heparin Specimen must be separated and froen within 1 hour of collection
Calcium (adjusted)	2.20-2.60 mmol/L N.B. adjusted calcium reference range	Plasma – PST Heparin
Calcium (urinary)	Dependent on dietary/fluid intake. Advice: Duty Biochemist, bleep 1718	Urine, spot (plain or 24h collection (plain/HCl acid)
Carbamazepine	Therapeutic ranges: Adults (>13y): 34-51 µmol/L Children (0-13y): 17-35 µmol/L	Plasma – PST Heparin
Carbohydrate antigen 125 (CA 125)	0-35 IU/mL	Serum - SST

Carbohydrate antigen 15-3 (CA 15-3)	0-32 IU/mL	Serum – SST
Carbohydrate antigen 19-9 (CA 19-9)	0-37 IU/mL	Serum - SST
Carcinoembryonic antigen (CEA)	0-3 µg/L	Serum - SST
Chloride	95-105 mmol/L	Plasma – PST Heparin
Chloride (urinary)	Dependent on dietary/fluid intake. Advice: Duty Biochemist, bleep 1718.	Urine, spot (plain) or 24h collection (plain/acetic acid)
Cholesterol (total), HDL and LDL	Advice: Duty Biochemist, bleep 1718.	Plasma – PST Heparin
Cortisol	In adult patients who are not on steroid treatment: A 9 a.m. cortisol <100 nmol/L suggests adrenal insufficiency A 9 a.m. cortisol >350 nmol/L is a normal result. No further investigation required. If two 9 a.m. results are <350 nmol/L a short synacthen test may be required; please consider referral to Endocrinology clinic for review. If this is an overnight dexamethasone suppression, a normal response is a 9 a.m cortisol <50 nmol/L after 1 mg of dexamethasone given at 11 p.m. A random (e.g. non-9:00 a.m.) cortisol or a value when the patient is on steroids is uninterpretable.	Serum - SST
Cortisol (free, urinary)	0-135 nmol/24h	Urine, 24h collection (plain)
Creatine Kinase (CK)	Males: 30-200 IU/L Females: 29-168 IU/L	Plasma – PST Heparin
Creatinine	Males: <4 wks: 24-107 µmol/L 4-11 wks: 15-47 µmol/L 12-25 wks: 13-37 µmol/L 26-51 wks: 13-33 µmol/L 1-2 yrs: 15-31 µmol/L 3-4 yrs: 23-37 µmol/L 5-6 yrs: 25-42 µmol/L 7-8 yrs: 30-48 µmol/L 9-10 yrs: 28-57 µmol/L 11 yrs: 36-64 µmol/L 12 yrs: 36-67 µmol/L	Plasma – PST Heparin

13 yrs: 38-76 $\mu\text{mol/L}$
 14 yrs: 40-83 $\mu\text{mol/L}$
 15 yrs: 47-98 $\mu\text{mol/L}$
 16 yrs: 54-99 $\mu\text{mol/L}$
 17 yrs: 59-104 $\mu\text{mol/L}$
 18-19 yrs: 51-81 $\mu\text{mol/L}$
 >19yrs: 49-90 $\mu\text{mol/L}$
 Females:
 <4 wks: 25-103 $\mu\text{mol/L}$
 4-11 wks: 16-48 $\mu\text{mol/L}$
 12-25 wks: 14-34 $\mu\text{mol/L}$
 26-51 wks: 13-32 $\mu\text{mol/L}$
 1-2 yrs: 15-31 $\mu\text{mol/L}$
 3-4 yrs: 23-37 $\mu\text{mol/L}$
 5-6 yrs: 25-42 $\mu\text{mol/L}$
 7-8 yrs: 30-48 $\mu\text{mol/L}$
 9-10 yrs: 28-57 $\mu\text{mol/L}$
 11 yrs: 36-64 $\mu\text{mol/L}$
 12 yrs: 36-67 $\mu\text{mol/L}$
 13 yrs: 38-74 $\mu\text{mol/L}$
 14 yrs: 43-75 $\mu\text{mol/L}$
 15 yrs: 44-79 $\mu\text{mol/L}$
 16 yrs: 48-81 $\mu\text{mol/L}$
 17 yrs: 45-84 $\mu\text{mol/L}$
 18-19 yrs: 51-81 $\mu\text{mol/L}$
 >19 yrs: 49-90 $\mu\text{mol/L}$
 N.B. Age, build and pregnancy affect the reference range for plasma creatinine.

Creatinine (urinary)	Dependent on dietary/fluid intake. Advice: Duty Biochemist, bleep 1718	Urine, spot (plain) or 24h collection (plain/HCl/acetic acid)
Cyclosporin	Therapeutic range depends on the indication for its prescription. Advice: Duty Biochemist, bleep 1718	Whole blood – EDTA. If sending with FBC, please send aa separate EDTA sample. Pre-dose specimen should reach lab by 09:30 (11:00 at weekends) for same day analysis.
Dehydroepiandrosterone Sulphate (DHEAS)	Males: <2 wks: 0.0-29.5 $\mu\text{mol/L}$ 2 wks–4 yrs: 0.0-2.5 $\mu\text{mol/L}$ 5-10 yrs: 0.0-4.9 $\mu\text{mol/L}$	Serum - SST

	<p>11-14 yrs: 0.7-10.3 $\mu\text{mol/L}$ 15-29 yrs: 2.4-17.2 $\mu\text{mol/L}$ 30-39 yrs: 1.7-12.6 $\mu\text{mol/L}$ 40-49 yrs: 1.3-9.2 $\mu\text{mol/L}$ 50-59 yrs: 0.9-6.7 $\mu\text{mol/L}$ >59 yrs: 0.7-4.9 $\mu\text{mol/L}$ Females: <2 wks: 0.0-29.5 $\mu\text{mol/L}$ 2 wks-4 yrs: 0.0-2.5 $\mu\text{mol/L}$ 5-10 yrs: 0.0-4.9 $\mu\text{mol/L}$ 11-14 yrs: 0.7-10.3 $\mu\text{mol/L}$ 15-29 yrs: 1.3-12.5 $\mu\text{mol/L}$ 30-39 yrs: 1.7-11.8 $\mu\text{mol/L}$ 40-49 yrs: 1.0-12.7 $\mu\text{mol/L}$ 50-59 yrs: 0.0-10.4 $\mu\text{mol/L}$ >59 yrs: 0.0-8.1 $\mu\text{mol/L}$</p>	
Digoxin	<p>Adults/children: 1.0-2.6 nmol/L Infants (up to 13 weeks): 2.0-3.0 nmol/L</p>	<p>Plasma – PST Heparin Sample collected 6 hours post dose</p>
Elastase (faecal)	<p>>200 $\mu\text{g/gram}$ stool Moderate exocrine pancreatic insufficiency <200 $\mu\text{g/gram}$ Severe: <100 $\mu\text{g/gram}$</p>	<p>Stool (plain bottle) Specimen must be a formed stool</p>
Erythropoietin (EPO)	5-25 IU/L	Serum - SST
Ferritin	<p>Males: 20-300 $\mu\text{g/L}$ Females: 10-200 $\mu\text{g/L}$</p>	Serum - SST
Folate	3.0-20.0 $\mu\text{g/L}$	Serum - SST
Follicle Stimulating Hormone (FSH)	<p>Reference ranges depend on age, sex and stage of menstrual cycle Males: <1 yr: 0.0-2.4 IU/L 1-8 yrs: 1.0-1.5 IU/L >8 yrs: 1.0-12.0 IU/L Females: <1 yr: 0.0-2.4 IU/L 1-7 yrs: 0.0-4.1 IU/L >7 yrs: 1.0-30.0 IU/L</p>	Serum - SST
Free fatty acids (FFA)	<p>Values (mmol/L) interpreted with simultaneous b- hydroxybutyrate and glucose values. Advice: Duty Biochemist, bleep 1718</p>	Serum - SST
Gamma glutamyl transferase (GGT)	15-40 IU/L	Plasma – PST Heparin
Gentamicin	Please visit:	Plasma – PST

	https://viewer.microguide.global/ouh/adult or https://viewer.microguide.global/ouh/paed	Heparin
Glucose	Advice: Duty Biochemist, bleep 1718	Plasma - FluOx
Glucose (CSF)	Approx 60% of plasma glucose result when samples are taken simultaneously – ensure paired plasma glucose specimen is collected	CSF - FluOx
Glycated Haemoglobin (HbA1c)	HbA1c reported in both IFCC and DCCT aligned units, see acb.org.uk/docs/default-source/guidelines/hba1cclabprofessionaloct2011.pdf For patients with a HbA1c of 42-47, please consider referral to the National Diabetes Prevention Programme [eligibility criteria 1)Age >18yrs 2)Not known to have diabetes 3) Not pregnant] Non-diabetic: IFCC 20-41 mmol/mol Hb DCCT: 4.0-5.9%	Whole blood - EDTA
Growth Hormone (GH)	Advice: Duty Biochemist, bleep 1718	Serum - SST
Haptoglobin	0.3-2.0 g/L Due to the lack of appropriate reference range, testing of Haptoglobin in children under 1 year of age may not be informative.	Serum - SST
Human Chorionic Gonadotrophin (hCG)	0-4 IU/L	Serum - SST
Insulin-like Growth Factor-1 (IGF-1)	Reference ranges are age, sex and Tanner stage dependent: Males: Up to 1 yr:2.5-17.1 nmol/L 1-3 yrs: 3.1-27.3 nmol/L 4-5 yrs: 5.0-34.0 nmol/L 6-7 yrs: 6.4-41.9 nmol/L 8-9 yrs: 8.3-51.4 nmol/L 10-11 yrs: 10.6-60.8 nmol/L 12-17 yrs: 12.7-66.5 nmol/L 18-20 yrs: 13.6-64.1 nmol/L 21-24 yrs: 11.5-54.8 nmol/L 25-30 yrs: 9.6-43.3 nmol/L 31-60 yrs: 7.0-31.7 nmol/L >60 yrs: 4.6-24.9 nmol/L Females: Up to 1 yr: 2.0-19.7 nmol/L 1-2 yrs: 2.3-25.3 nmol/L 3-5 yrs: 3.5-30.7 nmol/L 6-7 yrs: 4.8-37.9 nmol/L 8-9 yrs: 6.8-48.1 nmol/L 10-11 yrs: 9.5-59.6 nmol/L 12-17 yrs: 12.5-65.1 nmol/L 18-20 yrs: 14.3-61.7 nmol/L	Serum - SST

21-24 yrs: 12.0-50.1 nmol/L
 25-30 yrs: 10.3-39.6 nmol/L
 31-60 yrs: 6.4-31.0 nmol/L
 >61 yrs: 4.5-22.5 nmol/L

Insulin	Fasting insulin (>11 yrs) is up to 72 pmol/L. Children: Males: 3-4 yrs: 7-45 pmol/L 5-7 yrs: 9-54 pmol/L 8-9 yrs: 13-66 pmol/L 10 yrs: 18-73 mol/L >10 yrs: <72 pmol/L Females: 3-6 yrs: 8-52 pmol/L 7-8 yrs: 13-64 pmol/L 9 yrs: 18-73 pmol/L 10 yrs: 22-83 pmol/L >10 yrs: <72 pmol/L Insulin and C-peptide results should be interpreted in the context of concurrent glucose concentration	Serum - SST
Iron	Males: 14-31 µmol/L Females: 11-30 µmol/L	Serum - SST
Lactate	0.5-2.0 mmol/L	Plasma - FluOx
Lactate Dehydrogenase (LDH)	Males: 90-235 IU/L Females: 110-255 IU/L	Plasma – PST Heparin
Lipase	8-78 IU/L	Plasma – PST Heparin
Lithium	Adults: -.5-0.8 mmol/L	Serum - SST
Luteinising Hormone (LH)	Reference ranges depend on age, sex and stage of menstrual cycle. Males: <1 yr: 0.0-3.8 IU/L 1-8 yrs: 0.0-1.2 IU/L >8 yrs: 0.6-13.0 IU/L Females: <1 yr: 0.0-3.8 IU/L 1-7 yrs: 0.0-1.0 IU/L >7 yrs: 2.0-100.0 IU/L	Serum - SST
Magnesium	0.70-1.0 mmol/L	Plasma – PST Heparin
Methotrexate	0-0.1 µmol/L	Plasma – PST Heparin
Microalbumin	See Albumin, urinary	
N-terminal pro B-type Natriuretic Peptide	For guidance on interpretation of NT-proBNP refer to:	Serum - SST

(NTproBNP)	https://occg.info/heart-failure	
Oestradiol	Males: <9 yrs: 0-73 pmol/L >9 yrs: 0-160 pmol/L Females: <8 yrs: 0-73 pmol/L >8 yrs: 77-2400 pmol/L	Serum - SST
Osmolality	278-295 mosmol/kg	Plasma – PST Heparin
Osmolality (urinary)	350-1000 mosmol/kg	Urine, spot (plain)
P1NP	20-60 µg/L	Serum - SST
Paracetamol	The critical level for risk of liver damage decreases with time after ingestion, see algorithm in the BNF	Plasma – PST Heparin
Parathyroid Hormone	1.6-7.2 pmol/L	Plasma - EDTA
Phenobarbitone	Therapeutic range based on pre-dose specimens: 65-170 µmol/L	Plasma – PST Heparin
Phenylalanine	Note: for diagnosis/monitoring of PKU	Plasma – PST Heparin
Phenytoin	40-80 µmol/L	Plasma – PST Heparin
Phosphate	0-1 mth: 1.2-3.1 mmol/L 1-6 mths: 1.3-2.5 mmol/L 6 mths-2yrs: 1.3-2.2 mmol/L 2-4 yrs: 1.0-2.0 mmol/L 4-11 yrs: 0.9-1.8 mmol/L 12-15 yrs: 0.8-1.7 mmol/L >15 yrs: 0.7-1.45 mmol/L	Plasma – PST Heparin
Phosphate (urinary)	Dependent on dietary/fluid intake. Advice: Duty Biochemist, bleep 1718	Urine, spot (plain) or 24h collection (plain/HCl acid)
Porphobilinogen	PBG: creatinine ratio: 0-1.5 µmol/mmol creatinine	Urine, spot (plain) Specimen must be protected from light
Porphyrins	Urinary porphyrin:creatinine ratio: 0-35 nmol/mmol creatinine Advice: Duty Biochemist, bleep 1718	Urine, spot (plain) Whole blood – EDTA Specimen must be protected

		from light
Potassium	3.5-5.0 mmol/L	Plasma – PST Heparin
Potassium (urinary)	Dependent on dietary/fluid intake. Advice: Duty Biochemist, bleep 1718	Urine, spot (plain) or 24h collection (plain/acetic acid)
Progesterone	Males: <2 nmol/L Females: Post-menopausal/follicular phase: <2 nmol/L Luteal phase progesterone of >25 nmol/L usually indicates ovulation	Serum - SST
Prolactin	Males: 70-140 mIU/L Females: 110-560 mIU/L	Serum - SST
Prostate Specific Antigen (PSA)	<4 µg/L	Serum - SST
Protein (CSF)	<400 mg/L	CSF (plain)
Renin	Random: 11-32 mIU/L Interpretative comments provided.	Plasma – EDTA Specimen needs to be taken directly to the lab.
Salicylate		Plasma – PST Heparin
Sex Hormone Binding Globulin (SHBG)	Males: <4 wks: 14-120 nmol/L 4 wks-11 mths: 6-229 nmol/L 1-6 yrs: 42-189 nmol/L 7-9 yrs: 26-162 nmol/L 10-11 yrs: 15-108 nmol/L 12-13 yrs: 11-98 nmol/L 14-17 yrs: 10-50 nmol/L >17 yrs: 14-78 nmol/L Females: <4 wks: 14-120 nmol/L 4 wks-11 mths: 36-229 nmol/L 1-6 yrs: 42-189 nmol/L 7-9 yrs: 26-162 nmol/L 10-11 yrs: 15-108 nmol/L 12-13 yrs: 11-98 nmol/L 14-15 yrs: 10-84 nmol/L 16-17 yrs: 11-154 nmol/L 18-49 yrs: 34-148 nmol/L >49 yrs: 16-118 nmol/L	Serum - SST

Sirolimus	Therapeutic range depends on the indication for its prescription. Advice: Duty Biochemist, bleep 1718.	Whole blood – EDTA If sending with FBC, please send a separate EDTA sample. Pre-dose specimen should reach lab by 09:30 (11:00 at weekends) for same day analysis.
Sodium	135-145 mmol/L	Plasma – PST Heparin
Sodium (urinary)	Dependent on dietary/fluid intake. Advice: Duty Biochemist, bleep 1718	Urine, spot (plain) or 24h collection (plain/acetic acid)
Tacrolimus	Therapeutic range depends on the indication for its prescription. Advice: Duty Biochemist, bleep 1718.	Whole blood – EDTA If sending with FBC, please send a separate EDTA sample. Pre-dose specimen should reach lab by 09:30 (11:00 at weekends) for same day analysis.
Testosterone	Males: <6 mths: 0.3-10.5 nmol/L 6 ths-8 yrs: <1.3 nmol/L 9-10 yrs: <0.8 nmol/L 11-13 yrs: <15.6 nmol/L 14-15 yrs: 1.3-22.3 nmol/L >15 yrs: 8.4-28.7 nmol/L Females: 0-8yrs: <2.2 nmol/L 9-12 yrs: <1.0 nmol/L 13-14 yrs: 0.5-1.7 nmol/L >14yrs: 0.5-2.6 nmol/L This assay measures total testosterone	Serum - SST
Theophylline	Infants (<1 yr): 27-55 µmol/L Adults/children: 55-110 µmol/L	Plasma – PST Heparin

Thyroglobulin	For the management of follicular thyroid cancer only	Serum - SST
Thyroid Stimulating Hormone (TSH)	0-<1 wk: 0.64-8.80 mIU/L 1 wk-<1 yr: 0.88-5.42 mIU/L 1-5 yrs: 0.66-4.75 mIU/L 6-10 yrs: 0.47-4.20 mIU/L >11 yrs: 0.30-4.20 mIU/L	Plasma – PST Heparin Please give relevant clinical information and the laboratory normally selects appropriate thyroid tests according to the data on the request card
Thyroxine, free (FT4)	0-<1yr: 11.0-23.6 pmol/L 1-5 yrs: 11.7-20.8 pmol/L 6-10 yrs: 10.9-19.0 pmol/L 11-14 yrs: 10.0-17.0 pmol/L 15-19 yrs: 10.2-17.3 pmol/L >20 yrs: 9.0-19.0 pmol/L	Plasma – PST Heparin
Total Protein	60-80 g/L	Plasma – PST Heparin
Total Protein, urinary	Advice: Duty Biochemist, bleep 1718	Urine – spot (plain) or 24h collection (plain)
Transferrin	<4 wks: 0.8-2.3 g/L 4-7 wks: 0.9-2.4 g/L 8-15 wks: 1.1-2.9 g/L 16-25 wks: 1.8-3.1 g/L 26 wks-3 yrs: 1.8-3.5 g/L 4-9 yrs: 2.2-3.6 g/L 10-12 yrs: 2.0-4.1 g/L >12 yrs: 1.8-3.6 g/L	Serum - SST
Triglycerides	Fasting: 0.55-1.90 mmol/L	Plasma – PST Heparin Patient must fst for at least 12h
Triiodothyronine, free (FT3)	0-<1yr: 3.4-7.6 pmol/L 1-5 yrs: 4.3-7.2 pmol/L 6-10 yrs: 4.4-6.8 pmol/L 11-14 yrs: 3.4-6.9 pmol/L 15-19 yrs: 2.9-6.8 pmol/L >20 yrs: 2.6-5.7 pmol/L	
Troponin I	Males: 0-34 ng/L Females: 0-17 ng/L	Serum - SST
Urate (uric acid)	Children 0-3 yrs: 105-300 µmol/L Children >3 up to 9 yrs: 120-290 µmol/L	Plasma – PST Heparin

Males (>9 yrs): 210-420 $\mu\text{mol/L}$
Females (>9 yrs): 150-350 $\mu\text{mol/L}$

Urea	Males: 0-3 yrs: 1.8-6.0 mmol/L 4-13 yrs: 2.5-6.0 mmol/L 14-19 yrs: 3.0-7.5 mmol/L 20-50 yrs: 3.2-7.4 mmol/L >50 yrs: 3.0-9.2 mmol/L Females: 0-3 yrs: 1.8-6.0 mmol/L 4-13 yrs: 2.5-6.0 mmol/L 14-19 yrs: 3.0-7.5 mmol/L 20-50 yrs: 2.5-6.7 mmol/L >50 yrs: 3.5-7.2 mmol/L	Plasma – PST Heparin
Urea, urinary	Dependant on dietary/fluid intake Advice: Duty Biochemist, bleep 1718	Urine – spot (plain) or 24h collection (plain)
Valproate	300-700 $\mu\text{mol/L}$	Plasma – PST Heparin
Vancomycin	Please visit: https://viewer.microguide.global/ouh/adult or https://viewer.microguide.global/ouh/paed	Plasma – PST Heparin
Vitamin B12	180-900 ng/L	Serum - SST
Xanthochromia (CSF Spectroscopy)	Advice: Duty Biochemist, bleep 1718	CSF (plain) Specimens must be protected from light
Zinc	10-18 $\mu\text{mol/L}$	Plasma – PST Heparin

Signed:



Date: 4/12/2019