 Western Health and Social Care Trust	Clinical Chemistry Department
CLINICAL CHEMISTRY SPECIMEN RECEPTION LABORATORY MANUAL	Active Date 11/10/2018
CC/SPEC/030 version 2.30	Page 1 of 91

Location of Document

Electronic copy only in QPulse
 Hardcopy in SWAH and Altnagelvin Clinical Chemistry Department

Extracted Pages:

Altnagelvin: 1 Copy - Blood Bottle and Relevant Test. Located on Noticeboard 11.

SWAH: Reference ranges – one copy. Located on red clipboard in reporting Area PAT.B1.015

CHANGES IN THIS VERSION	Paper copy only active when stamped with RED “Active Document” stamp
2.30 - LiHep suitable for vancomycin / Procalcitonin added / SWAH extractions / Calprotectin now analysed in Ulster Lab; WHSCT Pathway added / Adalimumab PID added / Everolimus added / FAI Androgen profile / Barbiturates Overdose / Bile Acid / Some TATs adjusted / Dry ice replaced with Biofreeze Bottles	

CLINICAL CHEMISTRY Laboratory Reception Manual

Note – this manual is based upon the Laboratory users’ manual (LAB/ADMIN/022) with additional information regarding referral and sample transport protocols.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



INTRODUCTION

The WHSCT Clinical Chemistry Laboratory is located on two sites – The South West Acute Hospital (SWAH) in Enniskillen and the Altnagelvin Hospital in Londonderry. Both laboratory sites include a 24h emergency service. The Clinical Chemistry Laboratory in Altnagelvin is located on Floor G0 of the Laboratory & Pharmacy Services Centre. The Clinical Chemistry Laboratory in the SWAH is located in the Laboratory section on Floor -1 near the A&E department.

Altnagelvin Laboratory Hours

- (a) Monday to Friday 9.00am - 5.15pm
- (b) Saturday 9.00am - 12.00noon
- (c) All other times (including Bank Holidays) a 24h emergency service is available.

SWAH Laboratory Hours

- (a) Monday to Friday 08.55am - 5.00pm
- (b) Saturday 9.00am - 12.00noon
- (c) All other times (including Bank Holidays) a 24h emergency service is available.

Telephone Numbers

For advice on test selection / interpretation contact the Consultant Chemical Pathologist or Consultant Clinical Biochemist.

Altnagelvin Hospital

02871 345171

SWAH Hospital

02866 382000

Laboratory Reception/Results/Enquiries

Altnagelvin Ext 213796 / 7 / 8
SWAH Ext 252301 / 252284
Vocera

Clinical Chemistry Laboratory

Altnagelvin Ext 213961
SWAH Ext 252275

Dr Maurice O’Kane
Consultant Chemical Pathologist
(Head of Department)
Dr O’Kane’s Secretary

Altnagelvin Ext 213805

Altnagelvin Ext 213804

Dr Mark Lynch
Consultant Clinical Biochemist

Altnagelvin Ext 213806

Ms Siobhan Ashe
Lead BMS

Altnagelvin Ext 213808
SWAH Ext 252282


Ms Mary Burns
BMS SWAH

SWAH Ext 252283

Laboratory Fax Number

Altnagelvin 02871 611186
SWAH 02866382660

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.

 Western Health and Social Care Trust	Clinical Chemistry Department
CLINICAL CHEMISTRY SPECIMEN RECEPTION LABORATORY MANUAL	Active Date 11/10/2018
CC/SPEC/030 version 2.30	Page 3 of 91

CLINICAL CHEMISTRY LABORATORY

Emergencies from within Hospital site:

During normal working hours:

The laboratory **must** be telephoned about **all** emergency requests during the day.

The request form should be labeled "**Urgent**" to allow the specimen to be identified by laboratory staff.

Outside normal working hours:

On Call staff must be telephoned or beeped to arrange all emergency work before the specimen is sent.

Emergencies from GPs and other non hospital site requestors:

During normal working hours:

GP/requestor **must** contact Clinical Chemistry Laboratory, by telephone, to inform us that an urgent sample, requiring the results to be telephoned back, is being sent. Details of transport and approximate time of delivery to lab **must** be given.

The specimen and request form **must** be sent in an envelope to distinguish it from other routine requests.

The envelope **must** be clearly marked URGENT BIOCHEMISTRY.

The accompanying request form **must** have the name and telephone number of the person to be contacted with the results.

If sample is to be received in late afternoon details of who to contact if Health Centre closed when results are available should also be given.

Request Forms/Specimen Information

All request forms and samples must be clearly identified with a set of mandatory matching identifiers. Where possible printed labels should be used on both form and sample.

Data	Request Form	Specimen
H&C No.#	Mandatory	Mandatory
Forename & Surname	Mandatory	Mandatory
Date of Birth	Mandatory	Mandatory
Gender	Mandatory	Mandatory
Address	Desirable	
Patient Location/Destination for Report	Desirable	
Name of Consultant or GP	Desirable	
Test Request	Mandatory	
Date/Time	Desirable	Desirable
Anatomical Site & Specimen Type	Desirable where relevant	
Relevant Clinical Information	Desirable	
Signature of Requesting Clinician	Desirable	

There may be occasions where the H&C number is not available, e.g. unidentified persons, neonatal children where number has not been processed or patients from outside Northern Ireland. In these instances it is acceptable to use other forms of identifiers i.e. Hospital number or Casualty number (for unidentified patients).

Note: Requests missing mandatory identifiers will be rejected

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.

Specimen Tubes /Containers

It is essential that the specimen is collected into the correct container to ensure accurate results.

The following tubes are used:

BLOOD:

Gel Tubes:

Plastic tubes with **Yellow tops** containing a gel separator for clotted specimens also known as SST (serum separator tubes).

Glucose Tubes:

Plastic tubes with **Grey tops** containing Sodium Fluoride and Potassium oxalate.

Clotted Tubes:

Plastic tubes with **Red tops** for clotted samples.

Heparinised Syringes:

Plastic Syringes coated with heparin (**Needle must NOT be left on syringe**)

Heparin Tubes:

Glass/plastic tubes with **Green tops** containing heparin.

EDTA Tubes:

Glass/plastic tubes with **Purple tops** containing potassium EDTA.

Paediatric samples:

Small Heparinised tubes (**Green top**) available via Supplies. When filled tube should be inserted securely into a 4mL Heparin Vacuette plastic tube and the identification label attached to this.

Small Glucose tubes (**grey top**) available from Lab Reception.

Small Serum tubes (**red top**) available from Lab Reception.

Note: As per manufacturer's recommendations --Immediately following blood collection all yellow, red, green, purple and grey topped tubes MUST be gently inverted (*Turn the filled tube upside-down and return to upright position*) EIGHT times before sending to Lab. Such inversion assures a proper mix of additive and blood.

In addition:

- Do not remove lids from Tubes – see below.
- Do not shake the tubes. Vigorous mixing may cause foaming or haemolysis.
- Insufficient mixing or delayed mixing in serum tubes (red and yellow tops) may result in delayed clotting.
- In tubes with anticoagulants (green, purple and grey tops), inadequate mixing may result in platelet clumping, clotting and/or incorrect test results.

Always use the correct order of draw and mix samples carefully:

- Blood Culture
- Coagulation (blue top)
- Serum (red / yellow top)
- Heparin (green top)
- EDTA (purple top)
- Glucose (grey top)

See WHSCT Tube guide and order of draw:



Western Health
Social Care - VACUET

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



VACUETTE® SELECTION CHART

Western Health and Social Care Trust Version 1.0 Last updated 16.02.2018



Samples to be collected in the following order unless specified below:

PPC code	GBO code	Draw Vol.	Cap Colour	Tube Type	Haematology Tests	Biochemistry Tests	Microbiology Tests
1 KBC000151 +A2A10 C000161 +A2A10	454334	3ml	 Blue	Sodium Citrate	Coagulation Screen, INR, D-Dimer/ XDP, Thrombophilia Screen, Lupus Anticoagulant, Factor assays.		
2 KBC000139	454204		 Red	Serum	Gold Agglutinin.	Androgen Profile, Androstenedione, 17-Hydroxyprogesterone.	
3 KBC000141	454228	3.5ml	 Gold	Serum Gel	Paul-Bunnell.	Routine Biochemistry Profiles: Electrolyte, Liver, Bone, Lipid, Thyroid, Iron. Miscellaneous biochemistry tests: Amylase, CRP, CK, Magnesium, Urate, LDH, Troponin, NT-proBNP, PSA, hCG, Ferritin, Hydroxybutyrate, Therapeutic Drugs, Gentamicin, Ethanol, B12, Folate, Paracetamol, Salicylate, Osmolality, Conjugated Bilirubin.	Syphilis Screen, Rheumatoid Factor, ASOT, Bloods for Virus Reference Lab, Antibody Screen for Reference Lab.
4 KBC000141	454228	3.5ml	 Gold	Serum Gel		NON ROUTINE / REFERRALS [Separate Request form and tubes needed – do not include with ROUTINE BIOCHEMISTRY] Hormone Profile, Cortisol, Total Bile Acids, Vancomycin, Serum Protein Electrophoresis, Complement, Immunoglobulins, Vit D, Immunology Testing, Tumour Markers, O-Peptide, DHEAS (DHAS), Growth Hormone, Insulin.	
5 KBC000144	454029	4ml	 Green	Lithium Heparin		Chromosome Analysis.	
6 KBC000149	454021	4ml	 Lavender	K3 EDTA	Full Blood Count, Retics, ESR, Maternal sample for Kieihauers.	HbA1c, PTH, TPMT, TPMT Metabolites, Ammonia (on Ice), Tacrolimus, Sirolimus, Genetic DNA Testing, Aldosterone/Renin, Lead.	Meningococcal POR Bloods and POR bloods for reference labs. [For Paediatric POR bloods smaller volume pink top EDTA tubes are acceptable]
7 KBC000152		6ml	 Pink	Cross-match	Group and Screen, Crossmatch, Direct Coombs, Cord sample for Kieihauers.		
8 KBC000147	454221	2ml	 Grey	Fluoride Oxalate		Glucose, Lactate.	
9 KBC000154	455080	6ml	 Dark Blue	Trace Elements		Trace Metals (tube available via Clinical Biochemistry Lab) Aluminium, Chromium, Cobalt, Copper, Selenium, Zinc.	



VAWH01

Greiner Bio-One Ltd.
Tel: 01453 825255.
sales@uk.gbo.com

SEE WHSCT Venous Blood Collection SOP PHLEB/SOP/002
[Trust Intranet – Guidelines, procedures and protocols/Acute Services/Laboratory](#)

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



URINE:

Urine – Monovette® (Sarstedt) 10 mL **lemon top** tube for urine sample for Albumin Creatinine Ratio. Available as stock item NSV code KCP200 or Lab Reception. Also suitable for other urine and fluid specimens.

Universal Containers: Plain sterile containers for random urine, CSF and fluid specimens.

24h Urine Containers: For some tests, urine containers with specific preservatives must be obtained from the laboratory.

Faecal Occult Blood Seracult Plus FOB Cards must be used. Available from RSS or Lab Reception.

Some tests have specific collection and transport requirements which are described under the individual test name. If in doubt, please contact the laboratory before any sample is taken. Specimen tubes/containers for the Altnagelvin Site are available from Regional Supplies Service at Campsie, unless stated above. Specimen tubes/containers for the SWAH Site are available from the laboratory unless stated above.

Clinical chemistry Profile Tests

One or more of the following profile test groups may be requested using a single gel (**Yellow Top**) blood tube specimen [Serum Separator Tube (**SST**)].

Electrolyte Profile: Na, K, Cl, Urea, Creatinine, Total CO₂, Total Protein, eGFR (4vMDRD).

Liver Profile: Total Bilirubin, ALP, GGT, AST, ALT, Albumin.

Muscle Enzymes: Total CK, AST.

Bone Profile: Ca, Adjusted Calcium**, Albumin, ALP, Phosphate.

Cardiac Profile: Troponin T (Green top no longer required)

Lipid Profile: Total Cholesterol, Triglycerides, HDL, HDL/Total Chol ratio, calculated LDL.

Iron Profile: Serum Iron, Ferritin, Transferrin, calculated % Transferrin Saturation.

Thyroid Profile Free T4, TSH, Free T3 (If TSH is < 0.1)

B12 and Folate B12 and Folate

* Glucose result unreliable (i.e. may be lower than the true value) unless serum is separated and / or analysed quickly (within 30 minutes). Routine blood glucose must be sent in a Sodium Fluoride blood tube (**Grey Top**) with a separate form.

** Adjusted Calcium = Total Calcium + [(40 – Albumin) x 0.02]

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Any combination of the following routine Clinical Chemistry tests may be requested using one request form and ONE 4mL specimen (**Yellow Top**)

Tests that do not have a tick box should be clearly written in the Additional Tests area of the request form.

Test	Sample	Container	Comments
Alcohol (Ethanol)	Blood	4mL Yellow Top	Do not use alcohol wipes.
Amylase - serum	Blood	4mL Yellow Top	
Bone Profile	Blood	4mL Yellow Top	ALP range is age and sex related.
B12 and Folate	Blood	4mL Yellow Top	
CRP	Blood	4mL Yellow Top	
Calcium	Blood	4mL Yellow Top	
Carbamazepine/Tegretol	Blood	4mL Yellow Top	
Cardiac Troponin	Blood	4mL Yellow Top	
Digoxin	Blood	4mL Yellow Top	Specimen taken at least 6-8h after last oral dose.
Electrolyte Profile	Blood	4mL Yellow Top	
Hydroxybutyrate	Blood	4mL Yellow Top	Ketones
Iron Profile	Blood	4mL Yellow Top	Iron, Transferrin and Ferritin. Fasting sample preferred
LDH	Blood	4mL Yellow Top	
Lipid Profile	Blood	4mL Yellow Top	Specimen must be collected after an overnight fast.
Lithium	Blood	4mL Yellow Top	
Liver Profile	Blood	4mL Yellow Top	
Magnesium	Blood	4mL Yellow Top	
Muscle Enzymes	Blood	4mL Yellow Top	Total CK
Paracetamol	Blood	4mL Yellow Top	
Phenobarbitone	Blood	4mL Yellow Top	
Phenytoin	Blood	4mL Yellow Top	
PSA	Blood	4mL Yellow Top	
Salicylate	Blood	4mL Yellow Top	
Theophylline	Blood	4mL Yellow Top	
Thyroid Profile	Blood	4mL Yellow Top	
Urate, Blood	Blood	4mL Yellow Top	
Valproic Acid/Epilim	Blood	4mL Yellow Top	

[Note: **GREEN TOPPED Lithium Heparin TUBES** are also suitable for the following common Clinical Chemistry Profiles / analytes: Electrolyte, Bone, Liver, Thyroid, Lipid profiles and Mg, CK, CRP, Amylase, Hydroxybutyrate, Osmolality, LDH, Urate, Carbamazepine, Phenytoin, Digoxin, Valproate, Theophylline, Phenobarbitone, hCG, Conjugated Bilirubin, Paracetamol, Salicylate and Ethanol.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Separate form(s) and specimen(s) MUST be sent for each of the following tests.
These must not be requested with the routine tests outlined above.

Test	Sample	Container	Comments
Glucose - plasma	Blood	2mL Grey Top	Glucose is stable in grey top sample. Glucose is unstable in yellow top. Glucose results cannot be reliably interpreted from yellow top samples.
Glucose Tolerance Test	Blood	2 x 2mL Grey Top	Both T=0 and T=120 min labeled samples should be sent together with ONE form.
NT-ProBNP	Blood	4mL Yellow Top	
Glycated Haemoglobin - HbA _{1c}	Blood	4mL Purple Top	
Albumin Creatinine Ratio - ACR	Urine	10mL Lemon Topped urine Monovette Tube	Repeat early morning samples on 3 occasions.
Complement - C3, C4	Blood	4mL Yellow Top	
Cortisol - Blood	Blood	4mL Yellow Top	Random serum cortisol samples are of very limited value.
Parathyroid Hormone PTH	Blood	4mL Purple Top	

The following tests (Protein Electrophoresis, Immunoglobulins and serum Free Light Chains) may be requested on one form and only ONE 4mL specimen (**Yellow Top**) is required.
These must not be requested with the routine tests outlined above.

Test requested should be clearly written in the Additional tests box.

Test	Sample	Container	Comments
Immunoglobulins	Blood	4mL Yellow Top	In childhood reference ranges vary with age - Contact Laboratory
Protein Electrophoresis - serum	Blood	4mL Yellow Top	
Serum Free Light Chains	Blood	4mL Yellow Top	

Do not send Serology / Virology / Microbiology requests to Clinical Chemistry.


Specimens from Infectious Patients

All specimens from known or potential carriers of Category III pathogens, e.g. HIV, Hepatitis B, **MUST** be clearly marked with hazard labels on both the request form and specimen tubes.

Only one "Hazard" specimen should be sent per plastic bag.

Such samples MUST NOT BE SENT VIA VTS CHUTE

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.

 Western Health and Social Care Trust	Clinical Chemistry Department
CLINICAL CHEMISTRY SPECIMEN RECEPTION LABORATORY MANUAL	Active Date 11/10/2018
CC/SPEC/030 version 2.30	Page 9 of 91

Additional tests

may be requested on a sample that has already been processed. A completed request form for the additional tests must be forwarded to the laboratory stating the **Sample ID**entification number and the fact that the request is an add on. The SID number is on Lab Result Recall screen (Lab. Ref.) or report form (Lab Number at bottom LHS). [Verbal requests for urgent off site additional tests will be taken].

Specimens are held for 6 days after analysis.

However, not all tests will be stable over this period. Contact laboratory to discuss.

Transport of samples to Clinical Chemistry

Altnagelvin Hospital based samples:

VTS Chute system: Samples should be sent to the Clinical Chemistry Laboratory Chute Station – number 880.

Please note the following exceptions:

- Blood Gas (pO₂ results are affected)
- CSF (Resultant haemolysis may interfere with CSF spectroscopy and also CSF samples are not readily repeatable – see below).
- The VTS system is not 100% reliable. Occasionally pods sent via the VTS may be subject to delay, sent to an incorrect station or be diverted to an incorrect station so samples that are extremely urgent (e.g. Resus) not readily repeatable (e.g. CSF or samples taken following suppression or stimulation tests) or relatively unstable should not be sent via VTS

Hospital Porters: Samples (including those unsuitable for VTS transport) may be sent to the Clinical Chemistry Laboratory via Porters or other Hospital Staff. Sample should be left in Laboratory Specimen Reception Area.

GP Samples: Samples are transported to Laboratory via the normal Laboratory Transport Vans, Taxi or delivered in person as appropriate.

Urgent Samples: Laboratory staff should be informed either before samples are sent or samples should be handed directly to laboratory staff - See **Emergencies** above.

SWAH Hospital based samples:

VTS Chute system: Pods with Red Bands are automatically sent to the Laboratory Reception docking station.

Pods with Black Bands need to be programmed to “Laboratory Reception”

Please note the following exceptions:

- Blood Gas (pO₂ results are affected)
- CSF (Resultant haemolysis may interfere with CSF spectroscopy and also CSF samples are not readily repeatable – see below).
- The VTS system is not 100% reliable – see above.

Hospital Porters: Samples (including those unsuitable for VTS transport) may be sent to the Clinical Chemistry Laboratory via Porters or other Hospital Staff. Samples should be left in Laboratory Specimen Hatch – adjacent to the Blood Bank – please ring buzzer as appropriate.

GP / TCH Samples: Samples are transported to Laboratory via the normal Laboratory Transport Vans, Taxi or delivered in person as appropriate.

Urgent Samples: Laboratory staff should be informed before samples are sent or samples should be handed directly to laboratory staff - See **Emergencies** above.

Note: Samples should be transported at RT unless as otherwise indicated.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Transport of samples on ice to Clinical Chemistry

Please keep the paper REQUEST FORM separate from the ice as these tend to get wet when the ice melts to water and leaks out!

The ice and sample should be separated from the paper REQUEST FORM and be fully sealed in a watertight container to prevent leakage.

Samples requiring transport on ice may be sent via the VTS (880) but the ice and sample **MUST** be contained in special ward dedicated Green Plastic Screw-Topped Ice Transport containers.

Please do not place the Paper REQUEST FORM inside these containers

Analyte	Sample	Tube Type	Maximum Stability on ice*
ACTH	Blood	Purple Top	15 minutes
Calcitonin	Blood	Green Top	240 minutes [120 min if not on ice]
Catecholamines**	Blood	Special Green Top – contact Laboratory	15 minutes
Glucagon	Blood	Purple Top	120 minutes
Homocysteine	Blood	Purple Top	30 minutes
Vitamin C	Blood	Green Top	60 minutes
Ammonia	Blood	Purple Top	60 minutes
Peptides (Gastrin)	Blood	Purple Top	120 minutes
PTH Related Peptide (PTHrp)	Blood	Special Bottle – contact Laboratory	15 minutes

* From time of venepuncture. Samples must arrive in Biochemistry within this time period or the sample will be rejected as unsuitable.

** Only as part of Clonidine suppression test

*** Do not transport via the VTS

Note: There are other analytes that also require transport on ice but these are only very rarely required – contact lab for advice.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Endocrine and Other Common Miscellaneous Clinical Chemistry Tests

– Tube Type, Transport and Stability – all tests in table below refer to Blood.

Note: When **Red Top** tubes are specifically required **Yellow Top** tubes are unsuitable.

Analyte	Tube Type	Stability
Aldosterone / Renin	4mL Purple Top	Send to lab immediately - within 3h (Do not place on ice)
Androstenedione	6mL Red Top	Stable at room temperature
Cortisol	4mL Yellow Top	Stable at room temperature
Follicle Stimulating (FSH) / Luteinising Hormone (LH)	4mL Yellow Top	Stable at room temperature
Growth Hormone	4mL Yellow Top	Stable at room temperature
HCG	4mL Yellow Top	Stable at room temperature
Insulin	4mL Yellow Top + 2mL Grey Top	Stable at room temperature for 4h (Grey top for glucose)
Insulin like Growth Factor IGF 1	4mL Yellow Top	Send to lab immediately - Serum must be separated within 4h
C-peptide	4mL Yellow Top	Send to lab immediately - Serum must be separated within 4h
NT-ProBNP	4mL Yellow Top	Stable at room temperature
Dehydroepiandrosterone Sulphate (DHEAS / DHAS)	4mL Yellow Top	Stable at room temperature
Oestradiol	4mL Yellow Top	Stable at room temperature
Parathyroid Hormone Parathormone (PTH)	4mL Purple Top	Stable at room temperature
Bone Markers	4mL Yellow Top	Send to lab immediately - Serum must be separated within 2h
Procollagen III	4mL Yellow Top	Stable at room temperature
Progesterone	4mL Yellow Top	Stable at room temperature
Prolactin	4mL Yellow Top	Stable at room temperature
Sex Hormone Binding Globulin	4mL Yellow Top	Stable at room temperature
Testosterone	4mL Yellow Top	Stable at room temperature
Androgen Profile	6mL Red Top	Stable at room temperature
Thiopurine Methyl Transferase	4 mL Purple Top	Stable at room temperature

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Analyte	Tube Type	Stability
Thyroglobulin	4mL Yellow Top	Stable at room temperature
Thyroid Hormones	4mL Yellow Top	Stable at room temperature
Vitamin D	4mL Yellow Top	Send to lab immediately - Serum should be separated within 6h
Bone Markers	4mL Yellow Top	Send to lab immediately - Serum should be separated within 2h

Common Paediatric Laboratory Tests

Sample Bottle / minimum volume requirements – all tests refer to Blood unless stated otherwise:

Test	Sample Bottle	Vol	Lab	Comment / Notes
ACR (Albumin / Creatinine Ratio)	Sarstedt LEMON URINE	5mL	B	Early morning urine sample preferred
ACTH	2 x Small Pink Paed EDTA Bottle	2 x 0.5mL	B	Transport to lab immediately on ice – stable for only 15 mins. Both samples must be filled to mark
Allergy Screen	Adult Yellow Top Gel tube	1mL	I	Includes Total IgE; Food allergens; Inhaled allergens
Alpha Feto protein	Adult Yellow Top Gel tube	2mL	B	Belfast Lab
Amino acids Plasma	Adult EDTA Purple Top	1mL	B	RVH Children's lab, for screening send both urine and blood.
Amino acids Urine	Sarstedt LEMON URINE	10mL	B	
Ammonia	Adult EDTA Purple Top	1mL	B	Transport to lab immediately on ice – stable for only 60 minutes
Amylase*	Small Green Paed Li Hep tube	1mL	B	
Anti gliadin Antibody	Adult Yellow Top Gel tube	0.5mL	I	Any combination of such antibodies may be requested on the same sample – 2mL blood should be sufficient for an extended Panel
Anti islet cell Antibody	Adult Yellow Top Gel tube	0.5mL	I	
Anti LKM Antibody	Adult Yellow Top Gel tube	0.5mL	I	
Anti TPO Antibody	Adult Yellow Top Gel tube	0.5mL	I	
Atypical Pneumonia	Adult Yellow Top Gel tube	2mL	M	
Autoimmune Screen	Adult Yellow Top Gel tube	1mL	I	
B12 and Folate	Adult Yellow Top Gel tube	2mL	B	
Bilirubin Total*	Small Green Paed Li Hep tube	0.5mL	B	Light sensitive – place in envelope / Conjugated Bil may be requested on same sample
Blood Glucose	Yellow Fluor/Oxalate tube	1mL	B	Use if hypoglycaemia suspected
Bone Profile*	Small Green Paed Li Hep tube	1mL	B	Ca; PO4; Alb, ALP
Caeruloplasmin	Adult Yellow Top Gel tube	1mL	B	
Calprotectin	WHITE top Universal	5g	B	5g of faeces required
Carnitine	Adult Green Top Li Hep tube	1mL	B	RVH Children's lab
Metanephrines (Replaces Catecholamines)	ACIDIFIED WHITE top Universal	20mL	B	Available from lab – urine must be acidified ASAP.
Chromosomes	Adult Green Top Li Hep tube	1mL	G	Tubes stored in fridge
CMV, EBV	Adult Yellow Top Gel tube	2mL	M	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample Bottle	Vol	Lab	Comment / Notes
Coagulation Screen	Small Blue Paed Bottle	1.3mL	H	Tubes stored in fridge
Coeliac Screen	Adult Yellow Top Gel tube	1mL	I	
Complement	Small Green Paed Li Hep tube	1mL	B	C3, C4
Conjugated Bil*	Small Green Paed Li Hep tube	0.5mL	B	Light sensitive – place in envelope / Total Bil will be analysed also
Cortisol	Adult Yellow Top Gel tube	1mL	B	
Creatine Kinase*	Small Green Paed Li Hep tube	1mL	B	Muscle enzymes
CRP*	Small Green Paed Li Hep tube	1mL	B	
Cyclosporin / Tacrolimus / Sirolimus	Small Pink Paed EDTA Bottle	0.5mL	B	
DNA	Adult EDTA Purple Top	2mL	G	Small Pink Paed EDTA Bottle -contact BCH Genetics - ext 3173
FBP	Small Pink Paed EDTA Bottle	0.5mL	H	Add exactly 0.5mL of blood to tube
Ferritin	Adult Yellow Top Gel tube	1mL	H	
Food Allergens	Adult Yellow Top Gel tube	0.5mL	I	See Allergy screen
Gastrin Level	Adult EDTA Purple Top	4mL	B	Fasting sample send ASAP on ice
Gentamicin Level	Adult Yellow Top Gel tube or Small Green Paed Li Hep or Small EDTA Purple Top tube	1mL	M	
Glycosaminoglycans (GAGS) (MUCU)	WHITE top Universal	10mL	B	3 early morning urine samples collected on 3 separate days
Haemoglobin Electrophoresis	Small Pink Paed EDTA Bottle	0.5mL	H	RVH Haematology
HbA _{1c}	Small Pink Paed EDTA Bottle	0.5mL	B	
Hormone profile	Adult Yellow Top Gel tube	2mL	B	Includes LH, FSH, PRL, Oestradiol
Immunoglobulins	Adult Yellow Top Gel tube	2mL	B	Electrophoresis performed
Inhaled Allergens	Adult Yellow Top Gel tube	0.5mL	I	See Allergy screen
Insulin (fasting)	Adult Yellow Top Gel tube	2mL	B	Blood Glucose in Grey Top or small Yellow (Altnagelvin Only) Fluor/Oxalate tube should be taken at same time.
Insulin antibodies	Adult Yellow Top Gel tube	2mL	B	Guilford
Iron Profile	Adult Yellow Top Gel tube	2mL	B	Includes iron, transferrin, ferritin.
Lactate	Grey Top	2mL	B	Glucose may be measured on same sample
Lipid Profile*	Small Green Paed Li Hep tube	1mL	B	Total Cholesterol; Trig; HDL
Liver profile*	Small Green Paed Li Hep tube	1mL	B	Bil; ALP; ALT; AST; GGT; Alb
Magnesium*	Small Green Paed Li Hep tube	1mL	B	
Menin Titre	Adult Yellow Top Gel tube	1mL	M	
Mucopolysaccharides				See Glycosaminoglycans
Organic acids (Urine)	Sarstedt LEMON URINE	10mL	B	
Osmotic Fragility	Adult EDTA Purple Top	2mL	H	Phone lab day before test
P-ANCA	Adult Yellow Top Gel tube	0.5mL	I	
Test	Sample Bottle	Vol	Lab	Comment / Notes
Paul-Bunnell	Adult Yellow Top Gel tube	1mL	H	
Parathyroid Hormone (PTH)	Adult EDTA Purple Top	2mL	B	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample Bottle	Vol	Lab	Comment / Notes
Serum Protein Electrophoresis(SPE)	Adult Yellow Top Gel tube	1mL	B	Immunoglobulins run with all SPE requests
TFTs	Small Green Paed Li Hep tube	1mL	B	Separate tube required
Therapeutic Drugs (except Lithium)	Small Green Paed Li Hep tube	1mL	B	In general - Sample just before next dose
Torch/Asot Titres	Adult Yellow Top Gel tube	1-2mL	M	
Total IgE	Adult Yellow Top Gel tube	0.5mL	I	See Allergy screen
TPMT	Adult EDTA Purple Top	2mL	B	Thio Purine Methyl Transferase
Trace Metals Selenium; Zinc; Copper; Lead	Royal Blue topped Griener Trace Metal Tube	5mL	B	Selenium; Zinc; Copper; Lead Contact Biochemistry lab
U&E (EP)*	Small Green Paed Li Hep tube	1mL	B	Na; K; Cl; CO ₂ ; Urea; Cre; TP; Glucose
Urate*	Small Green Paed Li Hep tube	1mL	B	
Very Long Chain Fatty acids (Plasma)	Adult Green Top Li Hep tube or Adult EDTA Purple Top	2mL	B	Very Long Chain Fatty Acids
Vitamin A and E	Adult Yellow Top Gel tube	2mL	B	Light sensitive – place in envelope
Vitamin D	Adult Yellow Top Gel tube	2mL	B	Send to lab ASAP

Note: Any combination of Routine Biochemistry (see above tests in Bold*) may be requested on a single Small Green Paed Li Hep tube – for an extended panel please fill tube accordingly.

B = Biochemistry, H = Haematology, M = Microbiology, I = RVH Immunology, G = BCH Genetics

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Blood Bottle and Relevant Test

Yellow Top	Yellow Top	Red Top	Purple Top	Blue Top	Dark Blue Top	Green Top
ACE	Paul Bunnell (Altnagelvin)	17-Hydroxy progesterone	ACTH (on ice)	Coag Screen	Chromium	Calcitonin (on ice)
AFP		Progesterone	Ammonia (on ice)	D-Dimer XDP	Cobalt	Chromosome Analysis
Amylase	Androgen profile	Apo E Genotype	INR	Copper		
ANCA	PSA	ASOT*	Cyclosporin	Lupus anticoag (x2)	Selenium	Vit C (on ice)
Anti Intrinsic Factor Antibodies	Rheumatoid Factor	C-Peptide**	FBC	Thrombophilia Screen (x 3) [+ 1 Red and 1 purple top]	Zinc	
Aspergillus Titre	Serum Protein Electrophoresis (SPE)	DHEAS / DHAS**	Galactosidase			
B12/Folate	Testosterone	Growth Hormone**	Glucagon (on ice)			
bHCG	Theophylline	Hepatitis A/B/C*	Gut Hormone (x 4 on ice)			
BNP	Thyroid Antibodies	Insulin* (grey top for glucose as well)	Haemochromatosis HFE			
CA 125	Thyroid function (TFT)	Lyme Disease*				
CA 19-9	Troponin T	Rubella*	Hb A _{1c}			
Coeliac Screen	Urate	Syphilis*	HLA B27			Grey Top
Cortisol (Synacthen test)	Vitamin D	Thyroglobulin**	Homocysteine (on ice)			
Digoxin	IGF-1	Toxoplasmosis	Huntingtons (x 2)			Glucose
EP (inc eGFR)	C-Peptide	TPHA*	Meningococcal PCR			Lactate
Ferritin / Iron profile	Growth Hormone		PTH			
FSH/LH Hormone Profile	Insulin		Renin [Must reach Lab within 3 hours. Do <u>not</u> send on ice]			
Gentamicin	DHEAS / DHAS	*Red Top sample stated in Belfast Lab Manual – but Yellow Tops are acceptable	Tacrolimus			
Hydroxybutyrate	Thyroglobulin		TPMT			
Immunoglobulins		**Red or yellow stated in Belfast Manual	Aldosterone/Renin			
LFTs						
Lipid Profile						
Lithium						
Liver Antibodies						
Muscle Enzyme (CK)						
Oestradiol						

Notes:
 Samples on ice should be sent to the lab within 15 minutes.
 Vit D Samples should be sent to lab within 6h.

See lab handbooks for full details – Trust Intranet/Guidelines, procedures and protocols/Acute services/Laboratory

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test Protocols

Test protocols are available for a wide range of dynamic tests and test strategies including:

[Arginine Stimulation Test](#)

Short Synacthen Test

72h Fast

Fluid Deprivation Test

Investigation of Cushings Syndrome / Dexamethasone Suppression

Aldosterone / Renin

Gonadotropin Releasing Hormone test

Growth Hormone Suppression Test

Oral Glucose Tolerance Test

TRH Test

Clonidine Suppression Test

See: WHSCT INTRANET / Guidelines, procedures and protocols / Acute Services / Endocrinology Testing Protocols

Stability of Common Analytes

Taken from the following:

WHO Use of Anticoagulants in Diagnostic Laboratory Investigations: (WHO/DIL/LAB/99.1 Rev.2 year 2002)

MS Devgun. Delay in Centrifugation and measurement of Serum Constituents in Normal Subjects. Clin Physiol Biochem 1989;7:189-197

DJ Zhang et al. Effect of serum clot contact time on Clinical Chemistry Laboratory Results. Clin Chem 1998; 44:6 1325-33.

(RT = Room Temperature, d = day, w = week, y=year)

	WHO				Devgun			Zhang
	Whole Blood RT	Serum RT	4°C	-20°C	Whole Blood After 7h RT	Serum RT	4°C	Whole Blood RT
ELECTROLYTE								
Sodium	4d	2w	2w	1y	No change	5d	5d	At least 24h
Potassium	1h increase	6w	6w	1y	11% increase	2d	4d	3h increase
Chloride	1d decrease	7d	4w	1y	No change	3d	5d	6h decrease
Total CO ₂	Unstable decrease	1d	7d	2w	No change	2d	2d	6h decrease
Urea	1d increase	7d	4w	1y	No change	5d	5d	At least 24h
Total Protein	1d	6d	4w	1y	No change	5d	5d	6h increase
Creatinine	2-3d increase	7d	7d	3m	No change	1d	5d	At least 24h
Glucose	10min (*Grey top)	2d*	7d*	1d*				3h decrease
BONE PROFILE								
Calcium	2d decrease	7d	3w	8m	No change	3d	5d	At least 24h
Phosphate	1h increase	1d	4d	1y	11% decrease	2d	5d	3h increase
Albumin	6d	2.5m	5m	2.5m	No change	5d	5d	6h increase
ALP	4d decrease	7d	7d	2m	No change	5d	5d	At least 24h
Mg	1d increase	7d	7d	1y				At least 24h
LIVER								
Bilirubin	Unstable decrease	1d	7d	6m	No Change	3d	5d	At least 24h
ALT	4d decrease	3d	7d	7d				At least 24h
AST	7d decrease	4d	7d	3m	No change	2d	5d	At least 24h
GGT	1d decrease	7d	7d	1y	No change	5d	5d	At least 24h

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



	WHO				Devgun			Zhang
	Whole Blood	Serum			Whole Blood	Serum		Whole Blood
	RT	RT	4°C	-20°C	After 7h RT	RT	4°C	RT
MISC								
CK	7d decrease	7d	1m	1m				At least 24h
CRP	3w	11d	2m	3y				
Amylase	4d decrease	7d	1m	1y				At least 24h
Ammonia	15min	15min	2h	3w				
Lactate	6h	8h	3d					
Serum OSM		3h	1d	3m				
LDH	1h increase	7d	4d	6w	No change	2d	5d	At least 24h
HbA _{1c}	3d			6m				
Urate	7d increase	3d	7d	6m				At least 24h
Cortisol	7d	7d	7d	3m				At least 24h
Troponin T	8h	24h	7d	3m				
ProBNP	2d	5d	5d	5d				
PSA	4-7d	7d	3w	1y				
HCG	1d	1d	7d	1y				
PTH	2-3d	6h	1d	4m				
TDM								
Carbamazepine	2d	5d	7d	1m				
Phenytoin	2d	2d	1m	5m				
Digoxin		2w	3m	6m				
Valproate	2d	2d	7d	3m				
Theophilline		3m	3m	3m				
Phenobarb	2d	6m	6m	6m				
Lithium	1h decrease	1d	7d	6m				
THYROID								
FT4		2d	8d	3m				
TSH	7d	1d	3d	3m				At least 24h
LIPID								
Chol	7d increase	7d	7d	3m				At least 24h
Trigs	7d	2d	7d	1y				At least 24h
HDL	2d increase	2d	7d	3m				6h increase
PROTEINS								
C3*	1d	4d	8d	8d				
C4	1d	2d	8d	3m				
Haptoglobin	8d	3m	8m	3m				At least 24h
IgA	8d	8m	8m	8m				At least 24h
IgG	11d	4m	8m	8m				At least 24h
IgM	17d	2m	4m	6m				At least 24h
IOP								
Fe	2h increase	7d	3w	1y				6h increase
Transferrin	11d	4m	8m	6m				At least 24h
Ferritin		7d	7d	1y				At least 24h
B12		15min	1d	2m				
Folate		30min	1d	2m				

*C3 – In house studies suggest samples need to be separated on day of collection and stored at 4°C.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Turnaround Times (TAT) – For Tests performed in Altnagelvin

Test/Profile	TAT (Routine)*	TAT (In-Patient)	TAT (URGENT)
Electrolyte Profile	<36h	<4h	<1.5h
Blood Sugar	<36h	<4h	<1.5h
LFT	<36h	<4h	<1.5h
Direct / Conjugated Bilirubin	<36h	<4h	<3h
Bone Profile	<36h	<4h	<1.5h
NT Pro BNP	<36h	<4h	<3h
Muscle Enzymes (CK)	<36h	<4h	<1.5h
Lipid Profile	<36h	<4h	<1.5h
Iron Profile (Ferritin)	<36h	<4h	<1.5h
Paracetamol/Salicylate/Ethanol		<4	<1.5h
Amylase	<36h	<4h	<1.5h
Magnesium	<36h	<4h	<1.5h
Uric Acid	<36h	<4h	<1.5h
Ammonia			<3h
Lactate			<1.5h
Hydroxybutyrate			<3h
C-Reactive Protein	<36h	<4h	<1.5h
Thyroid Profile	<36h	<4h	<1.5h
Cortisol	48-72h		
Carbamazepine / Theophylline / Valproic Acid / Digoxin / Phenytoin / Vancomycin / Phenobarbitone / Lithium	<36h	<4h (Dig <6h)	<3h
Gentamicin	<36h	<4h	<2h
Troponin T	<36h	<4h	<1.5h
PSA, Total	< 24h	< 24h	
LDH	<36h	<4h	<1.5h
PTH	<36h	<6h	<3h
B12 and Folate	<36h	<4h	
Beta HCG	<36h	<12h	<1.5h
Serum Protein Electrophoresis /IgA, M, G Free Light Chains / Bence Jones Protein	<7d		
Complement - C3 and C4	<4d		
Alpha-1-Acid Glycoprotein	<7d		
Haptoglobin	<3d		
Albumin Creatinine Ratio	<4d		
Urinary Protein	<4d		
Cryoglobulins	<4wk		
Hb A _{1c}	<4d		
Blood gas / CoOx	<1h		
CSF Xanthochromia			<4h
pH Faecal/Urine	<4h		
CSF protein, glucose and lactate			<1.5h
Faecal occult blood	<72h		
Osmolality Serum and Urine		<4h	<1.5h

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Urine Electrolytes		<8h	<1.5h
Pleural Fluid		<4h	
Creatinine Clearance	<4d	<4d	
Porphyrins / Porphobilinogen	5d		<6h
Sweat Test (sweat conductivity)	Arranged with requesting physician / ward		

Turnaround Times (TAT) – For Tests performed in SWAH

Test/Profile	TAT (Routine)*	TAT (In-Patient)	TAT (URGENT)
Electrolyte Profile	<36h	<4h	<1.5h
Blood Sugar	<36h	<4h	<1.5h
LFT	<36h	<4h	<1.5h
Direct / Conjugated Bilirubin	<36h	<4h	<3h
Bone Profile	<36h	<4h	<1.5h
NT Pro BNP	<36h	<4h	<3h
Muscle Enzymes (CK)	<36h	<4h	<1.5h
Lipid Profile	<36h	<4h	<1.5h
Iron Profile (Ferritin)	<36h	<4h	<3h
Paracetamol/Salicylate/Ethanol		<4	<1.5h
Amylase	<36h	<4h	<1.5h
Magnesium	<36h	<4h	<1.5h
Uric Acid	<36h	<4h	<1.5h
Ammonia			<3h
Lactate			<1.5h
Hydroxybutyrate			<3h
C-Reactive Protein	<36h	<4h	<1.5h
Thyroid Profile	<36h	<4h	<1.5h
Carbamazepine / Theophylline / Phenytoin / Digoxin / Gentamicin / Lithium	<36h	<4h (Dig <6h)	<3h
Troponin T	<36h	<4h	<1.5h
PSA, Total	< 24h	<24h	
LDH	<36h	<4h	<1.5h
NT-ProBNP	<36h	<4h	<3h
PTH	<36h	<6h	<3h
B12 and Folate	<36h	<4h	
Beta HCG		<12h	<1.5h
Faecal occult blood	<72h		
Urinary Protein	<4d		
HbA _{1c}	<4d		
Blood gas / CoOx	<1h		
Osmolality Serum and Urine		<4h	<1.5h
Urine Electrolytes		<8h	<1.5h
Pleural Fluid		<4h	
Creatinine Clearance	<4d	<4d	
CSF protein, glucose and lactate			<1.5h
Sweat Test (sweat conductivity)	Arranged with requesting physician / ward		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



*Note: does not include allowances for weekends and holidays

Turnaround Times (TAT) – For Common Referral Tests

Test/Profile	TAT (Routine)	Comment
Renal Calculi – Birmingham City Hospital, Dudley Rd.	17d	

TAT – Time of receipt in laboratory to results available on laboratory host computer – Referral lab stated TAT plus 10d.

Increase in TAT will occur if incorrect type or number of samples and request forms, insufficient or illegible data, incorrect positioning of 2D barcode or use of handwriting or eye readable labels on scan-able forms.


Referral Tests entered into Laboratory Computer System:

Test	Worksheet Mnemonic	Sample	Referral Laboratory	TAT
TPMT	TPMT	Purple Top	Birmingham City	14
Thiopurine Metabolites	TPMET	Purple Top	Birmingham City	15
Fructosamine	FRUCT	Yellow Top	Birmingham City	14
Chromium / Cobalt (Whole Blood)	CRCO	Royal Blue	Charing Cross	24
TSH Receptor Antibodies	TSHR	Yellow Top	Sheffield (Protein)	17
Biotinidase	BIOT	Green Top	Sheffield Childrens	24
Soluble Transferrin Receptor	STFR	Yellow Top	King's College	52
Mitotane	MITO	Purple Top	Cardiff Tox Lab	17
Carbohydrate Deficient Transferrin	CDT	Yellow Top	Sheffield (Protein)	17
Infliximab Levels	IFL	Yellow Top	Exeter	20
Infliximab Antibodies	IFA	Yellow Top	Exeter	20
Adalimumab Levels	ADALL	Yellow Top	Exeter	20
Adalimumab Antibodies	ADALA	Yellow Top	Exeter	20
Antimullerian Hormone	AMH	Yellow Top	North Glasgow	24
Thyroid Profile – Alternative assay	THPA	Yellow Top	Edinburgh	14
Methylmalonic Acid	MMA	Purple Top	St Thomas'	20

Uncertainty of Measurement:

Uncertainty of Measurement, traceability and numerical significance are separate but closely related concepts that affect both the format and information conveyed in a quantitative test report. Uncertainty of Measurement provides a quantitative assessment of the quality of a test result. Current international standards (ISO 15189) require laboratories to provide estimates of uncertainty of measurement. An estimate of measurement uncertainty provides an interval of values within which the true value is believed to lie with a stated probability, and is therefore a quantitative indication of the reliability of a measurement.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.

 Western Health and Social Care Trust	Clinical Chemistry Department
CLINICAL CHEMISTRY SPECIMEN RECEPTION LABORATORY MANUAL	Active Date 11/10/2018
CC/SPEC/030 version 2.30	Page 21 of 91

Traceability and uncertainty are fundamental properties of all quantitative measurements. Because all measurements are made relative to a scale or defined standard, they are by definition *traceable* to this scale or standard. Traceability relates a measurement result to a stated metrological reference through an unbroken chain of calibrations or comparisons, each of which may contribute a stated level of uncertainty to the final test result. This unbroken chain of comparisons (leading back to a reference value) allows different laboratories to compare results and relate them to a common measuring scale.

A further tool to aid clinicians in the interpretation of results is the use of reference change values (RCV). These are of considerable use for the monitoring of patients, either in acute settings or in long term monitoring. Changes in serial results from an individual may be due to pathological improvement or deterioration in the individual, but may also be due to the following factors:

- Pre-analytical variation (CV_P)
- Analytical imprecision (CV_A)
- Within subject intra-individual variation (CV_I)

For a change to be significant, the difference in results must be greater than this inherent variation, or RCV, which can be calculated as:

$$RCV = 2^{1/2} Z(CV_P^2 + CV_A^2 + CV_I^2)^{1/2}$$

Where Z is the number of standard deviations appropriate to the desired probability (i.e. 1.96 for P<0.05 and 2.58 for P<0.01)

If you require further information or explanation on any of aforementioned or require detailed estimates for any particular analyte or measurand please contact the Clinical Chemistry Laboratory.

Consent

For in house tests: Specific written consent is not required for any test performed in the WHSCT Clinical Chemistry Laboratories with the specific exception of sweat testing. Parental consent is mandatory for all sweat tests and should be obtained prior to booking an appointment on a minor (<16y).

For tests sent to or referred to other Laboratories: It is the responsibility of the requester to ensure that the patient has been informed of, and has consented to, any such tests as required.

Note: All genetic testing requires consent, for which there is a 'Consent Form' section at the bottom of the Medical Genetics request form. In this regard it is the responsibility of the referring clinician to inform the patient:

- a) of the genetic tests to be performed
- b) of the requirement to store genetic material
- c) that results will be forwarded to their Consultant and GP
- d) that results will be used for the benefit of other family members

If the Consent Form is not completed, then the Regional Genetics Laboratories will assume that the provision of a sample implies that the referring clinician has obtained consent for genetic testing, storage of genetic material and for further family testing.

Confidentiality of Service User Information

The Clinical Chemistry Laboratory adheres to the Western Health & Social Care Trust's Policy on the Data Protection Act 1998 and Protection of Personal Information, which outlines the legal requirement for both the Trust and its' staff to treat personal information confidentially and ensure all information is held securely.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Comments/Complaints procedure

The Clinical Chemistry Laboratory adheres to the Western Health & Social Care Trust's Policy and procedure for the management of complaints and compliments. Copies of the policy are available upon request from the laboratory or via the Trust Intranet.

We aim to provide high quality services. If you have a comment, compliment or complaint about one of our services, please let us know by contacting a member of Laboratory staff.

Reference Intervals

Details regarding the origin and nature of quoted reference intervals are available upon request – please contact Clinical Chemistry Consultant Staff.

Specimen rejection criteria

The following requests/samples will be rejected by the Laboratory and a problem report will be issued:

- Illegible Requests
- Requests missing mandatory identifiers
- Request form and sample mismatches
- Samples collected into an incorrect sample bottle type
- Samples too old for analysis
- Samples not collected or transported under appropriate conditions
- ACR samples not received in urine Monovette tubes
- FOB samples not sent on Seracult cards

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Reference Ranges (Adult Blood unless indicated) WHSCT Clinical Chemistry Department

Profile	Test	Reference range	Units	
EP	Sodium	133 - 146	mmol/L	
	Sodium for patients under 16 years	135 - 146	mmol/L	
	Potassium (Serum)	3.5 - 5.3	mmol/L	
	Chloride	95 - 108	mmol/L	
	CO ₂	22 - 29	mmol/L	
	Urea	2.5 - 7.8	mmol/L	
	Creatinine		45 - 84 (Female)	umol/L
			59 - 104 (Male)	umol/L
	Protein, Total	60 - 80	g/L	
	Osmolality - serum	275 - 295	mOsm/kg	
eGFR	>60	mL/min/1.73m ²		
Glucose	Fasting Glucose (Non pregnant adult) (For gestational diabetes – see below)	4.0 - 6.0	mmol/L	
LFT	Bilirubin, Total	<21	umol/L	
	ALP	30 - 130 (Age Related – see below)	U/L	
	AST	10 - 40	U/L	
	ALT	10 - 35	U/L	
	GGT	10 - 50	U/L	
	Albumin	35 - 50	g/L	
	Bilirubin, Direct	1 - 7	umol/L	
BP	Calcium	2.20 - 2.60	mmol/L	
	Phosphorous	0.80 - 1.50	mmol/L	
Cardiac	Troponin T	0 - 14	ng/L	
Lipid	Total Cholesterol	2.8 - 5.0	mmol/L	
	HDL Cholesterol	1.0 - 2.5	mmol/L	
	Triglyceride	0.4 - 1.7	mmol/L	
	LDL Cholesterol (Calc)	1.0 - 3.0	mmol/L	
	Chol / HDL Ratio	-	mmol/L	
	Non HDL Chol	2 - 5		

Age	ALP – Male (U/L)	ALP – Female (U/L)
Neonates	Up to 600	Up to 600
Infants	70 - 550	70 - 550
2-5y	140 - 320	140 - 335
5-6y	130 - 350	130 - 345
6-7y	140 - 335	130 - 400

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Age	ALP – Male (U/L)	ALP – Female (U/L)
7-8y	135 - 430	140 - 400
8-9y	130 - 415	140 - 400
9-10y	140 - 345	140 - 450
10-11y	140 - 415	140 - 500
11-12y	140 - 445	140 - 460
12-13y	150 - 490	120 - 336
13-14y	140 - 515	80 - 284
14-15y	130 - 510	50 - 212
15-16y	105 - 455	45 - 150
16-17y	65 - 320	40 - 120
17-18y	55 - 220	40 - 120
18-19y	50 - 190	40 - 120
19-20y	40 - 155	40 - 120
Adult	30 - 130	30 - 130
>55y	40 - 135	40 - 150

BGAS (Arterial)	pH	7.35 - 7.45	
	pO ₂	11.0 - 14.4	kPa
	pCO ₂	4.3 - 6.4	kPa
	Bicarbonate	22 - 29	mmol/L
	Base Excess	-3.0 to +3.0	
	Carboxyhaemoglobin - COHb - non smoker	0 - 2	%
	Carboxyhaemoglobin - COHb - smoker	4 - 9	%
	MetHaemoglobin - (MetHb)	0 - 2	%
	Oxyhaemoglobin	94 - 98	%

CSF	CSF - Protein	0.15 - 0.40	g/L
	CSF - Glucose	2.5 - 4.4 (>75% of plasma glucose)	mmol/L
	CSF - Lactate	>4.2 mmol/L suggests bacterial aetiology in suspected meningitis	

TDM	Carbamazepine - Tegretol	4 - 12	mg/L	
	Digoxin	0.5 - 2.0	ug/L	
		Target range in heart failure 0.5 - 1.0		
	Lithium	0.4 - 1.0	mmol/L	
	Lithium - elderly	0.4 - 0.8	mmol/L	
	Phenobarbitone	10 - 40	mg/L	
	Paracetamol (4h)	Therapeutic levels Toxic levels	10 - 30 > 200 mg/L 4h post intake, >50 mg/L 12h post intake indicates a definite risk of hepatotoxicity.	mg/L
	Phenytoin	5 - 20	mg/L	
	Salicylate – Adult	Therapeutic Toxic levels	30 - 100 for antipyretic/analgesic 150 - 300 for antiinflammatory > 300 > 700 often lethal	mg/L
	Theophylline - Adult	10 - 20	mg/L	
	Theophylline - Neonate	5 - 10	mg/L	
Valproic Acid - Epilim	There is no well defined therapeutic or toxic range			

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Gentamicin/Vancomycin

See -- WHSCT Secondary Care Antimicrobial Therapy Guidelines – available on Trust net – under Medicines / Management of infection – see appendix 1 and 2

IRP

Iron	10 - 30	umol/L
Transferrin	1.8 - 3.8	g/L
Transferrin Saturation (Fasting)	Female > 50% / Male > 55% consistent with iron overload	
Ferritin – Female younger than 55 years	13 - 150	ug/L
Ferritin – Female older than 55 years	13 - 300	ug/L
Ferritin - Male	30 - 300	ug/L

Thyroid

TSH	0.27 - 4.20	mIU/L
Free T4	12.0 - 22.0	pmol/L
Free T3	3.1 - 6.8	pmol/L

Assay	Male	Female	Age
TSH	0.70 - 15.20 mIU/L	0.70 - 15.20 mIU/L	0 - 6 days
	0.72 - 11.00 mIU/L	0.72 - 11.00 mIU/L	>6d ≤3 mth
	0.73 - 8.35 mIU/L	0.73 - 8.35 mIU/L	≥3 ≤12 mth
	0.70 - 5.97 mIU/L	0.70 - 5.97 mIU/L	>1 ≤6 y
	0.60 - 4.84 mIU/L	0.60 - 4.84 mIU/L	≥6 ≤11 y
	0.51 - 4.30 mIU/L	0.51 - 4.30 mIU/L	>11 ≤20 y
	0.27 - 4.20 mIU/L	0.27 - 4.20 mIU/L	Adults
			Pregnancy
		0.33 - 4.59 mIU/L	1st trimester
		0.35 - 4.10 mIU/L	2nd trimester
	0.21 - 3.15 mIU/L	3rd trimester	
FT4	11.0 - 32.0 pmol/L	11.0 - 32.0 pmol/L	0 - 6 days
	11.5 - 28.3 pmol/L	11.5 - 28.3 pmol/L	>6d ≤3 mth
	11.9 - 25.6 pmol/L	11.9 - 25.6 pmol/L	≥3 ≤12 mth
	12.3 - 22.8 pmol/L	12.3 - 22.8 pmol/L	>1 ≤6 y
	12.5 - 21.5 pmol/L	12.5 - 21.5 pmol/L	≥6 ≤11 y
	12.6 - 21.0 pmol/L	12.6 - 21.0 pmol/L	>11 ≤20 y
	12.0 - 22.0 pmol/L	12.0 - 22.0 pmol/L	Adults
			Pregnancy
		12.1 - 19.6 pmol/L	1st trimester
		9.6 - 17.0 pmol/L	2nd trimester
	8.4 - 15.6 pmol/L	3rd trimester	
FT3	2.7 - 9.7 pmol/L	2.7 - 9.7 pmol/L	0 - 6 days
	3.0 - 9.3 pmol/L	3.0 - 9.3 pmol/L	>6d ≤3 mth
	3.3 - 9.0 pmol/L	3.3 - 9.0 pmol/L	≥3 ≤12 mth
	3.7 - 8.5 pmol/L	3.7 - 8.5 pmol/L	>1 ≤6 y
	3.9 - 8.0 pmol/L	3.9 - 8.0 pmol/L	≥6 ≤11 y
	3.9 - 7.7 pmol/L	3.9 - 7.7 pmol/L	>11 ≤20 y
	3.1 - 6.8 pmol/L	3.1 - 6.8 pmol/L	Adults
			Pregnancy
		3.8 - 6.0 pmol/L	1st trimester
		3.2 - 5.5 pmol/L	2nd trimester
	3.1 - 5.0 pmol/L	3rd trimester	

B12 and Folate

Vitamin B12	191 - 663 (Male and female)	ng/L
Folate	3.9 - 28.6 (Male and female)	ug/L
	[Folate values <3.0ug/L associated with increased anaemia risk]	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Other

Magnesium	0.70 - 1.00	mmol/L		
LDH	135 - 225	U/L		
	[Range in use from 18/06/2015 – following introduction of IFCC assay - prior to this date range was 240 – 480 U/L]			
Ammonia - Prem Neonate	<200	umol/L		
Ammonia - Term Neonate	<100	umol/L		
Ammonia - 1month to adult	18 - 72	umol/L		
Amylase - serum	25 - 125	U/L		
CK – Creatine Kinase	40 - 320 Male	U/L		
	25 - 200 Female	U/L		
CRP - C Reactive Protein	0 - 5	mg/L		
Cortisol	Contact Dr M O'Kane / Dr PLM Lynch			
	[30 Minute SST normal cortisol response greater than 450 nmol/L]			
HCG (Non Pregnant)	<5	U/L		
Hydroxybutyrate, Beta	0.1 - 0.3	mmol/L		
Lactate	0.5 - 2.2	mmol/L		
Parathyroid Hormone (PTH)	15 - 65	ng/L		
	PTH reference range appropriate for normocalcaemia only.			
pH - Faecal	5 - 9			
PSA 40-49yr Male	0 - 2.5	ug/L		
PSA 50-59yr Male	0 - 3.5	ug/L		
PSA 60-69yr Male	0 - 4.5	ug/L		
PSA 70-79yr Male	0 - 6.5	ug/L		
PSA results in the range 4 - 10 ug/L	Inconclusive			
Urate	200 - 400 Male	umol/L		
	140 - 360 Female	umol/L		
	In Gout the target Uric Acid level is less than 360 umol/L.			
NT- ProBNP <45 yrs	5 - 115	HF highly unlikely <50	HF Highly likely >450	ng/L
45 - 54 yrs	5 - 172	HF highly unlikely <50	HF Highly likely >450	ng/L
55 - 64 yrs	5 - 263	HF highly unlikely <75	HF Highly likely >900	ng/L
65 - 74 yrs	5 - 349	HF highly unlikely <75	HF Highly likely >900	ng/L
>75 yrs	5 - 738	HF highly unlikely <250	HF Highly likely >1800	ng/L

**Oral Glucose Tolerance Test:
WHO classification:**

	0 minutes	120 minutes
Normal	<6.1	<7.8
Diabetes Mellitus	≥7.0	or ≥11.1
Impaired Glucose Tolerance (IGT)	<7.0	and ≥7.8 and <11.1
Impaired Fasting Glucose (IFG)	≥6.1* to <7.0	and <7.8

*The WHSCT shared care guidelines have adopted a lower cut-off for the diagnosis of impaired fasting glucose (≥5.6 to <7mmol/L) following recommendations by the American Diabetes Association.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



The WHSCT have adopted the following International Association of Diabetes and Pregnancy Study Group (IADPSG) values for the diagnosis of Gestational Diabetes for the 75g OGTT:

Fasting	≥5.1 mmol/L
1h	≥10.0 mmol/L
2h	≥8.5 mmol/L

Diagnosis of Gestational Diabetes made if glucose values exceeded at any time point.

Proteins	Glycated Haemoglobin HbA _{1c} DCCT	4.0 - 6.0	%
	Glycated Haemoglobin HbA _{1c} IFCC	20 - 42	mmol/mol
	(A DCCT Target of <7% equates to a IFCC target of <53 mmol/mol)		
	Complement C3	0.8 - 1.7	g/L
	Complement C4	0.14 - 0.54	g/L
	Protein Electrophoresis - Albumin	35 - 50	g/L
	Protein Electrophoresis - Globulins	18 - 36	g/L
	Protein Electrophoresis - Total Protein	60 - 80	g/L
	Kappa FLC	3 - 19	mg/L
	Lambda FLC	6 - 26	mg/L
	Kappa/Lambda Ratio	0.3 - 1.7	
	Haptoglobin (Female)	0.4 - 1.6	g/L
	Haptoglobin (Male)	0.5 - 2.0	g/L

Immunoglobulins

	IgA (g/L)	IgG (g/L)	IgM (g/L)
Cord	<0.02	5.2 - 18.0	0.02 - 0.2
0 - 2 wks	0.01 - 0.08	5.0 - 17.0	0.05 - 0.2
2 - 6 wks	0.02 - 0.15	3.9 - 13.0	0.08 - 0.40
6 - 12 wks	0.05 - 0.40	2.1 - 7.7	0.15 - 0.70
3 - 6 mths	0.10 - 0.50	2.4 - 8.8	0.20 - 1.00
6 - 9 mths	0.15 - 0.70	3.0 - 9.0	0.40 - 1.60
9 - 12 mths	0.20 - 0.70	3.0 - 10.9	0.60 - 2.1
1 - 2 yrs	0.3 - 1.2	3.1 - 13.8	0.5 - 2.2
	IgA (g/L)	IgG (g/L)	IgM (g/L)
2 - 3 yrs	0.3 - 1.3	3.7 - 15.8	0.5 - 2.2
3 - 6 yrs	0.4 - 2.0	4.9 - 16.1	0.5 - 2.0
6 - 9 yrs	0.5 - 2.4	5.4 - 16.1	0.5 - 1.8
9 - 12 yrs	0.7 - 2.5	5.4 - 16.1	0.5 - 1.8
12 - 15 yrs	0.8 - 2.8	5.4 - 16.1	0.5 - 1.9
15 - 45 yrs	0.8 - 2.8	6.0 - 16.0	0.5 - 1.9
over 45 yrs	0.8 - 4.0	6.0 - 16.0	0.5 - 2.0

Urine	Amylase - 24h urine	<390	U/24h
	Calcium - 24h urine	2.5 - 7.5	mmol/24h
	Creatinine Clearance	80 - 160	mL/min

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Electrolytes – Random/24h urine	Contact Dr O’Kane/Dr Lynch	
Magnesium - 24h urine	2.4 – 6.5	mmol/24h
Osmolality - urine	Contact Dr O’Kane/Dr Lynch	
Phosphate - 24h urine	15 - 50	mmol/24h
Urate - 24h urine	1.5 - 4.5	mmol/L
Microalbumin - Alb/Creat Ratio (ACR) - Female	<3.5	mg/mmol
Microalbumin - Alb/Creat Ratio (ACR) - Male	<2.5	mg/mmol
Microalbumin - Albumin - Urine	<20	mg/L
Protein, Total - 24h urine	0.05 - 0.14	g/24h
Protein, Total – Protein/Creat Ratio (PCR)	<14	mg/mmol

Sweat

Conductivity <50 mmol/L are unlikely to be associated with CF
>90 mmol/L support a diagnosis of CF

Pleural Fluid

Pleural Fluid Gross appearance: The following descriptions are used: Clear, Cloudy, Purulent, Milky, Blood Stained, Straw Coloured, Amber Coloured.

Pleural Fluid Total Protein: Results <25 g/L suggest transudate
Results >35 g/L suggest exudates
Total protein between 25 – 35 g/L – use Light’s criteria – below.

Light’s - a fluid is classified as an exudate if any of the following criteria are met:
A Pleural Fluid:Serum Protein Ratio greater than 0.5. (fluid protein ÷ serum protein)
A Pleural Fluid LDH activity above 150 U/L (2/3 ULN)
A Pleural Fluid:Serum LDH Ratio greater than 0.6.
(Note:Patients with CHF on diuretics may show an increase in Pleural fluid protein values).

Pleural Fluid Cholesterol: >1.6 mmol/L suggests exudate.

Pleural Fluid Albumin gradient: (useful for patients on diuretics)
Serum fluid albumin gradient = serum albumin minus fluid albumin
<12 g/L indicates an exudate and >12 g/L a transudate.

Pleural Fluid Glucose (‘Is it rheumatoid?’): >5.3 mmol/L suggests transudate.
>1.6 mmol/L RA is unlikely cause

Pleural Fluid pH (‘Does this parapneumonic effusion need draining?’):
<7.30 suggests the presence of an inflammatory or infiltrative process.
<7.20 require drainage – not 100% sensitive.

Pleural Fluid Lipids (‘Is it a chylothorax?’): Triglyceride values > cholesterol suggests chylothorax.
BTS guidelines – Triglyceride values >1.24 – chylothorax
Triglyceride values <0.54 – psuedochylothorax
Cholesterol values >5.18 – chylothorax
Cholesterol values <5.18 – psuedochylothorax

Pleural Fluid Amylase (‘Is pancreatitis the cause?’): >125 U/L or the fluid / serum ratio is >1.0.

Pleural Fluid Creatinine / Urea: Increased pleural fluid urea or creatinine may be specific for diagnosis of urinothorax, when fluid accumulates in the pleural space in urinary tract obstruction.

Pleural Fluid Bilirubin / Tumour markers: Not useful.

Ascitic / Peritoneal Fluid

Ascitic Fluid Gross appearance: The following descriptions are used: Clear straw coloured, Blood-stained, Turbid, Tea coloured, Black, Dark molasses, Green/brown

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Serum Ascites Albumin Gradient (SAAG): SAAG = Serum Albumin – Fluid Albumin

SAAG <11 g/L [decreased portal pressure]	SAAG >11 g/L [increased portal pressure]
Malignancy – peritoneal (due to abnormal capillary permeability) Tuberculosis / Infection Pancreatitis Nephrotic syndrome	Malignancy – hepatic metastases (intrahepatic venous compression leading to portal hypertension) Cirrhosis / Liver disease Congestive cardiac failure


- Ascitic Fluid LDH:** >225 U/L (ULN) associated with malignancy (Not generally useful)
- Ascitic Fluid Glucose:** Fluid/Blood glucose ratio (GREY TOPs) of <0.7 - Tuberculous ascites (Not generally useful)
- Ascitic Fluid Amylase:** >125 U/L – suggest pancreatitis (Not specific - values usually extremely elevated >500). Amylase activity in ascites of non-pancreatic origin ~half the plasma value.
- Ascitic Fluid Creatinine:** Increased values may indicate the presence of urine.
- Ascitic Fluid Triglyceride:** >2.25 mmol/L and > corresponding serum concentration - Chylous ascites (Values up to 4.5mmol/L may be seen in with cirrhosis)
- Ascitic Fluid Bilirubin:** >103 µmol/L and > serum value is consistent with intrahepatic or gallbladder fistula or upper gut perforation.
- Ascitic Fluid Total protein:** Not recommended
(>30 g/L - infection / malignancy
<30 g/L - chronic liver disease/cirrhosis (<25 g/L greater probability))
- Ascitic Fluid Tumour markers / Cholesterol / pH / Lactate / Enzymes:** Not useful

Common Referrals – see report form or link below.

(Belfast Link Labs unless stated – as per BLL User Manual – Adult Ranges)- see hyperlink below – click on lab manual

<http://www.belfasttrust.hscni.net/services/Laboratory-MortuaryServices.htm>

The following are available on the laboratory computer system and or ECR

Bile Acids	0 - 10 (Fasting)	umol/L
	0 - 14 (Non-Fasting)	umol/L
Fructosamine	200 - 285	umol/L
Calprotectin (Faecal)	<60 Possible inflammatory disease >60	ug/g
		
	New Patient Pathway_Version 2_C	
TPMT – Deficient	Less than 10	mU/L
TPMT – Low	20 - 67	mU/L
TPMT – Normal	68 - 150	mU/L
TPMT – High	Greater than 150	mU/L
TP metabolites 6-TGN	235 - 450 pmol 6-TGN/8x10^8 cells	Maximun drug efficacy

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



TP metabolites 6-MMPM	<5700 pmol 6-TGN/8x10 ⁸ cells	>5700 risk of hepatotoxicity
CDT	0 - 2.6	%
TSH Receptor Antibody	0 - 0.9	IU/L
Soluble Transferrin Receptor	8.7 - 28.1	nmol/L
Biotinidase	2.5 – 10.5	U/L
Chromium and Cobalt	Contact Laboratory	
Infliximab Antibodies and Activity	Contact Laboratory	

ALL OTHER TEST REFERENCE Intervals

Contact Laboratory

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Pathology harmony:

To keep in line with other UK Clinical Chemistry Laboratories the following Pathology Harmony reference ranges and units were adopted by the WHSCT from 20 Oct 2010.

[Pathology Harmony- see www.pathologyharmony.co.uk is a UK wide DoH initiative to harmonise several aspects of work including reference ranges within the clinical Laboratory]

Analyte (Serum unless stated)	New UK wide Pathology Harmony Reference Ranges for non-pregnant Adults		Old WHSCT Reference Ranges (Same units unless stated)
Sodium	133 – 146	mmol/L	136 - 145
Potassium	3.5 – 5.3	mmol/L	3.5 – 5.1
Chloride	95 – 108	mmol/L	98 – 107
Bicarbonate	22 – 29	mmol/L	22 – 29
Urea	2.5 – 7.8	mmol/L	2.5 – 6.4
Phosphate	0.8 – 1.5	mmol/L	0.8 – 1.55
Magnesium	0.7 – 1.0	mmol/L	0.75 – 1.25
Albumin	35 – 50	g/L	35 – 50
Total Protein	60 – 80	g/L	64 – 83
Osmolality	275 – 295	mmol/kg	285 – 295
ALP	30 – 130	U/L	40 – 130
CK	40 – 320 Male 25 – 200 Female	U/L	40 – 170
Adjusted Calcium	2.2 – 2.6	mmol/L	2.10 – 2.55
Total Bilirubin	Less than 21	µmol/L	1 – 17
Urate	200 – 400 Male 140 – 360 Female	µmol/L	180 – 420
Carbamazepine	4 – 12	mg/L	8 – 12 single drug 4 – 8 multiple drug
Phenobarbitone	10 – 40	mg/L	10 – 40
Phenytoin	5 – 20	mg/L	10 – 20
Theophylline	10 – 20	mg/L	10 – 20
Lithium	0.4 – 1.0	mmol/L	0.4 – 1.0 (0.4 – 0.8 elderly)
24h Urine Calcium	2.5 – 7.5	mmol/24h	2.5 – 7.5
24h Urine Phosphate	15 – 50	mmol/24h	12.9 – 42.0
24h Urine Urate	1.5 – 4.5	mmol/24h	Less than 4.8
24h Urine Magnesium	2.4 – 6.5	mmol/24h	3.0 – 5.0
BNP	Units changed to ng/L from pg/mL Same number – no significant change		

Note: In the following table, outlining sample requirements, a number of tests are forwarded to various regional laboratories in Belfast [See under Sent to]. Such tests are not booked into or reported by the WHSCT Clinical Chemistry Laboratory and any queries regarding these tests should be made directly to the relevant Belfast laboratory.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
ACTH - Adrenocorticotrophic Hormone	Blood	4mL	EDTA/Purple Top	EDTA bottle must be filled completely to mark and transported to Lab on ice - within 15 mins	Separate and Freeze immediately upon receipt. Dispatch – Frozen. Store in freezer at reception. Lab van.	Endocrine Lab, RVH
Acylcarnitine	Blood	1mL	Li Heparin Green top	EDTA/Purple Top not suitable. May be performed on Guthrie card but plasma sample preferable	Separate. Mon to Thurs – 1st Class Post. Send in small screw top sample bottle. If arrives on Fri to Sunday separate and freeze prior to posting on Monday.	Sheffield Childrens
Adalimumab	Blood	4mL	SST/Yellow Top	See - Anti-TNFa drug levels and antibody analysis		
Albumin Creatinine Ratio (ACR)	Urine	10mL Early Morning Sample	Lemon Top Sarstedt Monovette Urine Tube	Repeat early morning samples on 3 occasions.		Altnagelvin
Alcohol (Ethanol)	Blood	4mL	SST/Yellow Top	Do not use alcohol wipes. May be serum, plasma or whole blood. EDTA is acceptable.	Do not accept samples for independent analysis e.g. Drink Driving or any samples from Police. If in doubt contact Dr O'Kane or Dr Lynch. Note: The Public Analyst laboratory, which previously analysed these samples no longer offers this service and now refers to a sister lab in England – Eurofinforensics (tel no. 08458381925) which may analyse them. Alcohol testing is also available from www.nivha.net , telephone number 02893438051 – see Drugs of Abuse	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Aldosterone	Blood	4mL	EDTA/Purple Top	Contact lab for information on patient preparation Fill sample to 4mL mark on bottle. 24h urine samples – usually not necessary – contact Dr Lynch or Dr O’Kane	Ref: CC/CP/016. Very strict sample collection procedure. Inform Dr O’Kane or Dr Lynch. Renin analysed on same specimen. Sample should be separated and frozen within 3 hours. Dispatch – Frozen. Store in freezer at reception. Lab van.	Endocrine Lab, RVH
Alkaline Phosphatase Isoenzymes	Blood	4mL	SST/Yellow Top		Separate. Dispatch – Store in fridge at reception. Lab van.	Immunoproteins Clin Chem RVH Belfast Link Labs
Alpha Fetoprotein - Ante-Natal	Blood	4mL	SST/Yellow Top	Contact laboratory for range in pregnancy	Separate. Dispatch – Store in fridge at reception. Lab van.	Dept of Genetics, BCH
Alpha Fetoprotein - Cancer Studies	Blood	4mL	SST/Yellow Top		Separate Friday to Saturday Dispatch – Store in fridge at reception. Lab van.	Belfast Link Labs
Alpha Fetoprotein - Hydatidiform Mole	Blood	6mL	Clotted/Red Top	Mole follow-up studies	Separate. Photocopy patient details and enter in Referrals under AFPCC. Send by post in special plastic box provided with samples.	Dept Medical Oncology, Charing Cross Hospital, Fulham Palace Rd, London W6 8RF
Alpha Fetoprotein – Liquor	Liquor	5mL	Universal Container	Contact laboratory for reference ranges	Dispatch – Store in fridge at reception. Lab van.	Belfast Link Labs
Alpha Galactosidase	Blood	4mL	EDTA/Purple Top	Fabry’s disease	Whole Blood – do not separate. 1st Class Post – to reach Willink Lab within 72h of venepuncture	Willink Genetics Unit, Manchester


This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Alpha-1-Acid Glycoprotein (Orosomucoid)	Blood	4mL	SST/Yellow Top		Separate. Dispatch – Store in fridge at reception. Lab van.	Protein Lab, Belfast Link Labs
Alpha-1-Antitrypsin	Blood	4mL	SST/Yellow Top	Belfast Lab will not accept 5mL tubes	Separate. Dispatch – Store in fridge at reception. Lab van.	Immunoproteins Clin Chem RVH Belfast Link Labs
Alpha-1-Antitrypsin Phenotype	Blood	4mL	SST/Yellow Top	Belfast Lab will not accept 5mL tubes	Separate. Dispatch – Store in fridge at reception. Lab van.	Immunoproteins Clin Chem RVH Belfast Link Labs
Alpha-1-Antitrypsin Faeces	Faeces	10g	Universal Containe	Samples should be frozen immediately upon of receipt.	Dispatch – send sample frozen	Protein Reference Unit and Immunopathology Level 2 Jenner Wing St George's Hospital Tooting London SW17 0NH
17 Alpha-Hydroxyprogesterone [17-Hydroxy Progesterone]	Blood	2mL	Clotted/Red Top Plain bottle	Yellow top not suitable. Used for diagnosis of CAH. Sample should be taken between 8 and 9am. Infant should be 2 days old. 1mL of serum required. Haemolysed samples unsuitable. Samples batched and analysed every 7 to 10 days – if required urgently contact Belfast.	Separate and freeze within 24 hours. Store in freezer at reception. Send sample frozen. Dispatch – Lab van. Belfast Lab may require prior warning if request urgent – requesting clinician to contact Endocrine Laboratory.	Endocrine Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Alpha Subunit	Blood	4mL	SST/Yellow Top	Referred to Regional Endocrine Lab Birmingham	Separate and send by First Class Post	Regional Endocrine Lab, Dept Clin Chem, Birmingham NHS Foundation Trust, Birmingham B29 6JD
Aluminium Whole Blood	Blood	6mL	Special tube – Royal Blue topped Griener Trace Metal Tube	Tubes stored in R8 Specific blood collection SOP required – see memo also. Same sample suitable for Whole Blood Manganese, Mercury, Thallium, Cadmium and Arsenic.	Do not separate – send whole blood samples. Dispatch Lab van. See information from Regional Trace Metal Laboratory  Trace Metal Information Sheet.do	Trace Metal Lab Belfast Link Labs
Amino Acids - Blood	Blood	1.0mL	EDTA/Purple Top or Green top Li Heparin	Give full clinical details including feeding and drugs. Ideally should examine plasma and urine at the same time.	Separate and Freeze. Record if Heparin or EDTA on request form. Dispatch – Frozen. Store in freezer at reception. Lab van.	Childrens Biochemistry Lab RVH
Amino Acids - Urine	Urine	10mL	Lemon Top Sarstedt Monovette Urine Tube	Give full clinical details including feeding and drugs. Ideally should examine plasma and urine at the same time.	Dispatch – Store in fridge at reception. Lab van. If Urine frozen (not going to Belfast within 48h) then frozen. Store in freezer at reception. Lab van.	Childrens Biochemistry Lab RVH
Aminophylline				See Theophylline		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Amiodarone	Blood	6mL	Clotted/Red Top	Sample should be taken prior to dose	Separate. First Class Post – send cover letter with sample – Contact Dr PLM Lynch or Dr O’Kane	Toxicology Unit, Top Floor, Bessemer Wing, King’s College Hospital, Denmark Hill, London SE59RS
Amitryptilline (Nortryptiline)	Blood	6mL	Clotted/Red Top	Gel tube not suitable	Dispatch – Lab van.	Toxicology Lab, RVH
Ammonia	Blood	4mL	EDTA/Purple Top	Transport sample to lab on ice without delay. Within 60 minutes. Inform Lab prior to venepuncture. Do not use sterets/alcohol at site of venepuncture.	Separate plasma ASAP within 15 mins. Analyse within 30 mins. [Maximum of 4h delay with plasma (not whole blood) on ice or in fridge is permissible – if longer freeze sample]. Heparin samples not recommended.	
Amphetamines	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube		Dispatch – Store in fridge at reception. Lab van.	Toxicology Lab, RVH
Amylase - serum	Blood	4mL	SST/Yellow Top			
Amylase - Random urine	Urine	10mL	Lemon Top Sarstedt Monovette Urine Tube	Needs a paired SST/Yellow Top for serum amylase		
Amylase – 24h urine	Urine	24h collection	Plain 24h Urine Bottle			

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Anaphylaxis	Blood	4mL	SST/Yellow Top	Samples should be taken within 1h, 2h post and 24h post. Anaphylaxis form should be filled in – stored at back of reception manual – see also CC/SPEC/028 Samples analysed for Mast cell tryptase	Keep all 3 samples together. Separate. Dispatch – Store in fridge at reception. Lab van.	Dept of Immunology, RVH
Androgen Profile	Blood	6mL	Clotted/Red Top	Includes: Testosterone, Sex Hormone Binding Globulin, Free Androgen Index, DHEA Sulphate. [Gel tube only suitable for Testosterone and DHEA]	All samples – separate and freeze into 3 aliquots. [1 aliquot for Test + DHAS; 1 aliquot for Androstenedione; 1 aliquot for 17OHP] Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Endocrine Lab, RVH
Androstenedione	Blood	6mL	Clotted/Red Top	Yellow top not suitable.	Separate and freeze within 24 hours. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Endocrine Lab, RVH
Angiotensin Converting Enzyme ACE	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast the next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Biochemistry Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Anti-TNF α drug levels and antibody analysis [Infliximab and Adalimumab]	Blood	4mL	SST/Yellow Top	Sample should be taken immediately before next dose – details to be included on request form. (minimum of 0.5mL of serum required) State if Infliximab or Adalimumab required.	Samples should be separated upon receipt and sent by First Class Post. Requests Pided before dispatch	Mr Adrian Cudmore Level 2 Area A Dept Clinical Chemistry Barrack Road Exeter EX2 5AD Tel 01392402904
APO A1	Blood	4mL	SST/Yellow Top		Separate. Dispatch – Store in fridge at reception. First Class Post	Dept. of Medical Biochemistry, University Hospital of Wales, Heath Park, Cardiff. CF14 4XW
APO B	Blood	4mL	SST/Yellow Top		As per APO A1	
APO E Genotype	Blood	4mL	EDTA/Purple Top	Contact Laboratory	Do not separate – Post whole blood to: John Roberts, 1 st Floor, North Wing, St Thomas' Hospital, Lambeth Palace Rd, London SE1 7EH	St. Thomas' Hospital, London
Ascitic Fluid	Fluid	10mL 2mL	Lemon Top Sarstedt Monovette Urine Tube / Universal Container / heparinised syringe - for pH	See fluid analysis	Centrifuge Lemon Tops and Universal samples. Label RB30 tube for transfer from universal.	
Ascorbic Acid					See Vitamin C	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Auto Antibody Screen	Blood	4mL	SST/Yellow Top	Full clinical history should be given	Do not separate. Dispatch Lab van.	Dept of Immunology, RVH
Barbiturate Screening - Blood	Blood	6mL	Clotted/Red Top	Contact Consultant staff for approval before dispatch.	Do not separate. Dispatch Lab van.	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH
Bence Jones Protein	Urine - Random	10mL	Lemon Sarstedt Monovette Urine Tube	An early morning urine specimen is preferred.		Altnagelvin
Benzodiazepine Screening	Blood	6mL	Clotted/Red Top	Gel tube not suitable	Separate	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH
Beta HCG - Antenatal	Blood	4mL	SST/Yellow Top			
Beta HCG - Cancer studies	Blood	4ml	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast the next day (Sample may remain in bag attached to form). Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Endocrine Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Beta-2-Microglobulin	Blood	4mL	SST/Yellow Top	Reference range is age related. Contact laboratory.	Separate. Dispatch – Send by first class post	Immunoproteins Clin Chem RVH Belfast Link Labs
Beta-2-Microglobulin	Urine	10mL	Lemon Top Sarstedt Monovette Urine Tube / Universal Container		Dispatch – Send by first class post	Immunology Department and Protein Reference Unit PO Box 894 Sheffield S5 7YT
Bile Acids	Blood	4mL	SST/Yellow Top		Separate. Dispatch – to Ulster Hospital via BLL (Place in dedicated blue bags) Biochemistry Laboratory, Ulster Hospital, Dundonald, BT16 1RH. Tel 02890484511 ext 2358. Samples should be stored separated at 4°C until dispatch. See -- CC/SPEC/024	Ulster Hospital
Antimullerian hormone	Blood	4mL	SST/Yellow Top	No longer referred on by Belfast	Separate and freeze on same day as collection. Send by first class post – not on Friday.	Biochemistry MacEwan Building Royal Infirmary Castle Street Glasgow G4 0SF
Bilirubin Direct (Conjugated)	Blood	4mL	SST/Yellow Top	Same specimen may be used for Total and Direct Bilirubin		
Bilirubin Paediatric	Blood	0.5mL	Li Hep Tube/Green	Same specimen may be used for Total and Direct Bilirubin. Protect from light.		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Bilirubin Total	Blood	4mL	SST/Yellow Top	Same specimen may be used for Total and Direct Bilirubin		
Biotinidase	Blood	2mL	Green top Li Heparin		Separate. Mon to Thurs – 1st Class Post. If arrives on Fri to Sunday separate and freeze prior to posting on Monday. Send in small screw top sample bottle.	Sheffield Childrens Biochemistry Lab
Blood Gas Analysis	Blood	0.6mL	1mL Heparinised Blood Gas Syringe, capillary tube, microsampler	If required - Send immediately to Lab. Allow no air to mix with specimen or be trapped in syringe. Needle must NOT be left on syringe, use syringe cap.	Analyse as soon as possible – samples should be analysed within 30 minutes of venepuncture stored at Room Temperature [Do not store on ice – old recommendations for ice was applicable to glass not plastic tubes]	
NT-ProBNP (B-Type Natriuretic Peptide)	Blood	4mL	SST/Yellow Top	Samples must reach lab within 24h. (EDTA/Purple Top samples are acceptable).	Whole blood samples, stored at RT, are stable for 24h Serum samples, stored at 2-8°C, must be tested within 72h If samples cannot be tested within these given times separate and freeze.	
Bone Markers CTX serum crosslaps BAP Ostase Bone specific ALP P1NP	Serum`	4mL	SST/Yellow Top	Timing of sample: (08:00am to 11:00 am) & FASTING. Samples should be taken at the same time and conditions for all measurements. Sample should reach lab within 2h. Belfast analyses all 3 markers on one tube [BAP and Ostase are shorthand for bone specific ALP]	Separate serum and freeze immediately on receipt – samples should be separated within 3h of venepuncture. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Bone Profile	Blood	4mL	SST/Yellow Top	ALP range is age and sex related.		
Breast Cancer Marker BrCa1	Blood	4mL	EDTA/Purple Top	Phone Dr Morrison BCH 329241 ext 2764 first.	Dispatch – send whole blood sample. Lab van.	Dept of Genetics, BCH
C Reactive Protein (CRP)	Blood	4mL	SST/Yellow Top			
C1 Esterase Inhibitor	Blood	4mL	SST/Yellow Top		Separate and Freeze. Dispatch – Frozen. Store in freezer at reception. Lab van.	Immunology, RVH
C3 Nephritic Factor (C3NeF)	Blood	4mL	SST/Yellow Top		Separate and Freeze. Dispatch – Frozen. Store in freezer at reception. Lab van.	Immunology, RVH
CA - 15-3	Blood	4mL	SST/Yellow Top	Contact laboratory for further information.	Separate. First Class Post.	Dept Medical Oncology, Charing Cross Hospital, Fulham Palace Rd, London W6 8RF
CA - 19-9	Blood	4mL	SST/Yellow Top Heparin/Green Top -also suitable	Contact laboratory for further information.	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast the next day (Sample may remain in bag attached to form). Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Belfast Link Labs
CA-125	Blood	4ml	SST/Yellow Top	Contact laboratory for further information.	As CA- 19-9	Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Caffeine	Blood	6mL	Clotted/Red Top	Gel tube not suitable.	Separate. Store in fridge at reception. Lab van.	Toxicology Lab, RVH
Calcitonin	Blood	4mL	Heparin/Green Top	Send to laboratory on ice within 4 hours. [Note: sample stable at RT for 2 hours]	Separate and Freeze ASAP. Dispatch – Frozen. Store in freezer at reception. Lab van.	Endocrine Lab, RVH
Calcium - Serum	Blood	4mL	SST/Yellow Top			
Calcium - Urine	Urine - 24h	24h collection	Issued from Laboratory	24h bottle contains dilute HCl acid		
Calculi Analysis (Renal Stones)	Calculi		Universal Container		1 st Class Post – see CC/SPEC/024	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH
Calprotectin	Faeces	1 - 5g	Universal Container (Random sample)	Stable for 4 days at RT	Dispatch – to Ulster Hospital via BLL (Place in dedicated blue bags) Store at 4oC if delay in transport	Ulster Hospital Clinical Chemistry Laboratory
Carbamazepine (Tegretol)	Blood	4mL	SST/Yellow Top	Take specimen immediately before next oral dose - Trough		
Carbohydrate Deficient Transferrin CDT	Blood	4mL	SST/Yellow Top	Used for determination of alcohol intake.	Separate. 1st Class Post. (Kevin Green 01142715552)	Immunology Department and Protein Reference Unit, PO Box 894, Sheffield S5 7YT

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Carboxy Haemoglobin (COHb - CoOx)	Blood	2mL 4mL	1mL Heparinised Syringe, capillary, microsampler or Heparin/Green Top	Needle must NOT be left on syringe, use syringe cap.		
Carnitine (Total and Free)	Blood	1mL	Li Heparin Green top	For virtually all clinical purposes an acylcarnitine profile is a more thorough investigation.	Separate. Mon to Thurs – 1st Class Post. If arrives on Fri to Sunday separate and freeze prior to posting on Monday. Send in small screw top sample bottle.	Sheffield Childrens
Carotene	Blood	4mL	SST/Yellow Top	Send in envelope to shield from light.	No longer available – send for Vit A and E. Separate and store in brown envelope at 4°C until dispatch by Lab van. Samples received on Fri or Sat should be separated and frozen prior to Lab van transport to Belfast.	Biochemistry Lab, RVH
Catecholamines - Blood	Blood		Contact Laboratory	Not usually done.	See CC/CP/024 Centrifuge at 4°C, separate and freeze ASAP. Take care to label sample timing details. Collate all samples and dispatch together. Dispatch – Frozen. Store in freezer at reception. Lab van.	Biochemistry Lab, RVH
Catecholamines - Paediatric	Urine - Random	15mL	Contact Laboratory	Sample must be collected into acid. (500uL of 40% HCl to 15 mL of urine) Now replaced by metanephrines.	Dispatch – Store in fridge at reception. Lab van.	Biochemistry Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Catecholamines - Urine	Urine - 24h	24h collection	Issued from Laboratory	24h bottle contains dilute HCl acid. Repeat twice if clinical suspicion is high. Now replaced by metanephrines.	Preservative: 40mL 30% HCl. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Verify that pH of aliquot is 3 or less otherwise it is unsuitable for analysis. Dispatch – Store in fridge at reception. Lab van.	Biochemistry Lab, RVH
CEA (Carcino Embryonic Antigen)	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast the next day (Sample may remain in bag attached to form). Samples received the day after venepuncture or on Fri or Sat should be separated and stored refrigerated prior to Lab van transport to Belfast.	Belfast Link Labs
Ceruloplasmin	Blood	4mL	SST/Yellow Top		Separate. Store in fridge at reception. Lab van.	Immunoproteins Clin Chem RVH Belfast Link Labs
Chloride - Sweat	Sweat			See Sweat conductivity Test		Altnagelvin
Cholecalciferol				See Vitamin D		
Cholestanol	Blood	4mL	EDTA/Purple Top or Heparin/Green Top	For diagnosis of Cerebrotendinous Xanthomatosis	Separate serum or plasma (minimum volume 0.2mL). Send by 1 st Class post. Send in small screw top sample bottle.	Sheffield Children's Laboratory


This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Cholesterol - Total	Blood	4mL	SST/Yellow Top	Total cholesterol > 5.0 mmol/L may indicate an increased risk of vascular disease.		
Cholinesterase Activity / Phenotyping	Blood	4mL	SST/Yellow Top or EDTA/Purple Top or Heparin/Green Top	Samples should be collected the day after any induced apnoea. Or 6 weeks after if FFP or cholinesterase preparation used to treat.	Separate serum or plasma (minimum volume 0.5mL). Send by 1 st Class post.	Cholinesterase Investigation Unit, Dept of Clinical Biochemistry, The Lewis Laboratory, Southmead Hospital, Bristol BS10 5NB
Cholinesterase Genotyping	Blood	4mL	EDTA/Purple Top	See above	Send whole blood sample – do not separate or freeze. See above	Southmead Hospital, Bristol BS10 5NB
Chondroitin Sulphate				See Mucopolysaccharides Screen		Childrens Biochemistry, RVH
Chromium Whole Blood (Cobalt analysed as well)	Blood	6mL	Special tube – [Redacted] Royal Blue topped Griener Trace Metal Tube	Cobalt analysed as well – for determining wear of artificial Hip joints Contact Barry Sampson 02033133644	Post whole blood to Trace Metals, Clinical Chemistry, Ground Floor Oncology, Charing Cross Hospital, Imperial College Healthcare NHS Trust, London W6 8RF Tel 02033135911 PID as CRCO	Trace metals, Charring Cross
Citrate – 24h Urine	Urine - 24h	24h collection	Issued from Laboratory – contain Thymol	See renal stone investigations	See renal stone investigations	Belfast Link Labs
Citrin Deficiency – (Same as Amino Acids – Blood)	Blood	1.0mL	EDTA/Purple Top or Green top Li Heparin	Give full clinical details including feeding and drugs. Ideally should examine plasma and urine at the same time.	Separate and Freeze. Record if Heparin or EDTA on request form. Dispatch – Frozen. Store in freezer at reception. Lab van.	Childrens Biochemistry Lab RVH




This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.

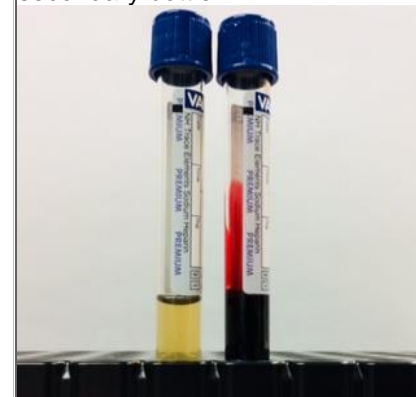


Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
CKMB Isoenzyme	Blood	4mL	SST/Yellow Top	Only assayed if Total CK is > 170 U/L		Immunoproteins Clin Chem RVH Belfast Link Labs
CKMB Mass	Blood	4mL	SST/Yellow Top	Only assayed by prior arrangement with Dr PLM Lynch or Dr O'Kane.		Protein Lab, Belfast Link Labs
Clobazam	Blood	6mL	Clotted/Red Top	For epilepsy. Gel tube not suitable. Assay no longer performed in BCH – contact Dr Lynch or Dr O'Kane. Usually not required – contact Toxicology Lab, Belfast Link Labs	Separate serum.	Toxicology Lab, RVH
Clonazepam	Blood	4mL	Heparin/Green Top	Contact National Poisons Information Service on 0844 892 0111 – see Dr Lynch or Dr O'Kane www.Toxbase.org		Toxicology Unit, Top Floor, Bessemer Wing, King's College Hospital, Denmark Hill, London SE59RS
Cobalt Whole Blood (Chromium analysed as well)	Blood	6mL	Special tube –  Royal Blue topped Griener Trace Metal Tube	Chromium analysed as well – for determining wear of artificial Hip joints Contact Barry Sampson 02033133644	Post whole blood to Trace Metals, Clinical Chemistry, Ground Floor Oncology, Charing Cross Hospital, Imperial College Healthcare NHS Trust, London W6 8RF Tel 02033135911 PID as CRCO	Trace metals, Charring Cross
Complement - C3, C4	Blood	4mL	SST/Yellow Top	Send immediately to Lab	Separate serum and store at 4oC. Samples received on Friday should be frozen. Transport chilled/frozen.	Altnagelvin

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Copeptin	Blood	4mL	Heparin/Green Top SST/Yellow Top Clotted/Red Top	 CT-proAVP.pdf	Separate and send by First Class Post. Concurrent serum OSM must be >300mosm/kg – otherwise do not send – contact Lab Consultant Staff	Dept Blood Science Royal Victoria Infirmary, Newcastle NE14LP
Copper - Plasma	Blood	6mL	 Royal Blue topped Griener Trace Metal Tube or Clotted/Red Top or SST/Yellow Top	Royal Blue Tubes stored in R8	Samples for plasma trace metals [Copper, Zinc, Selenium] should be separated as soon as possible after blood drawing. If they cannot be separated immediately, they should be refrigerated and separated within eight hours. Note: When separating plasma trace metals – use a  Royal Blue topped Griener Trace Metal Tube as the secondary tube – NB write PID details on secondary bottle.	Trace Metal Lab, Belfast Link Labs



This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					Note: For copper only – yellow top samples are acceptable – these should be centrifuged within eight hours – it is acceptable to leave on gel. Dispatch – Store in fridge at reception. Lab van. See Aluminium - information from Regional Trace Metal Laboratory	
Copper - Urine	Urine - 24h	24h collection	Plain 24h Urine Bottle	A brand new urine container may be used. However the vessel into which the urine is originally collected should be acid washed (10% analar HNO ₃ and then thoroughly washed out with distilled water).	No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception. Dispatch – Lab van.	Trace Metal Lab, Belfast Link Labs
Cortisol - Blood	Blood	4mL	SST/Yellow Top	Random serum cortisol samples are of very limited value.	Take should be taken to record sample time and other relevant details e.g. dexamethasone suppression. Specimens should be collected at 7am and 11pm. Times should be clearly marked on samples. ? Cushing's Disease: Blood taken at am and pm. ? Addison's Disease: Short Synacthen Test - Refer to Clinical Protocol SOP, CC/CP/001. Dexamethasone Test: Refer to Clinical Protocol SOP, CC/CP/008. Refer enquiries to Dr O'Kane or Dr Lynch for further information regarding protocols and result interpretation.	Altnagelvin

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Cortisol Binding Globulin	Blood	4mL	SST/Yellow Top	See Dr Lynch or Dr O'Kane	Separate Dispatch – first class post.	Clinical Chemistry Lab, Charing Cross Hospital, London
Cortisol - Urine	Urine - 24h	24h collection	Plain 24h Urine Bottle		No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception. Dispatch – Lab van.	Endocrine Lab, RVH
C-Peptide	Blood	4mL	SST/Yellow Top Clotted/Red Top Heparin/Green Top	Specimen must be sent to laboratory without delay. Serum should be separated within 4h.	Separate and freeze immediately on receipt. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Endocrine Lab, RVH
Creatine Kinase (CK)	Blood	4mL	SST/Yellow Top			
Creatinine Clearance	Blood and Urine - 24h	4mL 24h collection	SST/Yellow Top Plain 24h Urine Bottle	Specimen of blood for serum creatinine must be collected during the period of urine collection. See CC/CP/021	Measure and record volume on form and container. Transfer an aliquot of 24h specimen to a Lemon Sarstedt Monovette Urine Tube – main Lab.	
Cryoglobulins	Blood			Refer to protein section staff.	Performed by Altnagelvin protein staff only – See CC/PROT/011	Altnagelvin
CSF - Cerebral Spinal Fluid	CSF	1mL	Universal Container	Xanthochromia samples should be shielded from light. Samples should not be sent via VTS.	All samples should be centrifuged prior to analysis.	Altnagelvin
Xanthochromia						
CSF Protein Electrophoresis (Oligoclonal Bands)	CSF and Blood	0.5mL 4mL	Universal Container SST/Yellow Top	Serum and CSF samples required.	Separate serum, store in fridge until dispatch. Dispatch – Lab van.	Immunoproteins Clin Chem RVH Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
CSF Tau Protein (Asialylated transferrin)	Nasal Fluid	0.5mL 4mL	Universal Container	For CSF Rhinorrhoea	Dispatch – first class post	Dept of Immunology, PO Box 894, Sheffield, S5 7YTF
Cyclosporin	Blood	4mL	EDTA/Purple Top	Sent to various centres depending on source of request.	Refer directly to main reception.	Freemans Kings College Harefield Newcastle Belfast Link Labs
Cystine	Urine - 24h	24h collection	Plain 24h Urine Bottle		No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception. Dispatch – Lab van.	Childrens Biochemistry, RVH
Cystine Screen	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube	Early morning sample preferred.	Store in fridge at reception. Dispatch – Lab van.	Childrens Biochemistry, RVH
Dehydroepiandrosterone Sulphate DHEAS [DHAS]	Blood	4mL	SST/Yellow Top Clotted/Red Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and frozen prior to Lab van transport to Belfast.	Endocrine Lab, RVH
Digoxin	Blood	4mL	SST/Yellow Top	Take sample at least 6-8h after last oral dose.		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Dihydrotestosterone (DHT)	Blood	4mL	SST/Yellow Top	Analysed along with other steroids.	Separate serum. Dispatch – First class post	SAS Steroid Hormone Centre Specialist Laboratory Medicine Block 46 St James's University Hospital Beckett Street Leeds LS9 7TF
Drug Overdose / Poisoning	Blood Urine	4mL 10mL	SST/Yellow Top / Lemon Sarstedt Urine tube	Specimens are only sent to BLL following approval by Consultant staff. Full clinical details and history should be given, especially the suspected drug ingested. Emergencies: Doctor should consult Biochemist on-call at BLL and make necessary arrangements. However, transport of sample next morning is usually adequate. See www.Toxbase.org	Mon - Fri am. Send by Lab van driver. At other times arrange Taxi as per protocol - CC/SPEC/005. Inform Toxicology Lab, RVH. Note – depending on the drug some requests are referred UK labs – contact Consultant staff	Toxicology Lab, RVH
Drugs of Abuse Screen - Amphetamine, Barbiturates, Benzodiazepines, Cannabinoids,	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube	Indicate which drug group patient is suspected of abusing. Not available as an emergency test. (Cocaine/opiates/amph confirmed by MS)	Store in fridge at reception.	Toxicology Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Cocaine Metabolites, Opiates, LSD.				Note: Most samples come from Substitute Prescribing Teams based in Drug and Alcohol Units. There are also many GPs who monitor patients on substitute prescribing programmes. Samples from solicitors or GPs who have had patients sent along to them by solicitors or the court for drug testing are refused – refer any cases to a private lab based in Ballyclare -- which the solicitors can access on the internet www.nivha.net , telephone number 02893438051.		
Elastase	Faeces	10g	Universal Container	Samples stable for 24h	Freeze immediately upon receipt. Store in freezer at reception. Send frozen. Dispatch – Lab van.	Childrens Biochemistry, RVH
Electrolyte Profile	Blood	4mL	SST/Yellow Top			
Electrolytes Sweat				See Sweat test SOP CC/SI/024		Altnagelvin

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Electrolytes Urine	Urine - 24h Urine - Random	24h collection / 10mL	Plain 24h Urine Bottle Lemon Top Sarstedt Urine Tube		Measure and record volume of 24h sample on form and container. Transfer an aliquot of 24h specimen to a Lemon Sarstedt Monovette Urine Tube – main Lab.	
Enterocyte Antibodies	Blood	4mL	SST/Yellow Top	Contact Kevin Green Tel 01142715707	Separate serum. Dispatch – First class post	Immuology Dept and Protein Reference Unit PO Box 894 Sheffield S5 7YT
Ethosuximide - Zarontin	Blood	6mL	Clotted/Red Top	Contact Dr Lynch or Dr O’Kane – Rarely required.	Separate. Store in fridge at reception. Dispatch – Lab van.	Toxicology Lab, RVH
Ethylene Glycol	Blood	6mL	Clotted/Red Top	All requests to be brought to the attention of D Dr O’Kane or Dr Lynch immediately.		Toxicology Lab, RVH
Everolimus	Blood	4mL	EDTA/Purple Top	Take sample before next dose. State if on combination or mono therapy.	Store at RT Dispatch – Lab van.	Regional Toxicology Lab
Faecal Fat Excretion				No longer performed. Refer to Dr O’Kane or Dr Lynch.		
Fatty Acids, Very long chain VLCFA	Blood	2mL	Heparin/Green Top or EDTA/Purple Top	Samples referred directly to Sheffield	Separate immediately on receipt. Store in fridge at reception. Send in small screw top sample bottle.	Sheffield Children’s Laboratory
Fluid Analysis	Drain Fluid	10mL	Lemon Top Sarstedt Monovette Urine Tube / Universal	One or all of: pH, Total Protein, Amylase, Triglyceride, LDH. If pH required an extra 0.6mL is	Centrifuge Lemon Tops and Universal samples. Label RB30 tube for transfer from universal.	Altnagelvin

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
		2mL	Container / heparinised syringe - for pH	needed collected in a 1mL heparinised syringe.		
Folate	Blood	4mL	SST/Yellow Top	Lithium heparin samples may be used in exceptional circumstances for folate - but Li Hep samples are unsuitable for B12. Folate is relatively unstable and should be separated ASAP after venepuncture – within 4h. Folate in whole blood can fall by up to 30% within 24h. Samples should be taken fasting as recent food intake may appreciably increase folate levels.	Samples should be spun asap. Samples >6hours old are marked for comment X – (<i>~folate results may be unreliable</i>).	
Free Androgen Index- FAI – see androgen profile						
Free Light Chains				See Light Chains		
Fructosamine	Blood	4mL	SST/Yellow Top		Separate, PID - (worksheet FRUCT) using an urgent accession number. The photocopy of the original request form with lab accession number should be stored in the Fructosamine Pigeon hole in specimen reception. See -- CC/SPEC/024. Dispatch – first class post.	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
FSH - Follicle Stimulating Hormone	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Endocrine Lab, RVH
Galactose-1-Phosphate	Blood	1mL	Heparin/Green Top	Whole blood required – only required on known Galactosaemics. EDTA/Purple Top is unacceptable	Send whole blood to Bristol. Needs to reach lab within 24h of venipuncture – blood should be taken just before posting – do not post on Friday.	Newborn screening at Biochemical Genetics Lab. Southmead Hospital Bristol BS105NB
Galactose-1-Phosphate Uridyl Transferase GPUT (Beutler Test)	Blood	0.5mL	Heparin/Green Top	Whole blood required. EDTA/Purple Top is unacceptable (Low results found on samples >24h old are not reported and a repeat on a fresh (<24h) sample is requested. Normal results on old samples are reported).	Send whole blood to Children's lab – needs to reach lab within 24h of venepuncture (within 12h best). If samples received on Fri or Sat – contact Dr Lynch or Dr O'Kane – samples (red cells) may be washed in saline and stored at 4oC prior to transport if required.	Childrens Biochemistry Lab, RVH
G6PD	Blood	4mL	EDTA/Purple Top	Refer to Haematology		
Alpha Galactosidase	Blood	4mL	EDTA/Purple Top	Fabry's disease	Separate plasma. 1st Class Post – to reach Willink Lab within 72h of venepuncture	Willink Genetics Unit, Manchester
Gastrin	Blood	4mL	EDTA/Purple Top	Fasting sample if possible. See Gut Hormone profile	Separate and freeze immediately on receipt. Store in freezer at reception.	Regulatory Peptide Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
			Heparin/Green Top	Heparin/Green Top also suitable for gastrin but not other gut hormones. Samples should be sent on ice – stable for 2 hours on ice.	Send sample frozen. Dispatch – Lab van.	
Gentamicin	Blood	4mL	SST/Yellow Top	Samples should be clearly marked as Trough or Peak. Paediatric Heparin/Green Tops and EDTA/Purple Top also suitable.	Trough Pided as GENT Peak Pided as GENP Random/Unknown GEN	
Glucagon				See Gut Hormone Profile N-terminal C-terminal		
Glucose - plasma	Blood	2mL	Sodium Fluoride/Grey Top	Sodium fluoride/grey top sample is stable after 30 minutes. Hypoglycaemia cannot be reliably diagnosed on a SST/yellow top sample.		
Glucose Tolerance Test	Blood	2 x 2mL	Sodium Fluoride/Grey Top	Time 0 and time 120 minutes (Gestational diabetes may include at time 60 minutes)	Each sample should be given a separate accession number – see CC/MO/2010/06/21 and CC/AUTO/006	
HbA _{1c} Glycated Haemoglobin -	Blood	4mL	EDTA/Purple Top		Samples may be stored in fridge	
Glycosaminoglycans “GAGS”				See Mucopolysaccharides		
Growth Hormone	Blood	4mL	SST/Yellow Top Clotted/Red Top Heparin/Green	Contact laboratory. Random levels of limited value. For Acromegaly, take	Separate. Dispatch – Store in fridge at reception. Lab van.	Endocrine Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
			Top	specimen before patient gets out of bed after an overnight fast. Contact Dr O'Kane or Dr Lynch for details concerning stimulation tests.	Samples received on Fri or Sat should be separated and frozen prior to Lab van transport to Belfast.	
Gut Hormone Profile: Glucagon, Secretin, Vaso active Intestinal peptide VIP, Pancreatic Polypeptides, Gastrin, Gastrin releasing peptide, Neurokinin A, Somatostatin.	Blood	16 mL (for full profile)	EDTA/Purple Top x 4	VIP only - 2 x EDTA PP only - 1 x EDTA Gastrin only - 1 x EDTA Samples should be sent on ice. Heparin/Green Top also suitable for Gastrin but not other gut hormones. Stable on ice for 2 hours.	Separate and freeze immediately on receipt. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Regulatory Peptide Lab, RVH
Haemochromatosis - Gene analysis	Blood	4mL	EDTA/Purple Top	(Tel 90329241 ext 3097) (Changed from 29/11/10 – previously samples sent to Cardiff)	Whole blood required. Dispatch – Lab van	Haematology Lab, Belfast City Hospital
Haptoglobin	Blood	4mL	SST/Yellow Top			Altnagelvin
HCG - Human Chorionic Gonadotrophin	Blood	4mL	SST/Yellow Top	Tumour marker requests referred to Belfast Link labs	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Altnagelvin, SWAH, Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
HCG - Human Chorionic Gonadotrophin Molar HCG	Blood	6mL	Clotted/Red Top	Tumour marker requests referred to Belfast Link labs	Separate. Dispatch – first class post	Dept Medical Oncology, Charing Cross Hospital, Fulham Palace Rd, London W6 8RF
Homocysteine	Blood	4mL	EDTA/Purple Top	Transport sample to lab on ice within 30 minutes. Inform Lab prior to venepuncture.	Separate and freeze immediately on receipt. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Belfast Link Labs
Homogentisic Acid	Urine - Random	10mL	Lemon Top Sarstedt Urine Tube	Urine usually very dark coloured if present. See – organic acids	Dispatch – Store in fridge at reception. Lab van.	Childrens Biochemistry Lab, RVH
Hydroxybutyrate, Beta	Blood	4mL	SST/Yellow Top			
5-HydroxyIndole Acetic Acid (5-HIAA)	Urine - 24h	24h collection	Plain 24h Urine Bottle	Avoid foods rich in 5-HT before and during collection. Contact Laboratory for full list.	No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception. Ref: Patient information sheet - SOP - CC/PIS/001 - Dispatch – Lab van.	Biochemistry Lab, RVH
5-Hydroxy Tryptamine (5-HT)	Urine - 24h	24h collection	Plain 24h Urine Bottle	Assayed on same specimen as 5-HIAA	See 5-HIAA	Biochemistry Lab, RVH
Hydroxyproline	Urine - 24h	24h collection	Plain 24h Urine Bottle	Avoid meat, fish and gelatine for 24h before and during collection	No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception.	Biochemistry Lab, RVH
Hypo -Pack					See CC/CP/018	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
IgE – Total or RAST	Blood	4mL	SST/Yellow Top		Separate. Separate. Dispatch – Store in fridge at reception. Lab van.	Immunology, RVH
IgG4	Blood	4mL	SST/Yellow Top	For Hyper IgG4 disease (Immunology in Belfast refer them on)	Separate. Dispatch – Store in fridge at reception. Lab van.	Immunoproteins Clin Chem RVH Belfast Link Labs
IgG Subclasses	Blood	4mL	SST/Yellow Top	Usually performed on paediatric samples or on adults following request by respiratory physician.	Separate. Dispatch – Store in fridge at reception. Lab van. Belfast will not accept 5mL tubes	Immunoproteins Clin Chem RVH Belfast Link Labs
Imipramine (Tricyclic antidepressant)	Blood	6mL	Clotted/Red Top	No longer assayed at BCH. if required sample may be referred to King's College. Gel tube unsuitable. Sample should be taken pre-dose. Contact Dr O'Kane or Dr Lynch.	Separate. Dispatch – Store in fridge at reception. Lab van.	Toxicology Unit, Top Floor, Bessemer Wing, King's College Hospital, Denmark Hill, London SE59RS
Immune Complex	Blood	4mL	SST/Yellow Top	Preferable that sample is received in Belfast on the same day as collection - components are heat labile.	No need to separate if sample can be sent to Belfast on the same day as collection. If not, separate and freeze immediately on receipt. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Immunology, RVH
Immunoglobulins	Blood	4mL	SST/Yellow Top	In childhood reference ranges vary with age.		Altnagelvin
Indicans	Urine - 24h	24h collection	Plain 24h Urine Bottle		No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube.	Biochemistry Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					Store in fridge at reception.	
Infliximab	Blood	4mL	SST/Yellow Top	See Anti-TNFa drug levels and antibody analysis		
Insulin - Pro				See Proinsulin		
Insulin + C-Peptide	Blood	4mL 2mL	SST/Yellow Top Clotted/Red Top Heparin/Green Top Sodium Fluoride/Grey Top	Sodium Fluoride/grey Top for glucose MUST be taken at the same time. Send specimens to Laboratory immediately. EDTA/Purple Top sample suitable for Insulin – send on ice – stable for 2h.	Separate serum and freeze immediately on receipt – samples should be separated within 4h of venepuncture. Haemolysed samples unsuitable for insulin – RBCs release enzymes that “chew up” insulin. Process glucose sample ASAP and record glucose result on form. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Endocrine Lab, RVH
Insulin Auto Antibodies	Blood	4mL	SST/Yellow Top		Separate and forward by first class post	SAS Peptide Hormone Section Clinical Laboratory Royal Surrey County Hospital Egerton Road Guildford GU2 7XX
Insulin-Like Growth Factor (IGF-1)	Blood	4mL	SST/Yellow Top	Send to lab immediately. (One sample will suffice for Growth Hormone and IGF)	Separate and freeze immediately on receipt. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Endocrine Lab, RVH
Insulin-Like Growth Factor Binding	Blood	4mL	SST/Yellow Top	Send to lab immediately. (One sample will suffice for	Separate and forward by first class post	SAS Peptide Hormone Section

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Protein 3				Growth Hormone and IGF)		Clinical Laboratory Royal Surrey County Hospital Egerton Road Guildford GU2 7XX
Iron (Fe)	Blood	4mL	SST/Yellow Top	For suspected Iron deficiency, measure Ferritin only. For suspected overload request Iron Profile. Heparin/Green Top also suitable.		
Iron Profile (Iron, Ferritin, TSat%)	Blood	4mL	SST/Yellow Top	Sample should be taken after overnight fast. Heparin/Green Top also suitable.		
Lactate	Blood	2mL	Sodium Fluoride/Grey Top	Samples should be sent to Lab at RT within 1h. Samples received >6h will not be processed. [Lactate levels in whole blood may increase by up to 20% six hours].	Separate plasma from cells upon receipt. Do not process samples >6h old.	
Lamotrigine (Lamictal)	Blood	6mL	Clotted/Red Top	Gel tube unsuitable. Sample just before next dose. TDM generally unnecessary for lamotrigine – may be useful for patients on multiple drug therapy.	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Toxicology Lab, RVH
Lanoxin				See Digoxin		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Largactil	Blood	6mL	Clotted/Red Top	Chlorpromazine – TDM not routinely performed	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Toxicology Lab, RVH
Laxative Screen	Urine	10mL	Lemon Top Sarstedt Monovette Urine Tube	Prior approval by Consultant required.		Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH
LDH (Lactate Dehydrogenase)	Blood	4mL	SST/Yellow Top			
LDH Iso-Electrophoresis	Blood	4mL	SST/Yellow Top		Separate. Dispatch – Store in fridge at reception. Lab van.	Protein Lab Belfast Link Labs
Lead Whole Blood	Blood	6mL	Royal Blue topped Griener Trace Metal Tube or EDTA/Purple Top	Royal Blue Tubes stored in R8 2mL Heparin/Green Top also suitable for paediatrics.	Do not separate. Dispatch – Store in fridge at reception. Lab van. See Aluminium - information from Regional Trace Metal Laboratory	Trace Metal Lab Belfast Link Labs
Lead - Urine	Urine - 24h Urine –	24h collection	Plain 24h Urine Bottle		No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a	Trace Metal Lab Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
	Random	10mL	Lemon Top Sarstedt Monovette Urine Tube		Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception.	
Leucocyte Lysosomal Enzymes	Blood	4mL	EDTA Purple Top	Needs to reach Willink lab within 72h.	Do not separate. Keep at RT. Dispatch – First Class Post	Willink Biochemical Genetics Unit, Manchester
Light Chains (Free)	Blood	4mL	SST/Yellow Top	May be requested on same sample as Protein electrophoresis		Altnagelvin
Lipase	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Biochemistry Lab, RVH
Lipid Profile	Blood	4mL	SST/Yellow Top	Specimen should be collected after an overnight fast.		
Lipoprotein Electrophoresis	Blood	4mL	EDTA Purple Top	Specimen should be collected after an overnight fast.	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Lipoprotein a Lp(a)	Blood	4mL	SST/Yellow Top		Separate. Dispatch – Store in fridge at reception. First Class Post	Dept. of Medical Biochemistry, University Hospital of Wales, Heath Park, Cardiff. CF14 4XW
Lithium	Blood	4mL	SST/Yellow Top	Take sample 12h after last dose.		
Liver Profile	Blood	4mL	SST/Yellow Top	ALP reference range is age related.		
Luteinising Hormone (LH)	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Endocrine Lab, RVH
Magnesium - Blood	Blood	4mL	SST/Yellow Top			
Magnesium - Urine, 24h	Urine - 24h	24h collection	Issued from Laboratory	24h bottle contains dilute HCl acid.	Measure and record volume on form and container. Take an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube.	
Magnesium - Urine, Random	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube	Interpretation dependant on serum magnesium and magnesium intake.		
Mast Cell Tryptase				See Anaphylaxis		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
MELAS Genetic testing	Urine-Early Morning	10mL	Universal Container	Patient should be Fasting from Midnight Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis and Stroke	Sample should be posted on day of collection – samples should be collected Mon-Wed.	Merseyside and Cheshire Regional Molecular Genetics Laboratory. Genetics Department Liverpool Women's NHS Foundation Trust Crown Street Liverpool L8 7SS
Mercury	Urine-Random Urine - 24h	10mL	Lemon Top Sarstedt Monovette Urine Tube Plain 24h Urine Bottle	METAL BEDPAN MUST NOT BE USED TO COLLECT URINE. (Random sample OK – 24h collection not necessary)	24h sample - No preservative required. Measure and record volume on form and container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Store in fridge at reception.	Trace Metal Lab, Belfast Link Labs
Methaemoglobin (MetHb) (MetHb - CoOx)	Blood	2mL 4mL	1mL Heparinised Syringe, capillary, microsampler or Heparin/Green Top	Needle must NOT be left on syringe, use syringe cap.		
Metanephrines - Paediatric	Urine - Random	15mL	Contact Laboratory	Sample must be collected into acid. (500uL of 40% HCl to 15 mL of urine) Replaces catecholamines.	Dispatch – Store in fridge at reception. Lab van.	Biochemistry Lab, RVH
Metanephrines - Urine	Urine - 24h	24h collection	Issued from Laboratory	24h bottle contains dilute HCl acid.	Preservative: 40mL 30% HCl. Measure and record volume on form and	Biochemistry Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
				Replaces catecholamines. Patients should avoid stimulants (e.g. coffee) and paracetamol on day of and day before test.	container. Send an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Verify that pH of aliquot is 3 or less otherwise it is unsuitable for analysis. Dispatch – Store in fridge at reception. Lab van.	
Methanol	Blood	4mL	SST/Yellow Top	BY SPECIAL ARRANGEMENT ONLY – Contact Dr Lynch or Dr O’Kane.	Samples usually require urgent transport – no need to separate – (Sample may remain in bag attached to form)	Toxicology Lab, RVH
Methotrexate	Blood	4mL	SST/Yellow Top	Samples should be taken at 24h intervals after high dose therapy until serum level is <0.1 umol/L – BLL must be contacted beforehand. Note GP samples require EP, LFT, CRP and FBC rather than actual Methotrexate levels – contact Dr Lynch or Dr O’Kane.	Separate. Dispatch – Store in fridge at reception. Lab van.	Belfast Link Labs
Methylmalonic Acid	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube		Dispatch – 1st class post.	Nutristasis Unit Centre for Haemostasis and Thrombosis
Methylmalonic Acid	Blood	4mL	EDTA Purple Top	Transport sample to lab on ice within 30 minutes. Inform Lab prior to venepuncture.	Separate immediately on receipt. Dispatch – 1st class post. PID - (worksheet MMA)	1st floor, North Wing St. Thomas' Hospital London

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
				Usually requested with Homocysteine following low B12 and Folate		SE17EH
Micronutrient Screen	Blood			See - Vitamin D, Selenium, Zinc, Copper, Vit A and E, Vit C, B12 and folate.		
Mitotane	Blood	4mL	EDTA Purple Top	Contact Alun Hutchings 02820716894	Separate immediately on receipt. Dispatch – 1st class post.	Toxicology Laboratory The Academic Centre, Llandough Hospital Penarth CF64 2XX
Muco polysaccharides (Glycosamino glycans - GAGS)	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube	Early morning sample required.	Store in fridge at reception. Lab van.	Childrens Biochemistry Lab, RVH
Myoglobin				No longer available. Serum CK offered in place. Rhabdomyolysis renal failure unlikely if CK <5000 U/L.		
Niacin (Vitamin B3)				Not routinely measured – See Dr Lynch or Dr O’Kane		
Occult Blood	Faeces	Send in Seracult Card		Should avoid red meat, dark fish, uncooked vegetables, Iron supplements and alcohol for 3 days before and during collection. Note: False positive rate is reported by manufacturer as		Altnagelvin

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
				1-2%		
Oestradiol	Blood	4mL	SST/Yellow Top	State menstrual phase on form. Gel tube unsuitable.	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Endocrine Lab, RVH
Oligoclonal Bands				See CSF Protein Electrophoresis		
Organic Acids	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube	Full clinical details required.	Store in fridge at reception. Lab van.	Childrens Biochemistry Lab, RVH
Orosomuroid				See Alpha-1-Acid Glycoprotein		
Osmolality, Serum, Plasma	Blood	4mL	SST/Yellow Top	Heparin/Green Top also suitable.		
Osmolality, Urine	Urine - Random	1 mL at least	Lemon Top Sarstedt Monovette Urine Tube	Appropriate urine osmolality depends on clinical status. Contact laboratory.		
Oxalate	Urine - 24h	24h collection	Issued from Laboratory – contain Thymol	See renal stone investigations	See renal stone investigations	Belfast Link Labs
Oxalate	Blood	4mL	EDTA Purple Top	Sample must be collected on ice and separated	Samples must be separated within 15mins of venipuncture. Separated	UCLH Special Chemistry

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
				immediately – within 15Mins	samples should be frozen ASAP. Store in –80°C freezer in Haematology. Send packed in pre frozen Biofreeze bottles and Dispatch – Courier – Dr Gill Rumsby, UCLH Special Chemistry, 3 rd floor, 60 Whitfield Street, London W1T 4EU	
Oxyhaemoglobin (OHb – CoOx)	Blood	2mL 4mL	1mL Heparinised Syringe, capillary, micro sampler or Heparin/Green Top	Needle must NOT be left on syringe, use syringe cap.	Sample should be analysed within 2h. Store at RT not on ice.	
Pancreatic Polypeptides				See Gut Hormone Profile		
Pancreolauryl Test				No longer done		
P-ANKA	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Immunology Lab, Belfast Link Labs
Paracetamol	Blood	4mL	SST/Yellow Top	Sample should be taken at least 4h after drug ingestion.		
Paraquat	Urine – Random	10mL	Lemon Top Sarstedt Monovette Urine	Analysis of urine is the first line screening test. If screening positive then	Samples may require urgent transport to Belfast – contact Dr Lynch or Dr O’Kane. Separate serum.	Toxicology Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
	Blood	4mL	Tube EDTA/Purple Top Heparin/Green Top	Blood sample (taken at least four h post ingestion) should be sent to Toxicology BLL – contact Dr Lynch or Dr O’Kane		
Peritoneal Dialysis Adequacy Peritoneal Equilibration Test (PET) Test Renal Adequacy Test (RAT)	Contact RAT Lab	Contact RAT Lab	Contact RAT Lab		Separate serum samples. Forward samples to PET/RAT Laboratory BCH	RAT Laboratory BCH
Parathyroid Hormone (Parahormone, PTH)	Blood	4mL	EDTA/Purple Top	A SST/Yellow Top should also be taken for simultaneous Bone profile.		
PTH Related Peptide PTHrP	Blood	4mL	Special Commercial protease inhibitor cocktail tubes.	Special Bottles – PTHrP Cocktail tubes – required – obtained from Norwich Lab and Stored in freezer 2. All requests should be brought to the attention of Dr O’Kane or Dr Lynch. Samples bottles should be placed on ice prior to collection and samples transported to lab ASAP (within 15 minutes).	Two samples collected - Samples must be separated within 15 of venepuncture using refrigerated centrifuge. Separated samples should be frozen ASAP. Store in –80°C freezer in Haematology. Send one sample packed in pre frozen Biofreeze bottles and keep other as a backup. Dispatch – Courier	Specimen Reception, Norfolk and Norwich University Hospitals NHS Foundation Trust, Laboratory Medicine, level 1 East Block, Colney Lane Norwich, NR4 7UY

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
						Tel 01603289419 (Dr Allison Chipchase – Supraregional Assay Service for Metabolic Bone – Prof Bill Fraser)
pH – Faecal (Reducing substances usually requested also)	Faeces	5g	Universal Container	Samples must be received within 1h of collection – any samples received over the 1h deadline or with no time indicated should be rejected - see CC/MO/2010/05/28	Samples should be frozen as soon as possible after receipt and forwarded frozen to Belfast.	Childrens Biochemistry Lab, RVH
pH- Blood				See Blood Gas Analysis		
Phenobarbitone	Blood	4mL	SST/Yellow Top	Take specimen immediately before next oral dose - trough		Altnagelvin
Phenytoin	Blood	4mL	SST/Yellow Top	Take specimen immediately before next oral dose - trough		
Phosphate - Urine, 24h	Urine - 24h	24h collection	Issued from Laboratory	24h bottle contains dilute HCl acid.	Measure and record volume on form and container. Take an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube.	
Phosphate - Urine, Random	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine	Serum and Random Urine Phosphate may be used to calculate renal tubular		Altnagelvin

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
			Tube	phosphate threshold.		
Phytanic and Pristic acids	Blood	4mL	EDTA/Purple Top	Refsum disease, RCDP and peroxisomal disorders	Needs to reach Willink lab within 72h. Whole blood or plasma may be sent. Dispatch – 1st Class Post.	Willink Biochemical Genetics Unit
PLAP (Placental Alkaline Phosphatase)	Blood	4mL	SST/Yellow Top	Tumour Marker	Separate. Store at RT. Dispatch – first class post. If primary sample is Red Top – separate and send aliquot.	Department of Medical Oncology Charing Cross Hospital Fulham Palace Road London W6 8RF
Pleural Fluid	Fluid	10mL 2mL	Lemon Top Sarstedt Monovette Urine Tube / Universal Container / heparinised syringe - for pH	See fluid analysis	Centrifuge Lemon Tops and Universal samples. Label RB30 tube for transfer from universal.	
Porphyria	Urine Blood Faeces	10mL 4mL 5g	Lemon Sarstedt Monovette Urine EDTA/Purple Top Universal Container	All samples should be light protected. If the clinical suspicion of porphyria is high, please contact Dr O'Kane or Dr Lynch as first line tests may on occasion give negative results.	Urine PBG and Total Urinary Porphyrins are performed in Altnagelvin. Porphyria typing samples (blood, urine and faeces) should be sent to Cardiff by First Class Post	Medical Biochemistry, Cardiff.
Procalcitonin	Blood	4mL	Heparin/Green Top		Samples should be separated and sent refrigerated. If delay in transport freeze until dispatch.	Clinical Chemistry Laboratory Addenbrookes

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					Dispatch – Post	Hospital Cambridge
Procollagen 3	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venipuncture should be separated and stored at 4oC until transport to Belfast the next day. Samples received the day after venepuncture or on Fri or Sat should be separated and frozen until transport to Belfast frozen. Dispatch - Lab van.	Biochemistry Lab, RVH
Progesterone	Blood	4mL	SST/Yellow Top	No longer included in Hormone Profile	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast	Endocrine Lab, RVH
Proinsulin	Blood	6mL	Clotted/Red Top	Send to lab immediately – sample should be separated within 4h. [Insulin measured on same sample]	Separate and freeze immediately on receipt. Transport on pre frozen Biofreeze bottles required.	SAS Peptide Hormones Section, Royal Surrey County Hospital, Clinical Laboratory Level B, Egerton Road, Guilford GU27XX
Prolactin	Blood	4mL	SST/Yellow Top	Levels up to 1000 mU/L can be induced by stress. Contact	Mon to Thurs: Samples received on same day as venepuncture may be	Endocrine Lab, RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
				RVH ext 3180	stored unseparated at RT and sent to Belfast next day (Sample may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast	
Protein – Random Urine	Urine	10 mL	Lemon Top Sarstedt Monovette Urine Tube		Analyse for PCR	
Protein – 24h Urine	Urine	24h collection	Plain 24h Urine Bottle		Measure and record volume on form and container. Take an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube.	
Protein Electrophoresis	Blood	4mL	SST/Yellow Top			Altnagelvin
PSA - Prostate Specific Antigen	Blood	4mL	SST/Yellow Top	Results in the range 4 -10 ug/L are inconclusive. Samples for Free PSA are unstable.	Total PSA: Samples should be either run, spun (yellow topped) or separated (Red topped] on the day of receipt. Following serum separation: Samples that are going to be run that day should be stored at RT. Samples that are not going to be run that day should be stored at 4-8°C. Free PSA: Unseparated samples are stable for only 2h at RT. Samples should be separated ASAP. Following serum separation: Samples that are going to be run that	Free PSA samples sent to Endocrine laboratory in Belfast

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					day must be analysed immediately or stored at 4-8°C. Samples that are not going to be run that day should be stored at -20°C.	
Pterins and DHPR	Blood	5 filled circles	Dried Blood Spot Card	Phenylalanine at time of sampling must be >200umol/L in order to interpret results. DHPR – Dihydropteridine reductase	First Class Post	Newborn Screening and Biochemical Genetics Department West Midlands Regional Laboratory for Newborn Screening and Inherited Metabolic Disorders
Pyruvate	Blood	1mL	Contact Lab, special bottle required – 1:1 mix with 7% perchloric acid.	Not generally required. Lactate alone usually sufficient. See CC/CP/027	Store in fridge at reception. Lab van. Samples received on Fri or Sat should be separated and frozen prior to Lab van transport to Belfast.	Childrens Biochemistry Lab, RVH
Reducing Substances - Faeces	Faeces	1g	Universal container	Samples must be received within 1h of collection – any samples received over the 1h deadline or with no time indicated should be rejected - see CC/MO/2010/05/28	Samples should be frozen as soon as possible after receipt and forwarded frozen to Belfast.	Childrens Biochemistry Lab, RVH
Reducing Substances - Urine	Urine - Random	10mL	Lemon Top Sarstedt Monovette Urine Tube	Send to lab immediately.	Store in fridge at reception. Lab van.	Royal Belfast Hosp Sick Children
Renal Stones				See Calculi Analysis		

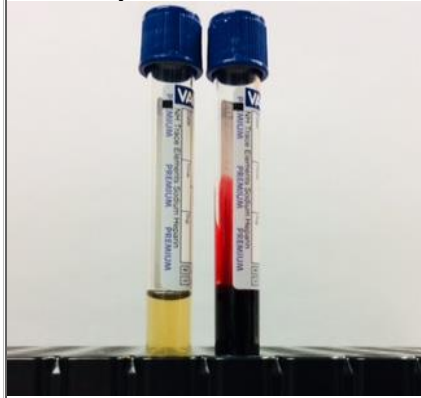
This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Renal Stone Investigations	Urine - 24h	24h collection x 2	24h urine container with Thymol Issued from Laboratory	Two 24h urine collections required: Collected at least one week apart [Thymol] See – CC/CP/017	a) Thymol containing 24h collection: Measure and record volume on form and container. Send entire 24hr collection to BLL Store at RT – do not refrigerate or freeze b) Random am urine: Process for pH (record pH result on request form). Refer sample to BLL for cystine screen. Store in fridge at reception. Dispatch – Lab van.	Belfast Link Labs
	Urine Random – early am	10mL	Lemon Top Sarstedt Monovette Urine Tube	Random am urine for pH and cystine screen – bottle should be filled to top to avoid air.		
Renin	Blood	4mL	EDTA/Purple Top	For patient preparation see CC/CP/016. EDTA sample bottle must be filled completely to mark and transported to lab within 3h. Note – samples should NOT be sent on ice	Separate and freeze immediately on receipt using the -70°C freezer – rapid freezing required due to cryoactivation at 2-8°C. – NB Clearly label. Once frozen in -70°C freezer sample may be stored / transferred to freezer at reception. Send sample frozen. [SWAH- use -20°C freezer] Dispatch – Lab van.	Endocrine Lab, RVH
Salicylate	Blood	4mL	SST/Yellow Top			
Secretin				See Gut Hormone Profile		
Selectivity of Proteinuria	Blood	4mL	SST/Yellow Top	Send urine and blood samples together.	Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Samples may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at	Protein Lab, Belfast Link Labs
	Urine - Random	10mL	Lemon Top Monovette Urine Tube			

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					4°C prior to Lab van transport to Belfast.	
Selenium - Plasma	Blood	6mL	<div style="background-color: blue; color: black; width: 100px; height: 1em; display: inline-block;"></div> Royal Blue topped Griener Trace Metal Tube	Royal Blue Tubes stored in R8	<p>Samples for plasma trace metals [Copper, Zinc, Selenium] should be separated as soon as possible after blood drawing. If they cannot be separated immediately, they should be refrigerated and separated within eight hours.</p> <p>Note: When separating plasma trace metals – use a <div style="background-color: blue; color: black; width: 100px; height: 1em; display: inline-block;"></div> Royal Blue topped Griener Trace Metal Tube as the secondary tube – NB write PID details on secondary bottle.</p>  <p>Note: Dispatch – Store in fridge at reception. Lab van. See Aluminium - information from Regional Trace Metal Laboratory</p>	Trace Metal Lab Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Sirolimus	Blood	4mL	EDTA/Purple Top	Take sample before next dose. State if on combination or mono therapy.	Store at RT Dispatch – Lab van.	Regional Toxicology Lab
Soluble CD25	Blood	4mL	SST/Yellow Top	Referred on via Regional Immunology	Separate and store at 4°C	Regional Immunology Lab
Soluble Transferrin Receptor	Blood	4mL	SST/Yellow Top		Separate and store at 4°C Dispatch – First Class Post.	Department of Clinical Chemistry, King's College Hospital, London, SE5 9RS
Steroid Profile	Urine - 24h	24h collection	Plain Bottle	Contact Name in Kings college – Dr N Taylor – Norman.taylor@kcl.ac.uk Relevant clinical details to be included – contact Dr Lynch or Dr O’Kane	Measure and record volume on form and container. Take an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Dispatch – first class post.	Department of Clinical Biochemistry, King's College Hospital London SE5 9RS
Sulphonylurea	Blood	4mL	SST/Yellow Top	All requests to brought to the attention of Dr Lynch or Dr O’Kane.	Separate upon receipt. Dispatch – first class post	SAS Peptide Hormone Section, Clinical Lab, Royal Surrey County Hospital, Egerton Rd, Guildford, Surrey, GU2 7XX
Sweat Test		Contact Lab		See CC/SI/024		Altnagelvin
Tacrolimus (FK 506)	Blood	4mL	EDTA/Purple Top		Do not separate. Store in fridge at reception. Dispatch - Lab van.	Kelvin Building RVH

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Testosterone	Blood	4mL	SST/Yellow Top		Mon to Thurs: Samples received on same day as venepuncture may be stored unseparated at RT and sent to Belfast next day (Samples may remain in bag attached to form) Samples received the day after venepuncture or on Fri or Sat should be separated and stored at 4°C prior to Lab van transport to Belfast.	Endocrine Lab, RVH
Theophylline Aminophylline, Nuelin	Blood	4mL	SST/Yellow Top	Measure 5 days after starting oral treatment and at least 3 days after any dose adjustment. A blood sample should usually be taken 4–6 hours after an oral dose of a modified-release preparation. Trough levels should be taken immediately before next oral dose. If aminophylline is given intravenously, a blood sample should be taken 4–6 hours after starting treatment.		
Thiamine - Vitamin B1			Heparin/Green Top	Not available routinely – contact Dr Lynch or Dr O’Kane. See www.Assayfinder.com	Do not separate. Dispatch – first class post	Department of Clinical Biochemistry Macewen Building Glasgow Royal Infirmary Glasgow G4 0SF

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Thiopurine Methyl Transferase (TPMT)	Blood	4mL	EDTA/Purple Top	Results are recorded in Lab computer. RECENT BLOOD TRANSFUSIONS MAY MASK A DEFICIENT TPMT RESULT. New activity assay in use from 01/08/10 – change in units and reference range	Do not separate. Check that there has been no previous requests – see CC/MO/2010/07/23. PID - (worksheet TPMT) using an urgent accession number. See - CC/SPEC/024. Dispatch – first class post.	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH
Thiopurine Metabolites 6TGN (6-thioguanine nucleotide) and 6MMPN (6-methylmercaptopurine nucleotide)	Blood	4mL	EDTA/Purple Top	Minimum 0.5mL required. For monitoring immunosuppressive effect of thiopurine drugs	Do not separate. Do not freeze sample. Dispatch – first class post.	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH
Thyroglobulin	Blood	4mL	SST/Yellow Top Clotted/Red Top	Haemolysis invalidates result	Mon to Thurs: Samples received on same day as venipuncture should be separated and stored at 4oC until transport to Belfast the next day. Samples received the day after venepuncture or on Fri or Sat should be separated and frozen until transport to Belfast frozen. Dispatch - Lab van.	Endocrine Lab, RVH
Thyroid Antibody TPO - Thyroid Peroxidase Antibody	Blood	4mL	SST/Yellow Top		No need to separate. Store at RT Dispatch - Lab van.	Belfast Link Labs Clinical Chemistry
Thyroid Antibody TSHR – TSH	Blood	4mL	SST/Yellow Top		PID - (worksheet TSHR) using an urgent accession number. See - CC/SPEC/024.	PRU Sheffield

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Receptor Antibody					Dispatch – first class post.	
Thyroid Profile FT4 + TSH (+ FT3)	Blood	4mL	SST/Yellow Top			
Thyroid Profile – Alternative assay FT4 + TSH (+ FT3)	Blood	4mL	SST/Yellow Top	To check for possible assay interference – Analysed on Abbott Architect	PID - (worksheet THPA) See - CC/SPEC/024. Dispatch – first class post.	Edinburgh Laboratory Medicine
Trace metals				See individual metals.		
Transferrin	Blood	4mL	SST/Yellow Top	Offered as part of Iron Profile Heparin/Green Top also suitable.		Altnagelvin
Transferrin Glycoform Analysis	Blood	4mL	SST/Yellow Top or Heparin/Green Top	For investigation of congenital disorders of glycosylation – not suitable for alcohol abuse. See www.assayfinder.com	Separate. Dispatch – first class post.	Neuroimmunology & CSF Lab, Rm 917, Institute of Neurology, Queen Sq, London WC1N 3BG
Trimethylamine (Fish odour syndrome)	Urine - Random	10mL	Lemon Top Monovette Urine Tube		Acidify to pH 1 dropwise with conc HCl upon receipt. Store in fridge at reception. Dispatch - Lab van. Note – samples should be acidified ASAP (within 1h) after collection Note samples may be sent to Children's Lab in Sheffield – if specifically requested (All samples on Miss Ellen Mason 340 283 6599	Childrens Biochemistry, RVH Or Sheffield Children's Laboratory
Troponin T	Blood	4mL	SST/Yellow Top	Heparin/Green Top tube also suitable – serial samples should be same sample type		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
TSH Binding Inhibitor Immunoglobulin (TBII)	Blood	6mL	Clotted/Red Top	If on neonate, samples required from mother also.	Separate. DO NOT FREEZE. Store at RT. Dispatch – first class post.	SAS Lab, RVI, Newcastle
TSH Receptor Antibody	Blood	4mL	SST/Yellow Top		Separate. Store at RT. Dispatch – first class post. If primary sample is Red Top – separate and send aliquot.	Protein Reference laboratory. Sheffield Teaching Hospital NHS Trust PO Box 894 SheffieldS5 7YT
Urate, Blood	Blood	4mL	SST/Yellow Top	In gout the target Uric Acid level is < 360 umol/L.	Samples from patients on Rasburicase should be collected in Heparin/Green Top and sent to lab on ice up to 4-5 days after last dose (1/2 life 18h).	
Urate, Urine	Urine - 24h	24h collection	Issued from Laboratory	24h bottle contains dilute NaOH.	Measure and record volume on form and container. Take an aliquot of 24h specimen in a Lemon Sarstedt Monovette Urine Tube. Check pH.	
Valproic Acid Sodium Valproate, Epilim	Blood	4mL	SST/Yellow Top	Only of value in assessing compliance -- there is no well defined therapeutic or toxic range.		Altnagelvin
Vancomycin	Blood	4mL	SST/Yellow Top	Samples should be clearly marked as Trough or Peak. Pink Paediatric EDTA tubes and Heparin/Green Tops also suitable.	Trough Pided as VANT Peak Pided as VANP Random/Unknown VANR	Altnagelvin
Varicella zoster virus (Chickenpox)	Blood	4mL	SST/Yellow Top	Serology IgG Immunity 10 day window after exposure to treat pregnant patient	Separate. Store at RT. Dispatch - Lab van.	Regional virus lab

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
Vasoactive Intestinal Peptide (VIP)				See Gut Hormone Profile		
Vasopressin (Arginine Vasopressin AVP)				Replaced by Copeptin		
Vitamin A	Blood	4mL	SST/Yellow Top	Analysed with Vit E. Send in envelope to shield from light.	Separate and store in brown envelope at 4°C until dispatch by Lab van. Samples received on Fri or Sat should be separated and frozen prior to Lab van transport to Belfast.	Biochemistry Lab, RVH
Vitamin B1				See Thiamine		
Vitamin B3 (Niacin)				Not routinely measured – See Dr Lynch or Dr O’Kane		
Vitamin B12	Blood	4mL	SST/Yellow Top	See Folate	See Folate	
Vitamin C	Blood	4mL	Heparin/Green Top	Contact laboratory in advance. Specimen must be transported to lab on ice within 60 mins. EDTA/Purple Top not suitable.	Separate and freeze immediately on receipt. Store in freezer at reception. Send sample frozen. Dispatch – Lab van.	Biochemistry Lab, RVH
Vitamin D (25 OH Vitamin D)	Blood	4mL	SST/Yellow Top	Contact laboratory in advance. Specimen must be transported to the laboratory within 3h. Current assay measures 25 OH D2 and D3.	Mon to Thurs: Samples received on same day as venipuncture should be separated and stored at 4°C until transport to Belfast the next day. Samples received the day after venepuncture or on Fri or Sat should be separated and frozen until transport to	Endocrine Lab, RVH

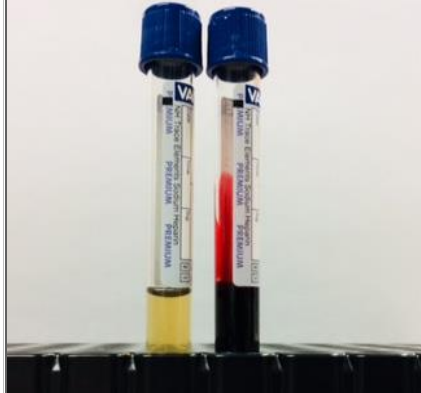
This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					Belfast frozen. Dispatch - Lab van.	
1,25 Vitamin D (1,25 OH Vitamin D)	Blood	4mL	SST/Yellow Top	Contact laboratory in advance. Specimen must be transported to the laboratory within 3h.	Separate immediately. Store in fridge. First Class post	Specialist Assay Lab, 2 nd floor CSB3 Central Manchester University Hospitals
Vitamin E	Blood	4mL	SST/Yellow Top	Analysed with vitamin A. Send in envelope to shield from light.	Separate and store in brown envelope at 4°C until dispatch by Lab van. Samples received on Fri or Sat should be separated and frozen prior to Lab van transport to Belfast.	Biochemistry Lab, RVH
Xanthine	Urine (early morning)	10mL	Lemon Top Sarstedt Monovette Urine Tube	Used to monitor patients with Lesch-Nyhnann Syndrome	A few crystals of thymol should be added to urine upon receipt. Dispatch – First Class Post	Purine Research Laboratory St Thomas' Hospital
Zarontin				See Ethosuximide		
Zinc – Plasma	Blood	6mL	Blue topped Griener Trace Metal	Royal Blue Tubes stored in R8 Heparin/Green Top not suitable – contaminated with zinc.	Samples for plasma trace metals [Copper, Zinc, Selenium] should be separated as soon as possible after blood drawing. If they cannot be separated immediately, they should be refrigerated and separated within eight hours. Note: When separating plasma trace metals – use a Blue topped Griener Trace Metal Tube as the secondary tube – NB write PID details on secondary bottle.	Trace Metal Lab Belfast Link Labs

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Test	Sample	Volume	Container	Comments	Handling and dispatch	Send to
					 <p>Note: Dispatch – Store in fridge at reception. Lab van. See Aluminium - information from Regional Trace Metal Laboratory</p>	

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



Investigation of Leucoencephalopathy on MRI in Adults


Disorder	Test	Bottle	
Adrenoleucodystrophy	C 26/22	4mL EDTA	Willink, Manchester
Krabbe Disease	Galactocerebrosidase β -galactosidase	4mL EDTA	Willink, Manchester
Homocystinuria	Homocysteine	4mL EDTA and plain urine	Willink, Manchester On ice 30mins
Cerebrotendinous xanthomatosis	Cholestanol	4mL EDTA	Children's Sheffield
Refsum disease	Phytanic Acid	4mL EDTA	Willink, Manchester
α/β Mannosidosis	α/β Mannosidase	4mL EDTA	Willink, Manchester
Metachromatic leucodystrophy	Arylsulphatase A	4mL EDTA	Willink, Manchester
Gangliosidosis GM1	Galactocerebrosidase	4mL EDTA	Willink, Manchester
Gangliosidosis GM2	Galactosidase	4mL EDTA	Willink, Manchester
Sandhoff disease	Hexaminidase A and B	4mL EDTA	Willink, Manchester
Gaucher disease	B-glucosidase	4mL EDTA	Willink, Manchester
Fabry disease	Galactosidase A	4mL EDTA	Willink, Manchester
Niemann-Pick disease (A and B)	Sphingomyelinase	4mL EDTA	Willink, Manchester

Willink Laboratory perform a Lysosomal Screen - The minimum sample required is **5ml** of whole blood in an EDTA specimen tube. Post specimens early in the week to avoid samples being delayed over the weekend. All relevant clinical information should be provided with the sample.

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.




Referral laboratories

Belfast City Hospital Clinical Biochemistry	Gardner Robb Building Lisburn Rd Belfast BT9 7AD	Hospital no: General enquires:	02890 329241 Ext 3096/2926/3628
Department of Medical Genetics	Lisburn Rd Belfast BT9 7AD	Clinical advice (normal hrs) “ (outside normal hrs)	Ext 3497/3136/3160 Ext 3216
Royal Group of Hospitals Clinical Biochemistry	Kelvin Building Grosvenor Rd Belfast BT12 6BA	Hospital no: Enquires (normal hrs) General Biochemistry Endocrine Biochemistry  BS-1 External labs-Endocrine Specin Paediatric Biochemistry Neonatal Screening Regional Regulatory Peptide Regional Toxicology	02890 240503 Prefix ext with 02890 63xxxx – Direct dial Ext 3798 Ext 3180 Ext 2148/3064 Ext 4043 Ext 2533 02890631906 (lab) 02890633164 (office) Ext 4714 Ext 3230 Ext 2148/3064 Ext 4043 Ext 2515/2737
Immunology, RVH	Regional Immunology Service	Clinical advice (normal hrs) General Biochemistry Endocrine Biochemistry Paediatric Biochemistry Neonatal Screening Regional Regulatory Peptide	Contact Medical doctor on call via lab or switchboard. Ext 2689

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



	Kelvin Building Grosvenor Rd Belfast BT12 6BA	Clinical advice (outside normal hrs)  REGULATORY PEPTIDE LAB JAN 20	
Musgrave Park Hosp	20 Stockman's Lane Belfast BT9 7JB		Tel: 02890 902000
Oncology Charing Cross Hosp	Fulham Palace Road London W6 8RF		Tel: 0208 8461415
King's College Toxicology Unit	Toxicology Unit, Top Floor, Bessemer Wing, King's College Hospital, Denmark Hill, London SE59RS		Dr Kishor Raja Tel: 02032993008 / 02302995882
Selly Oak Hospital	Dept of Clinical Biochemistry Selly Oak Hospital Raddlebarn Rd Birmingham B29 6JD		
Sheffield Childrens	Dept of Clinical Chemistry & Newborn Screening Sheffield Childrens NHS Trust Western bank Sheffield S10 2TH		
Southmead Hospital	Southmead Hospital Bristol BS10 5NB		Cholinesterase Lab - 01173234909
Willink Biochemical Genetics Unit	6 th Floor, POD 1, St Mary's Hospital, Oxford Road, Manchester M13 9WL		
Birmingham City Hospital	Department of Clinical Biochemistry, City Hospital, Dudley Rd, Birmingham, B18 7QH		

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.



SAS Laboratory Dept of Clinical Biochemistry	Royal Victoria Infirmary Newcastle Upon Tyne NE1 4LP	Tel: 0191 2824559 Fax: 0191 2820381
Harefield Hospital	Harefield Hospital Hillend Rd Harefield Middlesex UB9 6JH	
Freeman Hospital	Dept Of Clinical Chemistry Freeman Hospital High Heaton Newcastle Upon Tyne NE7 7DN	
Cardiff Porphyria Service	Department of Medical Biochemistry & Immunology University Hospital of Wales Heath Park Cardiff CF14 4XW	Tel: 029 2074 3565
Purine Research Laboratory, Biochemical Sciences, GSTS	Dr Lynette Fairbanks / Dr Tony Marinaki Purine Research Laboratory 4th Floor, North Wing St Thomas' Hospital Lambeth Palace Road London SE1 7EH	Tel: 0207 188 1266 / 0207 188 1265
Supraregional Assay Service for Metabolic Bone	Specimen Reception, Norfolk and Norwich University Hospitals NHS Foundation Trust, Laboratory Medicine, level 1 East Block, Colney Lane Norwich, NR4 7UY	Prof Bill Fraser Dr Allison Chipchase Tel 01603289419

This is a controlled document if printed on green paper and stamped active, it must not be copied or distributed without authorisation. A record of the revision and approval of this document can be found on Q-Pulse.