BON SECOURS HEALTH SYSTEM

BON SECOURS HOSPITAL CORK

LABORATORY MANUAL

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1.0 INTRODUCTION

1.1 This manual is designed to give an overall view of the services available in the Pathology Department. It is intended as a quick reference guide for all Pathology users.

1.2 All Pathology services undergo continuous review through quality assurance and audit activities. The laboratory is committed to performing its activities in accordance with the requirements of the following regulations and standards:-

- The current version of the International Standard ISO 15189 titled “Medical Laboratories Particular Requirements for Quality and Competency”.
- The current version of the International Standard ISO 22870 titled "Point of Care Testing (POCT) – Requirements for Quality and Competence".
- Regulations and Statutory Instruments current versions including those relevant to Haemovigilance and Traceability, Infectious diseases, Safety and welfare at work, Data protection, Carriage of Dangerous goods and In vitro Diagnostic Medical devices. Current versions of regulations and statutory instruments are available in Q-Pulse”.

1.3 **This manual is intended for users of the Pathology Services both within the hospital, and those from outside agencies.**

1.4 Laboratory management are committed to:-

- ensuring staff are familiar with this policy and all other policies and procedures.
- seeking and acting on feedback from users of Laboratory Manual.
- staff recruitment, training, development and retention at all levels to provide a full and effective service to its users.
- the proper procurement and maintenance of such equipment and other resources as are needed for the provision of the service.
- the collection, transport and handling of all specimens in such a way as to ensure the correct performance of laboratory examinations.
- the use of accredited examination procedures and methods that will ensure the highest achievable quality of all tests performed.
- reporting results of examinations in ways which are timely, confidential, accurate and clinically useful.
- the assessment of user satisfaction, in addition to internal audit and external quality assessment, in order to produce continual quality improvement.
- the safe testing, distribution and transfusion of blood/ blood components.
- the operation and control of an effective point of care/ near patient testing service.
- having procedures in place to treat patients and samples with due care and with respect when samples are being processed within the laboratory.

2.0 GUIDE TO USING THIS MANUAL

2.1 For internal users an **electronic version** of the manual is stored on the intranet. The document is stored in Adobe Acrobat format, which allows all computer users to read the document while preventing modification. Instructions on how to use the electronic version of the manual has been issued to Clinical Nurse Managers who have posted laminated instructions at workstations. Training programmes are in place to ensure all new clinical personnel are trained on the use of this manual. It is the responsibility of Clinical Nurse Managers to ensure that all staff are familiar with accessing the document. An e-mail is sent to all staff informing of an update to the manual and a list of changes. The manual is also accessable on the Bon Secours Website www.bonsecours.ie under Cork in the Pathology Section.

2.2 The laboratory tests and profiles you require information on can be located in the manual under sections 9 to 15 traceable to the department where the tests are performed.

3.0 GENERAL INFORMATION

3.1 Location of the Pathology Department

The Laboratory is located within the permanent facility of the Hospital grounds.

Please refer to the Bon Secours Health System website for parking information. Please click here to access website. If you need assistance, please contact security personnel who will assist you. Please note there are 2 designated parking spaces at the front of the Hospital for patients attending Phlebotomy. Please enter via the main door and follow signs for Blood Testing.

3.2 Pathology Department Opening Times

Department/activity	Opening Hours
Pathology Reception	Monday to Friday 9.00am - 5.00pm
Phlebotomy Out-patient Service (By appointment only)	Monday to Thursday 8.00am - 4.15pm Friday 8.00am – 2.00pm
Phlebotomy In-patient Service	Monday to Friday from 7.00am - 4.30pm Saturday from 7.00am - 11.00am
Specimen Reception	Monday - Friday from 7.00am - 5.45pm Saturday 8.30am - 12.30pm
Routine Laboratory Blood (Biochemistry, Haematology, Blood Bank and Immunology)	Monday to Friday 7.00am – 6.00pm Saturday from 9.00am - 12.45pm
Routine Laboratory Microbiology	Monday to Friday 8.00am – 6.00pm Saturday from 9.15am - 12.45pm
Routine Laboratory Histopathology Service	Monday to Friday 8.00am – 6.00pm Saturday from 9.15am - 12.45pm
Emergency out of hours service (on call diagnostic service)	Monday to Friday, 6.00pm – 8.00am Saturday 12.45pm - Monday 8.00am Bank Holidays (24 Hours)

3.3 Availability of Clinical and Scientific Advice

3.3.1 Where **Medical and Scientific advice is required** on medical indications, appropriate selection of available testing procedures and queries with respect to Pathology test results, the Pathology Department welcomes your queries. For **telephone queries** use the provided listing.

Department	Phone extension inside the Hospital	Phoning from outside the hospital
PATHOLOGY RECEPTION	1717	021-4801717
PHLEBOTOMY **Head of Department – Natacha Rodrigues**	1733	021-4801733
PATHOLOGY OFFICE **Head of Department – Amanda Long**	1720 2197	021-4542005 021-4801720 021-4802197
SPECIMEN RECEPTION **Head of Department – Louise Linehan**	1781 2261	021-4801781 021-4802261
HAEMATOLOGY **Chief Medical Scientist – Sarah O'Keeffe** **Consultant Haematologist – Dr. Eileen Kelleher** **Consultant Haematologist – Dr. Susan O'Shea** **Consultant Haematologist – Dr. Khalil Alnajjar**	1722 2264 1720 Pathology Office (Monday to Friday 9.15am – 5.30pm)	021-4801722 021-4802264 021-4801720 021-4545899 (Cork Clinic)
BLOOD BANK **Chief Medical Scientist – Clare Stone** **Consultant Haematologist – Dr. Eileen Kelleher** **Consultant Haematologist – Dr. Susan O'Shea** **Consultant Haematologist – Dr. Khalil Alnajjar**	1721 1721 1720 Pathology Office (Monday to Friday 9.15am – 5.30pm)	021-4801721 021-4801720 021-4545899 (Cork Clinic)
HAEMOVIGILANCE **Haemovigilance Officers – Mary O'Sullivan and Fiona A. Murphy**	1659	021-4801659 085-2540151
HISTOPATHOLOGY including Diagnostic Cytology **Chief Medical Scientist – Sandra Murphy** **Consultant Pathologist – Dr. Paul Ryan** **Consultant Pathologist – Dr. Aoife McCarthy**	1727 1665 1967 1723	021-4801727 021-4801665 021-4941967 086-6777487 021-4801723

Department	Phone extension inside the Hospital	Phoning from outside the hospital
Consultant Pathologist – Dr. Triona Hayes	1724	021-4801724
Consultant Pathologist – Dr. Adeline Chelliah	1931	021-4941931
Consultant Pathologist – Dr. Juan Pinto	1152	021-4861152
Consultant Pathologist – Dr. Adeyemi Idowu	1147	021-4861147
IMMUNOLOGY		
Senior Medical Scientist – Danny Brazil	1997	021-4941997
Consultant Immunologist – Prof. Conleth Feighery	N/A	087-9969041
BIOCHEMISTRY	1725	021-4801725
Chief Medical Scientist – Emma Herbert	1726	021-4801726
Chemical Pathologist – Dr. Mike Louw	N/A	086-8254528
MICROBIOLOGY	1730/ 1731	021-4801730 021-4801731
Chief Medical Scientist – Theresa Cunningham	1948	021-4941948 021-4941948
Consultant Microbiologist – Dr. Olive Murphy	1759	021-4801759 086-0121136
Consultant Microbiologist – Dr. Marianne Fraher	1759	021-4801759 086-0121136
Consultant Microbiologist – Dr. Deirdre O'Brien	1950	021-4801950 086-0121136
LABORATORY SERVICES MANAGER – Mary Kelly	1748	021-4801748
LABORATORY INFORMATION SYSTEM MANAGER – Miriam O'Donovan, Janet Sharkey	1729	021-4801729
QUALITY ASSURANCE – Berna Murray	1960	021-4941960
POINT OF CARE/ NEAR PATIENT MANAGER – Nicola Goulding	2240	021-4542807

3.3.2 List of Contacts for Out of Hours Service

The first point of contact out of hours is Hospital Reception 021 4801602.

CONTACT	TELEPHONE NUMBER
Laboratory Consultant Pathologists	Number available at Hospital Reception
Laboratory Services Manager	Number available at Hospital Reception
Chief Medical Scientists	Number available at Hospital Reception
Hospital Scientific Staff	Number available at Hospital Reception
Irish Blood Transfusion Service Scientific Staff (24 hours)	021 4807400
Irish Blood Transfusion Service Crossmatch	021 4807418
Irish Blood Transfusion Service Despatch	021 4807419
Irish Blood Transfusion Service Medical Officers	021 4807400
Irish Blood Transfusion Service (Dr. Sorcha Ní Loingsigh) Consultant Haematologist	021 4807400

3.3.3 Contacting Internal Bon Secours Laboratory Staff with an Urgent Request for Blood Out of Hours

3.3.3.1 Contact main reception and inform them that you require to speak with the on–call Blood Bank Laboratory staff. You must state that this request is urgent.

3.3.3.2 When the Laboratory staff makes contact with the nurse, the following details must be given:-

- Ward/ Location making the request
- The urgency of the request
- The patients details i.e. patient's name
- Proposed movement of the patient i.e. if the patient is to be relocated to perhaps Theatre or CCU
- The blood components/ tests requested
- State, if known, whether a blood sample for group and screen has already been reserved

3.3.3.3 "Emergency Stock" of group O Rh Negative Blood is always available in the Blood Bank refrigerator. It is the Consultant's decision to use the emergency stock or if it is safe to wait for the arrival of the Laboratory staff and the processing of the samples.

3.4 Bon Secours Hospital Website and Telephone Number

Website: www.bonsecours.ie
Phone No.: 021- 4542807 (General Hospital Number)

3.5 Laboratory Fees

A list of Pathology charges is available on request from the Laboratory Services Manager.

3.6 Staffing

The Pathology department team consists of:-

- Laboratory Services Manager
- Clinical Directorate
- Consultant Pathologists
- Consultant Chemical Pathologist
- Consultant Microbiologists
- Consultant Haematologists
- Consultant Immunologist
- Scientific/ Non Scientific Heads of Department
- Laboratory Scientific Staff
- Support Services
  - Cleaning Contractors
  - Information Technology
  - Phlebotomy
  - Secretarial
  - Lab Quality Assurance
  - Facilities Management
  - Specimen Reception
  - Validation Technician
  - Haemovigilance Officer
  - Point of Care Nurse Specialists
  - Point of Care/ Near Patient Manager
  - Quality, Safety and Risk Dept.

3.7 Accreditation Status

a. The Laboratory is accredited as a medical testing Laboratory to the International Standard ISO 15189, registration number 153MT (with the exception of Anti-Neutrophil Cytoplasmic Antibody (ANCA), Anti-Nuclear Antibody (ANA), Centromere, DNA Antibodies, Endomysial Antibodies IgA, Endomysial Antibodies IgG, Gastric Parietal Cell Antibodies, LKM Antibodies (Liver Kidney Microsomal Antibody), Mitochondrial Antibodies, Smooth Muscle Antibodies, Carba R Assay for CRE, ESBL, VRE, Syphilis RPR, Syphilis TPPA, all Chemical Pathology and Infectious Serology tests run and reported from the Abbott Alinity platforms.
Please refer to www.inab.ie.

b. The Laboratory services are accredited by JCI (Joint Commission International) as part of the overall Hospital accreditation process.

c. The Laboratory has been accredited as a training Laboratory by the Joint Committee for Biomedical Sciences for the in-service year for Medical Laboratory Scientist students.

4.0 LABORATORY REQUEST FORMS, SPECIMEN BOTTLES AND CONTAINERS

4.1 General Information

This section deals with the **information** that is required to be documented on the laboratory **request form** and the **specimen bottle** or container, prior to the analyses of samples.
The laboratory has a number of different request forms. These are used for different Pathology analyses as outlined below. It is **important** that the correct form is supplied for a particular test.

1. **Bon Secours Hospital General Laboratory Request Form (PL001)** is used for most Biochemistry, Haematology and Immunology blood tests

2. **Bon Secours Hospital Microbiology Form (PL002)** is used for Urines, Swabs, Sputum, Blood Cultures and Faeces

3. **Bon Secours Hospital Blood Transfusion Form (PL003)** is used for transfusion requests

4. **Bon Secours Hospital Allergy Request Form (PL006)**

5. **Bon Secours Hospital Histopathology Request Form – Breast Biopsy (PL007)**

6. **Bon Secours Hospital Virology Request Form (PL009)**

7. **Bon Secours Hospital Histopathology Request Form** is used for Histopathology specimens **(Form no. 425)**

8. **Bon Secours Hospital Mantoux Form** (reference BSC/PHLE/SOP/009 Att. 7.1)

9. **Bon Secours Hospital CSF Request Form (PL012)**

10. **Inpatient Respiratory Investigations Request Form (PL015)**

12. **Bon Secours Hospital Test Request Form for UPMC Hillman Cancer Centre (PL017)**

13. **Bon Secours Hospital Pleural Fluid Request Form (PL019)**

14. **Bon Secours Hospital Haematology – Bone Marrow Clinic Request Form (PL021)**

Note: Specific request forms are required for specialised testing processes that we do not perform in-house e.g. Chromosome Analysis/ DNA Genetic Screening. Please print off these forms as requested using the links provided in this manual, to accompany specimen(s) to external referral Laboratories.

4.2 Completing the Request Form

4.2.1 The following **essential** information must be documented in a **legible** manner on the request form including the **duplicate copy** where provided:-

1. Patient's **Hospital Number** (in-patients)
2. Patient's **Full Name** (Surname, Forename)
3. Patient's **Full Home Address**
4. Patient's **Date of Birth**
5. Patient's **Location** (Hospital Ward or room number). Where the requesting Physician is at an external location to that of the Bon Secours Hospital, Cork the postal address of the location should be included.
   NOTE: The Cork Clinic is not considered an external location.
6. Patient's **gender**
7. The name of the **requesting Clinician**
8. **Specimen type** and **anatomical site** where appropriate (specifically Histopathology specimens and Microbiology swabs)
9. **Examination(s)** required
10. **Date and time of specimen collection in 24 hr format.** Note the Laboratory records the date and time specimens are received.
11. **Clinical information** appropriate to the test(s) requested must be supplied e.g. history of administration of drugs, blood transfusion history diagnosis etc.
12. Specific requirements for the Blood Transfusion Laboratory, reference PL003:-
    - If specific blood products are required i.e. CMV negative, irradiated, this should be requested.
    - The specific type and date of surgery and reason for a transfusion request should be documented on the transfusion form.
    - Blood transfusion specimens must have the **signature** of the person collecting and labelling the sample and also the signature of the person completing the request form i.e. two signatures, even if they are the same person.

- The request form must contain the following minimum identification:-
  - Surname, first name
  - Hospital number
  - Date of birth
  - Signature of person taking the sample

  Unlabelled samples or samples labelled with addressograph labels will be rejected.

13. **Prioritization of Test Requests**
    - The Laboratory operates where practical a "first in, first out" policy with respect to the receipt, registration and processing of Haematology, Blood bank, Serology, Immunology, Biochemistry and Microbiology specimens with the exception of blood cultures, CSF and fluids. However, specific and clearly designated clinical areas (e.g. DOSA, CATH Lab, St Veronicas Day Ward, Oncology) may use a process that identifies to Specimen Reception personnel via the use of a coloured sticker that these identified specimens are deemed priority and are to be processed immediately upon receipt in Specimen Reception.
    - The Laboratory operates an urgent/ routine process with respect to the receipt, registration and processing of Histopathology specimens. The urgent status applies to:-
      - Specimens for frozen section
      - Specimens marked urgent
      - Specimens of breast core biopsies
      - Specimens of muscle and nerve biopsies
      - Specimens of liver biopsies
      - Specimens of temporal arteries
      - Specimens of renal biopsies
      - Intrathecal specimens

14. The **signature** of the person **completing** the form (including Blood Bank form)

Note: Where addressograph labels are used to identify the above details, a check must be undertaken by the person completing the form to ensure the data is correct i.e. location or primary Physician.

4.2.2 Allergy Test Request Form Requirements (PL006)

Request for specific allergen testing will only be accepted for processing on the allergy request form PL006. A maximum of five allergens may be requested as per the listing on the back of the request form and should be based on clinical history. A referral letter on its own is not sufficient. Failure to do so will result in delays as the Laboratory cannot proceed without the correct request form.

4.2.3 GP and External Requirements for Completing Request Forms/Referral Letter for Pathology Services

This section refers to GP requests and patients presenting to Laboratory outpatients. A request form/referral letter must accompany all requests for Pathology services. Failure to do so may result in patient delay as the Laboratory cannot proceed without test request documentation (request form/referral letter). Contact details (phone number) of the referring doctor must be provided on the request form. This is to ensure that the requesting doctor is contactable in the event of abnormal findings. Be advised that requests for specific allergen testing will only be accepted for processing on the allergy request form PL006. As the referring doctor, if you have any queries concerning the completion of the request form/referral letter, please do not hesitate to contact the Laboratory. For contact details, please refer to section 3.3 of this document.

4.3 Labelling the Specimen Container

4.3.1 The following **essential** information should be documented in a **legible** manner on the specimen container:-

1. Patient's full name
2. Date of birth
3. Hospital number (Blood Transfusion only)
3. Date and time of specimen collection
4. The **initials** of the person **collecting** the specimen (blood specimens only)
5. **Specimen type and anatomical site specifically for Histopathology, Non Gynaecological Cytology specimens and Microbiology swabs.**

Note 1: At a minimum two core identifiers must be used Name and Date of Birth.
Note 2: When requesting tests on **twins**, **patients** with the same surname in the same location or specimens requesting **blood grouping/ compatibility** testing services the following information is mandatory:-

1. Patient's full name
2. Date of birth
3. Hospital number (Blood Transfusion only)
4. Date and time of specimen collection

Blood transfusion samples must be handwritten and labelled, dated and signed by the person taking the sample. Unlabelled blood transfusion samples or samples labelled with addressograph labels will be rejected.
Note: All patient samples must be labelled at the bedside. (This is to prevent misidentification and labelling errors).
Sample labelling is performed in accordance with Nursing Policy ORG0001 titled "Patient Identification".

Specimens from selected Hospital locations may be labelled with labels printed at the patient's bedside using the Blood Track TX software. Labels will have the following information:-

1. Patient's full name
2. Hospital number
3. Date of birth
4. Sex

} Obtained from 2D barcode on patient's wristband

5. Collectors/ staff members name (obtained from staff ID badge)
6. Location
7. Date and time of collection

4.3.2 Instructions for 24 Hour Urine Collection

Instructions for Ward Collection

- Please obtain a bottle for this collection from the Laboratory. This will contain appropriate preservatives if required.
  Caution: These may be acid or base depending on the test, so care should be taken when handling.

Instructions for Collection Provided to Patients

- *The container may contain a preservative. This must not be washed out and care should be taken when filling the container as the preservative will be either acid or alkali.*
- *At a convenient time, e.g. 8am, void the bladder. This specimen is discarded. From this time until the same time the following day,* ***all*** *urine passed must be collected in the container.*
- *Once the collection is complete, it must be brought to the Laboratory and left in Specimen Reception during normal working hours or in the fridge if outside normal working hours.*
- *If any of the urine is discarded during collection, the collection must be restarted. A new container will have to be obtained from the Biochemistry department.*

A copy of this information is provided on each 24 hour container.

4.4 <u>Addressograph Labels on Specimen Bottles</u>

4.4.1 Patient details must be handwritten on blood specimen bottles except as defined in section 4.3.1.
Addressograph labels are not permitted on any blood specimen bottles.
Addressograph labels are permitted on all Microbiology, Histopathology and Cytopathology specimens.

4.5 Quality of Blood Specimens

4.5.1 Laboratory personnel must inspect prior to testing each blood specimen received for:-

- Evidence of Haemolysis
- Gross Lipaemia
- Presence of clots in all specimens requesting full blood count and coagulation tests
- For coagulation tests, specimens that are under filled or over filled cannot be analysed.

For other specimens, the integrity of the specimen is inspected i.e. broken cytology slides) etc.
In such instances, a **second specimen** may be requested or the **issued report** will have an appended comment noting the presence of haemolysis, lipaemia or clots as appropriate.

4.6 Non-Conforming Specimen Bottles, Forms or Specimen Quality Issues

4.6.1 Where the requirements with respect to labelling the request form and specimen container or specimen quality issues are not met the following will apply.

SPECIMEN ISSUES	REQUIRED ACTION
• No specimen received.	• Specimen Reception inform the clinical area and request a 2nd specimen
• Specimen site not identified on form or specimen • Specimen collected at incorrect time.	• Clinical area identifies the correct site on specimen • Ward contacted by Specimen Reception to provide correct time
• Two of the three mandatory unique identifiers are not correct or absent from the specimen (Full name, DOB, hospital no).	• Request second specimen ***or*** the ward staff will accept responsibility for same in **emergency cases** or **where the specimen cannot be replaced.** • If tested the report will show the non-conforming event.

SPECIMEN ISSUES	REQUIRED ACTION
• **Addressograph label on Blood Bank tube(s) or unlabelled Blood Bank tube(s).**	• **Blood transfusion samples which are unlabelled or labelled with an addressograph label will be rejected and a new sample requested.**
Addressograph labels on blood specimen other than Blood Transfusion with the exception of selected Hospital locations that use the Blood Track TX software for the generation of bedside printed labels	• Clincal staff may correct the error by removing the addressograph label and handwriting the patient details on the blood specimen or a 2nd specimen is collected. The clinical staff member rectifying the issue will be identified on the test report.
• Specimens unlabeled (other than Blood Bank).	• The specimen should be repeated where possible. Specimen Reception staff will phone for a repeat. • If the specimen is irreplaceable and a repeat cannot be obtained, ward staff will take responsibility by relabelling the specimen. The clinical staff member rectifying the issue will be identified on the test report.
FORM ISSUES	**REQUIRED ACTION**
• No request form provided with specimen.	• Clinical areas/ ward to provide form
• Demographic details on the form and specimen do not match.	• Clinical area/ ward updates the form with the correct information
• Required times missing from the form e.g. sample collect time	• Clinical area/ ward updates the form with the correct information
QUALITY ISSUES	**REQUIRED ACTION**
• Specimen grossly haemolysed • Specimen gross Lipaemic • Specimen too old	• A second specimen is to be collected from the patient

Please note the Laboratory staff document all non conforming events electronically.

4.6.2 It is important to note the Laboratory cannot process specimens with non conforming issues until they are resolved by clinical staff. Undue delay in correcting issues may result in a requirement to take a repeat specimen. The Pneumatic Tube System may be used to transport non conforming specimens and/ or forms to and from the clinical area for the speedy resolution of issues.

4.7 **Further Additional Testing**

If on sending a specimen for testing and **further additional testing** is required, please contact Specimen Reception to investigate the feasibility of using the initial specimen for analysis, as age of specimen may impact on the validity of test results. **A request form or equivalent must accompany such requests as the Pathology department cannot process additional test requests until the request form is provided.** Refer to section 6.2 of the current version of the procedure BSC/SR/SOP/002 titled "Procedure for the Receipt, Checking, Computer Registration, Secondary Processing Including Labelling and Distribution of Pathological Specimens".

4.8 **Non-Conforming Issues and Credit**

It is the policy of the Pathology department to credit the patient's account where non-conforming issues lead to the non testing of specimens.

5.0 DELIVERY, PACKING, TRANSPORT AND POSTAL REQUIREMENTS FOR DIAGNOSTIC AND INFECTIOUS (OR SUSPECTED INFECTIOUS) SPECIMENS

5.1 **General Information**

It is the policy of the Pathology Department to treat all specimens and samples as potentially infectious or high risk. Therefore, we advise you to take universal precautions in the collection, packaging and the delivery of specimens being sent to the Pathology Department for analysis.

5.1.1 Note routine specimens (where testing will be performed the following day) collected and delivered to the Laboratory during the out of hours period will result in an increase in the turnaround time for the test.

5.2 **Specimen Delivery From Within the Hospital**

- During the **routine** Pathology opening hours **blood specimens** will be **taken** by the **Phlebotomy** team.
- **Outside routine Pathology opening hours blood specimens** will be taken by either medical doctors or nurses on the ward.
  During routine hours, the Pneumatic Tube System is routinely used for the transport of specimens from all ward/ outpatient locations to the Laboratory. Instructions on the correct use of the Pneumatic Tube System are posted on each station, reference BSC/SR/SOP/007.
- Specimens being sent to the laboratory via the Pneumatic Tube System should be placed in a plastic sample bag. The sample bag may or may not be attached to the form. This depends on the form type. Specimens that are permitted for transport within the Pneumatic Tube System are placed in a red carrier and transported to Specimen Reception as per procedure BSC/SR/SOP/007.

- It is the responsibility of Specimen Reception staff to clock in the date and time of the specimen using the date and time clock located in Specimen Reception for specimens that are deliverd via the Pneumatic Tube System.

5.2.1 Procedure for the Out of Hours Delivery and Storage of Specimens to Pathology

5.2.1.1 **Emergency** out of hours specimens are delivered by the Pneumatic Tube System.

5.2.1.2 It is the responsibility of the Clinical Nurse Managers to ensure non-urgent specimens are delivered to Pathology immediately following collection. **Non-emergency** specimens received out of hours are to be stored as follows:-

1. **24 hour urines** are stored on the bottom shelf of the fridge opposite the Specimen Reception door.

2. In **fridge** labelled **"Non-Emergency Specimens Over Night Storage"** the following specimens are stored in designated labelled trays:-

    - urines (universal specimen) and 24 hour urine specimens
    - faeces specimens
    - swab specimens
    - sputum specimens
    - blood specimens (but not blood cultures)
    - diagnostic cytology
    - miscellaneous

    This fridge is located opposite the Specimen Reception door.

3. In press labelled **"Histopathology Specimens Only",** Histopathology specimens are stored in appropriate containers with fixative. This press is beside the Specimen Reception door.

4. It is the responsibility of the **person who delivers** routine specimens out of hours to the Pathology department to clock the date and time of the specimen using the time and date clock located in the Pathology foyer. **Under no circumstances can the Pneumatic Tube System be used to deliver routine specimens to the Laboratory during the out of hours period as the Specimen Reception department is not staffed.**

5.3 Specimen Delivery from Outside of the Hospital

The requirements stated below apply to all specimens or samples directed to the Pathology Department. These will be required to be packed and transported in accordance with the European Agreement concerning the International Carriage of Dangerous Goods by Road (UNADR). Posted samples are not suitable for urea and electrolytes, coagulation, phosphate, AST, LDH, glucose (unless in a fluoride tube), magnesium, hormone assays and tumour marker assays.

It is the policy of the Pathology department to provide our customers with specimen transport packaging materials. Please do not hesitate to ask us for your supply.

5.3.1 Packing Procedure for the Transport of Diagnostic Specimens (Non Infectious)

1. Specimen to be sent should be stored in a secure (preferably plastic) primary container.
2. Place primary sample into secondary receptacle (hard white container supplied by BSH) with absorbent material.
3. This will be placed in a 95kPa specimen transport bag.
4. Place the specimen bag with the sample in a padded (jiffy bag) envelope or a Surepath Solution Specibox.
5. Label the envelope with a hazard warning label, “Diagnostic Specimen, Category B, UN 3373”.
6. Place the name, address and contact number of the destination laboratory and the sending Laboratory on the outside of the envelope/ specibox.
7. The specimen can be transported as appropriate.

There is no requirement for a licensed courier to transport non infectious diagnostic samples.

5.3.2 Procedure for the Transport of Infectious or Suspected Infectious Specimens

When sending specimens or samples suspected or known to contain infectious or suspected infectious substances, the Microbiology and Infection Control departments should be contacted for advice regarding transport.

5.4 Disposal of Waste Material Used in Specimen Collection

All materials used in specimen collection should be treated as potentially hazardous and discarded using sharps containers and other appropriate colour coded bags. Do not hesitate to contact the Laboratory for appropriate disposal advice.

5.5 Storage of Examined Specimens for Archive and Look Back Purposes

Specimens post examinations are retained for defined periods depending on the specimen type. If you require further details, please contact the Pathology department. Contact details are provided in section 3.3 of this document titled "Availability of Clinical and Scientific Advice".

6.0 EXTERNAL THIRD PARTY ASSESSMENT PROGRAMME

6.1 The Pathology Department **participates** in relevant available **external third party assessment schemes**. We use these independent third party programmes to verify the accuracy of the test procedures used. Results of these assessments are reviewed regularly by clinical Pathology personnel.

7.0 PROVISION OF SERVICES

SERVICE	DESCRIPTION
Provision of Diagnostic Services	There is a wide range of Pathology tests available. For the full list of diagnostic services refer to chapters 9 to 16 of this document.
Biochemistry	The **automated chemistry** service provides analysis of samples for renal, liver, cardiac, lipid, iron studies and specific protein assays. The **Immunology** section performs Autoimmune, Serum Protein Electrophoresis (plus Immunofixation if necessary based on review of Electrophoresis), Urine Immunoelectrophoresis, allergy and associated assays while the **Immunoassay** section performs endocrine, tumour marker, troponin and therapeutic drug monitoring (TDM) assays.
Haematology	A **diagnostic Haematology service** is provided which includes **blood counts** and blood film examination. Routine **coagulation** screening includes PT-INR, APTT and Fibrinogen tests.
Blood Bank	The Hospital **Blood Bank** provides routine and emergency Blood Grouping, Antibody Screening and compatibility testing. A supply of blood products is also available, refer to the Hospital Transfusion Handbook for details or contact the Blood Transfusion department.
Serology	A comprehensive **Serology service** is provided including immunity status testing.
Histopathology	The Histopathology department provides a varied range of services including **Tissue Pathology** (including frozen sections for rapid diagnosis) and Diagnostic **Cytology**. For outpatient specimens collected outside the confines of the Bon Secours Hospital, Cork, a signed Service Level Agreement must be in place between the Pathology Department and the referring Doctor/ Dentist/Service.
Immunology	The Immunology department provides a diagnostic testing service, specifically in relation to facilitating the differential diagnosis of autoimmune diseases.

SERVICE	DESCRIPTION
Microbiology	The Laboratory examines a diverse range of specimens for bacterial, fungal, viral and parasitic infections and determines the sensitivity of bacteria to antibiotics. The department provides a **clinical service** which ensures that patients are treated in a timely and effective manner. The department works closely with the Hospital Infection Prevention and Control Department.
Related Diagnostic Services	Glucose tolerance test (refer to section 9.5) and mantoux testing. Mantoux testing is performed on the ward and ordered by the doctor using form BSC/PHLE/SOP/009 att. 7.1 which is available from the postroom. All necessary information is available and recorded here.
Phlebotomy Service	The Phlebotomy department on a routine basis 7.00am - 4.30pm Monday to Friday and Saturday from 7.00am - 11.00am take blood samples for diagnostic testing from in-patients. Outside these hours, blood samples are taken by trained Hospital personnel. Outpatient Phlebotomy is from 8.00am – 4.15pm Monday to Thursday 8.00am – 2:00pm Friday.
Consultant Advisory Services	Consultant Pathology advisory services are available in the following specialities, Histopathology, Immunology, clinical Microbiology, Haematology, Blood Transfusion and Biochemistry. For further details, refer to section 3.2 of this manual.
Warfarin Clinic	An outpatient Warfarin clinic service is available on Tuesdays between 10.00 am and 12.00 pm in the Phlebotomy department. This testing service should be pre booked by contacting 021-4801720 or 4802197 as it is by appointment only.
Therapeutic Phlebotomy	The therapeutic Phlebotomy procedure is available for the treatment of certain clinical conditions such as Haemochromatosis and Myeloproliferative Disorders (polycythaemia). This process is performed by Phlebotomy staff under the clinical guidance of a Consultant Gastroenterologist (with special interest in Liver Disorders) for Haemochromatosis and Consultant Haematologists for Myeloproliferative Disorders (polycythaemia). This testing service should be pre booked by contacting 021-4801720 or 4802197 for Myeloproliferative Disorders (polycythaemia) or 021-4344714 (Consultant Gastroenterologist Clinic) for Haemochromatosis as services are by appointment only.
Health Check and Wellness Centre Screening	To meet customer requirements a full range of pathology test packages are available as part of health screening. These packages are designed to cover any combination of pathology tests as required by the customer.

SERVICE	DESCRIPTION
Haemovigilance Service	All Haemovigilance reactions and events are documented and reported to the National Haemovigilance Office as per the requirements of the Hospital Transfusion Booklet. The Bon Secours Pathology Department is committed in conjunction with the Haemovigilance Officer, Haemovigilance to providing a reporting mechanism that assists the Quality Management Review Process. A Hospital Transfusion Committee is in operation and its membership includes Medical, Scientific and Nursing staff and also includes the Regional Director of the Irish Blood Transfusion Service or nominee. The committee meets regularly and discusses and advises on transfusion policies, inventory management, quality issues, haemovigilance and traceability.
Point of Care/ Near Patient Testing Service	A point of care/ near patient testing service is in place that meets clinical requirements as defined by the POC Committee. The POC Committee reports to Hospital/ Laboratory Management for point of care testing services/ issues. This POC Committee meets on a quarterly basis and if clinically required. The POC meeting is chaired by the Point of Care/ Near Patient Manager.

8.0 LABORATORY TESTS/ PROFILES AVAILABLE

8.1 This section outlines the tests that are available in the different Pathology Laboratories. These tests will be described under the following **disciplines/ sections**:-

- **Biochemistry**
- **Blood Transfusion**
- **Haematology**
- **Histopathology/ Cytology**
- **Immunology**
- **Microbiology** including Serology and Virology
- **Chromosome Analysis**

8.2 **Laboratory Test/ Profile Description**

Each laboratory test will be described under the following headings:-

- **Test Name**
- **Specimen type/ site**
  Where the **specimen is blood** and the required additive is stated as none, the requirement should be interpreted as a **clotted sample**.
- **Specimen requirements** including additive, required specimen volume and container type.

- **Special Requirements**
  The special requirements column defines for each diagnostic test if (applicable) the following:-
  - Patient preparation, e.g. fasting
  - Consent form
  - Special timing for collection of samples e.g. pre and post drug administration
  - Any special handling needs between time of collection and time received by the laboratory (transport requirements, refrigeration, warming, immediate delivery etc.)

- **Turnaround Time**
  Turnaround time is defined as the time **from receipt of specimen** in the Pathology department to the time **authorized results are electronically available.** In this document, turnaround time is defined as hours or working days. Working days denotes Monday to Friday and does not include out of hour periods including weekends and bank holidays.
  Occasionally, the Laboratory may be unable to meet the defined turnaround time as specified in this document for tests that are routinely performed in-house, e.g. or where a second opinion is required to confirm a Histopathology final diagnosis. Where delays in reporting results are encountered and which may compromise patient care, the Laboratory will communicate such delays to appropriate clinical personnel.

8.3 Repeat Examination due to Analytical Failure or Further Examination of the Primary Specimen

8.3.1 Repeat Examination due to Analytical Failure

It is the policy of the Pathology department in the event of an analytical failure to:-

- Repeat the test using a back-up instrument.
  or
- Store the specimens in appropriate conditions until the cause of the analytical failure is identified and corrected and then repeat the test. The urgency of the outstanding specimens is reviewed by the relevant laboratory Consultant Pathologist or nominee.

8.3.2 Further Examination of the Primary Specimen

Where further testing is relevant to the investigation or diagnosis of the condition or symptoms which gave rise to the original test request then it is the policy of the Pathology department to pursue a diagnosis by performance of additional tests using the primary specimen.

8.4 Tests Not Listed

If you require a diagnostic test that is not listed, please contact the Pathology department who will endeavour to **outsource** as appropriate your test requirement. The Pathology Department (Scientific/QA/Consultant staff) evaluate and select referral Laboratories and Consultants who provide second opinions based on objective criteria set out in Laboratory Policy. There are no outside sources of Laboratory services owned or recommended by referring physicians.

8.5 External Laboratory Testing

Some specimen/ samples are referred to external laboratories for testing. These will be recognised by the presence of an **asterisk *** after the test name.

8.6 Emergency Out of Hours Service

Tests provided out of hours in this service will be recognised by the presence of this symbol ♦ in the turnaround time column. A master list of tests performed out of hours is defined in section 25.0 of this document. If any other test is required, the person requesting the test should contact the relevant Laboratory Medical Consultant.

8.7 Instructions on the Collection of Specimens

Instructions on the collection of specimens are detailed in the special requirements section applicable to each test as detailed in Chapters 9 to 16 and or in the following Hospital policies and Laboratory procedures:-

Specimen Type	Document Name	Document Number
Blood	Procedure for Venepuncture of In-Patients	BSC/PHLE/SOP/001
Blood	Procedure for Venepuncture of Out-Patients by Phlebotomy Staff	BSC/PHLE/SOP/003
Urine	Sterile Urine Samples from Infants and Toddlers	CW0010
Urine	Collection of Mid Stream Urine for Culture and Sensitivity	NUR0179
Urine	Collection of Urine from an Ileal Conduit	STOMA0001
Urine	Performing Routine Urinalysis on Inpatients	NUR0052

9.0 BIOCHEMISTRY TESTS

9.1 Endocrinology

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
11 Deoxycortisol*	Blood	None 	4.9	Blood Tube	None	15 working days
17 Hydroxy Progesterone*	Blood	None 	4.9	Blood Tube	None	15 working days
ACTH*† Adrenocorticotrophic Hormone	Plasma	Potassium EDTA and aprotinin which is added to tube by Specimen Reception before blood is taken 	7.5	Blood Tube x 2	Freeze plasma immediately after specimen collection. Obtain tubes from lab before taking blood.	15 working days
ADH*† Anti Diuretic Hormone	Blood	Potassium EDTA and aprotinin which is added to tube by Specimen Reception before blood is taken 	7.5	Blood Tube	Freeze plasma within 1 hr of specimen collection	20 working days
Aldosterone*	24 hour urine collection	None	100	5L Urine container	Refer to section 4.3.2	15 working days
Aldosterone*†	Plasma	Potassium EDTA 	1	Blood Tube	Freeze serum within 4 hrs of specimen collection. State whether patient is standing or lying (after 8 hrs rest)	15 working days
Androstenedione*	Blood	None 	4.9	Blood Tube	None	20 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

BIOCHEMISTRY TESTS - Endocrinology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Anti-Mullerian Hormone (AMH)*	Blood	None 	4.9	Blood Tube	Freeze serum within 4 hrs of specimen collection. Do not use haemolysed specimen	20 working days
Calcitonin*†	Blood	None 	4.9	Blood Tube	Freeze serum within 4 hrs of specimen collection	15 working days
Cortisol (30 mins post synacthen)	Blood	None 	4.9	Blood Tube	Take exactly 30 min post synacthen	1 working day Mon - Fri
Cortisol (60 mins post synacthen)	Blood	None 	4.9	Blood Tube	Take exactly 60 min post synacthen	1 working day Mon - Fri
Cortisol (am)	Blood	None 	4.9	Blood Tube	Patient must be resting, take between 7 & 9 am	1 working day Mon - Fri
Cortisol (midnight)	Blood	None 	4.9	Blood Tube	Take at midnight	1 working day Mon - Fri
Cortisol (pm)	Blood	None 	4.9	Blood Tube	Take between 3 and 5pm	1 working day Mon - Fri
Cortisol (pre synacthen)	Blood	None 	4.9	Blood Tube	Patient must be resting	1 working day Mon - Fri
Cortisol (random)	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Cortisol Urinary*	24 hr urine collection	None	50	5L Urine container	Refer to section 4.3.2	15 working days
Dehydro Epiandrosterone DHEA*	Blood	None 	4.9	Blood Tube	None	15 working days
Dehydro Epiandrosterone DHEA (Urinary)*	Urine	None	100	5L Urine container	Refer to section 4.3.2	15 working days
Dehydro Epiandrosterone Sulphate DHEAS*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

BIOCHEMISTRY TESTS - Endocrinology…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Dihydrotestosterone DHT*	Blood	None 	4.9	Blood Tube	None	15 working days
Erythropoietin*	Blood	None 	4.9	Blood Tube	None	15 working days
Ferritin	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Folate (Folic Acid)	Blood	None 	4.9	Blood Tube	None	1 working day Mon – Fri
Follicle Stimulating Hormone (FSH)	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Free T_3 (Triiodothyronine)	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Reverse T_3*	Blood	None 	4.9	Blood Tube	Separate and freeze within 4 hours	25 working days
Free T_4 (Thyroxine)	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Gastrin*†	Blood	None 	4.9	Blood Tube	Freeze serum within 1 hr of specimen collection. Patient should be fasting a minimum of 10 hrs prior to collection.	25 working days
Glucagon*†	Blood	Potassium EDTA  and aprotinin which is added to tube by Specimen Reception before blood is taken	7.5	Blood Tube x 2	Freeze plasma within 1 hr of specimen collection. Obtain tubes from lab before taking blood.	30 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

BIOCHEMISTRY TESTS - Endocrinology…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Growth Hormone*†	Blood	None 	4.9	Blood Tube	Freeze serum within 4 hrs of specimen collection.	15 working days
hCG Serum	Blood	None 	4.9	Blood Tube	Refer to section 17.0 for recommended use of hCG in Pregnancy testing.	♦ 120 mins ϕ
Insulin*†	Blood	None 	4.9	Blood Tube	Freeze serum within 30 mins of specimen collection. State whether patient is fasting or post prandial.	15 working days
Insulin C-peptide*	Blood	None 	4.9	Blood Tube	Separated and frozen in <1 hour. State whether patient is fasting or post prandial.	15 working days
LH (Luteinising Hormone)	Blood	None 	4.9	Blood Tube	None	1 working day Mon – Fri
Monomeric Prolactin (Macroprolactin)	Blood	None 	4.9	Blood Tube	Contact Biochemistry for information	1 working day

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS - Endocrinology…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Oestradiol	Blood	None 	4.9	Blood Tube	This assay should NOT be used to assess Oestradiol levels for patients undergoing Fulvestrant or Mifepristone treatment. Structural and functional analogues of steroid hormones, including the Oestradiol molecule, have the potential to cause interference/cross reactivity with the Alinity i Oestradiol assay. Samples from patients administered medications which inhibit tumour cell proliferation (e.g. CDK 4/6 inhibitors) may be subject to interference/cross reactivity with the Alinity i Oestradiol assay. In addition, drugs which interfere with or activate production of steroid hormones (e.g. Aromatase inhibitors) may also interfere or cross react with the Alinity i Oestradiol assay. In such cases, an alternate method such as chromatography should be used.	1 working day Mon - Fri

BIOCHEMISTRY TESTS - Endocrinology…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Pancreatic Polypeptide PPP*†	Blood	None 	4.9	Blood Tube	Freeze serum within 1 hr of specimen collection	30 working days
Parathyroid Hormone (PTH)	Blood	Potassium EDTA 	2.7	Blood Tube	Freeze plasma if not analysed within 8 hrs.	1 working day Mon - Fri
Pregnanetriol *	24 hour urine collection	None	700	5L Urine container	Refer to section 4.3.2	15 working days
Progesterone	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Proinsulin*	Blood	None 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <4 hrs	15 working days
Prolactin	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Renin*†	Blood	Potassium EDTA 	2.7	Blood Tube	EDTA plasma frozen <4 hrs. State whether patient is standing or lying (after 8 hrs rest)	15 working days
Serotonin*†	Blood	Lithium Heparin 	9	Blood Tube	For 48 hrs before collection, the patient should not drink or eat: bananas, chocolate, tomatoes, grapefruit, nuts, avocado, pineapple, plums, citrus fruit, tea and coffee. Freeze whole blood within 1 hr of specimen collection	15 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

BIOCHEMISTRY TESTS - Endocrinology…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Sex Hormone Binding Globulin SHBG*	Blood	None 	4.9	Blood Tube	None	15 working days
Somatostatin*	Blood	Potassium EDTA and Aprotinin 	2.7 x 2	Blood Tube x 2	Bring to lab immediately, must be frozen in <1 hr	25 working days
Testosterone with SHBG*	Blood	None 	4.9	Blood Tube	None	15 working days
Testosterone (Free)	Blood	None 	4.9	Blood Tube	None	20 working days
Testosterone (Urinary)*	Urine	None	100	5L Urine container	Refer to section 4.3.2	15 working days
Thyroid Stimulating Hormone	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Vasoactive Intestinal Peptide (VIP)*†	Blood	Potassium EDTA to which Aprotinin has been added to tube by Spec. Reception before blood is taken. 	7.5	Blood Tube	Freeze plasma within 1 hr of specimen collection	25 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

9.2 BIOCHEMISTRY TESTS - Tumour Markers

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Alkaline Phosphatase (Placental)*	Blood	None 	4.9	Blood Tube x 2	None	15 working days
Alpha Feto Protein (AFP)	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
CA15-3	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
CA19-9	Blood	None 	4.9	Blood Tube	None	5 working days
CA-50*	Blood	None 	4.9	Blood Tube	None	15 working days
CA72-4*	Blood	None 	4.9	Blood Tube	None	15 working days
CA125	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
CYFRA 21-1*	Blood	None 	4.9	Blood Tube	None	15 working days
Carcinoembryonic Antigen (CEA)	Blood	None 	4.9	Blood Tube	None	1 working day Mon – Fri
hCG Total (Serum Quantitative as Tumour Marker)	Blood	None 	4.9	Blood Tube	Please provide spot urine sample in addition to blood sample when hCG is being used as tumour marker	1 working day Mon - Fri
Inhibin B*†	Blood	None 	4.9	Blood Tube	Freeze serum within 1 hr of specimen collection	20 working days
Neuroblastoma screen*†	Spot Urine	None	20	Sterile Universal	Freeze urine within 1 hr of specimen collection	15 working days

* These specimens/ samples are referred to external laboratories for testing.

9.2 BIOCHEMISTRY TESTS - Tumour Markers ……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Prostate Specific Antigen (PSA)	Blood	None 	4.9	Blood Tube	Serum to be separated within 4 hrs of collection	1 working day Mon - Fri
Prostate Specific Antigen (PSA Free) †	Blood	None 	4.9	Blood Tube	Serum to be separated within 3 hrs of collection	4 working days Mon - Fri
Thyroglobulin*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

9.3 BIOCHEMISTRY TESTS - Therapeutic Drug Monitoring

9.3.1 All drugs must be requested **using generic, not trade names** to ensure clarity. Please refer to the British National Formulary (BNF) which can be accessed by clicking on the following link www.medicinescomplete.com/mc/bnf/current/index.htm.

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Carbamazepine (Tegretol)*	Blood	None 	4.9	Blood Tube	Take before next dose	1 working day Mon - Fri
Digoxin*	Blood	None 	4.9	Blood Tube	Usual sampling time is >6 hrs after dose. Assumed to be oral administration.	1 working day Mon - Fri Urgent 3 hrs and verbal report
Flecainide*	Blood	None 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <4 hrs	15 working days
Gentamicin Once Daily Dosing	Blood	None 	4.9 Adult	Blood Tube	Pre Level: Refer to Gentamicin Once Daily Guideline.	♦ 120 mins ϕ
Gentamicin Multi Daily Dosing	Blood	None 	4.9 Adult	Blood Tube	Pre and Post Levels: Refer to Endocarditis Infection Guideline.	♦ 120 mins ϕ
Levetiracetam (Keppra)*	Blood	None 	4.9	Blood Tube	Take before next dose	15 working days
Lithium*	Blood	None 	4.9	Blood Tube	Take 12 hrs post dose	2 working days
Methotrexate*	Blood	None 	4.9	Blood Tube	Contact Biochemistry before test. Wrap tube in tin foil in transit. Whole blood, do not centrifuge.	1 working day
Mitotane*	Blood	Potassium EDTA 	2.7	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS - Therapeutic Drug Monitoring…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Paracetamol*	Blood	None 	4.9	Blood Tube	Take at least 4 hrs post suspected overdose.	Routine therapeutic <2 days Urgent/ query OD Verbal in < 3 hours from CUH.
Perampanel (Fycompa)*	Blood	None 	4.9	Blood Tube	Take before next dose	15 working days
Phenobarbital* (Phenobarbitone)	Blood	None 	4.9	Blood Tube	Take before next dose	2 working days
Phenytoin* (Epanutin)	Blood	None 	4.9	Blood Tube	Take before next dose	1 working day
Quinidine*	Blood	None 	4.9	Blood Tube	Before next dose. Bring to lab immediately, serum to be frozen within 4 hrs of collection	15 working days
Salicylate*	Blood	None 	4.9	Blood Tube	None	Routine therapeutic <2 days Urgent/ query OD Verbal in < 3 hours from CUH.
Tacrolimus (Prograf)*	Blood	Potassium EDTA 	4	Blood Tube	Take as trough sample	7 working days
Theophylline*	Blood	None 	4.9	Blood Tube	Sample time 2-4 hrs post oral administration of drug	5 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY TESTS - Therapeutic Drug Monitoring…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Tobramycin	Blood	None 	4.9	Blood Tube	Refer to Tobramycin Once Daily Guideline. Please specify on the request form whether sample is peak (post) or trough (pre) and indicate the time since last administration of the drug	♦ 120 mins ϕ
Toxicology Screen*	Blood	None 	4.9	Blood Tube	Please state medications	15 working days
Toxicology Screen*	Spot urine	None	20	Sterile Universal	Please state medications	15 working days
Valproic Acid (Epilim)*	Blood	None 	4.9	Blood Tube	Take before next dose	1 working day
Vancomycin	Blood	None 	4.9 Adult	Blood Tube	Refer to Vancomycin Dosing & Monitoring Guideline	♦ 120 mins ϕ

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

9.4 BIOCHEMISTRY TESTS – Allergy Testing

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Penicillin Allergen Panel Penicillin V and G	Blood	None 	4.9	Blood Tube	None Please click to access Allergy Request Form PL006	10 working days
Single Allergen Test (Specify required Allergen(s) from list on back of form PL006)	Blood	None 	4.9	Blood Tube	None Refer to section 9.4.1 for details of available Allergens Please click to access Allergy Request Form PL006	10 working days
Referred Single Allergen Test (Specify Allergen on right hand side of form PL006)*	Blood	None 	4.9	Blood Tube	None Refer to section 9.4.1 for details of available Allergens Please click to access Allergy Request Form PL006	15 working days
IgE Immunoglobulin E (Please request on form PL006)	Blood	None 	4.9	Blood Tube	None Please click to access Allergy Request Form PL006	10 working days

* These specimens/ samples are referred to external laboratories for testing.

9.4.1 BIOCHEMISTRY TESTS – Allergen Testing

SAMPLE REQUIREMENTS: ALLERGY REQUEST
4.9mL blood tube containing no additive
TURNAROUND TIME:
10 working days for in-house tests

We have changed our testing protocols to provide a focused allergen testing service instead of Allergy Screens in accordance with the recommendations of the all-Ireland Consultant Immunologist Group.

1. Allergen requests will only be processed if the appropriate Allergen request form (PL006) is used. Clinical details and symptoms as well as any previous allergies should be stated on the form. GPs should download this form and complete as we cannot accept GP referral letters for allergy testing.

2. Requests for **Screens** or for "**RAST"** will not be processed and this comment will be issued on the report.

3. A maximum of five allergens may be requested and should be based on clinical history.

   The following table shows the available Allergens.

Inhalant Allergens:	Foods Allergens:	Foods Allergens:
House dust mite (d1)	Egg white (f1)	Soybean (f14)
Cat epithelium and dander (e1)	Milk (f2)	White bean (f15)
Horse dander (e3)	Fish (cod) (f3)	Pea (f12)
Dog dander (e5)	Wheat (f4)	Chick pea (f309)
Rabbit epithelium (e82)	Egg yolk (f75)	
	Shrimp (f24)	
Timothy grass (g6)	Kiwi (f84)	
Meadow Fescue (g4)	Peanut (f13)	
Rye Grass (g5)	Brazil Nut (f18)	
English plantain (w9)	Almond (f20)	
Common silver birch (t3)	Cashew Nut (f202)	
	Pistachio (f203)	
Penicillium mould (m1)	Walnut (f256)	
Cladosporium mould (m2)	Sesame (f10)	
Aspergillus mould (m3)	Hazel nut (f17)	
Alternaria mould (m6)	Pecan nut (f201)	
Occupational Allergens	Penicillin Allergens:	
Latex (k82)	Penicillin G (c1) and V (c2)	
Chlorhexidine (c8)		
Total IgE	Order IgE using PL006	

9.5 BIOCHEMISTRY TESTS – General

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
5-HIAA* 5-Hydroxyindoleacetic Acid	24 Hour Urine Collection	50mL 2M HCl	100	5L Urine container	Refer to section 4.3.2. No pineapple, nuts, bananas or kiwi fruit are to be eaten immediately before or during collection	15 working days
Abatacept* (Orencia)	Blood	None 	4.9	Blood Tube	Please right click link to access Request Form choose 'Copy link address' from dropdown menu and paste the link into the Chrome browser, press return. Review request form for Abatacept levels and send with the sample. Sample must be taken before the next dose – trough level. Antibody analysis is currently not available	15 working days
ACE* Angiotensin Converting Enzyme	Blood	None 	4.9	Blood Tube	None	10 working days
Acetylcholine Receptor Antibodies*	Blood	None 	4.9	Blood Tube	Freeze 1mL serum <1 hr of specimen collection	15 working days
Acyl Carnitine Profile*	Blood	None 	Fill Circles	Guthrie Card	Click here to access Metabolic Investigations Request Form and send with the sample	25 working days
Adalimumab* (Humira)	Blood	None 	4.9	Blood Tube	Please right click link to access Request Form, choose 'Copy link address' from dropdown menu and paste the link into the Chrome browser, press return. Review request form for Adalimumab antibodies and levels and send with the sample. Sample must be taken before the next dose – trough level.	15 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY TESTS – General ……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Albumin	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Albumin Creatinine Ratio	Spot Urine	None	2	Sterile Universal	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	120 mins ϕ
Albumin (Fluid)	Fluid (pleural etc)	None	2	Sterile Universal	None	♦ 120 mins ϕ
Albumin (Urinary) Microalbumin	24 hour urine collection	None	10	5L Urine container	Refer to section 4.3.2	120 mins ϕ
Alcohol* (Testing not for legal purposes, please contact the Lab if request is in relation to legal or road traffic act)	Blood	Fluoride 	2.7	Blood Tube	Do not use alcohol swab on arm.	10 working days
Aldolase*	Blood	None 	4.9	Blood Tube	1 mL serum post 30 mins rest	15 working days
Alkaline Phosphatase isoenzymes*	Blood	None 	4.9	Blood Tube	None	20 working days

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BIOCHEMISTRY TESTS – General ……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Alkaline Phosphatase	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Alkaline Phosphatase (Fluid)	Fluid	None	2	Sterile Universal	None	♦ 120 mins ϕ
Alpha-Aminoadipic Semialdehyde (AASA)*	Urine	None	2	Sterile Universal	Freeze sample within 30 mins	25 working days
Alpha-1 Antitrypsin	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Alpha-1 Antitrypsin in faeces*	Faeces	None	20	Sterile Universal	None	15 working days
Alpha-1 Antitrypsin Phenotype*	Blood	None 	4.9	Blood Tube	Note Specimen Reception 2 x 1mL aliquot required	25 working days
ALT Alanine Amino Transferase	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Amino Acids*	Blood	Lithium Heparin 	4.9 Adult 2 x 1.2 Paed	Blood Tube	Click here to access Metabolic Investigations Request Form and send with the sample	15 working days
Amino Acids*	Spot Urine	None 	10	Sterile Universal	Must be frozen. Send to lab immediately. Check pH in lab and if > 8.5 then a repeat sample must be obtained. Click here to access Metabolic Investigations Request Form and send with the sample	15 working days

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Ammonia	Blood	Potassium EDTA 	2.7 Adult 1.3 Paed	Blood Tube	Transport immediately on ice. Separate and freeze if delayed	♦ 120 mins ϕ
Amylase	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Amylase (Fluid)	Fluid (pleural etc)	None	2	Sterile Universal	None	♦ 120 mins ϕ
Amyloid A Protein*	Blood	None 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <1 hr	15 working days
Anti-GAD Antibodies*	Blood	None 	4.9	Blood Tube	Freeze serum within 1 hr of specimen collection	20 working days
Anti-GAD Antibodies*	CSF	None	Refer to form PL012 for volume	Sterile Universal	Bring to lab immediately	20 working days
Anti-tyrosine Antibodies*	Blood	None 	4.9	Blood Tube	Freeze serum within 4 hrs of specimen collection	15 working days
Apolipoprotein A*	Blood	None 	4.9	Blood Tube	12 hrs fasting prior to collection	15 working days
Apolipoprotein B*	Blood	None 	4.9	Blood Tube	12 hrs fasting prior to collection	15 working days
Apolipoprotein E Apo E*	Blood	Serum 	4.9	Blood Tube	None	15 working days
Arsenic*	Blood	Lithium Heparin 	7.5	Trace metal-free tube (Bio)	Urine arsenic is the recommended sample	15 working days

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Arsenic*	Spot Urine	None	25	Sterile Universal	None	15 working days
AST Aspartate Amino Transferase	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Beta-2 Transferrin*	Fluid and Blood	None 	2	Sterile Universal	None	30 working days
		None 	5	Blood Tube		
Bicarbonate	Blood	Lithium Heparin 	4.9	Blood Tube	None	1 working day
Bilirubin Direct	Blood	None 	4.9 Adult 1.3 Paed	Blood Tube	Please note that the drug **Eltrombopage** can interfere with this method. Please inform the laboratory if the patient is on this medicine.	♦ 120 mins ϕ
Bilirubin Total	Blood	None 	4.9 Adult 1.3 Paed	Blood Tube	Please note that the drug **Eltrombopage** can interfere with this method. Please inform the laboratory if the patient is on this medicine.	♦ 120 mins ϕ
Biotinidase*	Blood	Lithium Heparin 	1.3	Blood Tube	Separate and freeze plasma within 3 hrs	25 working days
Bisoprolol*	Blood	None 	4.9	Blood Tube	None	15 working days
Blood Gases - Venous - Arterial - Angiography	Blood	Heparinised syringe	1	Blood Gas Syringe	Do not transport by the Pneumatic Tube System. To be walked immediately to Lab. Sample must be assayed within 60 mins. If lactate required, sample must be received and analysed within 10 mins.	♦ <60 mins

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
BNP (B-Type Natriuretic Peptide)	Blood	Potassium EDTA 	2.7	Blood Tube	Separate EDTA sample is required for this test.	♦ 120 mins ϕ
Breath Test for Helicobacter pylori	Breath	Follow Helicobacter Diagnostic Test Kit Protocol			Samples of breath are taken in OPD. Before taking specimen, patient:- • Should be off antibiotics for at least 4 weeks • Should be off antacids for at least 2 weeks • Should not eat for at least 6 hrs (may drink water) Refer to policy GASTRO008 and GASTRO009.	15 working days
Cadmium*	Blood	Lithium Heparin 	7.5	Trace metal-free tube (Bio)	None	15 working days
Cadmium*	Spot Urine	None	100	Sterile Universal	None	15 working days
Caffeine*	Blood	None 	1.3	Blood Tube	None	5 working days
Calcium	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Calcium (Urinary)	24 hour urine collection	50 mL 2M HCl	10	5L Urine Container	Refer to section 4.3.2	1 working day
Calcium* (Ionised)	Blood (Arterial/ Venous)	Balanced Heparin Syringe	1	Blood Gas Syringe	Arrange test in advance with Biochemistry lab as assay must be arranged with Mercy Hospital. Transport immediately to lab.	2 hours

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Calcium Creatinine Ratio in Urine	Urine	None	10	Sterile Universal	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	120 mins ϕ
EGFR (Calculation for Chemotherapy Only)	Blood	None 	4.9	Blood Tube	Provide patients weight and height	♦ 120 mins ϕ
Calculi Analyses* - Kidney Stone - Gall Stone	Calculi (Stone)	None	Not applicable	Sterile Universal	None	20 working days
Carbohydrate Deficient Transferrin*	Blood	None 	4.9	Blood Tube	None	15 working days
Carnitine (Total)*	Blood	Lithium Heparin 	9	Blood Tube	Centrifuge & freeze plasma immediately after specimen collection	15 working days
Carnitine (Urine)*	Spot Urine	None	10	Sterile Universal	Please ensure blood sample is taken at the same time.	15 working days
Catecholamines and Metanephrines*	24 hour urine collection	50mL, 2M HCl	100	5L Urine Container	Refer to section 4.3.2	15 working days
Catecholamines *	Blood	Potassium EDTA 	9	Blood Tube	Diet: Within 48 hrs of assay do not eat chocolate, bananas or citrus fruit, and consume tea and coffee in moderation. Beta-blocker treatment may interfere with assay. Freeze plasma within 1 hr of specimen collection.	15 working days

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Ceruloplasmin*	Blood	None 	4.9	Blood Tube	None	15 working days
Chloride	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Cholesterol	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Cholesterol – HDL	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Cholesterol – LDL	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Cholinesterase*	Blood	None 	4.9 x 2	Blood Tube	None	15 working days
Chromium*	Blood	Lithium Heparin 	7.5	Trace Metal-Free Tube	None	15 working days
CK Isoenzymes*	Blood	None 	4.9	Blood Tube	None	20 working days
CKMB*	Blood	None 	4.9	Blood Tube	None	15 working days
CK-total	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Cobalt*	Blood	Lithium Heparin 	7.5	Trace Metal Free Tube	None	15 working days
Complement C1 Inhibitor Quantitation and Function*	Blood x 2	None Sodium Citrate	4.9 5	Blood Tube x 2	Quantitation will only be performed if Lab receives only serum sample.	20 working days

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Complement Function Test*	Blood	None 	4.9	Blood Tube	None	15 working days
Complement C_2*	Blood	None 	4.9	Blood Tube	None	15 working days
Complement C_3	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Complement C_4	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Complement C_5*	Blood	None 	4.9	Blood Tube	None	15 working days
Complement Total (CH50)*	Blood	None 	4.9	Blood Tube	Freeze serum within 1hr of specimen collection	20 working days
Copper*	Blood	Lithium Heparin 	7.5	Trace Metal Free Tube	None	15 working days
Copper*	24 hour urine collection	None	200	5L Urine container	Refer to section 4.3.2	15 working days
C-peptide*	Blood	None 	4.9	Blood Tube	Freeze serum within 4hrs of specimen collection	7 working days
Creatinine	Blood	None 	4.9	Blood Tube	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	♦ 120 mins ϕ

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Creatinine Clearance	24 Hour urine collection	None	10	5L Urine container	Refer to section 4.3.2 4.9 mL clotted blood to be taken during 24 hrs collection	120 mins ϕ
	Blood	None 	4.9	Blood Tube	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	120 mins ϕ
Creatinine Clearance Calculated GFR for Chemotherapy	Blood	None 	4.9	Blood Tube	Please provide patient's weight and height. Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	♦ 120 mins ϕ
Creatinine Fluid	Fluid (pleural etc)	None	2	Sterile Universal	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	♦ 120 mins ϕ

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BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
C – Reactive Protein (CRP)	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Cryoglobulins	Blood	None 	4.9	Pre-warmed Blood Tube	Keep at 37ºC Bring to Biochemistry immediately	7 working days
CSF Amino Acids*	CSF	None	1	Sterile Universal	Please right click link to access Request Form, choose 'Copy link address' from dropdown menu and paste the link into the Chrome browser, press return. Send request form with the sample.	28 working days
CSF Neurotransmitters *	CSF	Special Tubes from Bio	2	Special Tubes from Bio	Must contact Biochemistry one week in advance of collecting sample.	30 working days
CSF Phospho-Tau Protein*	CSF	None	0.25	Sterile Universal	Sample to be frozen on day of collection. Request this test using CSF form PL012.	30 working days
CSF Spectrophotometry for Xanthochromia*	CSF	Special tube from Bio. Protect from light.	1	Special tube from Bio and completed special request form, including CT scan result.	Please contact Bio lab before taking sample. Sample to be taken minimum 12 hours and up to 7 days maximum post event. Special request form to be completed.	5 working days
CSF Tau A-Beta Protein*	CSF	None	0.25	Sterile Universal	Sample to be frozen at -80ºC on day of collection. Request this test using CSF form PL012.	30 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
CTX (C-Telopeptide of Type 1 procollagen)*	Serum	None 	4.9	Blood Tube	Fasting sample required. Non haemolysed serum to be Transported Frozen: Note: Possible interference in patients treated with Biotin (Vitamin B7, B8 or H) or taking food supplements containing Biotin. Patient should not take these materials for 8 days prior to sample collection.	10 working days
Cystine*	Spot Urine	None	10	Sterile Universal	10 mL early morning urine (fasting). Frozen <1 hr.	15 working days
Elastase*	Faeces	None	2g	Sterile Universal	None	15 working days
Electrophoresis of Serum (Serum Protein Electrophoresis SPE)	Blood	None 	4.9	Blood Tube	Do not request an electrophoresis of serum if it is less than one month since the previous order for this test. In exceptional circumstances, please contact the Biochemistry Lab if a sample needs to be processed in a stated timeframe.	5 working days Note: If immunofixation is required based on the Electrophoresis result, the turnaround time will be increased by 6 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Electrophoresis of Urine (Urine Immunoelectrophoresis)	Early Morning Urine	None	20	Sterile Universal	Refrigerate if delay in bringing to Lab. Do not request an electrophoresis of urine if it is less than one month since the previous order for this test. In exceptional circumstances, please contact the Biochemistry Lab if a sample needs to be processed in a stated timeframe.	5 working days Note: If additional immunofixation is required based on the original result, the turnaround will be increased by 6 working days.
Ethosuximide*	Blood	None 	4.9	Blood Tube	Trough sample, give details of dosage including length of time patient is on this medication	10 working days
Faecal Calprotectin*	Faeces	None	20g minimum	Sterile Universal	Store at 4ºC	15 working days
Fibroblast Growth Factor 23*	Blood	Potassium EDTA 	7.5	Blood Tube	None	25 working days
Free Fatty Acids*	Blood	None 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <1 hr. Patient must be fasting	15 working days
Very Long Chain Fatty Acids (VLCFA)*	Blood	Lithium Heparin 	4.9	Blood Tube	Bring to lab immediately	25 working days
Fructosamine*	Blood	None 	4.9	Blood Tube	None	20 working days
Gamma GT	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Globulin	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Globulin (CSF)	CSF	None	Refer to form PL012 for volume	Sterile Universal	None	♦ 120 mins ϕ
Glucose (Fasting)	Blood	Fluoride 	2.7 Adult 1.3 Paed	Blood Tube	12 hrs fasting prior to collection	♦ 120 mins ϕ
Glucose (Non-Fasting)	Blood	Fluoride 	2.7 Adult 1.3 Paed	Blood Tube	None	♦ 120 mins ϕ
Glucose 2 hours post (Prandial)	Blood	Fluoride 	2.7 Adult 1.3 Paed	Blood Tube	2 hrs post meal	♦ 120 mins ϕ
Glucose (CSF)	CSF	None	Refer to form PL012 for volume	Sterile Universal	Ensure concurrent blood glucose measurement	♦ 120 mins ϕ
Glucose (Fluid)	Fluid (pleural etc)	None	2	Sterile Universal	None	♦ 120 mins ϕ
Glucose Tolerance Test	Blood	Fluoride 	2.7 Adult 1.3 Paed	Blood Tube x 3	Contact Pathology dept. to arrange	5 hours
Glycosamino-glycans (Mucopolysacc-harides)*	Spot Urine	Merthiolate (Added in Biochemistry)	30	Sterile Universal	2nd specimen of day	50 working days
Guthrie Card (New Born Screen)*	Blood	None 	Fill circles on Guthrie Card and dry	N/A	Take > 7 days after birth	25 working days
Haptoglobin*	Blood	None 	4.9	Blood Tube	None	15 working days
HbA1c Glycosylated Haemoglobin	Blood	Potassium EDTA 	2.7	Blood Tube	Please take separate sample for HbA1c analysis. Whole blood, do not centrifuge.	3 working days
Histamine (Urine)*	Urine	None	20	Sterile Universal	None	15 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Histamine (Plasma)*	Blood	Potassium EDTA 	2.7 x 2	Blood Tube x 2	None	15 working days
Homocysteine*	Blood	Sodium Citrate 	4.9 Adult 1.5 Paed	Blood Tube Blood Tube	Centrifuge & freeze immediately after specimen collection Paediatric Samples: Centrifuge & freeze immediately after specimen collection. Click here to access Metabolic Investigations Request Form and send with the sample	15 working days 15 Working days
Homogentistic Acid*	Early morning urine	None	20	Sterile Universal	Bring to lab immediately, must be frozen in <1 hr	15 working days
Hydroxyproline*	24 Hour urine collection	None	50	5L Urine container	Refer to section 4.3.2 Store urine in a refrigerator (+4°C) between each urination. At the end of collection, send the urine to the lab without delay DIET: within 48 hours prior to the assay, avoid consuming collagen-rich foods (meat, jelly or gelatin, ice creams, confectioneries, cold meats, etc.)	15 working days
Hypocretin (Orexin)*	CSF	None	1.0	Sterile Universal	Request this test using CSF form PL012.	Up to 60 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
IgA Immuno-globulin A	Blood	None	4.9 Adult 1.3 Paed	Blood Tube	None	1 working day Mon - Fri
IgA Subclasses*	Blood	None	4.9	Blood Tube	None	15 working days
IgD Im-muno-globulin D*	Blood	None	4.9	Blood Tube	None	15 working days
IgE Immuno-globulin E	Blood	None	4.9	Blood Tube	None	10 working days
IgG Immuno-globulin G	Blood	None	4.9 Adult 1.3 Paed	Blood Tube	None	1 working day Mon - Fri
IgG Immuno-globulin G Subclasses*	Blood	None	4.9	Blood Tube	None	15 working days
IgM Immuno-globulin M	Blood	None	4.9 Adult 1.3 Paed	Blood Tube	None	1 working day Mon – Fri
Immune Complexes*	Blood	None	4.9	Blood Tube	None	20 working days
Immunoreactive Trypsin*	Blood	None	4.9	Blood Tube	Bring to lab immediately, must be frozen in <1 hr	15 working days
Infliximab Antibodies*	Blood	None	4.9	Blood Tube	Please right click link to access Request Form choose 'Copy link address' from dropdown menu and paste the link into the Chrome browser, press return. Review request form for infliximab antibodies and levels and send with the sample. Sample must be taken before the next dose – trough level.	15 working days
Insulin Like Growth Factor 1 (IGF1)*	Blood	None	4.9	Blood Tube	Freeze serum < 4 hrs of specimen collection	15 working days
Insulin Like Growth Factor 2 (IGF2)*	Blood	None	4.9	Blood Tube	Freeze serum < 4 hrs of specimen collection	28 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Insulin Like Growth Factor Binding Protein 3 (IGF BP3)*	Blood	None 	4.9	Blood Tube	Freeze serum < 4 hrs of specimen collection	20 working days
Interleukin-6*	Blood	None 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <4 hrs	15 working days
Iron (Fe)	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Serum Kappa / Lambda (including Kappa Lambda Ratio)	Blood	None 	4.9	Blood Tube	Do not request a Kappa/ Lambda ratio if it is less than one month since the previous order for this test. In exceptional circumstances, please contact the Biochemistry Lab if a sample needs to be processed in a stated timeframe.	10 working days
24 hr Urine Kappa & Lambda*	24 hr urine collection	None	20	5L Urine Container	Do not request a urine Kappa/ Lambda if it is less than one month since the previous order for this test. In exceptional circumstances, please contact the Biochemistry Lab if a sample needs to be processed in a stated timeframe.	15 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Lactate	Blood	Fluoride EDTA (Adult Glucose Tube)	2.7	Blood Tube	Transport to Biochemistry immediately on ice.	♦ 120 mins ϕ
Lactate (Paediatric)	Blood	Fluoride EDTA (Adult Glucose Tube)	1.3	Blood Tube	Transport to Biochemistry immediately on ice.	♦ 120 mins ϕ
Lactate	CSF	Fluoride EDTA (Adult Glucose Tube)	Refer to form PL012 for volume	Blood Tube	Transport to Biochemistry immediately on ice.	♦ 120 mins ϕ
Lactate Dehydrogenase (LDH)	Blood	None 	4.9	Blood Tube	Do not transport by the Pneumatic Tube System	♦ 120 mins ϕ

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Lactate (Blood Gas)	Blood	Heparinsed Syringe	1.0	Blood Gas Syringe	Do not transport by the Pneumatic Tube System. Please walk sample immediately to Lab and ideally transport on ice. Sample must be assayed within 10 mins. Please state if venous or arterial as reference interval is different.	♦ 60 mins ϕ
Lactate Dehydrogenase (LDH Isoenzymes)*	Blood	None 	4.9	Blood Tube	Do not transport by the Pneumatic Tube System	15 working days
Lactate Dehydrogenase (LDH Fluid)	Fluid (pleural etc)	None	2	Sterile Universal	Do not transport by the Pneumatic Tube System	♦ 120 mins ϕ
Lamotrigine*	Blood	None	4.9	Blood Tube	Bring to lab immediately, must be frozen in <4 hrs	15 working days
Laxative Screen (Faeces)*	Faeces	None	20	Sterile Universal	None	25 working days
Laxative Screen (Urine)*	Urine	None	20	Sterile Universal	None	25 working days
Lead*	Blood	Potassium EDTA 	2.7 x 2	Blood Tube x 2	Whole blood, do not centrifuge	15 working days
Lead*	24 hour urine collection	None	30	5L Urine container	Refer to section 4.3.2	15 working days
Lipase*	Blood	None 	4.9	Blood Tube	None	15 working days

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BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Urinary Lipase*	24 hour urine collection preferably, otherwise single specimen	None	10	5L Urine container preferably otherwise Sterile Universal	Refer to section 4.3.2	15 working days
Lipoprotein (a)*	Blood	None 	4.9	Blood Tube	None	15 working days
Magnesium	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Magnesium (Urine)	24 Hour Urine collection	50mL 2M HCl	10	5L Urine container	Refer to section 4.3.2	1 working day Mon – Fri
Manganese*	Blood	Lithium Heparin 	7.5	Trace Metal-Free Tube	None	15 working days
Mercury*	Blood	Lithium Heparin 	7.5	Trace metal free tube (Bio)	None	20 working days
Mercury*	Spot Urine	None	100	Sterile Universal	None	15 working days
Metanephrines (Plasma)*	Blood	Lithium Heparin 	4.9 x 2	Blood Tube x 2	Bring to lab immediately, must be frozen in <30 mins	25 working days
Methaemoglobin	Blood	Lithium Heparin 	4.9	Blood Tube	Venous sample taken into blood gas syringe	<60 mins
Methylhistamine*	Urine	50mL 2M HCl	100	5L Urine Container	None	15 working days
Methyl Malonic Acid – Plasma	Blood	Lithium Heparin 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <60 mins	20 working days

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Microalbumin Creatinine Ratio	Spot Urine	None	10	Sterile Universal	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	1 working day
Beta 2 Microglobulin	Blood	None 	4.9	Blood Tube	None	1 working day Mon – Fri
Molybdenum*	Blood	Lithium Heparin 	7.5	Trace Metal-Free Tube	None	15 working days
Myoglobin*	Spot Urine	None	20	Sterile Universal	Sample needs to be frozen within 1 hour.	15 working days
Myoglobin Serum*	Blood	None 	4.9	Blood Tube	None	15 working days
NTx (N-telopeptide)*	Spot Urine	None	5	Sterile Universal	Freeze on day of collection, send to referral lab frozen.	15 working days
Occupational Health Drugs of Abuse Screen*	Urine	None	50	x 2 marked "A" and "B" Sterile Universal	Chain of custody kits (bottles A+B) must be ordered in advance via Biochemistry.	15 working days
Oligoclonal banding*	CSF	None	Refer to form PL012 for volume	Sterile Universal	Clotted blood taken simultaneously	20 working days
Oligoclonal banding (Small Volume)*	CSF	None	Refer to form PL012 for volume	Sterile Universal	Clotted blood taken simultaneously	15 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Organic Acids*	Spot Urine	None	10	Sterile Universal	Must be frozen. Send to lab immediately. Check pH in lab and if > 8.5 then a repeat sample must be obtained. Click here to access Metabolic Investigations Request Form and send with the sample	20 working days
Osmolality	Blood	None 	4.9	Blood Tube	None	♦ 1 working day 2 Hrs when taken as part of water depreviation test
Osmolality	Spot Urine	None	5	Sterile Universal	Send to lab immediately	♦ 1 working day 2 Hrs when taken as part of water depreviation test
Osteocalcin*	Blood	None 	4.9	Blood tube	Non Haemolysed Frozen serum required	10 working days
Oxalate*	24 hour urine collection	50 mL 20% HCl	20	5L Urine container	Refer to section 4.3.2	15 working days

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Oxalate/ Creatinine Ratio*	Spot Urine	None	5	Sterile Universal	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	15 working days
Oxalate*	Blood	None 	4.9 x 2	Blood tube x 2	Separated and frozen within 3 hours	15 working days
pH in Pleural Fluid	Fluid	Lithium Heparin 	1	Blood Gas Syringe	None	<60 mins ♦
Phosphate (Inorganic)	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Phosphate (Urinary)	24 hour urine collection	50 mL 2M HCl	10	5L Urine Container	Refer to section 4.3.2	1 working day Mon - Fri
Phytanic Acid*	Blood	Potassium EDTA 	2.7 x 2	Blood Tube x 2	Bring to lab immediately, must be frozen in <1 hr	15 working days
Porphyrins (Blood)* †	Blood	Potassium EDTA 	7.5	Blood Tube	Whole Blood. Protect from light (cover with tin foil and store at 4°C). Click here to access Porphyrin Request Form and send with the sample	15 working days

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Porphyrins (Faeces)* †	Faeces	None	10g	Sterile Universal	Protect from light, refrigerate. Click here to access Porphyrin Request Form and send with the sample	15 working days
Porphyrins (plasma)* †	Blood	Potassium EDTA 	7.5	Blood Tube	Protect from light. Click here to access Porphyrin Request Form and send with the sample	15 working days
Porphyrins (urine)* †	Urine	None	Random urine. Minimum volume of 5mL.	Sterile Universal	Protect from light (cover with tin foil and store at 4°C). Click here to access Porphyrin Request Form and send with the sample	15 working days
Potassium (K)	Blood Urine	None 	4.9	Blood Tube Sterile Universal	None	♦ 120 mins ϕ
Prealbumin*	Blood	None 	4.9	Blood Tube	None	15 working days
Procollagen Type-1 Pro Peptide*	Blood	None 	4.9	Blood Tube	None	15 working days
Procollagen 3*	Blood	None 	4.9	Blood Tube	Freeze serum <4 hrs after collection	20 working days
Protein Total	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Protein Total (CSF)	CSF	None	Refer to form PL012 for volume	Sterile Universal	None	♦ 120 mins ϕ
Protein Total (Fluid)	Fluid (pleural etc)	None	2	Sterile Universal	None	♦ 120 mins ϕ

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Protein (Urinary)	24 hour urine collection	None	10	5L urine container	Refer to section 4.3.2	1 working day
Protein Creatinine Ratio	Urine	None	10	Sterile Universal	Please note that the drugs Flucytosine and Eltrombopage can cause interference with the Creatinine method. Please inform the Laboratory if the patient is on either of these medicines so that Creatinine can be measured by a different method.	1 working day
PTH-Related Protein*	Blood	Potassium EDTA and Aprotinin 	7.5 mL tube with Aprotinin available from Specimen Reception	Blood Tube	Send on ice. Freeze plasma within 1 hr of specimen collection	25 working days
Pyruvate*†	Blood	Perchloric Acid	2	Special tube from Biochemistry	Contact Biochemistry for special tube before performing test.	25 working days
Red Cell Folate*	Blood	Potassium EDTA 	2.7 x 1	Blood Tube	Send both whole blood and serum for analysis	15 working days
		None 	4.9 x 1	Blood Tube		
Salivary Cortisol*	Saliva	None	1	Salivette	Contact Biochemistry for special containers.	20 working days
Selenium*	Blood	Lithium Heparin 	7.5	Trace Metal Free Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

† These tests require special patient preparation or conditions. For clarification purposes, please contact Biochemistry department before taking sample.

BIOCHEMISTRY TESTS – General……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Sodium (Na)	Blood Urine	None 	4.9	Blood Tube Sterile Universal	None	♦ 120 mins ϕ
Sperm Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Sulphonylureas*	Urine	None	2	Sterile Universal	Freeze within 4 hrs	15 working days
Thiopurine-S-Methyl Transferase (Red Cell) (TPMT)*	Blood	Potassium EDTA 	2.7	Blood Tube	Whole blood keep at 4°C	20 working days
Transferrin	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Transferrin Glycoform Analysis*	Blood	Lithium heparin 	1.3	Blood Tube	None	25 working days
Transferrin Saturation (Calculation)	Blood	None 	4.9	Blood Tube	None	120 mins ϕ
Triglycerides	Blood	None 	4.9	Blood Tube	If fasting triglyceride is required collect sample after 12 hrs fasting	♦ 120 mins ϕ
Triglycerides (Fluid)	Fluid	None	2	Sterile Universal	None	♦ 120 mins ϕ

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Troponin-I	Blood	Lithium heparin 	4.9	Blood Tube	Samples to be taken in accordance with Troponin Algorithm. Click here to access Troponin Algorithm.	♦ 120 mins ϕ
Tryptase*	Blood	None 	4.9	Blood Tube	When investigating anaphylactic shock take sample immediately after event and again at 2 and 4 hours.	20 working days
Tumour Necrosis Factor – Alpha (TNF Alpha)*	Blood	None 	4.9	Blood Tube	Bring to lab immediately. Must be frozen in < 4 hr	28 working days
Urate (uric acid)	Blood	None 	4.9	Blood Tube	None	♦ 120 mins ϕ
Urate (Urinary)	24 hour urine collection	50 mL 2.5 M NaOH	10	5L Urine Container	Refer to section 4.3.2	1 working day Mon - Fri
Urate (Fluid)	Fluid	None	2	Sterile Universal	None	♦ 120 mins ϕ
Urea	Blood Urine	None 	4.9	Blood Tube Sterile Universal	None	♦ 120 mins ϕ
Urinary Cotinine*	Urine	None	10	Sterile Universal	None	15 working days
Urinary Electrolytes (Na, K, Cl, Urea)	24 hour urine collection	None	10	5L Urine container	Refer to section 4.3.2	1 working day♦
Urinary Electrolytes (Spot) (Na, K, Cl, Urea)	Urine	None	5	Sterile Universal	None	1 working day♦
Urinary Na, K, Osmolality	Urine	None	5	Sterile Universal	Transport to lab immediately	♦ 120 mins ϕ

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Urine Purine and Pyrimidine Screen*	Urine	None	5	Sterile Universal	Store sample at 4°C	20 working days
Vedolizumab (Entyvio)*	Blood	None 	4.9	Blood Tube	Click here to access Request Form and levels and send with the sample. Sample must be taken before the next dose – trough level.	15 working days
Vigabatrin*	Blood	None 	4.9	Blood Tube	Bring to lab immediately, must be frozen in <4 hrs	15 working days
Viscosity*	Blood	Potassium EDTA 	7.5	Blood Tube	Keep at room temp	10 working days
Vitamin A* (Retinol)	Blood	Lithium Heparin 	4.9	Blood Tube	Protect from light. Freeze plasma in <1 hour of specimen collection	15 working days
Vitamin B_1* (Thiamine)	Blood	Potassium EDTA 	7.5	Blood Tube	Protect from light. Freeze blood within 4 hours of specimen collection	20 working days
Vitamin B_6* (Pyridoxal Phosphate)	Blood	Potassium EDTA 	2.7	Blood Tube	Protect from light Freeze blood within 4 hours of specimen collection	20 working days
Vitamin B_{12}	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Vitamin C* (Ascorbic Acid)	Blood	Lithium Heparin 	9	Blood Tube	Freeze plasma <1 hr of specimen collection. Store away from light.	20 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY TESTS – General…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Vitamin D (25 OH Vitamin D) A measure of overall reserves, dietary intake and endogenous sunlight dependent synthesis.	Blood	None 	4.9	Blood Tube	None	1 working day Mon - Fri
Vitamin D_3* (1, 25 (OH) $_2$ Vitamin D) A measure of Vitamin D metabolism.	Blood	None 	4.9 x 2	Blood Tube	Sample to be sent to Lab immediately. Serum to be frozen within 4 hrs of specimen collection.	20 working days
Vitamin E* (Tocopherol)	Blood	Lithium Heparin 	4.9	Blood Tube	Protect sample from light, bring to lab immediately, plasma to be frozen within 90 mins of collection	15 working days
Vitamin K* (Phylloquinone)	Blood	None 	4.9	Blood Tube	Protect sample from light, bring to lab immediately, serum to be frozen within 90 mins of collection	15 working days
Xylose	Blood	Fluoride 	2.7 Adult	Blood Tube	Contact Biochemistry for details of test	15 working days
Xylose	Urine	None	10	Sterile Universal	Contact Biochemistry for details of test	15 working days
Zinc*	Blood	Lithium Heparin 	7.5	Trace Metal Free Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

9.6 BIOCHEMISTRY PROFILES

On every patient where a serum creatinine has been ordered an estimated GFR is reported, using the CKD-EPI equation. It must be noted that this estimation of GFR is **not** suitable for the calculation of chemotherapy dosages where the existing eGFR will continue to be used. Where a patient has an eGFR requested the CKDEPI value will not be reported, in order to avoid any potential confusion.
Full information on the use of this equation and the interpretation of results can be found at http://www.kidney.org/professionals/kls/pdf/12-10-4004_KBB_FAQs_AboutGFR-1.pdf.

ADMISSION PROFILE INCLUDING FBC
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Glucose, Magnesium (Mg), FBC
Sample Requirements
Blood Tube (4.9mL) containing no additive Blood Tube (2.7mL) containing EDTA Glucose Tube Fluoride (2.7 adult, 1.3 paed)
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

CHILDREN'S WARD BIOCHEMISTRY
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Magnesium (Mg), Total Protein, Albumin, Globulin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), C – Reactive Protein (CRP), Random Glucose
Sample Requirements
Blood Tube (1.3mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY PROFILES……cont'd

LIPOPROTEIN PROFILE (FASTING)
Cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL)
Sample Requirements
Blood Tube (4.9mL) containing no additive
Special Requirements
Patient should be fasting for at least 12 hours before Phlebotomy (Fluids are allowed)
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

LIPID PROFILE (NON-FASTING)
Cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

LIVER/ RENAL / BONE PROFILE
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Magnesium (Mg)
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY PROFILES……cont'd

LIVER FUNCTION TESTS
Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

PATIENT PROFILE (NON FASTING)
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Cholesterol, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

PATIENT PROFILE (+LPP - FASTING)
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin
Sample Requirements
Blood Tube (4.9mL) containing no additive
Special Requirements
Patient should be fasting for at least 12 hours before Phlebotomy (Fluids are allowed)
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY PROFILES……cont'd

RENAL / BONE PROFILE
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Albumin, Phosphate, Alkaline Phosphatase (ALP), Total Protein, Globulin, Magnesium (Mg)
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

THYROID FUNCTION TESTS
Free Thyroxine (FT4), Thyroid Stimulating Hormone (TSH)
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
1 Working Day (Monday to Friday)

UREA / ELECTROLYTES / CREATININE
Sodium, Potassium, Chloride, Urea, Creatinine
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

UREA / ELECTROLYTES / CREATININE & LIVER
Sodium, Potassium, Chloride, Urea, Creatinine, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin
Sample Requirements
Blood Tube (4.9mL) containing no additive
Turn Around Time
♦ 120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

BIOCHEMISTRY PROFILES……cont'd

COUNTERWEIGHT PLUS FASTING PROFILE
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Cholesterol, Triglyceride, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), *HbA1c, Full Blood Count (FBC), Ferritin*, Free T4*, Thyroid Stimulating Hormone (TSH), Glucose Tolerance Test
Sample Requirements
Blood Tube (4.9mL) containing no additive Blood Tube (2.7mL) containing EDTA x 2 Glucose Tube Fluoride (2.7mL) x 2 if GTT requested
Turn Around Time
120 mins ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated. 1 working day for tests marked with *

♦ Tests provided in the emergency out of hours service.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

9.7 FLUID BATTERIES

9.7.1 Tests are ordered on non-standard body fluids (those other than blood, urine and CSF) depending on the site of the fluid as follows:-

Fluid Type	Tests
Pericardial	Total protein LDH Glucose
Peritoneal	Total protein Albumin Glucose
Pleural	Total protein Albumin LDH Glucose
Synovial	Total protein Albumin LDH Glucose

A clotted blood sample must be sent at the same time.

9.7.2 The appearance of the fluid sample will also be noted. In addition, if required the following tests are also available on fluid samples:-

- Alkaline phosphatase
- Amylase
- Cholesterol
- Creatinine
- Glucose
- Lactate
- Triglycerides
- Urate

9.8 Troponin Algorithm

In May 2014 a new high sensitivity Troponin I (hsTnI) method was introduced into routine use. The algorithm in Table 1 shows a suggested use of this assay in the evaluation of acute chest pain.

Please note that the new method differs from the previous assay in a number of ways:-

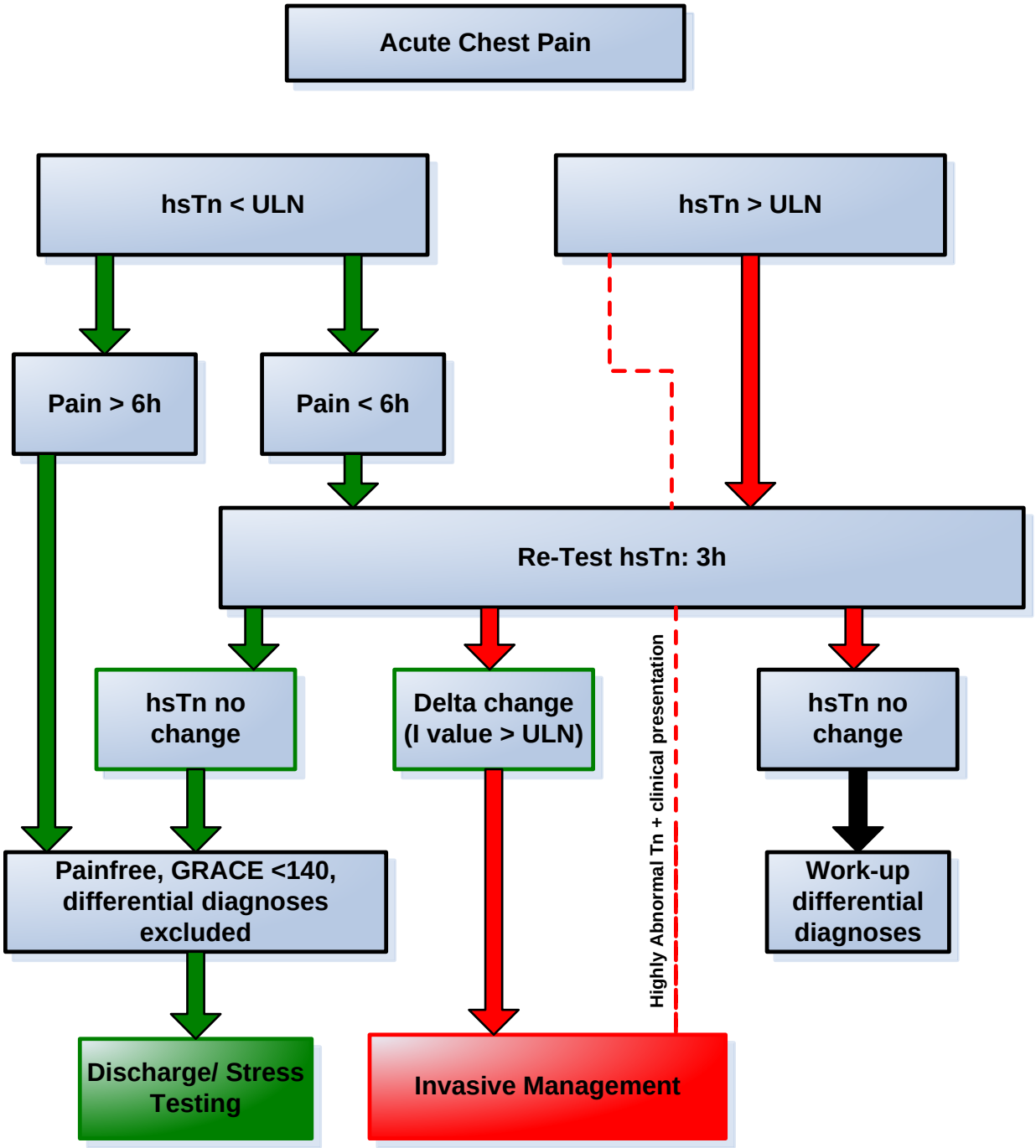
1. The units of hsTnI are ng/L (also equivalent to pg/mL) as opposed to µg/L. The numerical results change by a factor of 1000 so 0.04 µg/L will now be expressed as 40 ng/L.

2. There is a gender difference in the new method.
   Male: < 34 ng/L and Female: < 16 ng/L when reported to the nearest whole number.
   The reference interval for the existing method is < 0.05 µg/L (=> 50 ng/L) and does not differentiate male and female,

3. The new Algorithm can be used in the evaluation of Acute Chest Pain. This requires a measurement at presentation and again three hours later. The interpretation of the result is based not only on the absolute concentration but also on the change (delta) between the baseline and the second value. A delta change of 50% over the Baseline value and/or a value greater than the gender specific Upper Limit of Normal (ULN) is significant and should be investigated.

4. An abnormally high value of > 262 ng/L at presentation also supports the diagnosis of MI in an appropriate clinical context.

Table 1


Acute Chest Pain
hsTn < ULN
hsTn > ULN
Pain > 6h
Pain < 6h
Re-Test hsTn: 3h
hsTn no change
Delta change (I value > ULN)
hsTn no change
Highly Abnormal Tn + clinical presentation
Painfree, GRACE <140, differential diagnoses excluded
Work-up differential diagnoses
Discharge/ Stress Testing
Invasive Management

10.0 BLOOD TRANSFUSION

10.1 BLOOD TRANSFUSION TESTS

ABO incompatible transfusion can be a fatal but avoidable event. Erroneous patient identification and specimen labelling account for many errors that lead to ABO mismatched transfusion. If the blood in the tube used for pretransfusion compatibility testing is not that of the patient identified on the label i.e., 'Wrong blood in tube' (WBIT), this may lead to catastrophic outcomes, such as death from ABO-incompatible red cell transfusion. WBIT is a National Haemovigilance Office reportable incident.

Two-Sample Rule: The two-sample rule is a well-established guideline to improve patient safety by identifying cases of 'Wrong blood in tube' (WBIT). The Blood Bank must ensure that there are TWO distinct samples from a patient that have generated the same blood group from both samples.

If the Blood Bank already has a historic blood group registered on the Laboratory Information System, then only one Group and Screen/Crossmatch sample is required. If the patient has no previous records in Blood Bank, BSHC and is for crossmatch, then the Group and Screen/Crossmatch must be repeated with a second sample. Only one transfusion sample, whether for a Group and Screen or Group and Crossmatch, should be taken at initial phlebotomy.
It is **NOT** acceptable to take two samples at one venepuncture event and send them to Blood Bank on separate request forms as this does not improve patient safety.

If a Crossmatch request is received, or if a Group and Screen is converted into a Crossmatch, the Transfusion Laboratory will inform the clinical area if a second transfusion sample is required to confirm the patient's blood group. Where time does not permit a second sample to be taken, Group O red cells will be issued.

BLOOD TRANSFUSION TESTS

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Cold Agglutinins	Blood	Potassium EDTA 	7.5	Blood Tube	None	2 working days☼
Direct Antiglobulin Test	Blood	Potassium EDTA 	2.7	Blood Tube	None	4 hours♦

♦ Tests provided in the emergency out of hours service.
☼ These tests may not be performed until the following routine day if received after 16.00 hours on Monday to Friday

BLOOD TRANSFUSION TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Group and Crossmatch	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	Urgent requests, contact Blood Bank Laboratory See also section 10.3 titled "Life Threatening Haemorrhage". All samples are stored for 28 days only. After 28 days, a new sample must be taken for Group and Crossmatch. Note: If the patient has been transfused or pregnant in the last 3 mths, a new sample is required after 3 days. CHECK BLOOD TRACK FOR AVAILABILITY OF BLOOD	Routine: 4 hours (except pre-assessment, see note below) ^ Note: testing is prioritised according to patient need♦#
Group and Screen	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	Urgent requests, contact Blood Bank Laboratory See also section 10.3 titled "Life Threatening Haemorrhage". All samples are stored for 28 days only. After 28 days, a new sample must be taken for Group and Screen or Crossmatch. Note: If the patient has been transfused or pregnant in the last 3 mths, a new sample is required after 3 days.	Routine: 1 day. Note: testing is prioritised according to patient need♦#

\# Turnaround times may be significantly increased if:
- Antibodies are present
- Samples are referred to external site
- Patient is on treatment that affects serological transfusion tests e.g. Daratumumab

^ Crossmatch samples for pre-assessment clinic patients are taken up to 28 days in advance of surgery. The crossmatch will be done at a time that ensures the blood is available for the date and time stated on the request form.

♦ Tests provided in the emergency out of hours service.

BLOOD TRANSFUSION TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Human Leucocyte Antigen (HLA) Typing*	Blood	Potassium EDTA 	5 - 10	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
Human Leucocyte Antigen Antibodies*	Blood	None 	4.9	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
Transfusion Reaction Investigation	Blood	Potassium EDTA 	7.5	Blood Tube	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001)	10 working days Serological results will be available on the next routine day ∇
Platelet Antibodies*	Blood	None 	4.9 x 2	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
Platelet Genotyping by DNA*	Blood	Potassium EDTA 	10–20 Adult 1-2 Paed	Blood Tube	Samples should be received Mon to Thurs am.	10 working days

∇ Tests provided in the emergency out of hours service if authorised by a Consultant.

* These specimens/ samples are referred to external laboratories for testing.

10.2 BLOOD PRODUCTS/COMPONENTS FOR TRANSFUSION

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Albumin	None	None	None	None	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001)	Immediately♦
Anti D Immunoglobulin	None	None	None	None	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001)	Routine: 1 hour Urgent: Immediately♦
Coagulation Factor Concentrates	None	None	None	None	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001)	Not normally held in the Blood Bank. Advance notice during routine hours is required
Fibrinogen Concentrate	None	None	None	None	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001) See also section 10.3 titled "Life Threatening Haemorrhage"	Routine: 1 hour Urgent: Immediately ♦
Prothrombin Concentrate Complex (PCC)	None	None	None	None	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001)	Routine: 1 hour Urgent: Immediately ♦
Platelets●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	Urgent: Contact the Blood Bank. Platelets are not held in the Blood Bank routinely. They must be brought in from the IBTS. Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001). See also section 10.3 titled "Life Threatening Haemorrhage"	4 hours♦

♦ Tests provided in the emergency out of hours service.

● The blood specimen is required if the blood group has not been previously tested by the laboratory.

BLOOD PRODUCTS/COMPONENTS FOR TRANSFUSION…….cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Solvent Detergent Plasma (SDP) (Frozen Plasma)●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001) See also section 10.3 titled "Life Threatening Haemorrhage"	1 hour if blood group already know by laboratory otherwise 2 hours♦
Red Cells●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	Refer to Hospital Transfusion Handbook (BSC/HV/MAN/001) See also section 10.3 titled "Life Threatening Haemorrhage"	4 hours (routine)♦ See 10.1 Group and Screen and Group and Crossmatch
For details on other products, refer to Hospital Transfusion Book.						

♦ Tests provided in the emergency out of hours service.

● The blood specimen is required if the blood group has not been previously tested by the laboratory.

10.3 LIFE-THREATENING HAEMORRHAGE

Contact the Blood Bank Laboratory immediately Ext 1721 or front desk for Medical Scientist on call. State Massive Haemorrhage Protocol Activated in Location XXXX for patient YYYY.

Refer to the Hospital Transfusion Handbook BSC/HV/MAN/001 Life-Threatening Haemorrhage Protocol.

Where a clinical condition dictates that a transfusion is required prior to the completion of testing, the transfusion support may vary depending on the following:-

- the degree of clinical urgency
- the prior availability of the patient's sample and a validated blood group report in the hospital blood bank
- the presence of antibodies
- complex transfusion requirements where the sample must be referred to the Irish Blood Transfusion Service for serological investigations and crossmatch

NOTE:

2 Emergency O Neg red cell units and 2 x 1g Emergency Fibrinogen Concentrate are normally available in the Blood Bank Issue Fridge.

1 Emergency O Neg red cell unit and 2 x 1g Emergency Fibrinogen Concentrate are normally available in the Satellite Blood Fridge.

Uncrossmatched Group O or group specific blood can be issued in 15 minutes. Risks associated with use are identical to risks associated with use of O RhD negative uncrossmatched blood, but uses resources better i.e. unnecessary use of O RhD negative blood is avoided.

Crossmatched blood will be available in 40 – 60 minutes, provided a sample has been received or is already in the Blood Bank, and the patient does not have antibodies.

RhD Negative red cells are a scarce resource and small stocks (minimum 5 units) are held in the hospital. Female patients of childbearing potential are prioritised for transfusion of RhD Negative red cells. The decision to switch other patients to RhD positive red cells is made in consultation with the patient's treating doctor and Consultant Haematologist, where clinical need for transfusion must be prioritised over transport time of further RhD Negative blood from IBTS, or after transfusion of 10 units of RhD Negative red cells (IBTS policy).

Platelets are not normally held in the Blood Bank, BSHC and must be transported from MRTC, IBTS, St. Finbarr's Hospital, Cork. This takes 30 – 45 minutes from time of receipt of order, provided the patient's blood group is known. Group A platelets will be ordered if the patient's blood group is unknown.

Frozen plasma (SDP) is held in the Blood Bank, BSHC and takes 40 minutes to thaw and issue to a patient. Thawed Group AB SDP will be issued if the patient's blood group is unknown.

LIFE-THREATENING HAEMORRHAGE…… cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Group and Screen●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	**Contact Blood Bank Laboratory to check if blood sample is required**	45 minutes♦# From time of receipt of sample
Group and Crossmatch●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	**Contact Blood Bank Laboratory to check if blood sample is required and estimated time of availability of red cells**	40 – 60 minutes from time of receipt of sample. Emergency O Neg available immediately Uncrossmatched blood – 15 minutes♦# See above for further details
Red Cells●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	**Contact Blood Bank Laboratory to check if sample is required and estimated time of availability of red cells**	40 – 60 minutes if there is a valid sample already in the blood bank. Emergency O Neg available immediately Uncrossmatched blood – 15 minutes See Group and Crossmatch#
Platelets●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	**Contact Blood Bank Laboratory to check if sample is required and estimated time of availability of platelets.** **Platelets are not held in the Blood Bank routinely. See above for further details**	30- 45 minutes♦ from time of receipt of order See above for further details

\# Turnaround times may be significantly increased if:
- Antibodies are present
- Samples are referred to external site
- Patient is on treatment that affects serological transfusion tests e.g. Daratumumab

♦ Tests provided in the emergency out of hours service.

● The blood specimen is required if the blood group has not been previously tested by the laboratory.

LIFE-THREATENING HAEMORRHAGE…… cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Solvent Detergent Plasma (SDP) (Frozen Plasma)●	Blood	Potassium EDTA 	7.5 2.7 Paed	Blood Tube	**Contact Blood Bank Laboratory to check if sample is required.** **SDP needs to be thawed before it can be issued from the Blood Bank**	40 minutes♦ from time of receipt of order
Fibrinogen Concentrate	None	None	None	None	**Contact Blood Bank Laboratory**	Unlabelled – immediately Labelled for patient – 10 minutes♦ from time of receipt of order
HAEMATOLOGY TESTS DURING LIFE-THREATENING HAEMORRHAGE						
Full Blood Count (FBC) ◙	Blood	Potassium EDTA 	2.7 1.3 Paed	Blood Tube	**Contact Haematology Laboratory**	10 Min ♦ from time of receipt of order ϕ
INR and APTT	Blood	Sodium Citrate 	3	Blood Tube	**Contact Haematology Laboratory**	15-20 Min ♦ from time of receipt of order ϕ
Fibrinogen	Blood	Sodium Citrate 	3	Blood Tube	**Contact Haematology Laboratory**	1st request 35-40 Min further requests thereafter 15-20 Min ♦ from time of receipt of order ϕ
D-Dimer	Blood	Sodium Citrate 	3	Blood Tube	**Contact Haematology Laboratory**	15-20 Min ♦ from time of receipt of order ϕ

♦ Tests provided in the emergency out of hours service.

● The blood specimen is required if the blood group has not been previously tested by the laboratory on 2 separate occasions.

◙ In the event of the performance of manual blood films turnaround time is 2 hrs for Full Blood Counts.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

11.0 HAEMATOLOGY TESTS

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
11.1 BLOOD COUNTS AND ESR						
Erythrocyte Sedimentation Rate (ESR)	Blood	Potassium EDTA 	2.7 Adult 1.3 Paed	Blood Tube	None	2 hours Performed on-call at request of the Consultant Haematologist only
Full Blood Count (FBC)	Blood	Potassium EDTA 	2.7 Adult 1.3 Paed	Blood Tube	None	♦ 90 mins ϕ
Full Blood Count including Manual Blood Film Examination (FBC)	Blood	Potassium EDTA 	2.7 Adult 1.3 Paed	Blood Tube	None	♦ 120 mins ϕ
Reticulocyte Count	Blood	Potassium EDTA 	2.7 Adult 1.3 Paed	Blood Tube	None	90 mins ☼ ϕ
11.2 COAGULATION						
Activated Partial Thromboplastin Time (APTT)	Blood	Sodium Citrate 	3	Blood Tube	Testing must be complete within 4 hours of specimen collection	♦ 100 mins ϕ
D-Dimer	Blood	Sodium Citrate 	3	Blood Tube	Testing must be complete within 4 hours of specimen collection	♦ 100 mins ϕ
DOAC Level*	Citrated Plasma	Sodium Citrate 	7.5	Blood Tube	None	10 Working Days
Fibrinogen	Blood	Sodium Citrate 	3	Blood Tube	Testing must be complete within 4 hours of specimen collection	♦ 100 mins ϕ
International Normalised Ratio (INR)	Blood	Sodium Citrate 	3	Blood Tube	Testing must be complete within 6 hours of specimen collection	♦ 100 mins ϕ

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

☼ These tests may not be performed until the following routine day if received after 17.30 hours on Monday to Friday and after 12.30 on Saturdays.

ϕ Note: 95% of results reported for this test will achieve the turnaround time as stated.

HAEMATOLOGY TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
11.2 COAGULATION						
Heparin Induced Thrombocytopenia Screen (HITs)	Blood	2 Clotted Samples 	10	Blood Tube	Contact Laboratory. Samples must be received in lab immediately post Phlebotomy. **The type and amount of Heparin administered must be stated on request form.** Click here to access St. James's Test Request Form. All positive screens will be referred to SJH for confirmatory testing.	2 hours Samples referred to SJH 20 working days
Prothrombin Time (PT)	Blood	Sodium Citrate 	3	Blood Tube	Testing must be complete within 6 hours of specimen collection	♦ 100 mins ϕ
11.3 SPECIAL STAINING PROCEDURES						
Bone Marrow Aspirate	Bone Marrow Aspirate	None	N/A	Slides	Do not fix aspirate on ward. Aspirate will be fixed by staff in the laboratory.	4 working days if accompanied with biopsy. 3 working days if stand-alone
11.4 MISCELLANEOUS HAEMATOLOGY TESTS						
EMA Screen for Hereditary Spherocytosis*	Blood	Potassium EDTA 	7.5 + 2.7	Blood Tube	Monday to Wednesday mornings only	15 working days
Infectious Mononucleosis Screening Test (Monospot)	Blood	None  Potassium EDTA 	4.9 2.7	Blood Tube Blood Tube	None None	4 hours♦

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

HAEMATOLOGY TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
11.4 MISCELLANEOUS HAEMATOLOGY TESTS						
Malaria Parasites Screen (This includes Blood Film Examination and Screening Test for Plasmodium Antigens)	Blood	Potassium EDTA 	2.7	Blood Tube	Where possible thick and thin smears should be prepared by Lab personnel. During out of hours the laboratory staff must be directly contacted.	6 hours ♦
Urinary hCG (Pregnancy Test)	Urine	None	5-20	Sterile Universal	None	1 hour ♦
Sickle Cell Screen (HBS)*	Blood	Potassium EDTA 	2.7	Blood Tube	Order FBC and Ferritin when requesting HBS Screen	24 hours
11.5 COAGULATION TESTS REFERRED						
Coagulation Factor Assays*	Blood	Sodium Citrate 	3	Blood Tube	Samples should be received Mon to Thurs am	10 working days
Factor Xa activity (Heparin Assay)*	Blood	Sodium Citrate 	3	Blood Tube	Samples should be received Mon to Thurs am. Specimens must be taken between 2 and 4 hrs post last administration of Heparin. Indicate on request form if patient is on Clexane or Innohep.	10 working days
Inhibitor Screen*	Blood	Sodium Citrate 	3	Blood Tube	Samples should be received Mon to Thurs am	10 working days
Lupus Anticoagulant*	Blood	Sodium Citrate 	1 x 10 1 x 3.0	Blood Tube	Clinical information must be provided. If a patient is on anticoagulation therapy, it must be discontinued for 1 month prior to sample collection. Samples must be received into the Lab within 1 hr of collection.	10 working days

* These specimens/ samples are referred to external laboratories for testing.

HAEMATOLOGY TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
11.5 COAGULATION TESTS REFERRED						
Platelet Function Assessment (PFA 100)*	Blood	Sodium Citrate 	3 x 3	Blood Tube	Samples should be received Mon to Thurs am and by appointment with the laboratory	10 working days
Thrombophilia Screen*	Blood	Sodium Citrate  And Potassium EDTA  1 Clotted Sample 	1 x 10 1 x 3.0 2 x 2.7 1 x 4.9	Blood Tube	Clinical information must be provided. Click here to access Eurofins Biomnis Consent Form and send with the sample. If a patient is on anticoagulation therapy, it must be discontinued for 1 month prior to sample collection. Samples must be received into the Lab within 1 hr of collection.	15 working days
Von Willebrands Screen*	Blood	Sodium Citrate 	3 x 3	Blood Tube	Samples should be received Mon to Thurs am.	15 working days

* These specimens/ samples are referred to external laboratories for testing.

HAEMATOLOGY TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
11.6 SPECIALISED HAEMATOLOGY TESTS (REFERRED)						
ADAMTS 13 Factor Willibrand Cleavage Protease*	Peripheral Blood	Sodium Citrate 	3 x 3	Serum	Sample to be taken before any treatment, transfusion of plasma or any plasma exchange. Click here to access Biomnis Test Request Form and send with the sample.	20 working days
CD34 (Marker)*	Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
Glucose 6 Phosphate Dehydrogenase (G6PD)*	Blood	Potassium EDTA 	2.7 1.3 (Paed)	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
Haemoglobin Screening (Abnormal)*	Blood	Potassium EDTA x 2 	1.3	Blood Tube	Samples should be received Mon to Thurs am. Order Ferritin and FBC assays also.	10 working days
Leucocyte Immunopheno-Typing*♣ (Flow Cytometry)	Bone Marrow or Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
Leucocyte Immunopheno-Typing* (Flow Cytometry)	CSF	Not applicable	1	Sterile Universal	CSF can only be taken Mon, Tues and up to 12 noon Wed	10 working days
PNH (Flow Cytometry)*	Blood	Potassium EDTA 	5-10	Blood Tube	Samples can only be taken Mon, Tues, Wed and up to 12 noon Thurs	5 working days
Pyruvate Kinase*	Blood	ACD Whole Blood supplied by Biomnis 	5	Blood Tube	Samples should be received Mon to Thurs am.	10 working days

* These specimens/ samples are referred to external laboratories for testing.

♣ Please contact the Haematology Laboratory, if requesting Leucocyte Immunopheno-Typing in the investigation of leukaemia.

HAEMATOLOGY TESTS……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
11.6 SPECIALISED HAEMATOLOGY TESTS (REFERRED)						
T & B Lymphocytes*	Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs am.	10 working days
T Cell Lymphocyte (T4, T8) Subset Levels* (CD4, CD8)	Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs am.	10 working days

* These specimens/ samples are referred to external laboratories for testing.

11.7 HAEMATOLOGY PROFILES

COAGULATION SCREEN
Prothrombin Time (PT) International Normalised Ratio (INR) Activated Partial Thromboplastin Time (APTT)
Sample Requirements
Blood Tube (3mL) containing Sodium Citrate
Turn Around Time
♦ 100 mins

LUPUS ANTICOAGULANT
International Normalised Ratio (INR) Activated Partial Thromboplastin Time (APTT) Fibrinogen APTT with Lupus Sensitivity (AFSL) Lupus Anticoagulant Screen
Sample Requirements
Patients should not be on any anticoagulant therapy or have anticoagulant therapy discontinued for 1 month.
Turn Around Time
10 working days

♦ Tests provided in the emergency out of hours service.

11.7 HAEMATOLOGY PROFILES ……..cont'd

THROMBOPHILIA SCREEN
International Normalised Ratio (INR) Activated Partial Thromboplastin Time (APTT) Fibrinogen APTT with Lupus Sensitivity (AFSL) Lupus Anticoagulant Screen Activated Protein C Ratio (APCR) Anti-Thrombin 3 (AT3) Protein C (Pr C) Protein S (Pr S) Prothrombin Gene Mutation (PGM)
Sample Requirements
Patients should not be on any anticoagulant therapy or have anticoagulant therapy discontinued for 1 month.
Turn Around Time
10 working days

12.0 HISTOPATHOLOGY

12.1

- The "part type" description of a specimen as documented on the Histopathology request form by the Clinician is required for appropriate examination procedures relating to it.
- This description also forms part of the final diagnostic report and consequently historical medical record of a patient. Therefore, the accuracy of this description is an **essential** requirement.
- The Specimen Reception department in liaison with the Histopathology department may require clarification from the source of the specimen in cases where the description is absent, ambiguous or incomplete.
- Note that the specimen description should **not** include the procedure, previous diagnosis or clinical history. There is a separate area on the request form for this information.
- The time required to receive clarification may result in a delay of the final report. This can be avoided by the initial accurate completion of the specimen description on the request form.

The Histopathology National Quality Improvement (NQI) Programme divides Histopathology and Cytology specimens into categories according to the procedure (p) code within which turnaround times (TATs) are analysed.
It is presently increasingly difficult for Histopathology Departments nationally, including the BSHC Histopathology Department, to meet the NQI Target TAT for some routine cases. A process is in place to improve staffing and resources in the laboratory as we work towards achieving NQI Target TAT for all sample types. Our aim is to meet the NQI target TATs for all urgent cases. A realistic BSHC Target TAT for routine cases is included below.

Test/Profile/P Code	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container /Type***		
Small Biopsy (P01)	Fixed Tissue	Prefilled 10% Formalin Pot	Sufficient to fully immerse the specimen	Pre-filled container with lid firmly closed	None	80% of cases by Day 10
GI Endoscopic Biopsy (P02)	Fixed Tissue	Prefilled 10% Formalin Pot	Sufficient to fully immerse the specimen	Pre-filled container with lid firmly closed	None	80% of cases by Day 10
Non-Biopsy Cancer Resection (P03)	Fixed Tissue	Prefilled 10% Formalin Pot	Sufficient to fully immerse the specimen	Pre-filled container with lid firmly closed	None	80% of cases by Day 7

Test/Profile/P Code	Specimen Type	Specimen Requirements			Specimen Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container /Type***		
Non-Biopsy Other (P04)	Fixed Tissue	Prefilled 10% Formalin Pot	Sufficient to fully immerse the specimen	Pre-filled container with lid firmly closed	None	80% of cases by Day 14
Non Gynae Cytology FNA (P06)	Fluid/FNA/ Fixed slide	Neat or in Saline or Cytospin Collection fluid	Approx 10mls	Standard sterile Universal container	None	80% of cases by Day 10
Non Gynae Cytology Exfoliative (P07)	Fluid/Brush/ Fixed Slide	Neat or in Saline or Cytospin Collection fluid	Approx 10mls	Standard sterile Universal container	None	80% of cases by Day 10
Frozen Section (Q007)	Fresh Tissue	None	N/A	Dry/ empty Histopathology Container	• **Tissue for frozen sections must be hand delivered to Specimen Reception between 9 - 4.00pm Mon – Fri.** • **3 hrs notice to the Lab is required for planned frozen sections.**	20 mins

Factors that may impact target TAT include the following:-

- Requirement to obtain additional clinical/radiological information
- Requirement for longer fixation in some cases (TAT may take >/= 20 working days)
- Requirement for specimen decalcification
- Requirement to examine a large number of blocks/slides in a case
- Requirement for ancillary testing including levels, immunohistochemistry, special stains and Molecular Pathology
- Requirement for Intradepartmental Consultation

For cases sent externally for reporting (e.g. Gynae cytology cases, cases that require direct immunofluorescence), our target TAT is as per the target TAT stated in the Histopathology laboratory manual for the department reporting the case.

12.2 Molecular Genetic Testing on Tumours

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container /Type***		
Colorectal Panel*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Pathologist selected material upon request	10 working days
Gastric Her2*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Selected carcinomas requiring ISH confirmation.	10 working days
GIST Panel*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Pathologist selected material upon request	15 working days
Her 2 ISH Analysis (Breast Carcinomas)*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Selected breast carcinomas requiring ISH confirmation. Notify Lab of urgent cases.	10 working days
Lung Panel*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Pathologist selected material upon request	10 working days
Melanoma Panel*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Pathologist selected material upon request	10 working days
Microsatellite Instability*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Pathologist selected material upon request. Requires MMR first, liaise with Pathologist.	20 working days
Oncomine*	Paraffin Embedded Fixed Tissue	N/A	N/A	N/A	Pathologist selected material upon request	20 working days

***** These specimens/ samples are referred to external laboratories for testing.

12.3 CYTOPATHOLOGY

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements
		Additive Required	*Volume Required mL*	*Container Type*	
Biliary Brush Sample	Brush	Cytology Collection Fluid	N/A	Universal	None
Body Fluid (Various)	Fluid	None	N/A	Universal	Where possible, if Microbiology required, please send additional sample.
Bronchial Lavage	Fluid	None	N/A	Universal	Where possible, if Microbiology required, please send additional sample.
Cervical Specimen (Thin Prep) and HPV*	Fluid	Prefilled Thin Prep Collection Fluid	N/A	Thin Prep Vial	Click here to access Biomnis Cytology Test Request Form and send with the sample.
Cerebrospinal Fluid (CSF)	Fluid	None	Refer to form PL012 for volume	Universal	Where possible, if Microbiology required, please send additional sample. Request this test using CSF form PL012.
Fine Needle Aspirate (FNA) (Breast)	Slides	None	N/A	Slide Holder	Alcohol spray fix at time of preparation
Fine Needle Aspirate (FNA) (Breast)	Fluid	Cytospin Collection Fluid	N/A	Universal	None
Fine Needle Aspirate (FNA) (Not Breast)	Slides	None	N/A	Slide Holder	Alcohol spray fix at time of preparation
Fine Needle Aspirate (FNA) (Not Breast)	Fluid	Cytospin Collection Fluid	N/A	Universal	None
Hepatic Brush Sample	Brush	Cytospin Collection Fluid	N/A	Universal	None
Sputum	Sputum	None	N/A	Universal	Where possible, if Microbiology required, please send additional sample.

* These specimens/ samples are referred to external laboratories for testing.

13.0 IMMUNOLOGY

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Adrenal Antibody*	Blood	None 	4.9	Blood Tube	None	30 working days
ANCA (Anti-Neutrophil Cytoplasmic Antibodies)	Blood	None 	4.9	Blood Tube	Notify Immunology lab @ 1997 of all urgent ANCA requests	Urgent - 1 working day Routine BSHC - 2 working days Routine other sites – 3 working days
Antinuclear Antibody (ANA)	Blood	None 	4.9	Blood Tube	None	5 working days
Aquaporin 4 Antibody*	Blood	None	4.9	Blood Tube	None	20 working days
Autoantibody Screen (ANA, AMA, LKM, SMA, GPCA)	Blood	None 	4.9	Blood Tube	None	5 working days
Avian Precipitins*	Blood	None 	4.9	Blood Tube	None	15 working days
Bullous Antibodies*	Blood	None 	4.9	Blood Tube	None	20 working days
CASPR2 Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days
CASPR2 Antibody*	CSF	None	0.5	Universal	Request this test using CSF form PL012.	20 working days
Cyclic Citrullinated Peptide Antibody (CCP)	Blood	None 	4.9	Blood Tube	None	3 working days
dsDNA Antibody	Blood	None 	4.9	Blood Tube	None	5 working days
Endomysial IgA Antibody	Blood	None 	4.9	Blood Tube	None	4 working days
Extractable Nuclear Antigen (ENA Screen)	Blood	None 	4.9	Blood Tube	None	3 working days
GABA and AMPA Receptor Antibodies*	Blood	None 	4.9	Blood Tube	None	20 working days
GABA and AMPA Receptor Antibodies*	CSF	None	0.5	Universal	Request this test using CSF form PL012.	20 working days

* These specimens/ samples are referred to external laboratories for testing.

IMMUNOLOGY..... cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Ganglioside Antibodies* (Anti GM1 and GQ1b)	Blood	None 	4.9	Blood Tube	None	20 working days
Ganglioside Antibodies* (Anti GM1 and GQ1b)	CSF	None	0.5	Universal	None	20 working days
Ganglionic Acetylcholine Receptor Antibody*	Blood	None 	4.9	Blood Tube	None	40 working days
Glomerular Basement Membrane Antibody (GBM)	Blood	None 	4.9	Blood Tube	None	5 working days
Gliadin Antibodies (IgA, IgG)*	Blood	None 	4.9	Blood Tube	None	10 working days
Glycine Receptor Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days
Intrinsic Factor Antibody	Blood	None 	4.9	Blood Tube	None	3 working days
Islet Cell Antibody*	Blood	None 	4.9	Blood Tube	None	30 working days
LGI1 Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days
LGI1 Antibody*	CSF	None	0.5	Universal	Request this test using CSF form PL012.	20 working days
MUSK Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days
Myelin Associated Glycoprotein Antibody (MAG)*	Blood	None 	4.9	Blood Tube	None	10 working days
Myelin Oligodendrocyte Glycoprotein Antibody (MOG)*	Blood	None 	4.9	Blood Tube	None	20 working days
Myositis Marker Antibodies (Anti Synthetase Antibodies)*	Blood	None 	4.9	Blood tube	None	15 working days
Neuronal Antibodies*	Blood	None 	4.9	Blood Tube	None	20 working days

* These specimens/ samples are referred to external laboratories for testing.

IMMUNOLOGY..... cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
NMDA Receptor Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days
NMDA Receptor Antibody*	CSF	None	Refer to form PL012 for volume	Universal	None	20 working days
Ovarian Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days
Phospholipid Antibodies* (IgG and IgM Cardiolipin and β2 Glycoprotein Antibodies)	Blood	None 	4.9	Blood Tube	None	20 working days
Rheumatoid Screen (RF Latex & CCP)	Blood	None 	4.9	Blood Tube	None	3 working days
Thyroglobulin Antibody*	Blood	None 	4.9	Blood Tube	None	10 working days
Thyroid Peroxidase Antibody (TPO)	Blood	None 	4.9	Blood Tube	None	3 working days
TSH Receptor Antibody*	Blood	None 	4.9	Blood Tube	None	10 working days
tTG IgA Antibody (Positive tTG will be followed by an Endomysial IgA Antibody Test)	Blood	None 	4.9	Blood Tube	None	3 working days
Voltage Gated Calcium Channel (VGCC) Antibody*	Blood	None 	4.9	Blood Tube	None	20 working days

* These specimens/ samples are referred to external laboratories for testing.

14.0 MICROBIOLOGY TESTS

14.1 General Bacteriology

Turnaround times are based on routine specimens. In some cases, additional testing and/ or referral may be required. This will extend expected turnaround times.
Amies charcoal swabs are manufactured with raw material products which are Latex free.

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Acid Fast Bacilli Culture (AFB/ TB Culture) (Mycobacterium Species)	Sputum Pus Pleural fluid Other body fluids	None	5-10 as available as available as available	Sterile universal container	Refer to section 14.3.1	Up to 45 days Interim AAFB smear report available @ 1 working day
	Bone marrow	None	as available	Special bone marrow/ TB culture bottle	Bottle available from Microbiology dept. on request	
	Urine (EMU)	None	10-20	Sterile universal container		
	Tissue	None	as available	Sterile universal container	Do not use Formalin with tissue	
	Bronchial lavage\brushings	None	as available	Specimen trap container		
	Swabs	None	N/A	Charcoal Swabs	2 pus swabs required or tissue accompanied by pus swab	

MICROBIOLOGY - General Bacteriology ..... cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Blood Cultures for Adult	Blood	None	10 added to each bottle	BacT Alert Bottles aerobic (green) and anaerobic (orange)	Refer to section 14.3.2 of this document	**Positives:** **Gram Stain:** 5 hrs **Preliminary Culture:** 1 working day from detection **Full Report and Susceptibility:** 2 working days from detection **Negatives:** 5 working days except in cases of infective endocarditis where it is 10 days. Updated reports available on PIMS ♦
Blood Cultures for Babies and Children	Blood	None	1-4 per bottle	Paediatric BacT Alert Bottle Paediatric (yellow)	Refer to section 14.3.2 of this document	**Positives:** **Gram Stain:** 5 hrs **Preliminary Culture:** 1 working day from detection **Full Report and Susceptibility:** 2 working days from detection **Negatives:** 5 working days except in cases of infective endocarditis where it is 10 days. Updated reports available on PIMS ♦
Bacterial PCR*	Fluids/ Tissues from normally sterile sites	None	0.5 mL or Fingernail size piece of tissue	Sterile Universal Container	None	15 Working Days

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

MICROBIOLOGY - General Bacteriology ..... cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Cerebrospinal Fluid for Cryptococcus Culture	CSF	None	Refer to form PL012 for volume	Sterile universal container	None	4 working days
Cerebrospinal Fluid for Microscopy, Culture and Susceptibility	CSF	None	Refer to form PL012 for volume	Sterile universal container	Refer to section 14.3.3 of this document	2 working days♦ Interim verbal microscopy results available within 2 hrs
COVID 19 PCR	Naso-pharyngeal & Throat Swab	None	Viral UTM Swab	Viral UTM Swab 	Refer to section 14.3.18	Up to 2 working days
Faeces For Clostridium difficile Toxin	Faeces	None	5-10	Sterile universal container	Detection of **Clostridium difficile Toxin A and B** in suspect pseudo-membranous colitis or antibiotic-associated diarrhoea or where indicated.	1 working day

♦ Tests provided in the emergency out of hours service.

MICROBIOLOGY TESTS – General Bacteriology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Faeces for Clostridium difficile antigens – GDH Glutamate dehydrogenase	Faeces	None	5-10	Sterile universal container	Detection of **Clostridium difficile antigens** (predominately Glutamate dehydrogenase GDH)	1 working day
Faeces for Cryptosporidium	Faeces	None	5-10	Sterile universal container	This test will routinely be performed on all samples from the children's ward and all fluid samples.	2 working days
CPE/ESBL/VRE Screen	Rectal Swab	None	Not relevant	Copan FecalSwab 	Refer to section 14.3.14 VRE Screens	4 working days
Faeces For Intestinal Pathogens	Faeces	None	5-10	Sterile universal container	Faecal Culture for Salmonella, Shigella, Campylobacter, E. coli 0157 and other gastrointestinal pathogens depending on clinical details supplied. Please include history of foreign travel and/ or consumption of shellfish.	2 working days

MICROBIOLOGY TESTS – General Bacteriology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Faeces Occult Blood	Faeces	None	5-10	Sterile universal container	None	1 working day
Faeces For Ova Cysts and Parasites*	Faeces	None	5-10	Sterile universal container	See 14.3.15 Please state clinical history including foreign travel.	10 working days
Faeces for Rotavirus and Adenovirus	Faeces	None	5-10	Sterile universal container	This test is performed routinely on children 5 years or age or less.	2 working days
Fluid from Sterile Site for Culture and Susceptibility	Amniotic fluid Ascitic fluid Bursa fluid Pericardial fluid Peritoneal fluid Pleural fluid	None	5-10	Sterile universal container	Refer to sections 14.3.4 and 14.3.5 of this document	2 working days
	Synovial (Joint) fluid					♦
Helicobacter pylori culture*	Two gastric biopsies should be taken, one from the antrum and one from the body of the stomach which are embedded in Portagerm pylori transport medium	None	Not relevant	Portagerm pylori medium is available from Micro	Micro must be notified 1 day in advance of biopsies being taken and samples must be transported to Microbiology ASAP	15 working days
MRSA Screen	Miscellaneous Swabs	None	Not relevant	Charcoal Swab	Refer to section 14.3.12 MRSA screens	2 working days
Mycology, Fungal Culture	Skin Scrapings, Hairs, Nail Clippings, Tissue	None	5 pieces	Sterile Universal container or Dermapak	Refer to section 14.3.5 of this document	Up to 15 working days. Interim microscopy reports available @ 1 working day

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♦ Tests provided in the emergency out of hours service.

MICROBIOLOGY TESTS – General Bacteriology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Pharmacy Culture	TSA plates and SAB plates	None	N/A	Agar plate	Fungal growth phoned directly to Pharmacy	2 working days for TSA plates 7 working days for SAB plates
Sputum for Culture and Sensitivities **Bronchial Lavage** for culture and sensitivity	Sputum Bronchial lavage/aspirate/ brushings/ washings/ alveorlavage Transthoracic/ Transtracheal aspirate	None	5-10	Sterile universal container	Refer to section 14.3.6 of this document	2 working days

MICROBIOLOGY TESTS – General Bacteriology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Swabs for Culture and Sensitivity including ear, eye, mouth, throat, nasal, high vaginal swab (HVS), penile, cervical, urethral, wound and ulcer	Swabs	None	Not relevant	Special adult ear swab (charcoal) available from Microbiology dept. 	Refer to sections 14.3.7 Eye 14.3.8 Throat 14.3.9 Nasal 14.3.10 HVS, penile and cervical 14.3.11 Wound 14.3.5 Fungal	2 working days
Swabs for Whooping Cough (Bordetella pertussis)	Per nasal Swab	None	Not Relevant	Special pernasal swab available from Microbiology dept. 	None	Up to 7 working days

MICROBIOLOGY TESTS – General Bacteriology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Tissue for Culture and Sensitivity	Tissue	None	Not Relevant	Universal container filled with 0.85% saline and ballotini beads	Refer to section 14.3.5 Do not use Formalin	2 working days
Tips for culture and sensitivity	CVP or Hickman lines Central/arterial /portacath/ venous tips Cannula tips	None	Not Relevant	Sterile universal container	The culture of urinary catheter tips is not clinically useful and they will not be processed in the laboratory. For central/ arterial / portacath tips please send distal 4 cms (cut using sterile scissors)	2 working days
Urine for Microscopy, culture and sensitivities	Urine MSU CSU CATCH BAG Supra Pubic Ileal Conduit	None	10	Sterile universal container	Refer to section 14.3.13 of this document	2 working days♦
Urine Bilirubin	Urine	None	5-20	Sterile Universal Container	None	1 working day♦

♦ Tests provided in the emergency out of hours service.

14.2 MICROBIOLOGY TESTS – Serology

Please see section 14.3.17 for general notes and requesting guide for Virology/ Serology tests

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Aciclovir Pre Levels*	Blood	None 	4.9	Blood Tube	None	15 working days
Aciclovir Post Levels*	Blood	None 	4.9	Blood Tube	Post dose sample should be taken either 1 hr after the end of IV administration or 2 hrs after oral administration.	15 working days
Adenovirus Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Antibiotic assay Aminoglycosides including **Amikacin* Gentamicin Tobramycin** **Glycopeptides** including **Vancomycin Teicoplanin***	Blood	None 	4.9	Blood Tube	Refer to Gentamicin & Tobramycin Once Daily Guideline Refer to Endocarditis Infection Guideline. Refer to Vancomycin Dosing & Monitoring Guideline Refer to Amikacin Dosing and Monitoring Guideline Amikacin Teicoplanin	Gentamicin 3 hours♦ Vancomycin 3 hours♦ 1 working day 5 working days
Anti Streptolysin – O Titre (ASOT)	Blood	None 	4.9	Blood Tube	Useful for the investigation of Group A Beta-haemolytic Streptococcal infection or post-streptococcal disorder e.g. rheumatic fever. Normal Findings: Titre of 0 - 200 Todd units per ml.	1 working day
Amoebiasis Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Aspergillus Antibodies*	Blood	None 	4.9	Blood Tube	Aspergillus antibody titres may be useful in the investigation of allergic broncho-pulmonary aspergilloma.	15 working days
Aspergillus Antigen (Galactomannan (GM))* (Acute Infection)	Blood	None 	4.9	Blood Tube	Aspergillus antigen detection may be useful in invasive aspergillosis. See section 14.3.17.	15 working days
Beta Glucan Antigen*	Blood	None 	4.9	Blood Tube	Aspergillus antigen detection may be useful in invasive aspergillosis. See section 14.3.17.	15 working days
Bartonella henselae Antibodies (CATSCRATCH FEVER)*	Blood	None 	4.9	Blood Tube	Special form available in the Microbiology dept.	15 working days
Blastomyces Antibodies*	Blood	None 	4.9	Blood Tube	Clinical requests for this test need to have a travel history. Click here to access referral lab request form and send with the sample.	15 working days
Bordetella pertussis Anti-toxin Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Brucella Serology (Titre)*	Blood	None 	4.9	Blood Tube	Clinical information is essential. Please complete relevant clinical details on back of Serology test request form.	15 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Campylobacter Antibodies*****	Blood	None 	4.9	Blood Tube	Note: Camplylobacter serology is **NOT** available for the diagnosis of acute Campylobacter infection. The test is valid only for possible sequelae arising from previous Campylobacter infections.	15 working days
Chikungunya Serology*	Blood	None 	4.9	Blood Tube	Test is only performed following prior discussion with the Reference Laboratory	15 working days
Chlamydia pneumoniae IgM*	Blood	None 	4.9	Blood Tube	Refer to section 14.3.17 Restricted test: will only be referred following approval from Consultant Microbiologist.	15 working days
Chlamydia sp. specific Antibodies***** (includes C. trachomatis, C. pneumoniae and C. psittaci)	Blood	None 	4.9	Blood Tube	None	15 working days
Chlamydia trachomatis/ Gonorrhoea/ Trichomonas (PCR)*	Urethral Swab Cervical Swab Eye Swab Urine	None	Not relevant	Special swabs available from Micro Sterile universal container	None	10 working days
Creutzfeldt-Jakob Disease* (14-3-3 Protein)	CSF	None	CSF no. 3 with min volume of 1.5	Sterile universal container	Click here to access CJD Request Form and send with the sample. Samples need to be sent to the Lab within 30 mins of aspiration. It is essential that clinical details, MRI and EEG results are included.	35 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Cytomegalovirus CMV Culture*	Viral Throat Swab, Urine, BAL	None	5	Swab Sterile universal container	None	15 working days
Cytomegalovirus (CMV) PCR*	Blood CSF Urine Bronchial Lavage Throat Swab	Potassium EDTA Whole Blood, Plasma 	4.9 0.5	Blood Tube Sterile universal container	Please send to Laboratory immediately as sample must be frozen For CSF specimens, document request on form PL012.	15 working days
CMV IgG*	Blood	None 	4.9	Blood Tube	None	10 working days
CMV IgM	Blood	None 	4.9	Blood Tube	None	3 working days
Coccidioides Antibodies*	Blood	None 	4.9	Blood Tube	Clinical requests for this test need to have a travel history. Click here to access referral lab request form and send with the sample.	15 working days
Coxiella burnetii* (Q Fever Antibodies)	Blood	None 	4.9	Blood Tube	Refer to section 14.3.17. Please complete relevant clinical details on back of Serology test request form.	15 working days
Cryptococcal Antigen*	Blood CSF	None  N/A	4.9 Refer to form PL012 for volume	Blood Tube Sterile Universal Container	None	15 working days
Dengue Virus Serology*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Diptheria IgG (Immunity)*	Blood	None 	4.9	Blood Tube	None	15 working days
Echinococcus Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Enterovirus Culture*	Faeces Pleural Fluid CSF Viral Throat Swab	None None	10-20 Refer to form PL012 for volume 1	Sterile Universal Container Viral Swab	None	15 working days
Enterovirus PCR*	CSF Stool Respiratory Excretions Viral Skin Swab Viral Throat Swab Vesicle Fluid	None	0.5	Sterile Universal Container Viral Swab	For CSF specimens, document request on form PL012.	15 working days
Epstein-Barr virus IgG*	Blood	None 	4.9	Blood Tube	None	15 working days
Epstein-Barr virus IgM*	Blood	None 	4.9	Blood Tube	None	15 working days
Epstein-Barr virus PCR*	Blood	Potassium EDTA 	4.9	Blood Tube	Transport to the lab immediately. Specimen must be spun and separated within 6 hrs. Specimen is sent **frozen** to the reference lab.	15 working days
Farmers Lung Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Filaria Serology*	Blood	None 	4.9	Blood Tube	None	15 working days
Francisella tularensis*	Blood	None 	4.9	Blood Tube	None	15 working days
Haemophilius influenzae Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Haemophilus influenzae PCR*	Blood	Potassium EDTA 	2.7 (1mL minimum)	Blood Tube	Sample taken pre-antibiotic. Transport to the lab immediately.	10 working days
	CSF	None	0.5	Sterile Universal Container	For CSF specimens, document request on form PL012.	
Helicobacter pylori IgG Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Hepatitis A Antibodies Total*	Blood	None 	4.9	Blood Tube	None	10 working days
Hepatitis A IgM	Blood	None 	4.9	Blood Tube	None	2 working days
Hepatitis B Surface Antibodies (Immunity Check)	Blood	None 	4.9	Blood Tube	None	3 working days
Occupational Health Additional Method	Blood	None 	4.9	Blood Tube	None	15 working days
Hepatitis B Core Antibodies	Blood	None 	4.9	Blood Tube	None	2 working days
Hepatitis B DNA*	Blood	None  Potassium EDTA 	4.9	Blood Tube	Transport to the lab immediately. Specimen must be spun and separated within 6 hrs. Specimen is sent **frozen** to the reference lab.	15 working days
Hepatitis B (VRL Markers)*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Hepatitis B surface Antigen (HbsAg)	Blood	None 	4.9	Blood Tube	None	2 working days
Hepatitis C Antibodies	Blood	None 	4.9	Blood Tube	None	2 working days
Hepatitis C PCR (Polymerase Chain Reaction)*	Blood	Potassium EDTA Whole Blood Plasma 	9	Blood Tube	Deliver specimen to laboratory immediately	10 working days
Hepatitis D Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Hepatitis E Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Herpes simplex Antibodies*	Blood	None 	4.9	Blood Tube	Please discuss with Microbiologist	15 working days
Herpes simplex PCR*	Viral Swab CSF	N/A None	N/A Refer to form PL012 for volume	Viral Swab Sterile Universal	None None	15 working days 15 working days
Histoplasma Antibodies*	Blood	None 	4.9	Blood Tube	Clinical requests for this test need to have a travel history. Click here to access referral lab request form and send with the sample.	15 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
HIV PCR*	Blood	Potassium EDTA 	4.9	Blood Tube	Transport to the lab immediately. Specimen must be spun and separated within 6 hrs. Specimen is sent **frozen** to the reference lab.	20 working days
HIV Antigen/ Antibody Test	Blood	None 	4.9	Blood Tube	None	2 working days
HTLV 1 and 2*	Blood	None 	4.9	Blood Tube	None	15 working days
Human Herpes virus 6*	Blood	None 	4.9	Blood Tube	None	15 working days
Influenzae A and B	Naso-pharyngeal Aspirate or nasal and throat swab only	None	1mL Naso-pharyngeal Aspirate Viral UTM Swab	Sterile Universal Container or Viral UTM Swab 	Refer to section 14.3.17	3 hours during routine hours Test performed between 9am – 11pm 7 days a week♦
Extended Resp. Panel	Nasal and throat swab only	None	Viral UTM Swab	Viral UTM Swab 	Standard test for CCU/Oncology. All other requests Consultant to Consultant Microbiologist only. Refer to section 14.3.17	1 working day

* These specimens/ samples are referred to external laboratories for testing.

♦ Tests provided in the emergency out of hours service.

MICROBIOLOGY TESTS – Serology……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Legionella pneumophila urinary antigen test	Urine	None	20	Sterile Universal Container	Refer to section 14.3.17	2 working days
Legionella Culture*	Sputum or Bronchial Lavages	None	4	Sterile Universal Container	None	15 working days
Leishmania Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Leishmania Detection*	Skin Bone Marrow Biopsies	None	N/A	Sterile Universal Container	Transport to the Laboratory immediately	15 working days
Leptospira Antibodies*	Blood	None 	4.9	Blood Tube	None	10 working days
Lymes Disease (Borrelia burgdorferi) Antibodies*	Blood CSF	None  None	4.9 500µl	Blood Tube Sterile Universal Container	Please complete relevant clinical details on back of Serology test request form.	15 working days 15 working days
Lymphoma Viral Screen	Blood	None 	4.9	Blood Tube	Refer to section 14.3.17	2 working days
Measles IgG*	Blood	None 	4.9	Blood Tube	None	15 working days
Measles IgM*	Blood	None 	4.9	Blood Tube	Click here to access Oral Fluid Specific Request Form	15 working days
	Saliva	Oracol Swab (i.e. Salivary Swab)	N/A	Special foam salivary swabs available in Micro.		
Measles RNA PCR*	Saliva	Oracol Swab (i.e. Salivary Swab)	N/A	Special foam salivary swabs available in Micro.	Click here to access Oral Fluid Specific Request Form	15 working days
CSF PCR Panel	CSF	None 	0.5	Sterile Universal Container	Document request on form PL012.	1 working day

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Mumps IgG*	Blood	None	4.9	Blood Tube	None	15 working days
Mumps IgM*	Blood	None	4.9	Blood Tube	None	15 working days
	Saliva	Salivary Swab	N/A	Special foam salivary swabs available in Microbiology	Click here to access Oral Fluid Specific Request Form	
Mycobacterium TB PCR*	CSF or other normally sterile fluid	None	0.5	Sterile Universal Container	For CSF specimens, document request on form PL012	15 working days
Mycoplasma pneumoniae IgM	Blood	None	4.9	Blood Tube	None	1 working day
Occupational Blood/ Body Fluid Exposure **Source Tests:** • **Hepatitis B Surface Antigen** • **Hepatitis C Antibodies** • **HIV (if patient consented)**	Blood	None	4.9	Blood Tube	Refer to Hospital Policy OCC0009 **State clearly on form source or recipient of Occupational Blood/ Body Fluid Exposure injury**	"Verbal" results are available within 4 hours♦
Recipient Tests: **Hepatitis B Surface Antibodies**	Blood	None	4.9	Blood Tube		
Neisseria meningitides Antibodies*	Blood	None	4.9	Blood Tube	Convalescent sample 2-3 weeks post onset	15 working days
Parvovirus B19 IgG (Non Acute) Serology*	Blood	None	4.9	Blood Tube	None	15 working days

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♦ Tests provided in the emergency out of hours service.

MICROBIOLOGY TESTS – Serology……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Pneumococcal Antibodies IgG*****	Blood	None 	4.9	Blood Tube	None	15 working days
Neisseria meningitidis PCR*****	Blood	Potassium EDTA 	2.7 (0.5mL minimum)	Blood Tube	Sample taken pre-antibiotic (Specimens should be received in the Lab. before midday for transport to the reference Lab. the next day). Click here to access specific request form.	10 working days
	CSF	None	>0.5 Request this test using CSF form PL012.	Sterile Universal Container		
PCR for Norovirus (previously SRSV, "Winter Vomiting Bug")*	Faeces	None	10-20	Sterile Universal Container	None	1 working day
Parainfluenzae virus Immunofluor-escence*	Naso-pharyngeal aspirate or mouth washings	None	2	Sterile Universal Container	None	15 working days
Parvovirus B19 IgM (Acute) Serology*	Blood	None 	4.9	Blood Tube	None	15 working days
Pneumococcal Urinary Antigen	Urine	None	2	Sterile Universal container	None	2 working days
Pneumocystis jiroveci PCR* (Formally known as Pneumocystis carinii (PCP))	Bronchial Lavage/ Sputum	None	5	Sterile Universal Container	None	15 working days

***** These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Polyoma Virus (JC)*	Blood	None 	4.9	Blood Tube	**Transport to the lab immediately.** Blood specimen needs to be **frozen** within 24 hrs.	15 working days
	CSF		0.5	Sterile Universal Container	Request this test using CSF form PL012.	
	Urine		10	Sterile Universal Container		
Polyoma BK Virus*	Blood	None 	4.9	Blood Tube	**Transport to the lab immediately.** Blood specimen needs to be **frozen** within 24 hrs.	15 working days
	Urine		10	Sterile Universal Container		
Procalcitonin	Blood	None 	4.9	Blood Tube	None	2 working days
Quantiferon test for MTB Complex	Whole Blood	Heparin anti-clotting agent	4 x 1 bottles	Blood tubes in box supplied	Special Tubes available from Phlebotomy by request.	2 working days
Reagent Strip Urinalysis	Urine	None	1	Sterile Universal Container	Reagent Strip Urinalysis is performed if requested as part of a urine culture but may be requested without urine culture.	1 working days
Respiratory Syncytial Virus Antigen (RSV)	Nasopharyngeal aspirate	None	2	Sterile Universal Container	None	2 working days♦
Rickettsia Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days

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MICROBIOLOGY TESTS – Serology……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
Rubella IgG (Immunity)	Blood	None 	4.9	Blood Tube	None	2 working days
Rubella IgM*	Blood	None 	4.9	Blood Tube	None	15 working days
Saccharomyces cerevisiae Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Schistosomal Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Strep. Pneumoniae PCR*	Blood	Potassium EDTA 	2.7 (1mL minimum)	Blood Tube	Sample taken pre-antibiotic (Specimens should be received in the Lab. before midday for transport to the reference Lab. the next day).	10 working days
	CSF	None	>0.5	Sterile Universal container	Request this test using CSF form PL012.	
Group B Streptococcal PCR*	Blood	Potassium EDTA 	2.7 (1mL minimum)	Blood Tube	Sample taken pre-antibiotic. Transport to the lab immediately. Performed on patients <3 mths old. Please contact Lab if patient is >3 mths old.	10 working days
	CSF	None	>0.5	Sterile Universal Container	Request this test using CSF form PL012.	
Strongyloides Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Total Syphilis Antibodies*	Blood	None 	4.9	Blood Tube	None	10 working days
Tetanus IgG (Immunity)*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

MICROBIOLOGY TESTS – Serology……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Toxocara Antibodies*	Blood	None 	4.9	Blood Tube	Special form available in the Microbiology dept.	15 working days
Toxoplasma IgM	Blood	None 	4.9	Blood Tube	None	2 working days
Toxoplasma IgG*	Blood	None 	4.9	Blood Tube	None	10 working days
Trichinosis Antibodies*	Blood	None 	4.9	Blood Tube	None	15 working days
Urine for Pneumococcal Antigen	Urine	None	2	Sterile Universal container	None	2 working days
Varicella zoster DNA*	Viral swab of vesicular fluid	None	None	Viral UTM Swab 	None	15 working days
Varicella zoster IgG Antibodies	Blood	None 	4.9	Blood Tube	None	2 working days
Viral Culture*	Faeces other body fluids Swab	None None	1-20 None	Sterile Universal Container Viral UTM Swab 	Special viral swab available in the Microbiology dept.	15 working days
West Nile Virus IgM*	Blood	None 	4.9	Blood Tube	None	15 working days

* These specimens/ samples are referred to external laboratories for testing.

14.3 SPECIAL REQUIREMENTS FOR MICROBIOLOGY SAMPLING AND TESTING

14.3.1 MYCOBACTERIA TUBERCULOSIS (TB) STAINING AND CULTURE (AFB CULTURE)

Specimens Required

Sputum / Urine (EMU):	Three early morning specimens
Pus:	As much pus as possible
Other Body Fluids:	As available
Bone Marrow:	As much material as possible. Special bottle for collection of bone marrow available in the Microbiology department, please contact.

Bronchial Brushings (slide)

Please note 'Swab' samples are not useful for the demonstration or isolation of mycobacteria. Fluid or tissue samples should be sent.
Please note that whilst the demonstration of acid-fast bacilli in smears is diagnostic, positive samples may have few bacilli and are smear negative.

14.3.2 BLOOD CULTURE

Only take blood for culture when there is a clinical need to do so and not as routine. (Click here to access the policy entitled 'Indication for Taking Blood Cultures' for further information). Blood cultures should be taken after identification of possible sepsis and, before the administration of antibiotics (refer to policy D&TP0016, Integrated Care Pathway for the management of Sepsis Shock, in Q-Pulse). This should not prevent prompt administration of antimicrobial therapy.

If a patient is on antibiotics, blood cultures should be taken immediately before the next dose with the exception of paediatric patients. Drawing more than one set of cultures (at separate times from separate sites) can help to distinguish true bacteraemia from contaminated cultures (Shafazand and Weinaker, 2002). Samples should not be taken from existing peripheral cannulas but if the patient has an existing Central Venous Access Device a sample should be taken from this following collection of a separate peripheral sample.

Bottles

The blood culture bottles and system in use are the BacT/Alert (Biomerieux) system. Bottles should be kept at a cool room temperature in the wards. The number of bottles stored in each ward should be limited to their general usage and excessive stocks avoided.
Three bottles are available:-

- **green** top (**aerobic)**
- **orange** top (**anaerobic)**
- **yellow** top **(paediatric)** bottle.

COLLECTION PROCEDURE:

Please refer to all relevant areas of Hospital Venepuncture Policy (HOS/65)

Blood cultures should be collected using the Blood Culture Adapter sets for peripheral and line cultures available on the ward as per Bon Secours Hospital, Cork, Collection of Blood Culture Specimens Policy (Q Pulse Ref NUR0178). Skin should be disinfected with a 3mL Chloraprep applicator swab prior to collection of peripheral blood. Blood Culture bottles are filled from peripheral sites via a safety multi-fly needle, the adapter cap and associated BCF Adapter (14.1110). Blood is collected from vascular access devices via Sarstedt multi-adapter (ref 12.1205.100). Please reference Procedure as per blood sampling in Hospital Policy Management and Care of Central Venous and Arterial Catheters (Ref No: NUR0122). **Add up to 10 ml of blood per adult bottle and up to 4 ml per pediatric bottle.**

If other blood tests are required, always collect the blood culture first. The BC adapter cap with attached BCF Adapter is disconnected from the butterfly and discarded to a sharps container and the additional blood bottles filled in order as per the Lab Manual.

Ensure additional labels do not cover the bottle bar code. Do not remove any part of the barcode from the bottles as these are used in the laboratory during processing.

Record the procedure, including indication for culture, time, site of venipuncture, and any complications**.** Transport specimens to the laboratory immediately in the bag attached to the Microbiology request form **using the pneumatic chute system at all times**. Fill out clinical details, antibiotic, time & site of venepuncture on the Microbiology request form.

Time to Report

Most organisms will be detected within 24-48 hrs and normally blood cultures are incubated for up to 5 days but this time may be extended to 10 days in some cases e.g. infective endocarditis. Please contact the Microbiology Department to discuss such cases.

POSITIVE CULTURES ARE NOTIFIED TO THE WARD INVOLVED IMMEDIATELY ON DETECTION BY THE MICROBIOLOGY/ ON CALL STAFF THEREFORE THERE IS NO NEED FOR WARD STAFF TO CONTACT THE MICROBIOLOGY LABORATORY TO DETERMINE IF A BLOOD CULTURE IS POSITIVE.

14.3.3 CEREBROSPINAL FLUID (C.S.F.) – INVESTIGATION FOR INFECTION

Samples should be transported to the lab as soon as possible.
Bacteraemia is sometimes seen associated with meningitis, and a blood culture should be taken when meningitis is suspected.
If in doubt, the Consultant Microbiologist should be contacted for advice.

Specimen Required

CSF sample - as much sample as possible divided as per the CSF Request Form PL012:-

a. Send a blood glucose sample (to compare with CSF glucose value)
b. Send blood culture as outlined in section 14.3.2
c. Send EDTA blood sample for PCR for meningococcus if this is suspected.
d. Send a throat swab for meningococcus if this is suspected.

Ordering the correct test and providing the correct volumn of sample will ensure that all tests are completed.

Normal Findings

Cell Type			
WBC (Leucocytes)	Neonates	<28 days	0-30 cells per cmm
	Infants	1 to 12 months	0-15 cells per cmm
	Children/Adults	>1 year	0-5 cells per cmm
RBC (Erythrocytes)	No RBC's should be present in normal CSF		

Protein: 0.15 - 0.45 G/L

Viral Meningitis

If clinical and laboratory findings suggest viral meningitis, a CSF PCR Panel should be requested on the CSF. A faeces and throat swab sample may also be sent for Enterovirus. Additional viruses such as EBV may also be excluded by referral to the National Virus Reference Laboratory. Depending on clinical suspicion, consider sending a serum sample for HSV, VZV, Mumps, Measles, EBV and Enterovirus IgM.
Results are phoned to the ward as soon as they are available.

14.3.4 FLUIDS FROM SITES NORMALLY STERILE

Specimens should be transported and processed as soon as possible.

The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer.

Volume of aspirated material	Optimal time for transport to laboratory
<1ml	<10min
1ml	<30min
>2ml	<3h

The recovery of anaerobes is compromised if the transport time exceeds 3 hours.

If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48 hours are undesirable.

Samples Required

A sample for **culture** in a sterile universal container. In addition to the sterile universal container, an EDTA (red) sample for **white cell count** may be of diagnostic value.

Normal Findings:

Peritoneal / Ascitic Fluid	White Cell Count:	0 - 200 /cmm
Synovial / Joint Fluid	White Cell Count:	0 - 200 /cmm

14.3.5 MYCOLOGY (FUNGAL) EXAMINATION AND CULTURE

Systemic Fungal Infections

The isolation of fungi from blood and deep tissue is difficult. If systemic fungal disease is suspected please contact the Laboratory or the Consultant Microbiologist to discuss case and ensure that fungal culture is specifically requested on the request form.

Superficial/ Skin Fungal Infections

Specimens Required: Skin, Hair, Nails, Tissue

Taking of Samples

1. Preliminary cleansing of the lesion with 70% alcohol reduces bacterial contamination.
2. Scales of skin are scraped with a scalpel or the side of a microscope slide from the active periphery of the inflamed area. Infected nails should be clipped off for examination and scrapings taken from deeper areas of the nail bed. Infected hairs must be carefully chosen to avoid submitting healthy hair.
3. All samples should be sent to the laboratory in a sterile universal container or "Dermapak" available from the Microbiology department.
4. A 5 day fungal culture will be performed on swabs and fluid specimens when requested or where clinically indicated.

14.3.6 SPUTUM CULTURE/ BRONCHO-ALVEOLAR LAVAGE/ BRONCHIAL WASHINGS/ ANTRAL WASHOUT

Sample Required

A good quality sputum sample should be submitted.
Salivary or muco-salivary samples may give misleading results as these samples will be contaminated by normal mouth flora.
Sputum and Antral washout are cultured for all likely Lower Respiratory Tract (LRT) pathogens.
Broncho-Alveolar Lavage (BAL's) are routinely cultured for bacterial pathogens as well as Mycobacteria and fungi and are referred if indicated for examination for CMV, other viruses and Pneumocystis carinii.

14.3.7 EYE SWABS

Samples Required

1. For investigation of **keratitis** a corneal scrape is required. Please notify laboratory prior to sampling to ensure prompt processing.
2. For investigation of **conjunctivitis** a swab should be taken as follows:- Retract the lower eye lid and stroke the tarsal conjunctiva with a transport swab and remove all purulent material. Place swab in transport medium case. If chlamydial infection is suspected, please contact the laboratory beforehand to obtain chlamydial transport swab. Break the swab into this medium and replace cap. Send swabs to the laboratory immediately.
3. For investigation of endopthalmitis an aspirate from the aqueous humour is required. Please notify the laboratory prior to sampling to ensure prompt processing.

14.3.8 THROAT SWAB

Sample required

Using a tongue depressor take a vigorous swab sample from the tonsil or inflamed area. Replace the swab in the Amies transport medium charcoal.

14.3.9 NASAL SWAB

A nasal swab is <u>not usually useful</u> for the investigation of sinusitis.
Antral lavage or pus from sinus should be sent if acute maxillary sinusitis is suspected. Nasal swabs <u>are useful</u> for the investigation of carriage of Staphylococcus species, including MRSA.

Sample required

Rotate one swab twice round each of the anterior nares.

14.3.10 GENITAL INFECTIONS

Sexually Transmitted Diseases

Samples Required

Females: Cervical or High Vaginal Swabs, Urethral Swabs, Urine (Chlamydia, gonorrhoea and trichomonas)
Males: Urethral Swab and Urethral Smear, Urine (Chlamydia, gonorrhoea and trichomonas)

Genital Tract Swabs

Cervical and high vaginal swabs should be taken with the aid of a speculum. It is important to avoid vulval contamination of the swab. For *trichomonas*, the posterior fornix, including any obvious candidal plaques should be swabbed. If pelvic infection, including gonorrhoea, is suspected, the cervical os should be swabbed. These samples should be collected using the aptima collection device.

High Vaginal Swabs
After the introduction of the speculum, the swab should be rolled firmly over the surface of the vaginal vault. The swab should then be placed in Amies transport medium with charcoal.

Cervical Swabs
After introduction of the speculum into the vagina, the swab should be rotated inside the endocervix. The swab should then be placed in Amies transport medium with charcoal.

Urethral Swabs
Contamination with micro-organisms from the vulva or the foreskin should be avoided. Thin swabs are available for collection of specimens.
The patient should not have passed urine for at least 1 hour. For males, the swab is gently passed through the urethral meatus and rotated. Place the swab in Amies transport medium with charcoal.

Intrauterine Contraceptive Devices (IUCDs)
The entire device should be sent in a sterile universal container.

Rectal Swabs
Rectal swabs should be taken via a proctoscope.

Transport all swabs immediately to the laboratory.
If Chlamydial infection is suspected, please contact the laboratory beforehand for Chlamydial Transport Swabs.
If Herpes simplex infection is suspected, please contact the laboratory beforehand for Viral Transport medium.

Urine Samples
Sterile universal container

14.3.11 PUS SAMPLES/ WOUND SWABS

Wound swabs should only be taken when signs of clinical infection are present. Deep swabs rather than superficial will give more accurate representation of bacteria/ fungi present which may be causing infection. If viral infection is suspected please refer to section 14.3.16.
Please indicate clearly on the request form and the swab the site of the wound otherwise interpretation of culture results may be difficult.

Specimens Required

1. Pus sample (always preferable to a wound or pus swab) in sterile universal container.
2. Wound swab in transport swab. (Please note on form and the swab, the site of the wound and clinical details).

Wound or Pus samples are screened for all likely bacterial pathogens and, if present, these organisms and their antibiotic sensitivity results are reported. The inclusion of relevant clinical information on the request form assists in deciding the relevance of some bacterial isolates.

14.3.12 MRSA SCREENS

Staff and/or patient screens for colonisation by Meticillin-Resistant Staph aureus (MRSA) are necessary from time to time in the control of infection with this organism. The Consultant Microbiologist and the infection control Clinical Nurse Manager will initiate and monitor this screening as deemed necessary.

A full MRSA screen consists of:-

Nasal Swab:	Rotate **one** swab twice round each of the anterior nares.
Throat Swab:	Using a tongue depressor take a vigorous swab sample from the tonsil or back of pharynx.
Perineal Swab:	Use one swab to sample.
Axillary Swab:	Use one swab for each axilla.
Groin Swab:	Use one swab for each groin.

If present, also send swab if wounds, sites of damaged or abnormal skin, intravenous line insertion sites, catheter urine samples, and sputum if expectorating.

14.3.13 URINE

A clean mid-stream specimen is essential. In urinary tract infection (UTI) the bacterial count exceeds 100,000 organisms/ml in the majority of cases. Two samples should ideally be taken to make a diagnosis.
Urine acts as a culture medium and therefore specimens should be stored at 4^{o}C to prevent subsequent multiplication of bacteria after collection of the patient sample which would invalidate the bacterial count. **Any sample which may be subject to delay of more than 2 hrs before being sent to the lab should be refrigerated.**

Samples Required

MSU A midstream urine is the recommended sample and requires careful collection.

CSU Samples may be from patients who have had a catheter passed for a one-off urine sample or who have in-dwelling catheters. In patients with a long term indwelling catheter samples should only be sent if clinically indicated i.e. patient symptomatic or systemically unwell or having a catheter change or urinary tract instrumentation.

BSU Bag specimen of urine. A sterile collection bag is applied to the cleansed perineum to catch urine, which must then be drained into a sterile universal container. This is commonly used in infants. Culture results are difficult to interpret as contamination is common with this method of specimen collection.

Tests Available

1. Microscopy White cell count:
   Normal range 0-10 / c.mm
   Red cell count (normally absent)
   Comment on the presence of organisms, casts, crystals, etc.

2. Bacterial Colony Count:
   should be less than 1,000 orgs/ml (<10^3orgs/ml)
   1,000 - 100,000 orgs/ml may indicate UTI
   >100,000 orgs/ml is usually indicative of UTI

14.3.14 CPE/ ESBL/VRE SCREENS

The Consultant Microbiologist and the infection prevention and control clinical nurse manager will recommend and monitor patient and environmental screening as deemed necessary. CPE/ ESBL/ VRE screening is ideally carried out on a rectal swab or occasionally if this is not possible on a faeces sample. All 3 tests may be ordered on one rectal swab.

14.3.15 OVA CYSTS AND PARASITES

Please include as much clinical information as possible, particularly any history of foreign travel.

Sellotape Slides

Diagnosis of “Pinworm” (Enterobius vermicularis) infestation in children may also be made using the sellotape slide technique. Apply a piece of sellotape to the anal margin at night (the female worm crawls out of the anus at night and lays eggs in the anal margin). Then remove the sellotape and attach it to a glass slide which is sent to the laboratory. Please label the slides with the patient's name and hospital number.

14.3.16 ANTIBIOTIC ASSAY

Refer to the Antimicrobial Guidelines in the Public Documents Folder on the desktop under Antimicrobial Guidelines.

14.3.17 SEROLOGY\VIROLOGY GENERAL COMMENTS AND REQUESTING GUIDE

Please discuss with the Consultant Microbiologist if tropical or obscure infection is suspected. If viral infection is suspected in immunocompromised patients, please contact the Consultant Microbiologist for advice.

Identification of patients with invasive fungal infection

The diagnosis of invasive fungal infection still poses many challenges and there is no single diagnostic test that is both sensitive and specific. In the majority of cases the use of other data e.g. clinical predisposition and findings, radiological investigations remains an important component of diagnostic strategy and the tests listed below may be used as a adjunct to appropriate clinical and radiological evaluation.

Routine microbiological tests:
Use of routine microscopy and culture of appropriate samples e.g. blood, BAL, tissue remain an important part of the diagnostic workup.

Histological examination
Histological examination of tissue should be considered in certain cases e.g. invasive aspergillosis of the lung, sinuses etc,

(1→3)-β-D-Glucan test (BG)
(1→3)-β-D-Glucan is a structural component of the cell wall of various medically important fungi. Testing for this protein detects the presence of fungal infection some days before clinical signs or symptoms and before other biomarkers become positive. It only indicates the presence of fungus. It cannot specify yeast or mould or the infecting species. Infections detected by this test include Candidiasis (except *C. parapsilosis*), fusariosis, trichoporonosis and aspergillosis. It also has the potential to detect invasive fungal infections due to *Pneumocystis jiroveci*.

False positive results can occur due to contamination of the specimen with fungal spores or contact with items like cellulose filters, gauze and cotton swabs or in patients who have had recent surgery, have dressings, are on dialysis, are in receipt of blood products or are receiving IV amoxicillin/clavulinic acid

Fungal species including *Cryptococcal* species, *Absidia corymbifera*, *Rhizopus*, *Rhizomucor* and *Mucor* species have very little (1→3)-β-D-Glucan and so may give false negative results.
A minimum of 0.5ml of refridgerated serum is required.

Aspergillus Antigen/Galactomannan (GM)

Galactomannan (GM) is a cell wall polysaccharide which is released by *Aspergillus* species during hyphal growth in tissues and is detectable in blood at a median of 5-8 days (range, 1-27 days) before the clinical manifestation of Aspergillosis or the demonstration of abnormalities in high-resolution CT scan. The concentration of circulating GM corresponds with the fungal tissue burden and so may be used to monitor the patient's response to antifungal treatment.

Detection of Aspergillus antigen as a screening test is unlikely to be beneficial or cost-effective if the pre-test probability of the test is low. Testing should be reserved for high-risk populations including allogenic stem cell transplant patients, acute myeloid leukaemia patients and patients undergoing aggressive chemotherapeutic regimens for relapsed disease.

Serial testing is required (twice weekly) to achieve acceptable sensitivity.

False positives may occur, especially in patients treated with certain β lactam antibiotics (pipercillin/tazobactam, amoxicillin/clavulanic acid, ampicillin and phenoxymethylpenicillin). This false positive result can persist for over 10 days post administration of the β lactam antibiotics. Patients undergoing dialysis and patients undergoing liver transplantation for autoimmune liver disease or patients with chronic graft-versus-host disease after allogenic bone marrow transplant may also have false positive results.

False negative results can occur if there is previous exposure to antifungal drugs. A false negative result may also occur in patients with non or minimally invasive manifestation of aspergillosis (Aspergilloma or tracheobronchitis). GM detection is not useful for patients suffering from chronic cavity pulmonary aspergillosis or allergic bronchopulmonary aspergillosis.

This test has poor sensitivity, good specificity and an excellent negative predictive value in the detection of invasive aspergillosis in high-risk patients.

Patient Testing Strategy

In addition to other routinely used diagnostic tests in patients with relevant risk factors and suspected invasive aspergillosis perform a GM test twice weekly, confirm a positive with a follow up sample and a request for BG also.

In addition to other routinely used diagnostic tests in patients with relevant risk factors and suspected invasive candidiasis perform a BG test twice weekly and C. albicans antigen test to determine if the cause is C. albicans or non-albicans.

In addition to other routinely used diagnostic tests in patients with relevant risk factors and suspected fungal infection other than the above perform a BG test twice weekly.

Atypical pneumoniae and Respiratory Infections

1. **Chlamydia pneumoniae**
   ELISA tests for IgM antibodies that appear within 2 to 4 weeks of onset of illness. Restricted test: will only be referred following approval from Consultant Microbiologist.

2. **Legionella pneumophila**
   In an acute setting, please send urine for urinary antigen. This test is useful in the early detection of Legionnaires disease.
   Positive Legionella screening tests are confirmed at the Atypical Pneumoniae Unit, Respiratory and Systemic Infection Laboratory, CPHL, 61 Colindale, London NW9 5HT. This results in an additional turnaround time of 2 weeks.

3. **Mycoplasma pneumoniae**
   This is an EIA test for the detection of IgM antibodies. IgM antibodies usually appear 10 days after onset of illness.

4. **Coxiella burnetii**
   ELISA test for IgM, IgG and IgA antibodies that appear within 2 to 4 weeks of onset of illness.

5. **Influenzae A and B and Swine Flu**
   Serology not appropriate. During off season periods, a nasopharyngeal aspirate (NPA) is required. In season, please send a nasal and throat viral swab or a nasopharyngeal aspirate.

SEROLOGY: General Notes

Serological Tests

For a serological diagnosis, i.e. antibody tests based on appearance of IgG, acute (as early as possible in the illness) and convalescent sera (2-3 weeks after on-set) should be taken for antibody titration. A four-fold rise in titre is considered significant. Single samples for serology are of limited value unless used for detection of IgM antibody when such tests are available.

VIROLOGY: General notes

Virus Isolation

Where virus isolation is attempted, specimens must be taken early in the illness in the correct manner (contact Microbiology department).

Please Note: Samples marked 'virus studies' or 'viral screen' will not be processed. Please specify requests and give clinical details. Failure to supply the required information will lead to delays in reporting.
The patient's date of birth must be supplied in all cases.

Requesting Guide

The following "Requesting Guide" may assist in identifying possible agents with a certain clinical syndromes. This guide is derived from guidelines issued by the National Virus Reference Laboratory, Dublin.

	TESTS TO BE ORDERED	
Provisional Diagnosis/ Symptoms	**Possible Virus/ Agent/ Disease**	**Specimen Type**
Respiratory Infection URTI and LRTI (Atypical pneumonia) (Refer to section 14.3.16)	Mycoplasma pneumoniae Ab IgM Chlamydia pneumoniae Ab IgM Legionella pneumophila (Urinary Antigen)	Serum/ Clotted Blood  Urine
	Coxiella burnetii (Q Fever) Ab IgM Please request if clinically suspected. Not part of routine atypical pneumonia screen.	Serum/ Clotted Blood 
Respiratory Infection URTI and LRTI (Viral) (Refer to section 14.3.16)	Influenza A Influenza B Respiratory Syncytial Virus (RSV) Human Metapneumovirus Seasonal testing for Parainfluenza and Adenovirus Cytomegalovirus (CMV) in immuno compromised patients	Nose and throat swab in viral transport media Nasopharyngeal Aspirate (NPA) or Bronchial Lavage Bronchial Lavage
Arthralgia	Parvovirus B19 Mycoplasma pneumoniae Borrelia burgdorferi (Lyme Disease) Consider Brucella. Please request if clinically suspected. Not part of routine arthralgia screen.	Serum/ Clotted Blood 
Exanthem (Skin Rash)	Measles IgM Rubella IgM Parovirus B19 Borrelia burgdorferi (Lyme Disease) (if clinically suspected) HIV (if risk factors) Hepatitis B (if risk factors) Dengue (if risk factors)	Serum/ Clotted Blood  Oracol Swab (Saliva Oral Fluid for Measles only)

	TESTS TO BE ORDERED	
Provisional Diagnosis/ Symptoms	**Possible Virus/ Agent/ Disease**	**Specimen Type**
Exanthem (Skin Rash)	Herpes Simplex Virus (HSV) Varicella Zoster Virus (VZV)	Viral swab Vesicle Fluid/
	Molloscum Contagiosum Orf Virus	Scrapings on Slide Vesicle Fluid/ Scrapings on Slide
	Enterovirus	Stool/ Viral Throat Swab/ Vesicle Fluid/ Scrapings on Slide
Central Nervous System	Mumps virus	Serum/ Clotted Blood or  salivary swab or CSF
	Measles IgM	Oracol Swab (Salivary Swab)
	Herpes simplex virus Varicella zoster virus	Viral UTM Copan Swab Respiratory Secretions or CSF
	Enterovirus (Coxsackie Echo)	CSF/ Stool/ Viral Throat Swab/ Pleural Fluid
	Dengue (if risk factors) West Nile Virus (if risk factors)	Serum/ Clotted Blood 
Hepatitis Screen	Hepatitis A, B, C, Cytomegalovirus (CMV IgM) Epstein-Barr Virus (EBV IgM) Leptospirosis antibodies	Serum/ Clotted Blood  Plasma 
CABG/HEP screen	Hepatitis B & C	Serum/ Clotted Blood 
Genital Infection	Herpes Simplex Virus	Viral Swab
	Chlamydia trachomatis/ Gonorrhoea/ Trichomonas	Aptima collection device
	Syphilis (Treponema pallidum)	Serum/ Clotted Blood 
Diarrhoea/Vomiting	Rotavirus Adenovirus Astrovirus Calicivirus Norovirus (small round structured virus)	Stool

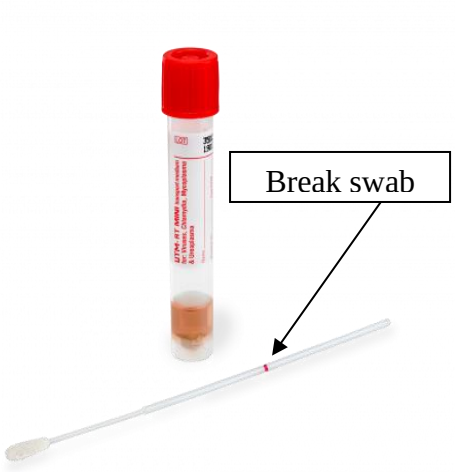
	TESTS TO BE ORDERED	
Provisional Diagnosis/ Symptoms	**Possible Virus/ Agent/ Disease**	**Specimen Type**
Intra-Uterine Infection	Toxoplasma IgM Cytomegalovirus (CMV IgM) Rubella IgM Parvovirus B19 Varicella Zoster Virus (VZV)	Serum/ Clotted Blood  Viral UTM Copan Swab Respiratory Secretions
Inflammatory Bowel Disease Profile	Quantiferon, HIV Screening Test Hepatitis B Surface Antigen Hepatitis B Core Antibodies Hepatitis B Surface Antibodies Hepatitis C Antibodies TPMT Autoantibody Screen Varicella Zoster IgG	Serum/ Clotted Blood  Blood Tube (4.9mL) containing no additive x 3 Blood Tube (7.5mL) containing EDTA Quantiferon Blood Collection Tube
Biologics Profile	Quantiferon Hepatitis B surface antigen HIV Screening Test Hepatitis C Antibodies Hepatitis B Core Antibodies Varicella Zoster Virus IgG Hepatitis B Surface Antibodies	Serum/ Clotted Blood  Blood Tube (4.9mL) containing no additive x 3 Blood Tube (7.5mL) containing EDTA Quantiferon Blood Collection Tube
Lymphoma Viral Screen	Hepatitis B surface antigen HIV Screening Test Hepatitis C Antibodies Anti Hepatitis B Core Varicella Zoster IgG	Serum/ Clotted Blood 
Organ Donor	Syphilis RPR/ TPPA Cytomegalovirus (CMV IgM) Toxoplasma Total Hepatitis B Surface Antigen HIV Hepatitis C Antibodies HTLV	Serum/ Clotted Blood 
Ante Natal	Rubella IgG Hepatitis B surface Antigen HIV (Must be requested) Syphilis RPR/ TPPA	Serum/ Clotted Blood 
Pleurodynia	Coxsackie Group B viruses	Stool/ Viral Throat Swab or Pleural Fluid

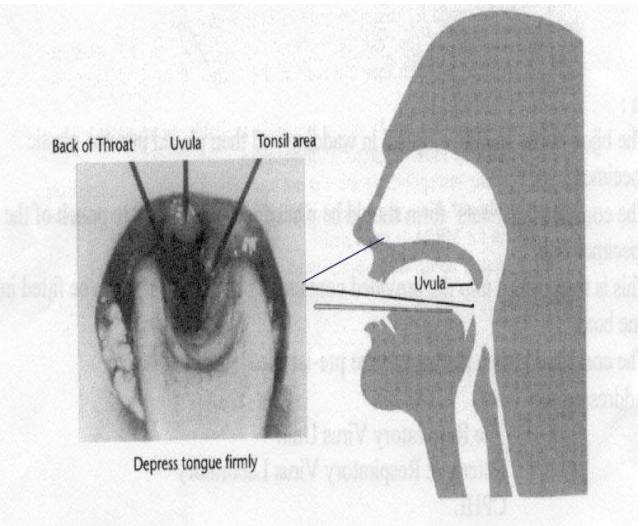
	TESTS TO BE ORDERED	
Provisional Diagnosis/ Symptoms	**Possible Virus/ Agent/ Disease**	**Specimen Type**
Pericarditis/ Myocarditis	Coxsackie Group B viruses	Stool/ Viral Throat Swab or Pleural Fluid
	Coxiella burnetii (Q Fever) Chlamydia Group Mycoplasma pneumoniae	Serum/ Clotted Blood 
Lymphadenopathy & Glandular Fever	Epstein Barr Virus (EBV IgM) Cytomegalovirus (CMV IgM) Toxoplasma IgM Bartonella Order HIV separately if requested	Serum/ Clotted Blood 
Paraparesis	Human T-Lymphotropic Virus (HTLV)	Serum/ Clotted Blood 
	Enterovirus (Coxsackie Echo)	Stool
Conjunctivitis	Adenovirus Herpes Simplex Virus (HSV) Enterovirus (Coxsackie Echo)	Viral Eye Swabs
	Chlamydia trachomatis	Swab in Chlamydia transport media
Stomatitis	Herpes Simplex Virus (HSV)	Swab in viral transport media Serum/ Clotted Blood 
	Enterovirus (Coxsackie Echo)	Stool/ Throat Swab
Hand, Foot and Mouth Disease	Coxsackie A16 Virus	Stool
Immune Status	Rubella IgG Mumps IgG Measles IgG Parvovirus IgG Hepatitis B Surface Antibodies Hepatitis A IgG Antibodies Hepatitis C	Serum/ Clotted Blood 
Haemorrhagic cystitis	Adenovirus Polyoma	

14.3.18 COVID 19 TESTING

The procedure for collecting nasal and throat swabs for investigation of respiratory viruses including COVID-19.

- Explain procedure to the patient
- Collect **both nasal and throat swab** using the one swab
- Insert swab into patients open mouth
- The swab is used first to abrade the tonsils and pharynx (see diagram below on right). This will induce a gag reflex.
- This swab is then inserted into the nostril and rubbed against and above the nasal turbinate (swab to be advanced almost 4 inches into the nostril. This will bring a tear to the eye)
- Repeat for the other nostril.
- **Place the swab into the red container** containing the transport medium.
- Break off the swab at the moulded breakpoint on the swab shaft (see picture below on the left)
- **Close lid securely.** Ensure that the bottle lid is secured tightly onto the bottle to prevent leakages.
- **Label specimen** for COVID19 PCR and write on clinical details if patient is symptomatic.
- Can be sent in POD system (clean POD inside and outside with 70% Alcohol wipe before sending)





Diagnosis of Acute Infection (PCR):
PCR is the 'gold standard' recommended for the diagnosis of COVID-19 during the acute phase of infection.
False negative results can occur if testing takes place in the initial incubation period following infection. The minimum duration from infection to a positive test remains uncertain. SARS-CoV-2 viral RNA can be detected one-to-two days prior to symptom onset in upper respiratory tract samples (Figure 1). Viral load peaks around the time of symptom onset, the level of virus in nasopharyngeal secretions declines progressively over time after onset of symptoms becoming undetectable approximately two weeks following symptom onset.

The diagnostic window for using PCR to detect acute infection with SARS-CoV-2 therefore ranges from approximately three days following exposure to the virus until two weeks following symptom onset (Figure 1).

Testing in BSHC is performed using one of the following assays:
- GeneXpert
- BioFire FilmArray

Interpretation of PCR Results:
When SARS-CoV-2 is **DETECTED,** this indicates that virus is present.
Note: Viral RNA may be detected for a period when replicating virus is no longer present. Detection of virus RNA does not necessarily mean that the person is infectious.

When SARS-CoV-2 is **NOT DETECTED,** in a well taken sample during the symptomatic period this makes it much less likely that the person has COVID-19. However, in some people with symptomatic infection virus has been undetectable in nasopharyngeal samples swabs.

Note: A negative PCR result is only an indication of the patient's status at a point in time. If self-isolation is required from a public health perspective, a negative result may not negate the need for self-isolation.

14.4 MICROBIOLOGY PROFILES

INFLAMMATORY BOWEL DISEASE (IBD) PROFILE
Quantiferon, HIV, Hepatitis B Surface Antigen, Hepatitis B Core Antibodies, Hepatitis B Surface Antibodies, Hepatitis C Antibodies, TPMT, Autoantibody Screen, Varicella Zoster IgG
Sample Requirements
Blood Tube (4.9mL) containing no additive x 3 Blood Tube (7.5mL) containing EDTA Quantiferon Blood Collection Tube
Turn Around Time
Refer to individual tests for turnaround time in this document

BIOLOGICS PROFILE
Quantiferon, HIV, Hepatitis B Surface Antigen, Hepatitis B Core Antibodies, Hepatitis B Surface Antibodies, Hepatitis C Antibodies, Varicella Zoster IgG
Sample Requirements
Blood Tube (4.9mL) containing no additive x 3 Blood Tube (7.5mL) containing EDTA Quantiferon Blood Collection Tube
Turn Around Time
Refer to individual tests for turnaround time in this document

15.0 CHROMOSOME ANALYSIS/ DNA GENETIC SCREENING

15.1 Chromosome Analysis and Genetic Testing is a very specialised Laboratory technique presently not performed by the Bon Secours Pathology Department. However, we do refer specific requests to other specialised Laboratories. These tests are specific to a particular syndrome or abnormality**. It is essential that the sample request form clearly identifies the test(s) required by the Clinician** as it is only these requests that will be investigated. The relevant clinical history must be provided as it is of benefit in the performance of these tests. The list below includes the majority of the more commonly requested tests, but it is impractical to list all Chromosome Analysis / Genetic tests that may be requested. If a particular test is required, but does not appear on the following list, please contact the Chief Medical Scientist, Histopathology Department for further details.

Consent is required for the listed genetic tests, refer to the links in special requirements to access the referral Laboratory consent forms where available. Please print Genetic Test Request Forms and complete including signatures of the patient and requesting Doctor.

Please note it is <u>critical</u> that patient details on the request form and specimen match, <u>including</u> spelling. Any discrepancies will result in the sample not being tested by the referral Laboratory.

<u>BIOCHEMISTRY - Chromosome Analysis/ DNA Genetic Screening</u>

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
DNA GENETIC SCREENING						
Alpha-1 Antitrypsin Genotype*	Blood	Potassium EDTA 	7.5	Blood Tube	Bring to Lab immediately. Preferably Monday to Wednesday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	30 working days
		None 	4.9	Blood Tube		
APO E Lipoprotein Genotyping*	Blood	Potassium EDTA 	7.5	Blood Tube	Preferably Monday to Thursday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	20 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY - Chromosome Analysis/ DNA Genetic Screening……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
DNA GENETIC SCREENING						
Cystic Fibrosis DNA Studies*	Blood	Potassium EDTA 	7.5 (Adult) 4 (Paed)	Blood Tube	Preferably Monday to Thursday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	25 working days
Dihydropyrimidine dehydrogenase Gene Screen (DPD)*	Blood	Potassium EDTA 	2.7	Blood Tube (Whole Blood)	Whole blood.	20 working days
FABRY Disease Screen* (Alpha Galactosidase plus Genetic Screen as indicated)	Blood	Potassium EDTA 	2.7	Blood Tube	Preferably Monday to Wednesday am. Consent required, click here to access Centrogene Consent Form and send with the sample. Whole blood, do not centrifuge.	30 working days
Familial Hypercholesterol-aemia Genetics*	Blood	Potassium EDTA 	7.5	Blood Tube	Consent required, click here to access form.	25 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY - Chromosome Analysis/ DNA Genetic Screening……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
DNA GENETIC SCREENING						
GCH1*	Blood	Potassium EDTA 	2	Blood Tube	Preferably Monday to Wednesday am. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	30 working days
Haemochromatosis DNA*	Blood	Potassium EDTA 	7.5	Blood Tube	Preferably Monday to Thursday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	25 working days
Hereditary Transthyretin Mediated Amyloidosis Gene (h ATTR) (Screening Test for Cardiac Amyloidosis)*	Blood	Potassium EDTA 	2 x 2.7	Blood Tube	Preferably Monday to Wednesday am. Consent required, click here to access request/ consent form. Whole blood, do not centrifuge.	42 working days
Maternally Inherited Diabetes and Deafness Genetic Screen*	Blood	Potassium EDTA 	2 x 7.5	Blood Tube	Preferably Monday to Wednesday am. Consent by patient required and specific request form fully completed by requesting clinician. Click on link for form. Click here to access MIDD Genetics Request Form and send with the sample. Whole blood, do not centrifuge.	50 working days

* These specimens/ samples are referred to external laboratories for testing.

BIOCHEMISTRY - Chromosome Analysis/ DNA Genetic Screening……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
DNA GENETIC SCREENING						
MEN Type 2 Genetics*	Blood	Potassium EDTA 	7.5	Blood Tube	Preferably Monday to Wednesday am. Consent required, click on link for form. Click here to access TDL Consent Form and send with the sample. Whole blood, do not centrifuge.	40 working days
MODY Genetics*	Blood	Potassium EDTA 	2 x 7.5	Blood Tubes	Preferably Monday to Wednesday am. Consent by patient required and specific request form fully completed by requesting clinician. Click on link for form. Click here to access MODY Genetics Request Form and send with the sample. Whole blood, do not centrifuge.	50 working days
PNPO* Pyriamidine 5' Phosphate Oxidase	Blood	Potassium EDTA 	2	Blood Tube	Preferably Monday to Wednesday am. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	45 working days
UGT1A1 Genetic Test* (Alternate name Gilberts Syndrome)	Blood	Potassium EDTA 	2 x 7.5	Blood Tube	Whole blood. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Complete patient's history and family history. Please also confirm if the mutation has been described in the patient's family, if so please confirm which relative. Whole blood, do not centrifuge.	25 working days

* These specimens/ samples are referred to external laboratories for testing.

IMMUNOLOGY - Chromosome Analysis/ DNA Genetic Screening

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
GENETICS						
Angelman Syndrome*	Blood	Potassium EDTA  Lithium Heparin 	7.5 4.9	Blood Tube (Do not use tubes containing beads)	Monday **OR** Tuesday before midday. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B12-INTGB and send with the sample. Whole blood, do not centrifuge.	25 working days.
Chromosome Analysis Blood*	Blood	Lithium Heparin 	4.9	Blood Tube	Monday **OR** Tuesday before midday. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B13-INTGB and send with the sample. Whole blood, do not centrifuge.	25 working days
Di George Syndrome*	Blood	Potassium EDTA  Lithium Heparin 	7.5 4.9	Blood Tube	Monday **OR** Tuesday before midday. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B22-INTGB and send with the sample. Click here to access Eurofins Biomnis Consent Form B34-INTGB and send with the sample. Whole blood, do not centrifuge.	40 working days.
Fragile X DNA Studies*	Blood	Potassium EDTA 	7.5	Blood Tube (Do not use tubes containing beads)	Monday **OR** Tuesday before midday. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B12-INTGB and send with the sample. Whole blood, do not centrifuge.	25 working days

* These specimens/ samples are referred to external laboratories for testing.

IMMUNOLOGY - Chromosome Analysis/ DNA Genetic Screening……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
GENETICS						
Huntington's Disease*	Blood	Potassium EDTA 	7.5	Blood Tube	Monday to Wednesday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B12-INTGB and send with the sample. Whole blood, do not centrifuge.	40 working days
Myotonic Dystrophy*	Blood	Potassium EDTA 	3 x 7.5	Blood Tube	Monday to Wednesday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B12-INTGB and send with the sample. Whole blood, do not centrifuge.	50 working days
Prader-Willi Syndrome*	Blood	Potassium EDTA  Lithium Heparin 	7.5 4.9	Blood Tube (Do not use tubes containing beads)	Monday **OR** Tuesday before midday. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form B12-INTGB and send with the sample. Whole blood, do not centrifuge.	25 working days

* These specimens/ samples are referred to external laboratories for testing.

HAEMATOLOGY- Chromosome Analysis/ Karyotyping/ Cytogenetics

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
CHROMOSOME ANALYSIS/ KARYOTYPING/ CYTOGENETICS						
AML Cytogenetic Panel*	Bone Marrow or Blood	Potassium EDTA 	10	Blood Tube	Check with Haematology Lab	15 working days
BCR-ABL Fusion Gene*	Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday.	10 working days
BCR-ABL Transcripts (Quantitation)*	Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday.	10 working days
Bone Marrow FISH*	Bone Marrow	Lithium Heparin 	4.9	Blood Tube	Samples should be received Mon to Thurs midday.	15 working days
CALR Mutation*	Bone Marrow or Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday.	15 working days
Chromosome Analysis Bone Marrow (Cytogenetics Bone Marrow)*	Bone Marrow	Lithium Heparin 	4.9	Blood Tube	Samples should be received Mon to Thurs midday.	15 working days
CLL Panel (TP53, 17pdel, IGHV)*	Bone Marrow or Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday.	15 working days
Immunoglobulin Gene Mutation* (IgVH Mutation)	Bone Marrow or Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday.	20 working days
JAK2*	Bone Marrow or Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday.	10 working days
MDSNGS Panel*	Bone Marrow	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday. Click here to access Eurofins Biomnis Consent Form and send with the sample	20 working days

* These specimens/ samples are referred to external laboratories for testing.

HAEMATOLOGY- Chromosome Analysis/ Karyotyping/ Cytogenetics……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
CHROMOSOME ANALYSIS/ KARYOTYPING/ CYTOGENETICS						
MPL Mutation Studies (MPLS)*	Bone Marrow or Blood	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday	15 working days
MPN Panel* (JAK2, CALR, MPN, BCR-ABL)	Blood/ Bone Marrow	Potassium EDTA 	2.7	Blood Tube	Samples should be received Mon to Thurs midday	10 working days

* These specimens/ samples are referred to external laboratories for testing.

HAEMATOLOGY – DNA Genetic Screening

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	*Volume Required mL*	*Container Type*		
DNA GENETIC SCREENING						
Factor II Prothrombin Gene Mutation*	Blood	Potassium EDTA 	7.5	Blood Tube	Preferably Monday to Thursday am Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	15 working days
Factor V Leiden DNA Studies*	Blood	Potassium EDTA 	7.5	Blood Tube	Preferably Monday to Thursday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	15 working days
MTHFR* (Methylene Tetrahydrofolate Reductase Deficiency)*	Blood	Potassium EDTA 	2 x 7.5	Blood Tube	Preferably Monday to Wednesday am. Consent required, click on link for form. Click here to access Eurofins Biomnis Consent Form and send with the sample. Whole blood, do not centrifuge.	30 working days

* These specimens/ samples are referred to external laboratories for testing.

16.0 POINT OF CARE/ NEAR PATIENT TESTING

The following Point of Care/ Near Patient Testing is performed and reported in designated clinical areas.

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
ACT+ (Activated Clotted Time) ACT Low Range (LR)	Blood	N/A	N/A	N/A	Sample taken in approved areas. Refer to procedure BSC/POC/SOP/014.	<5 mins
Blood Gas CCU & **MAU** Venous/ Arterial	Blood	Heparinised	1	Blood Gas Syringe	For further information, contact POC/ NPT or Biochemistry dept. Refer to policy BSC/POC/SOP/018. Do not shake sample as haemolysis may cause an elevation in potassium concentration.	<15 mins
Clo Test for Helicobacter pylori (Endoscopy/ Theatre)	Tissue	Follow test kit protocol			Refer to policy ENDO 0017.	30 mins
Creatinine (Capillary) (Radiology)	Blood capillary finger prick	Heparinised	65µL	Capillary tube	Refer to procedure BSC/POC/SOP/017	< 5 mins
Gastric pH (Childrens Ward)	Gastric Fluid	N/A	N/A	N/A	Refer to policy DIE0008	<5 mins
Glucose (Capillary) (All Clinical Locations)	Blood Capillary (Finger Prick)	N/A	N/A	N/A	For further information, contact Diabetes Nurse Specialist. Refer to BSC/POC/SOP/020 and DIAB 003.	<5 mins
Oxyhaemoglobin (Cath Lab)	Blood	Heparinised	50µl	Blood Gas Syringe	Sample taken in a controlled Cath Lab environment. Refer to procedure BSC/POC/SOP/016	<5 mins

16.0 POINT OF CARE/ NEAR PATIENT TESTING ……..cont'd

Test/Profile	Specimen Type	Specimen Requirements			Special Requirements	Turnaround Time
		Additive Required	***Volume Required mL***	***Container Type***		
Ketone (Capillary) (Approved wards)	Blood Capillary (Finger Prick)	N/A	N/A	N/A	For further information, contact Diabetes Nurse Specialist. Refer to policy NUR 0185.	<5 mins
Urinalysis (4 Panel) (All clinical locations)	Urine	N/A	5-20	Clean Container	Refer to policy NUR0052	<5 mins
Urinalysis (10 Panel) (Approved wards)	Urine	N/A	5-20	Clean Container	Refer to policy BSC/POC/SOP/015	<5 mins
Urinary hCG (Pregnancy Test) (Approved wards)	Urine	None	5-20	Sterile Universal Container	Refer to procedure BSC/POC/SOP/013	<5 mins

Note: Records of Point of Care/ Near Patient Test results are maintained in the patient's Medical Record.

16.1 Point of Care/ Near Patient Testing Critical Test Result Values

Parameter	Units of Measurement	Lower Limit	Higher Limit	Required Action by User
Blood Gas CCU - Potassium	mmol/L	≤ 2.5	≥ 6.0	Treat and Medical SHO contacted
Blood Gas CCU - Lactate	mmol/L	N/A	> 2.0 first occurrence > 4.0 all occurrences	Sepsis protocol initiated and Medical SHO Contacted
Blood Gas CCU - pH	pH	≤ 7.3	≥ 7.6	Contact NCHD/ SHO
Blood Gas CCU - Glucose	mmol/L	≤ 3.0	≥ 20	Contact NCHD/ SHO
Blood Gas CCU - Na	mmol/L	< 120	> 160	Contact NCHD/ SHO
Blood Gas CCU - iCa	mmol/L	< 0.5	> 1.58	Contact NCHD/ SHO
Capillary Glucose	mmol/L	≤ 3.0	≥ 20.0	If tested and result is <4.0, treat as per hospital policy. Repeat after 15minutes. If still <4.0 contact doctor to review. If tested and result is >20, contact the doctor within 30 minutes. Follow treatment pathway in form 2070, the Glucose Monitoring and Insulin Prescription Record.
Capillary Ketone	mmol/L	N/A	≥ 1.0	If between 1.0mmol/L and 3.0mmol/L contact House doctor and Diabetes Specialist Nurse. If >3.0mmol/L contact Consultant Endocrinologist and Diabetes Specialist Nurse.
Pregnancy	N/A	All positive results		Inform relevant clinical personnel

17.0 Pregnancy Testing Fact Sheet

Testing hCG to Screen for Pregnancy

The Basis of the Test

In pregnancy, hCG is normally synthesised and secreted by blastocysts. Hence, implantation and placental development must occur before hCG can be detected in serum or in urine. Typically, implantation occurs about day-23 into the cycle. hCG is excretede into urine in pregnant women and levels of hCG are very similar in both serum and urine at any one time.

The production of hCG is highly variable between individuals for any gestational age.

It takes about 14 days from fertilization to reliably detect pregnancy in more than 99% of pregnancies. Therefore, a negative pregnancy test, whether performed in urine or serum, does not exclude early pregnancy before day post LMP+28 or so.

Comparsion between Serum and Urine Tests

The *urine pregnancy hCG test (Alere Sure Step One Step hCG)* performed in the Bon Secours Hospital Cork sufficiently sensitive in most cases to show positive results in pregnancy around the first day of the first missed period in women with normal 28-day cycles. The levels of maternal urinarhy hCG at that stage are normally 50-250 mIU/ mL, which is easily detected as 'Positive' by the test.

The *serum hCG pregnancy test* performed in the Bon Secours Hospital Cork is also highly sensitive. Serum hCG levels range between 50-500 mIU/ mL by the first day of the first missed period in women with normal 28-day cycles. Results between 5-25 mIU/ mL are as equivocal for pregnancy.
Tests performed in reproductive age females before LMP+28 days may be negative whether or not the person is pregnant and whether the test is done in urine or serum. Urine hCG tests as performed in the Bon Secours Hospital are no less reliable and are very much faster than serum hCG tests.

Note that hCG testing is relatively unreliable in diagnosing ectopic pregnancy.

Regulations and Guidelines

The relevant EU directive (Council Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionizing radiation in relation to medical exposure, and repealing Directive 84/466/Euratom) and various Learned Society guidelines set out and emphasise the need to operate according to rules of precaution based on time from LMP. They do not appear to mandate or even recommend serum hCG testing when deciding on the advisability of radiological tests in women at risk of being pregnant.

Practicalities

A serum sample for an hCG pregnancy test received in the Biochemistry department will take up to ***2 hours*** to analyse and report because of fundamental factors involved in the analysis. The average turnaround time for a urinary hCG pregnancy test is <***30 mins*** to analyse and report.

18.0 Dynamic Function Tests Performed In Biochemistry

Dynamic Test	Measurand(s)	No of samples
Dexamethasone Suppression Tests	Cortisol, ACTH	2 sets
Synacthen (ACTH Stimulation) Test	Cortisol	3 sets
Investigation of Acromegaly or Gigantism	Glucose, Growth Hormone	3 sets
Oral Glucose Tolerance For The Diagnosis Of Diabetes Mellitus	Glucose	2
Water Deprivation Test	Serum and Urine Osmolality	2 or 3 sets
TRH (Thyrotropin Releasing Hormone) Test	TSH, Prolactin	3
LHRH (Luteinising Releasing Hormone) Test	FSH, LH	3
Ischaemic Forearm Exercise	Lactate	3

Each dynamic function test is described in detail in the following pages, including instructions for patient preparation and interpretation of results. For information on the specific tests, refer to the individual measurand information.
Where a drug is to be administered, it must be prescribed by authorised medical personnel and obtained from the pharmacy.

18.1 Dexamethasone Suppression Tests

Purpose:
Dexamethasone suppression tests determine whether the normal ACTH-dependent secretion of cortisol by the adrenal gland is suppressed in response to the administration of dexamethasone.
There are two different types of dexamethasone suppression tests:
1) the low-dose test and
2) the high-dose test

Before Performing A Dexamethasone Suppression Test:
Patients in whom a diagnosis of hypercortisolism (such as Cushing's syndrome) is considered should have a **24-hour urine free cortisol** measurement performed first. A normal result excludes hypercortisolism due to pituitary or adrenal disease. However, very obese persons may over-secrete cortisol.

Why Are The Tests Performed?

The **low-dose test** can help differentiate healthy (e.g. very obese) people from those who pathologically overproduce cortisol. The **high-dose test** can help determine if the abnormality originates in the pituitary (Cushing's Disease), in the adrenals or in an ectopic site.

The secretion of ACTH from the pituitary gland is normally regulated by the level of cortisol in blood plasma. ACTH stimulates the adrenal cortex to produce cortisol. As plasma cortisol levels increase, ACTH secretion is suppressed. As cortisol levels decrease, ACTH increases.

Dexamethasone is a synthetic steroid similar to cortisol, which suppresses ACTH secretion in normal people. Therefore, giving dexamethasone should reduce ACTH levels, resulting in decreased cortisol levels. People with pituitary glands which produce too much ACTH will have an abnormal response to the low-dose test, but a normal response to the high dose.

Preparation of the Patient for the Test:

Drugs that can affect test results include corticosteroids, oestrogens, oral contraceptives, phenytoin, spironolactone, barbiturates, and tetracyclines. Please discuss the test with the Biochemistry Department in advance if these drugs are being taken.

How The Test Is Performed:

1) **The low-dose overnight method**:

a. Take blood for cortisol and ACTH measurement at 8 a.m. on the first morning of the test.
b. Give the patient 1 mg of dexamethasone orally at 11 p.m. and allow the patient to sleep overnight.
c. Take blood at 8 a.m. on the second morning for cortisol and ACTH measurement.

2) **The high-dose overnight method**:

a. Take blood for cortisol and ACTH measurement at 8 a.m. on the first morning of the test and label with the actual time.
b. Give the patient 8 mg of dexamethasone orally at 11 p.m. and allow the patient to sleep overnight.
c. Take blood at 8 a.m. on the second morning for cortisol and ACTH measurement.

Interpretation of Results:

Low dose (1 mg method): Normal people should have serum cortisol concentrations of less than 124 nmol/L following dexamethasone 1 mg. ACTH secretion should be suppressed completely.

High dose (8 mg method):

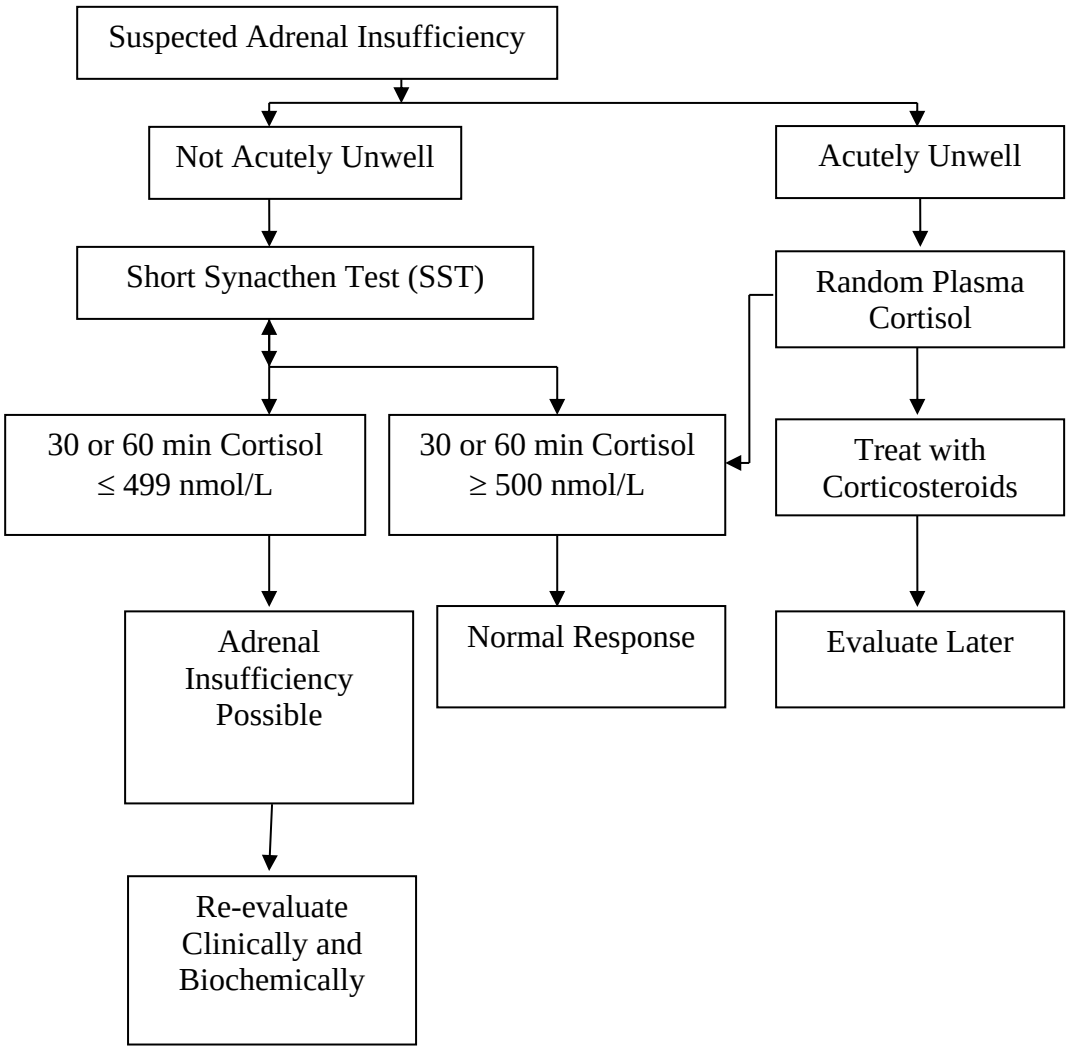
Serum cortisol concentrations should be less than 50% of the baseline value and ACTH suppressed in normal patients and in those with pituitary-dependant hypercortisolism, following 8 mg dexamethasone.

18.1.1 Suspected Adrenocortical Insufficiency

Patients with adrenal failure may present acutely (with hypoglycaemia, hyponatraemia with hyperkalaemia and dehydration) or chronically with general malaise, anorexia, vomiting, intermittent abdominal pain and weight loss. Pigmentation may be seen on sun exposed areas and also sites of friction such as the palmar creases and buccal mucosa.

If the diagnosis is strongly suspected in acutely ill patients, there should be no delay in administering glucocorticoids as soon as blood has been taken for plasma cortisol and ACTH; the definitive diagnosis can wait. Dexamethasone should be given in this circumstance as the short Synacthen test can be performed the next day since dexamethasone does not interfere with cortisol assays.

Patients on long-term corticosteroid therapy become hypoadrenal due to adrenal atrophy. As a result they may have a poor response to exogenous ACTH, but there is no evidence that the response to ACTH is useful in tailoring glucocorticoid withdrawal.



18.2 'Synacthen' (ACTH Stimulation) Test

Definition
The Synacthen (ACTH stimulation) test measures the ability of the adrenal cortex to producing cortisol appropriately in response to ACTH.
Tetracosactide, the active substance of Synacthen, consists of the first 24 amino acids occurring in the natural ACTH sequence and displays the same physiological properties as ACTH. It stimulates adrenocortical production of glucocorticoids and mineralocorticoids and, to a lesser extent, of androgens.

Preparing The Patient For The Test:
The test **should not** be performed

- in patients on current regular oral or injected steroid therapy as the results cannot be interpreted.
- In pregnant or in lactating women

How The Test Is Performed:
Cortisol in the blood is measured before and again after an ACTH injection.

a. Take a baseline venous blood sample for serum cortisol measurement and label "Time 0" and with the actual time.
b. Inject 250 micrograms (the contents of one ampoule of "Synacthen") intramuscularly into a large muscle, using standard I.M. injection technique.
c. Take a second venous blood sample for serum cortisol measurement **30 minutes** after the Synacthen injection and label "30 min" and with the actual time.
d. Take a third venous blood sample for serum cortisol measurement **60 minutes** after the Synacthen injection and label "60 min" and with the actual time.

Possible Undesirable Effects Related To Tetracosactide Injection:
Tetracosactide can provoke hypersensitivity reactions, which tend to be more severe in patients susceptible to allergies (especially asthma). Hypersensitivity reactions may include skin reactions at the injection site, dizziness, nausea, vomiting, urticaria, pruritus, flushing, malaise, dyspnoea, and angioneurotic oedema. Isolated cases of adrenal haemorrhage have been reported with Synacthen.

Interpretation:
A normal response to Synacthen is shown by a 30 or 60 min cortisol value of greater than or equal to 500 nmol/L. A cortisol value of less than or equal to 499 nmol/L indicates possible adrenal insufficiency and should be re-evaluated Clinically and Biochemically.

This definition only defines adrenal insufficiency. The definition of normality is problematic since there is considerable variation in healthy individuals and a significant overlap with patients who have adrenal insufficiency. Baseline and incremental cortisol values do NOT apply to women taking oral contraceptives or to pregnant women.

In ACTH deficiency the response to the short test may be normal or reduced.
The response to Synacthen is not affected by obesity.

18.3 Investigation of Acromegaly or Gigantism

IGF-1
The simplest screening test for excess growth hormone (hGH) secretion leading to acromegaly (or to pituitary gigantism in adolescents) is to measure insulin-related growth factor-1 (IGF-1; sometimes called somatomedin-C) in serum. Elevated IGF-1 is quite sensitive and specific for acromegaly in adults but elevated values should be further investigated by measuring the growth hormone response to a glucose load.

Oral GTT to Investigate Growth Hormone Excess:
Note: Random GH values are useless to exclude acromegaly since elevated GH may occur with stress and low values < 5 mIU/L are seen in up to 8% of acromegalic patients who are subsequently identified by the failure of GH to suppress during GTT. This **test is unnecessary** in diabetic patients who should already have a suppressed GH in the presence of hyperglycaemia.

Principle:
GH secretion is part of the counter-regulatory defence against hypoglycaemia and physiological GH secretion is inhibited by hyperglycaemia. In acromegaly, or gigantism, GH secretion is autonomous and does not suppress and may paradoxically rise with hyperglycaemia.

Side Effects:
Some subjects may feel nauseated and may have vasovagal symptoms during this test.

Preparation:
Patients must fast for a minimum of 10 hours before this test but may drink small volumes of water.

Note: The clinician may require samples to be taken at additional times to the standard OGTT used for the diagnosis for Diabetes Mellitus. It is important that the times are stated on the form and exactly what test(s) need to be taken at each time.

Requirements:
Oral Rapilose® OGTT Solution is used to provide the glucose load for this test.

Adults: In adults, a 300 mL dose of Rapilose® OGTT Solution is equivalent to 75g anhydrous glucose as recommended by the World Health Organisation

Children: In children weighing less than 43Kg, the amount of **Rapilose® OGTT Solution** given is related to the child's weight. For children, the recommended test load is 1.75g of glucose per kg body weight up to a total of 75g of glucose, this is equivalent to 7 mL of **Rapilose® OGTT Solution** per kg body weight up to a maximum of 300 mL of **Rapilose® OGTT Solution** (maximum load is 75g of anhydrous glucose). If the patient is a child, then please inform Phlebotomy of the weight of the subject so that the correct dose can be prepared.

Procedure:
Venous blood samples are taken for GH and glucose (4-5 mL in plain & 1-2 mL in fluoride EDTA tubes). The Rapilose® OGTT Solution should be drunk within 5 minutes. Take further blood samples for GH and glucose at the times indicated by the clinician – see note above. Please **send blood both** in plain white and in yellow (Fluoride-EDTA) tubes **at all time points.**

Interpretation:
Normal subjects will exhibit suppression of GH to undetectable values during the test. Acromegalic subjects display either no suppression or a paradoxical rise in GH secretion during the test. Note however that a paradoxical rise in GH may also occur during GTT during normal adolescence.

18.4 Oral glucose tolerance test for the diagnosis of Diabetes Mellitus

Indication
The diagnosis of diabetes is made on the basis of repeatedly elevated fasting plasma glucose (> 7.0). The use of the oral glucose tolerance test is to clarify borderline elevations in fasting plasma glucose, and is required in a minority of patients.

Contraindications:
This test is only necessary if fasting glucose measurements are equivocal. i.e. 6.0 to 7.0 mmol/L.
This test should **not be performed** in patients who fulfil the criteria for diabetes mellitus. These are:
1. a fasting plasma glucose >7.0 mmol/L or two or more occasions and
2. clinical symptoms of diabetes *e.g.* polydipsia, polyuria, ketonuria and rapid weight loss with a random plasma glucose of >11.1 mmol/L).

This test should **not be performed** in patients who are under physical stress e.g. post surgery, trauma or infection or extreme psychological stress as these may give misleading results.
This test should **not be performed** in patients with periodic hypokalaemic paralysis.

Principle:
In normal individuals pancreatic insulin secretion maintains blood glucose within a tight concentration range following an oral glucose load. Failure of insulin secretion, or resistance to insulin action, will result in an elevation in blood glucose.

Side Effects:
Some subjects feel nauseated and may have vasovagal symptoms during this test.

Preparation:
Patients should to eat a normal carbohydrate diet (>150g daily) for at least 3 days prior to the test and undertake normal physical activity.
Patients must fast for 10-14 hours prior to this test but may drink small volumes of plain water.
Smoking and physical exercise **are not allowed** in the morning prior to, and during, the test.

Requirements:
Oral Rapilose® OGTT Solution is used to provide the glucose load for this test.

Adults: In adults, a 300 mL dose of Rapilose® OGTT Solution is equivalent to 75g anhydrous glucose as recommended by the World Health Organisation

Children: In children weighing less than 43Kg, the amount of **Rapilose® OGTT Solution** given is related to the child's weight. For children, the recommended test load is 1.75g of glucose per kg body weight up to a total of 75g of glucose, this is equivalent to 7.0 mL of **Rapilose® OGTT Solution** per kg body weight up to a maximum of 300mL of **Rapilose® OGTT Solution** (maximum load is 75g of anhydrous glucose). If the patient is a child, then please inform Phlebotomy of the weight of the subject so that the correct dose can be prepared.

Procedure:
- This test should be performed in the morning. Patients should remain at rest during the test.
- Time 0 min: 2 mL blood should be taken in fluoride EDTA tubes (yellow cap)
- The Rapilose® OGTT Solution should be drunk over 5 minutes.
- Time 120 min: 2 mL blood should be taken in a fluoride EDTA tube (yellow cap)

There is **no need to take urine** samples for glucose measurements.

Interpretation:

	Plasma Glucose (mmol/L)	
	0 min	**120 min**
Non diabetic	< 6.0	< 7.8
Impaired glucose tolerance	6.1 - 6.9	7.9 - 11.0
Diabetic	> 7.0	> 11.1

WHO Diagnostic Criteria 2000:
Symptoms of diabetes (i.e. polyuria, polydipsia and unexplained weight loss) plus:
a. random plasma glucose concentration > 11.1 mmol/L or
b. fasting plasma glucose concentration > 7.0 mmol/L (fasting is defined as no calorie intake for at least 8 hours) or
c. 2 h plasma glucose concentration > 11.1 mmol/L during an oral glucose tolerance test (OGTT). OGTT is not recommended for routine clinical use.
With no symptoms, diagnosis should not be based on a single plasma glucose determination. At least another plasma glucose on another day with a value in the diabetic range is essential, either fasting or at 120 min after a glucose load. If the fasting values are not diagnostic, the 120 min value should be used.

Impaired Fasting Glucose (IFG) And Impaired Glucose Tolerance (IGT):
a. IFG: fasting plasma glucose > 6.0 mmol/L but <7.0 mmol/L.
b. IGT: fasting plasma glucose < 7.0 mmol/L and 2 hour plasma glucose during an OGTT > 7.8 but < 11.1 mmol/L.
c. All subjects with IFG should have an oral glucose tolerance test (OGTT).

Gestational Diabetes Mellitus (GDM):

Gestational diabetes is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Strict glucose homeostasis is required during pregnancy in order to reduce the well-described GDM-associated perinatal morbidity and mortality, as well as the associated maternal complications.

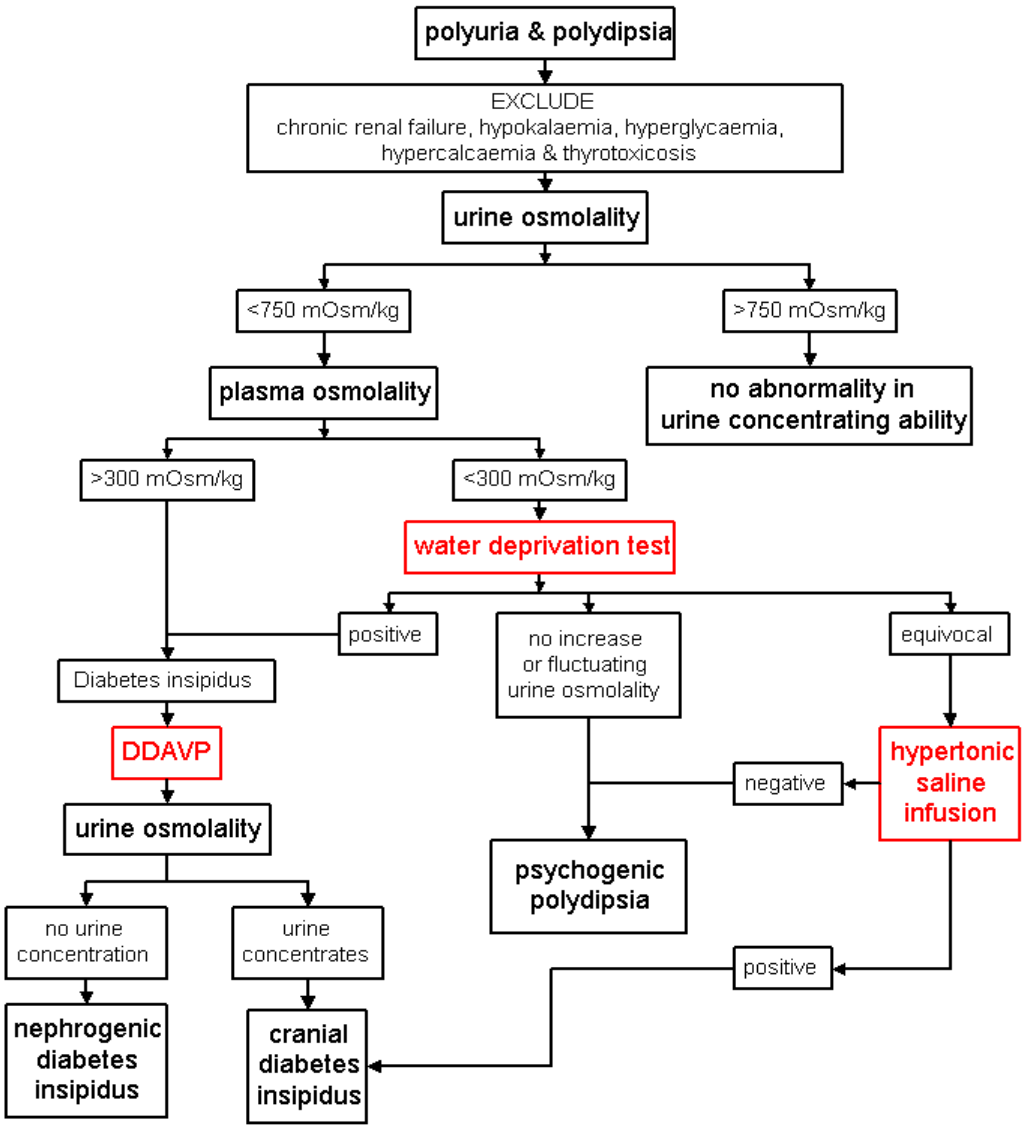
Although the majority of women who develop GDM return to normal after delivery, progression to insulin dependent diabetes often occurs in younger, thinner women. Other women have an increased risk of developing NIDDM later in life. It is recommended that women with GDM are retested six weeks after delivery and classified as:

- normal
- IFG (impaired fasting glucose)
- IGT (impaired glucose tolerance)
- diabetic

18.4.1 Investigation of Polydipsia & Polyuria

Polydipsia and polyuria are subjective symptoms, which should be carefully explored in the history to distinguish them from dry mouth and from urinary frequency. A daily loss of > 2.5 L urine with persistent urine osmolalities < 300 mOsm/kg may be considered abnormal. The first line of investigation is to ascertain whether baseline values for urine volumes and plasma osmolality and sodium concentration are in fact abnormal. The next step is to determine if the increased urine production is driven by osmotically active substances excreted in the urine which cause obligate fluid loss *e.g.* glucose. It is then necessary to check if the water loss is due to either intrinsic tubular dysfunction or due to metabolic factors affecting tubular function e.g. hypokalaemia or hypercalcaemia. Polyuria is an infrequent manifestation of hyperthyroidism although a proportion of patients do complain of excessive thirst. Often the most difficult patients to diagnose are those with dipsogenic (psychogenic) polydipsia. Many of these patients are investigated with water deprivation tests that are characterised by fluctuating urine volumes and osmolalities that mirror their illicit drinks during the test.

It is important to consider drugs that cause dryness of the mouth as a cause of increased fluid intake.


polyuria & polydipsia
EXCLUDE
chronic renal failure, hypokalaemia, hyperglycaemia, hypercalcaemia & thyrotoxicosis
urine osmolality
<750 mOsm/kg
>750 mOsm/kg
plasma osmolality
no abnormality in urine concentrating ability
>300 mOsm/kg
<300 mOsm/kg
water deprivation test
positive
no increase or fluctuating urine osmolality
equivocal
Diabetes insipidus
DDAVP
urine osmolality
negative
hypertonic saline infusion
psychogenic polydipsia
no urine concentration
urine concentrates
positive
nephrogenic diabetes insipidus
cranial diabetes insipidus

18.5 Water Deprivation Test

Indication:
Investigation of suspected cranial or nephrogenic diabetes insipidus and primary polydipsia.

Contraindications:
- The presence of other causes of polydipsia and polyuria.
- In patients with heart failure and symptomatic ischaemic heart disease

The **test is not required** if there is evidence for the ability to concentrate urine e.g. a spot urine osmolality > 750 mmol/kg.

Principle of Test:
Water restriction in the normal individual results in secretion of ADH by the posterior
pituitary. Failure of this mechanism results in a rise in plasma osmolality owing to water loss, and a dilute urine of low osmolality. The two causes are a failure of ADH secretion and insensitivity of the renal tubules to ADH. They may be distinguished by the administration of DDAVP (synthetic ADH).

Side Effects:
Patients with true diabetes insipidus may become severely water depleted during water deprivation and MUST be carefully monitored throughout the procedure.

Requirements:
- Accurate weighing scales for weighing the patient.
- A volumetric cylinder for measuring urine volume.

Performing the Test:
Baseline:
a. Weigh the patient
b. Calculate and record 5% of this baseline body weight
c. Take samples of serum (white plain tube) and urine (MSU tube) for osmolality
d. Remove all sources of fluid and food from the patient's access.

Fluid restriction phase:
a. Deprive the patient of all fluids and food.
b. **Hourly:** Weigh the patient, and measure urine output.
c. When the patient is unable to tolerate fluid deprivation any longer, weigh, measure urine output, and take samples of serum (white plain tube) and urine (MSU tube) for osmolality. (Please mark actual time on all specimens).

Terminate this phase of the test if:
- the patient becomes distressed by thirst
- The patient loses >5% of baseline body weight
- Plasma osmolality exceeds 300 mOsm/kg

DDAVP challenge phase

Following the fluid deprivation phase, but **before allowing the patient to drink**

a. Administer DDAVP (Desmospray) 20 micrograms (two sprays) intra-nasally
b. Measure urine volume and osmolality at 30 and 60 min. afterwards.
c. Fluid may be given (200 mL) after 30 min. and should be restricted to less than 500 mL in the 8 hours after the test.

18.5.1 Interpretation of Water Deprivation and DDAVP Test

Post-dehydration osmolality (mOsm/kg)		Post DDAVP osmolality (mOsm/kg)	Diagnosis
plasma	**urine**	**urine**	
283-293	**> 750**	**> 750**	normal
> 293	< 300	< 300	nephrogenic diabetes insipidus
> 293	< 300	> 750	cranial diabetes insipidus
< 293	300-750	< 750	chronic polydipsia
< 293	300-750	< 750	partial nephrogenic DI or primary polydipsia
> 293	300-750	> 750	partial cranial DI

NB: chronic primary polydipsia can dissipate the renal medullary osmotic gradient, thereby reducing the renal response to endogenous and exogenous AVP. In cranial DI, maximal urinary concentration may be achieved only after repeated DDAVP.

18.6 TRH (Thyrotropin Releasing Hormone) Test

Definition:

The TRH (Thyrotropin Releasing Hormone) Test measures the ability of the pituitary to producing TSH (thyrotropin) appropriately in response to TRH.

Indication:

The TRH test is indicated in the investigation of pituitary secretion of TSH and in distinguishing thyroid hormone resistance from 2^{o} hyperthyroidism in cases of high TSH and high thyroxine levels in plasma.
The TRH test may be combined with the GnRH (LHRH) test as a partial combined test of pituitary function.

Contraindications:

TRH can cause smooth muscle spasm and should be used with caution in patients with asthma or ischaemic heart disease. The TRH test should not be used in pregnant women. Patients should not have taken thyroxine for 3 weeks prior to this test.

Principle:
TRH (thyrotropin releasing hormone) is a tripeptide secreted by the hypothalamus that stimulates the production and secretion of TSH by the anterior pituitary. TRH also stimulates prolactin release. Protirelin is a synthetic form of TRH.

Side Effects:
Most adult patients express an urgent need but inability to pass urine. Other side effects include flushing, dizziness and a metallic taste in the mouth.

Preparation:
No specific patient preparation is required

Requirements:
Protirelin (TRH) 200 mcg) for IV injection
The dose for children is 7 mcg/kg to a maximum 200 mcg.

Procedure:

time 0 min	take 3 mL blood for TSH and Prolactin immediately give TRH I.V. as a bolus (dose as above)
time 30 min	take 3 mL blood for TSH and Prolactin

Note: GnRH may be administered I.V. directly before or after TRH as part of a partial combined pituitary test.

Interpretation:

- Normal basal values of TSH should be 0.2-6 IU/mL. The normal increment in TSH at 30 min should be 5-30 (mean 15) IU/mL with a slight diminution at 60 min.
- Exaggerated TSH response is seen in primary hypothyroidism.
- A flat response is seen in primary hyperthyroidism; but also in some apparently euthyroid patients with ophthalmic Graves disease or multinodular goitre.
- A delayed response with the TSH concentration lower at 30 than 60 min may be seen in hypothalamic dysfunction.
- Various drugs can modify the TSH response.
- The TSH response is flat in most cases of TSHoma whereas in thyroid hormone resistance the TSH response is brisk.
- Prolactin secretion is normally stimulated by TRH administration.

18.7 LHRH (Lutinising Releasing Hormone) Test

Indications:

- To tell the difference between primary and secondary hypogonadism.
- To diagnose hypothalamic-pituitary disease in precocious and delayed puberty in both sexes in children with low basal gonadotropins.
- To evaluate low testosterone levels in men or low oestradiol levels in women

Principle:

GnRH (gonadotropin releasing hormone) is a decapeptide secreted by the hypothalamus, which stimulates the production and secretion of LH and FSH by the anterior pituitary.

Side Effects:

GnRH may rarely cause nausea, headache and abdominal pain.

Preparation:

Patients should not be on oestrogen therapy for four weeks prior to the test.

Requirements:

HRH® (recombinant LHRH) 100 micrograms.

Procedure:

time 0 min	Take 2 mL blood for LH & FSH Immediately give HRH® 100 mcg I.V. as a bolus (dose as above)
time 30 min	Take 2 mL blood for LH & FSH

Interpretation:

- An exaggerated response is seen in primary & secondary gonadal failure.
- Following GnRH, the response may be considered normal if the basal values are in the reference range and there is at least a doubling at 20 min for LH and FSH. The response varies throughout the menstrual cycle: early (D4) < late follicular (D11) = "luteal" (D21), max response occurs at the mid-cycle (D14).
- Normal basal reference values in pre-pubertal children are:-
  LH < 2.0 IU/L
  FSH < 2.0 IU/L
- A flat response in gonadotropins (< 5 IU/L) occurs in pre-pubertal children and with pituitary and/or hypothalamic disease. However, a normal response does NOT exclude pituitary or hypothalamic disease since the response will be affected by the exact anatomy of the disorder.
- The magnitude of the LH response is proportional to the mean nocturnal LH and therefore the evolution of puberty

18.8 Ischaemic Forearm Exercise Test

Indication:
The differential diagnosis of metabolic causes of muscle weakness, fatigue and cramps.

Principle of the Test:
Normal subjects exhibit a rise in lactate during ischaemic exercise. Glycogenolysis and glycolysis proceed to lactate during ischaemic exercise as oxygen is required for further oxidation in the Krebs cycle.

Side Effects:
This test is uncomfortable to perform and the subject will need encouragement to ensure that sufficient exercise is performed for a valid test.

Preparation:
The subject should rest for 30 min prior to the test.

Requirements:
- 4 special tubes for lactate (discuss with lab) and 4 plain white tubes for CK
- Manually operated Sphygmomanometer (not 'Dynamap'-type electronic model)
- A soft rubber ball

Procedure:
At each time point samples should be taken for lactate and CK (1 mL).
- A sphygmomanometer cuff is placed on the upper arm and an intravenous cannula inserted in the antecubital vein, which should be kept patent with saline.
- Allow three minutes to elapse after the cuff has been relaxed to allow free perfusion of the arm.
- Two **baseline** blood samples are drawn from the arm.
- The cuff is inflated above systolic pressure and the subject should squeeze the rubber ball once every few seconds for 2 minutes or as long as it can be tolerated. It is essential that the exercise should continue to produce muscle pain and that the fingers are extended fully between contractions. Patients may find it helpful and encouraging to be advised of the time they have exercised.
- The cuff is deflated.
- Two blood samples **(T0)** are immediately taken from the now hyperaemic arm as soon as blood has flushed through, and at 1 **(T1)** and 2 **(T2)** mins later.

Interpretation:
Normal subjects obtain relatively instantaneous relief of pain and can move their fingers immediately on release of the cuff. Patients with metabolic defects often cannot exercise for 2 minutes, develop a marked forearm cramp, and are unable to extend their fingers.
A normal response is shown by maximum rises (between baseline and peak values) in plasma lactate > 2.2 mmol/L. The absence of a venous blood lactate response to ischaemic exercise is characteristic of all diseases in which there is impairment of conversion of glycogen to glucose or lactate in muscle (e.g. McArdle's syndrome).

19.0 PATHOLOGY PROFILES

CHRONIC LIVER SCREEN (FASTING)
Hepatitis B Antigen, Hepatitis C, Autoantibody Screen, RA Screen, Ferritin, Iron Profile, Coeliac Screen, Fasting Lipids, Thyroid Function, Liver Function Tests, Alpha 1 Antitrypsin
Sample Requirements
Blood Tube (4.9mL) containing no additive x 2 Blood Tube (4.9mL) containing no additive x 3
Turn Around Time
Refer to individual tests for turnaround time in this document

CHRONIC LIVER SCREEN (NON-FASTING)
Hepatitis B Antigen, Hepatitis C, Autoantibody Screen, RA Screen, Ferritin, Iron Profile, Coeliac Screen, Non Fasting Lipids, Thyroid Function, Liver Function Tests, Alpha 1 Antitrypsin
Sample Requirements
Blood Tube (4.9mL) containing no additive x 2 Blood Tube (4.9mL) containing no additive x 3
Turn Around Time
Refer to individual tests for turnaround time in this document

COVID BLOOD PROFILE
Full Blood Count, Prothrombin Time, International Normalised Ratio, Activated Partial Thromboplastin Time, Fibrinogen, D-Dimer, C-Reactive Protein, Ferritin, U&E, Creatinine
Sample Requirements
Blood Tube (4.9mL) containing no additive x 1 Blood Tube (2.7mL) containing EDTA x 1 Blood Tube (2.7mL) containing Sodium Citrate x 1
Turn Around Time
Refer to individual tests for turnaround time in this document

20.0 REPORTING OF TEST RESULTS

20.1 Customer Queries with Respect to Test Results

Refer to section 3.3 of this document titled "Availability of Clinical and Scientific Advice".

20.2 Reporting of Results within the Hospital

All results, once released, are available on the hospital computer system (PIMS). Hardcopy reports, where applicable, are printed for distribution to ward locations once per day for inclusion in the patient file. In addition, designated Doctor's receive an additional copy of their reports on a daily basis.

20.3 Reports for External Locations

Reports are issued to external customers in hard copy format or electronically through result reporting system (Medibridge). All such reports are posted on the day of testing if results are available before 3.30 p.m. Where results are not available, they will be posted the next working day. Note reports traceable to Bon Secours Glasnevin and Bon Secours Tralee are issued directly to printers located in the respective Pathology Departments.

20.4 Telephoned Results

- It is the policy of the Pathology Department to telephone reports only when results for specific clinical parameters have reached critical levels or where the Clinician/ nominee has requested for results to be phoned.
- **At ward level where information is received concerning verbal reports then a record must be maintained of the communication using Form 37a titled "Verbal/ Telephone Order Form".**

20.4.1 External Telephone Results

It is the policy of the Pathology department not to telephone results to external practitioners or patients with the exception of:-

- Warfarin patients following attendance at the outpatient warfarin clinic
- Where specific parameters have reached critical levels

20.5 Reference Ranges (Biological Reference Intervals)

Reference ranges for test attributes are documented on all reports.
Warning: Many diaries and handbooks provide lists of reference intervals for common analytes. You are asked not to refer to these in the interpretation of results generated by the Pathology Laboratory. We have prepared our own reference intervals which are dependent on the method of analysis used and are also specific to the population which we serve. The use of inappropriate reference intervals can be at best confusing and at worst dangerous. If you are in any doubt about the validity of any reference interval provided to you, please contact the Pathology Laboratory for clarification.

20.6 Interpretation of Numerical Results

Note: The information provided below for flagging/ marking of results is valid for numerical results where the test has an associated reference range defined in the Laboratory Information System. Not all numerical tests have defined reference ranges so will not be flagged/marked as abnormal.

20.6.1 Hardcopy Reports

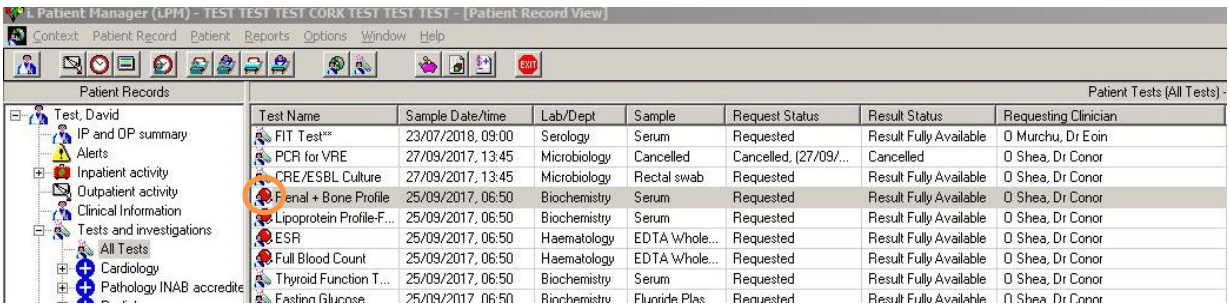
Results are indicatively marked as follows:-

H	-	Abnormally High
HH	-	Very Abnormally High
L	-	Abnormally Low
LL	-	Very Abnormally Low

Within range results have no associated marking or comment.

20.6.2 Electronic Reports on PIMS (Hospital System)

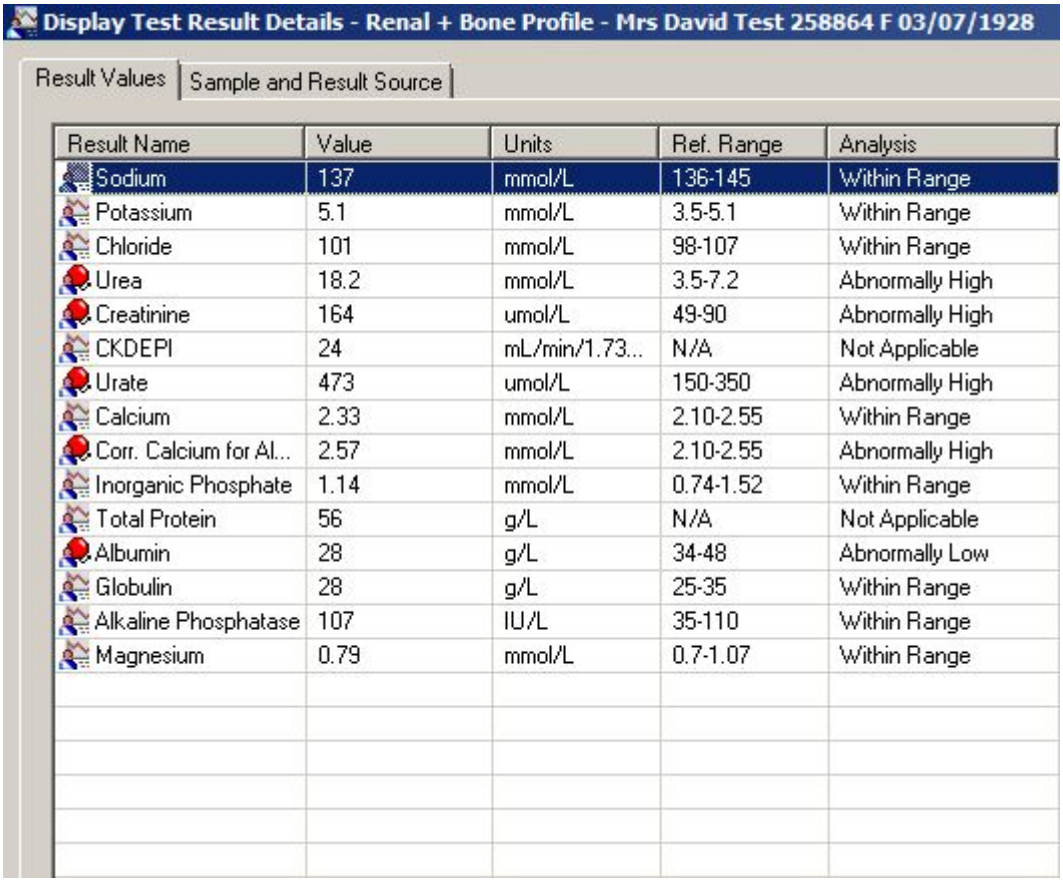
(a) **Using patient record view**, a master list of test requests appears on screen. A red balloon preceding the test name indicates or flags an abnormal result. Refer to the attached printscreen.



(b) On review of individual test results the analysis column in PIMS notes the following for each result:-

- Within Range
- Abnormally Low
- Very Abnormally Low
- Abnormally High
- Very Abnormally High

Refer to the attached printscreen.



Result Name	Value	Units	Ref. Range	Analysis
Sodium	137	mmol/L	136-145	Within Range
Potassium	5.1	mmol/L	3.5-5.1	Within Range
Chloride	101	mmol/L	98-107	Within Range
Urea	18.2	mmol/L	3.5-7.2	Abnormally High
Creatinine	164	umol/L	49-90	Abnormally High
CKDEPI	24	mL/min/1.73...	N/A	Not Applicable
Urate	473	umol/L	150-350	Abnormally High
Calcium	2.33	mmol/L	2.10-2.55	Within Range
Corr. Calcium for Al...	2.57	mmol/L	2.10-2.55	Abnormally High
Inorganic Phosphate	1.14	mmol/L	0.74-1.52	Within Range
Total Protein	56	g/L	N/A	Not Applicable
Albumin	28	g/L	34-48	Abnormally Low
Globulin	28	g/L	25-35	Within Range
Alkaline Phosphatase	107	IU/L	35-110	Within Range
Magnesium	0.79	mmol/L	0.7-1.07	Within Range

20.6.3 Electronic Reports on Medibridge Results Reporting System

Results are indicatively marked as follows:-

*H - Abnormally High
*L - Abnormally Low

Within range results have no associated marking or comment.

20.6.4 Interpretation of Textual Results

For textual results, the interpretive comment will not be flagged, but rather incorporated into the body of the report (hardcopy/electronic).

20.7 Specimen Type on Blood Reports

Please note as per accreditation requirements our test reports identify the specific specimen type used in the testing process.

20.8 Authorisation of Test Reports

The table below identifies clinical responsibility for the authorization of test reports as it relates to each Laboratory discipline.

Laboratory Discipline	Position	Deputy
Biochemistry	Consultant Chemical Pathologist (Dr. Michael Louw)	Consultant Chemical Pathologist (Prof. Carel Le Roux)
Blood Transfusion/ Haematology	Consultant Haematologist (Dr. Eileen Kelleher) (Dr. Susan O'Shea) (Dr. Khalil Alnajjar)	Consultant Haematologist (Dr. Eileen Kelleher) (Dr. Susan O'Shea) (Dr. Khalil Alnajjar)
Histopathology including Diagnostic Cytology	Consultant Pathologist (Dr. Triona Hayes, Dr. Paul Ryan, Dr. Aoife McCarthy, Dr. Adeline Chelliah, Dr. Juan Pinto, Dr. Adeyemi Idowu)	Consultant Pathologist (Dr. Triona Hayes, Dr. Paul Ryan, Dr. Aoife McCarthy, Dr. Adeline Chelliah, Dr. Juan Pinto, Dr. Adeyemi Idowu)
Microbiology including serology	Consultant Microbiologist (Dr. Olive Murphy, Dr. Marianne Fraher, Dr. Deirdre O'Brien)	Consultant Microbiologist (Dr. Olive Murphy, Dr. Marianne Fraher, Dr. Deirdre O'Brien)
Immunology	Consultant Immunologist (Prof. Conleth Feighery)	Consultant Immunologist TBC

20.9 Requirements Regarding Patients

Where appropriate, there is open disclosure to relevant persons i.e. requesting Clinician, of incidents that resulted or could have resulted in patient harm.
It is the policy of Pathology Bon Secours Hospital, Cork to issue test results to the requesting Clinician and not to the patient. Test results may be released to additional bodies /agencies including but not limited to GPs, insurers, statutory bodies and in transition of care events.

21.0 CUSTOMER COMPLAINTS

21.1 The Pathology department operates a complaints system. The objectives of our complaints handling system are:-

- That all complaints are rapidly and effectively handled.
- The customer and/or patient difficulties are alleviated promptly.
- That the same problem will not occur again because the cause has been identified and corrected.
- That customer confidence is restored in our service.
- That relevant information is recorded and reported to Clinical Directorate and the Laboratory Services Manager.

21.2 If the service provided is not satisfactory, please contact the Pathology Department/ Laboratory Services Manager/ Laboratory Quality Assurance Officer to process the complaint.

22.0 DATA PROTECTION

The Bon Secours Health System is registered with the Data Commissioner in Ireland to capture and process patient information. It is the policy of the Pathology department to manage data and information with the highest degree of integrity, security and confidentiality.

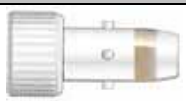
The Laboratory is responsible for the management of all patient information obtained or created during the performance of Laboratory activites. Management of patient information shall include privacy and confidentiality.
The Laboratory shall inform the user and/or patient in advance of the information it intends to place in the public domain.

When required by law the Laboratory may share patient data without their consent; examples include provision of data to the National Cancer Registry or to the Health Protection Surveillance Centre (notifiable diseases), National Haemovigilance Office (Serious Adverse Events/Serious Adverse Reactions). This is noted to the patient during the hospital admission process.

A copy of Bon Secours Data Protection and Privacy Statement is available within the Laboratory Outpatients reception area for patients who attend Laboratory Outpatients.

On www.bonsecours.ie on the webpage footer click on “data protection and privacy”. This describes the Health Systems description of how it collects and uses personal data in a way that is consistent with the obligations and patient rights under the General Data Protection Regulation.

23.0 GUIDE TO THE USE OF BLOOD TUBES FOR ROUTINE LABORATORY TESTS

TUBE CAP COLOUR/ CONTENTS (EUROPEAN)	COLOUR	APPLICATION
White (No Anticogulant)		Clinical Chemistry/ Virology/ Bacteriology/ Immunology
Orange (Lithium Heparin)		Troponin
Red/ Pink (EDTA)		F.B.C./ ESR/ Blood Transfusion
Yellow (Fluoride EDTA)		Glucose (Adult)
Yellow (Heparin Fluoride)		Glucose (Paediatric)
Green (Trisodium Citrate 1:9)		Coagulation

Where multiple blood tubes are to be drawn, the tubes should be taken in the following sequence:-

Clotted
Citrate
Lithium Heparin
EDTA
Fluoride

} **CCLEF**

Reference: Gurr et al "Musterstandardarbeitsanweisung Präanalytik" J Lab Med 2011

24.0 PATHOLOGY CRITICAL TEST RESULT VALUES

Process for Verbal Communication of Critical Results

- Policy requires that the clinician responsible for patient care is verbally alerted to Pathology critical test results in <60 mins from the time the Laboratory has released the results.

- The critical values listed have been defined by the Laboratory Consultant in charge of each scientific discipline and agreed with Paediatric Consultants in the case of paediatric values.

- **Paediatric = Child <16yrs**

- A critical result value is defined as "A critical test result value is a markedly abnormal test result that may signify a pathophysiological state that may be life threatening or of immediate clinical significance and that requires urgent action".

- An episode is one hospital stay and it can be composed of a number of care events.

- To comply with Hospital/ Laboratory accreditation and clinical requirements please note:-

  - Laboratory will request and document the following information from clinical personnel in receipt of a verbal notification for a critical test result:-

    - Clinical staff member's full name and title
    - Confirm clinical location
    - Read back the test results

  - Laboratory staff must phone clinical personnel (Phone to inform ward, Consultant, GP or external agency) within 30 mins of releasing the test result

  - Clinical personnel on receipt of a critical result will:-

    - Document the verbal communication of results on from 37a
    - Ensure clinician/ nominee responsible for patient care is alerted within 30 mins of the Laboratory communication.

BIOCHEMISTRY CRITICAL TEST RESULT VALUES – CATEGORY A
Results require communication within 30 minutes. This classification indicates potential immediate danger to the patient, or a potentially life-threatening illness when urgent intervention is required.

Parameter	Unit of Measurement	Lower Limit ≤	Higher Limit ≥	Required Action by Laboratory
Sodium	mmol/L	120	150	Repeat and phone first time in an episode and if value deteriorates by more than 5 mmol/L. Note for MAU: Repeat and phone Sodium values < 126 mmol/L first time in an episode and if value deteriorates by more than 5 mmol/L.
Sodium (Paediatric <16 yrs)	mmol/L	128	145	Phone first time in an episode and if value deteriorates by more than 3.0 mmol/L.
Potassium	mmol/L	2.5	6.0	Repeat and phone first time in an episode and if value deteriorates by more than 0.5 mmol/L.
Adjusted Calcium	mmol/L	1.8	3.0	Phone first time in an episode and if value deteriorates by more than 0.3 mmol/L. Calcium to be phoned if there is no adjusted calcium result
Urea	mmol/L	N/A	30.0	Phone the first time in an episode and if the value rises by more than 10 mmol/L per day.
Urea (Paediatric <16 yrs)	mmol/L	N/A	10.0	Phone the first time in an episode and if the value rises by more than 10 mmol/L per day.
Creatinine	µmol/L	N/A	354	Phone the first time in an episode and if the value rises by more than 100 µmol/L per day
Creatinine (Paediatric <16 yrs)	µmol/L	N/A	200	Phone the first time in an episode and if the value rises by more than 100 µmol/L per day
CKDEPI	ml/Min	15	N/A	Phone the first time in an episode.
Amylase	IU/L	N/A	250	Phone the first time in an episode and if the value rises by more than 100 IU/L per day
Phosphate	mmol/L	0.3	N/A	Phone the first time in an episode.
Magnesium	mmol/L	0.4	N/A	Phone the first time in an episode.
Glucose	mmol/L	3	20	Phone the first time in an episode.
Glucose (Paediatric <16 yrs)	mmol/L	3	15	Phone the first time in an episode.
Ammonia	µmol/L	N/A	100	Phone the first time in an episode and all Ammonia results to the Mercy
BNP	ng/L	N/A	500	Phone the first time in an episode.
Lactate	mmol/L	N/A	2.0 4.0	Phone the first time in an episode. Phone all values >4.0 mmol/L.
pH	pH units	7.3	7.6	Phone.
Troponin	ng/L	N/A	Female >16 Male >34	Phone the first time in an episode.
CK-total (Creatinine Kinase)	IU/L	N/A	5000	Phone the first time in an episode.
Beta-hCG (Pregnancy)	mIU/mL	N/A	>5	Phone*.
CRP	mg/L	N/A	300	Phone the first time in an episode.
CRP (Paediatric <16 yrs)	mg/L	N/A	100	Phone the first time in an episode.

Note: It is not necessary to phone Beta-hCG to Fertility Clinics unless marked urgent or instruction for a result to be phoned is indicated on the request form.

BIOCHEMISTRY CRITICAL TEST RESULT VALUES – CATEGORY B
Results require communication within 24 hours.

Parameter	Unit of Measurement	Lower Limit ≤	Higher Limit ≥	Required Action by Laboratory
ALT	IU/L	N/A	510	Phone the first time in an episode.
ALT (Paediatric <16 yrs)	IU/L	N/A	510	Phone the first time in an episode.
AST	IU/L	N/A	510	Phone the first time in an episode.
AST (Paediatric <16 yrs)	IU/L	N/A	510	Phone the first time in an episode.
Triglyceride	mmol/L	N/A	20	Phone the first time in an episode.
Free T4	pmol/L	8	50	Phone the first time in an episode.
TSH	IU/L	N/A	30.0	Phone the first time in an episode.
Prolactin (non-pregnant)	mIU/L	N/A	1000	Phone the first time in an episode.
Vitamin B12	pg/L	148	N/A	Phone the first time in an episode.
Cortisol Unless part of Dexamethasone suppression test	nmol/L	<50	None	Phone.
Cortisol (30 mins Post Syn)	nmol/L	<250	None	Phone.
Gentamicin (Pre/ Random/ Unlabelled)	mg/L	N/A	>1	Phone.
Gentamicin (Post)	mg/L	N/A	>5	Phone.
Tobramycin	mg/L	N/A	>1	Phone.
Vancomycin	mg/L	N/A	>20	Phone.
DPD Gene Screening	N/A	N/A	N/A	Inform Dr Bird if Mutation is identified.
Paraprotein	g/L	Any IgE/IgD	IgG >15 IgA >10 IgM >10	Phone the first time identified
Hypogammaglobulinaemia	g/L	IgG <3	N/A	Phone the first time identified

BON SECOURS HEALTH SYSTEM

HAEMATOLOGY CRITICAL TEST RESULT VALUES

Parameter	Units of Measurement	Lower Limit	Oncology Patient Limits #	Higher Limit	Required Action by Laboratory
Haemoglobin §	g/dl	<8.5	<7.5	Male: >20 Female: >18	*Phone
White cell count * Patients with known CLL	X 10^9/L X 10^9/L	<3.0 N/A	<1.0 N/A	>30 >100	*Phone
Platelets	X 10^9/L	<30	<20	>1000	*Phone
Platelet (previously within normal range)	X 10^9/L	<75	N/A	N/A	*Phone
Platelet (Paediatric <16 yrs)	X 10^9/L	<40	N/A	>1000	*Phone
Neutrophil Count	X 10^9/L	<0.5	<0.5	N/A	*Phone
Blood Film	N/A	Presence of blast cells on first presentation or any morphology suggestive of blood disorder requiring clinical intervention			*Phone Consultant Haematologist
Prothrombin Ratio (INR) Non-anticoagulated Anticoagulated	 ratio ratio	 N/A N/A	 N/A N/A	 >1.2 >5.0	*Phone
Activated Partial Thromboplastin Time (APTT) Non-anticoagulated Anticoagulated	 sec sec	 N/A N/A	 N/A N/A	 >32 >70	*Phone
Fibrinogen	g/L	<1.0	N/A	N/A	*Phone
Heparin Induced Thrombocytopenia Screen (HITs)	N/A	All Positive Results			*Phone
Infectious Mono Screen (Monospot)	N/A	All Positive Results			*Phone
Pregnancy Test (Urine)	N/A	All Positive Results			*Phone
Malaria and Sickle Cell Screen Screen	N/A	All Positive Results			*Phone

 # Oncology patients include those from the following locations: BERN, VER, SVPAC, ONC, OLC, Radiotherapy (UPMC) as well as those under the care of an Oncology/ Haematology Consultant.

§ If a patient Haemoglobin has been <8.5 (or <7.5 for oncology patients) and has decreased by 1.5g/l then the result will be phoned.

*** If a patient WBC has previously been >30 and has subsequently increased by >50% then the result will be phoned.**

Θ If a patient has FBC results that are in keeping with a known diagnosed blood disorder, then results will not be phoned, however, parameters that may influence ordering blood product support will be communicated.

BON SECOURS HEALTH SYSTEM

BLOOD BANK CRITICAL TEST RESULTS

Parameter*	Units of Measurement	Lower Limit	Higher Limit	Required Action by Laboratory
Direct Antiglobulin Test	N/A	N/A	3+ or 4+ with Hb <8.5g/dl	*Phone Consultant Haematologist
A new red cell antibody where transfusion is required urgently when there could be a delay in finding compatible blood	N/A	N/A		*Phone
Wrong blood in tube – an unexpected change in blood group compared to a historical blood sample, query misidentified patient.	N/A	N/A		Request urgent resampling

HISTOPATHOLOGY CRITICAL TEST RESULT VALUES

Test	Critical Test Value	Required Action by Laboratory
Frozen section*	All results when available	Phone to Consultant in Theatre

* For frozen sections, results will be phoned by the Consultant Pathologists within 20 mins of specimen registration.

Note: The referring clinician is responsible for ensuring both that they have indictated any degree of clinical urgency to the Laboratory, and that they have received and acted upon the report. This primary responsibility is not dependent on any communication from the Laboratory.
Pathologists should use their experience and judgement to identify unexpected/ critical results/ diagnoses such as unexpected finding of malignancy, cases where a diagnosis is significantly modified after the initial report.
Pathologists should communicate directly with clinicians, using a satisfactory method of communication based on experience/ judgement, preferably on the same day on which the diagnosis is made, when circumstances permit.

IMMUNOLOGY CRITICAL TEST RESULT VALUES

Test	Critical Test Value	Required Action by Laboratory
ANCA	Positive pANCA and MPO antibodies or cANCA and PR3 antibodies (first time)	Phone Clinician and notify Consultant Immunologist by e-mail
GBM Antibodies	Positive (first time)	Phone Clinician and notify Consultant Immunologist by e-mail
Liver Kidney Microsomal Antibodies (LKM)	Positive (first time)	Phone Clinician and notify Consultant Immunologist by e-mail
Anti NMDA Antibodies	Positive (first time)	Phone Clinician and notify Consultant Immunologist by e-mail

BON SECOURS HEALTH SYSTEM

MICROBIOLOGY CRITICAL TEST RESULT VALUES

Test	Critical Test Value	Required Action by Laboratory
Blood Culture (Gram Stain)	All positive Blood Culture gram stain results	Phone to inform ward, Consultant, GP or external agency (EXCEPT partner bottle of a blood culture set previously reported as positive to the ward with the same gram result)
CSF	All positive CSF direct microscopic results	Phone to inform ward, Consultant, GP or external agency
Joint Fluid	All positive Joint Fluid gram stain results	Phone to inform ward, Consultant, GP or external agency

25.0 LIST OF TESTS PERFORMED ON-CALL

BIOCHEMISTRY

Profiles

ADMISSION PROFILE (Biochemistry Section)
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Glucose, Magnesium (Mg)
CHILDREN'S WARD BIOCHEMISTRY
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Magnesium (Mg), Total Protein, Albumin, Globulin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), C – Reactive Protein (CRP), Random Glucose
LIPOPROTEIN PROFILE (FASTING)
Cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL)
LIPID PROFILE (NON-FASTING)
Cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein
LIVER/ RENAL / BONE PROFILE
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Magnesium (Mg)
LIVER FUNCTION TESTS
Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin
PATIENT PROFILE (NON FASTING)
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Cholesterol, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Magnesium (Mg)
PATIENT PROFILE (+LPP - FASTING)
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Phosphate, Cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin, Magnesium (Mg)

RENAL / BONE PROFILE
Sodium, Potassium, Chloride, Urea, Creatinine, Urate, Calcium, Albumin, Phosphate, Alkaline Phosphatase (ALP), Total Protein, Globulin, Magnesium (Mg)
UREA / ELECTROLYTES / CREATININE
Sodium, Potassium, Chloride, Urea, Creatinine
UREA / ELECTROLYTES / CREATININE & LIVER
Sodium, Potassium, Chloride, Urea, Creatinine, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase (ALP), Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl Transferase (GGT), Total Protein, Albumin, Globulin

Individual Tests

- Ammonia
- Amylase
- hCG Serum
- Blood Gases (including Lactate if required if sample < 15 mins) (Venous, Arterial, Angiography)
- BNP (B-Type Natriuretic Peptide)
- CK-total
- C – Reactive Protein (CRP)
- EGFR (Calculation for Chemotherapy Only – Weight and Height required))
- Gentamicin (Pre, Post, Random)
- Glucose (Fasting)
- Glucose (Non-Fasting)
- Glucose 2 hours post (Prandial)
- Iron (Fe) and Transferrin.
- Lactate (Adult and Paediatric)
- Lactate Dehydrogenase (LDH)
- Osmolality (Serum)
- Troponin-I
- Vancomycin (Pre and Post)
- Tobramycin
- Occupational Blood/ Body Fluid Exposure

CSF

- Protein
- Glucose
- Globulin
- Note: Xanthochromia – special bottle and form required. – Assayed in Biochemistry, CUH and is not available from them during the on-call period

Urine

- Urinary Na, K, Osmolality

Fluids

Please state source of fluid as tests performed are specific to collection location. See section 9.7 of this document for details.

- Amylase (Fluid)
- Albumin (Fluid)
- Alkaline Phosphatase (Fluid)
- LDH (Fluid)
- pH in Pleural Fluid
- Creatinine (Fluid)
- Protein Total (Fluid)
- Glucose (Fluid)
- Urate (Fluid)
- Triglyceride (Fluid)

BLOOD BANK

- Group and Crossmatch
- Group and Screen (Antibody Screen if required)
- Direct Antiglobulin Test
- Issue of Blood Products
  1. Albumin 5% / 20%
  2. PCC
  3. FEIBA
  4. Fibrinogen Concentrate
  5. Anti-D Immunoglobulin
- Platelets (Pooled or Single)
- Solvent Detergent Plasma (SDP)
- Red Cells
- Transfusion Reaction Investigation**

HAEMATOLOGY

Profiles

COAGULATION SCREEN
Prothrombin Time (PT)
International Normalised Ratio (INR)
Activated Partial Thromboplastin Time (APTT)

Individual Tests

- Full Blood Count (FBC) including Blood Film Review for Manual WBC Differential and Red Cell Morphology
- Activated Partial Thromboplastin Time (APTT)
- D-Dimer
- Fibrinogen
- International Normalised Ratio (INR)
- Prothrombin Time (PT)
- Infectious Mononucleosis Screening Test (Monospot)
- Malaria Parasites **
- Urinary hCG (Pregnancy Test)
- Erythrocyte Sedimentation Rate (ESR) (performed on-call at the request of a Consultant Haematologist only)

** Haematology/ Blood Bank staff member must be called in to perform this test.

MICROBIOLOGY

- Blood Cultures for Adult
- Blood Cultures for Babies and Children
- Cerebrospinal Fluid for Microscopy, Culture and Susceptibility
- Fluid from Sterile Site for Culture and Susceptibility (Synovial (Joint) Fluid)
- Urine for Microscopy, Culture and Sensitivities
- Urine Bilirubin
- Influenzae A and B (Test performed between 9am – 11pm 7 days a week)
- Covid 19 PCR (Test performed between 9am – 11pm 7 days a week)
- Respiratory Syncytial Virus (RSV)
- Extended Respiratory Panel

Note: Please refer to this document for test specific information.

26.0 TEST INDEX

TEST NAME	DEPARTMENT
5-Hydroxyindoleacetic Acid (5-HIAA)	Biochemistry
11 Deoxycortisol	Biochemistry
17 Hydroxy Progesterone	Biochemistry
Acetyl Cholinesterase Receptor Antibodies	Biochemistry
Abatacept (Orencia)	Biochemistry
Aciclovir Pre and Post Levels	Microbiology
Acid Fast Bacilli Culture (AFB)	Microbiology
Activated Clotted Time (ACT)	Point of Care/ Near Patient Testing
Activated Partial Thromboplastin Time (APTT)	Haematology
Acyl Carnitine Profile	Biochemistry
Adalimumab (Humira)	Biochemistry
ADAMTS 13 Factor Willibrand Cleavage Protease	Haematology
Adenovirus Antibodies	Microbiology
Adrenal Antibody	Immunology
Adrenocorticotrophic Hormone (ACTH)	Biochemistry
Admission Profile	Biochemistry
Albumin	Biochemistry
Albumin (Blood Product)	Blood Bank
Albumin (Fluid)	Biochemistry
Albumin (Urinary) Microalbumin	Biochemistry
Albumin Creatinine Ratio	Biochemistry
Alcohol	Biochemistry
Aldolase	Biochemistry
Aldosterone	Biochemistry
Alkaline Phosphatase	Biochemistry
Alkaline Phosphatase (Placental)	Biochemistry
Alkaline Phosphatase (Isoenzymes)	Biochemistry
Allergen Screening	Biochemistry
Alpha-Aminoadipic Semialdehyde (AASA)	Biochemistry
Alpha 1 Antitrypsin	Biochemistry
Alpha 1 Antitrypsin in Faeces	Biochemistry
Alpha 1 Antitrypsin Genotype	Biochemistry
Alpha 1 Antitrypsin phenotype	Biochemistry

TEST NAME	DEPARTMENT
Alpha Galactosidase (See Fabry Disease Screen)	Biochemistry
Alpha Feto Protein (AFP)	Biochemistry
Alanine Amino Transferase (ALT)	Biochemistry
Amino Acids	Biochemistry
AML Cytogenetic Panel	Haematology
Ammonia	Biochemistry
Amoebiasis Antibodies	Microbiology
Amylase	Biochemistry
Amylase (Fluid)	Biochemistry
Amylase (Urinary)	Biochemistry
Amyloid A Protein	Biochemistry
Androstenedione	Biochemistry
Angelman Syndrome	Histopathology
Angiotensin Converting Enzyme (ACE)	Biochemistry
Anti D Immunoglobulin (Blood Product)	Blood Bank
Anti Diuretic Hormone (ADH)	Biochemistry
Anti -GAD Antibodies	Biochemistry
Anti GM1	Immunology
Anti-Mullarian Hormone (AMH)	Biochemistry
Anti-Neutrophil Cytoplasmic Autoantibodies (ANCA)	Immunology
Antinuclear Antibody	Immunology
Anti Streptolysin – O Titre (ASOT)	Microbiology
Anti -tyrosine Antibodies	Biochemistry
Antibiotic Assay Aminoglycosides including - Gentamycin - Amikacin - Tobramycin Glycopeptides including - Vancomycin - Teicoplanin	Microbiology
Apolipoprotein A	Biochemistry
Apolipoprotein B	Biochemistry
Apolipoprotein E (Apo E)	Biochemistry
APO E Lipoprotein Genotyping	Biochemistry
Aquaporin 4 Antibody	Immunology
Arsenic	Biochemistry
Aspergillus Antibodies	Microbiology

TEST NAME	DEPARTMENT
Aspergillus Antigen (Galactomannan (GM))	Microbiology
Aspartate Amino Transferase (AST)	Biochemistry
Atypical Pneumoniae Screen	Microbiology
Autoantibody Screen (Anti – Nuclear, Mitochondrial, LKM, Smooth Muscle, Gastric Parietal Cell Antibody)	Immunology
Avian Precipitins	Immunology
Bacterial PCR	Microbiology
Bartonella henselae Antibodies (Catscratch Fever)	Microbiology
BCR/ABL Fusion Gene	Haematology
BCR-ABL Transcripts (Quantitation)	Haematology
Beta 2 Microglobulin	Biochemistry
Beta 2 Transferrin	Biochemistry
Beta Glucan Antigen	Microbiology
Bicarbonate	Biochemistry
Biliary Brush Sample	Histopathology
Bilirubin Direct	Biochemistry
Bilirubin Total	Biochemistry
Biologics Profile	Microbiology
Biotinidase	Biochemistry
Bisoprolol	Biochemistry
Blastomyces Antibodies	Microbiology
Blood Cultures	Microbiology
Blood Gases (Venous, Arterial, Angiography)	Biochemistry
Blood Gas CCU	Point of Care/ Near Patient Testing
Blood Gas CCU Venous Including Potassium and Lactate	Point of Care/ Near Patient Testing
BNP B-Type Natriuretic Peptide	Biochemistry
Bone Marrow Aspirate	Haematology
Bone Marrow FISH	Haematology
Bordetella pertussis anti-toxin Antibodies	Microbiology
Breath Test for Helicobacter pylori	Point of Care/ Near Patient Testing
Brucella Titre	Microbiology
Bullous Antibodies	Immunology
CA15-3	Biochemistry
CA19-9	Biochemistry

TEST NAME	DEPARTMENT
CA-50	Biochemistry
CA72-4	Biochemistry
CA125	Biochemistry
Cadmium	Biochemistry
Caffeine	Biochemistry
Calcitonin	Biochemistry
Calcium	Biochemistry
Calcium (Urinary)	Biochemistry
Calcium (Ionised)	Biochemistry
Calcium Creatinine Ratio in Urine	Biochemistry
Calculi Analyses (Kidney Stone, Gall Stone)	Biochemistry
CALR Mutation (Flow Cytometry)	Haematology
Campylobacter Antibodies	Microbiology
Carbamazepine	Biochemistry
Carbohydrate Deficient Transferrin	Biochemistry
Carcinoembyronic Antigen (CEA)	Biochemistry
Cardiolipin IgG Antibodies (Anti Phospholipid Antibodies)	Histopathology
Carnitine (Total)	Biochemistry
Carnitine (Urine)	Biochemistry
CASPR2 Antibody	Immunology
Catecholamines (Blood)	Biochemistry
Catecholamines and Metanephrines (24 hr urine collection)	Biochemistry
CD4, CD8 (T4, T8) T Cell Lymphocyte Subset Levels	Haematology
CD34 (Marker)	Haematology
Cerebrospinal Fluid for Cryptococcus	Microbiology
Cerebrospinal Fluid for Microscopy, Culture and Susceptibility	Microbiology
Ceruloplasmin	Biochemistry
Chikungunya Serology	Microbiology
Children's Ward Biochemistry Profile	Biochemistry
Chlamydia pneumoniae IgM	Microbiology
Chlamydia sp. Specific Antibodies	Microbiology
Chlamydia trachomatis/Gonorrhoea/Trichomonas PCR	Microbiology
Chloride	Biochemistry
Cholesterol	Biochemistry
Cholesterol - HDL	Biochemistry
Cholesterol - LDL	Biochemistry

TEST NAME	DEPARTMENT
Cholinesterase	Biochemistry
Chromium	Biochemistry
Chromosome Analysis on Blood (Karyotyping)	Histopathology
Chromosome Analysis Bone Marrow (Cytogenetics Bone Marrow)	Haematology
CK Isoenzymes	Biochemistry
CLL Prognostic Factors (TP53, 17pdel, IGVH)	Haematology
Clo Test for Helicobacter pylori	Point of Care/ Near Patient Testing
CMV IgG	Microbiology
CMV IgM	Microbiology
Coagulation Factor Assays	Haematology
Coagulation Screen Profile	Haematology
Cobalt	Biochemistry
Coccidioides Antibodies	Microbiology
Cold Agglutinins	Haematology
Colorectal Panel	Histopathology
Complement C1 Inhibitor Quantitation and Function	Biochemistry
Complement Function Test	Biochemistry
Complement C_2	Biochemistry
Complement C_3	Biochemistry
Complement C_4	Biochemistry
Complement C_5	Biochemistry
Complement Total (CH50)	Biochemistry
Copper	Biochemistry
Cortisol (as part of procedure for Dexamethasone test)	Biochemistry
Cortisol (as part of procedure for Synacthen test)	Biochemistry
Cortisol (pre synacthen)	Biochemistry
Cortisol (30 mins post synacthen)	Biochemistry
Cortisol (60 mins post synacthen)	Biochemistry
Cortisol (am)	Biochemistry
Cortisol (Midnight)	Biochemistry
Cortisol (pm)	Biochemistry
Cortisol (Random)	Biochemistry
Cortisol (Urinary)	Biochemistry

TEST NAME	DEPARTMENT
Counterweight Plus Fasting Profile	Biochemistry
COVID 19 PCR	Microbiology
Coxiella burnetii (Q Fever Antibodies)	Microbiology
C-peptide	Biochemistry
C – Reactive Protein (CRP)	Biochemistry
CPE/ ESBL Screen	Microbiology
Creatine Kinase MB Fraction (CKMB)	Biochemistry
Creatine Kinase Total (CK-Total)	Biochemistry
Creatinine	Biochemistry
Creatine (Capillary)	Point of Care/ Near Patient Testing
Creatinine Clearance	Biochemistry
Creatinine Clearance Calculated GFR for Chemotherapy	Biochemistry
Creatinine (Pleural Fluid)	Biochemistry
Creutzfeldt-Jakob Disease	Microbiology
Cryoglobulins	Biochemistry
Cryptococcal Antigen	Microbiology
CSF Amino Acids	Biochemistry
CSF Neurotransmitters	Biochemistry
CSF PCR Panel	Microbiology
CSF Phospho-Tau Protein	Biochemistry
CSF Spectrophotometry for Xanthochromia	Biochemistry
CSF Tau A-Beta Proteins	Biochemistry
CTX (C-Telopeptide of Type 1 Procollagen)	Biochemistry
Cyclic Citrullinated Peptide Antibodies (CCP)	Immunology
CYFRA 21-1	Biochemistry
Cystic Fibrosis DNA Studies	Biochemistry
Cystine	Biochemistry
Cytomegalovirus CMV Culture	Microbiology
Cytomegalovirus CMV PCR	Microbiology
Cytopathology Body Fluid (Various)	Histopathology
Cytopathology Bronchial Lavage	Histopathology
Cytopathology Cervical Specimen (Thin Prep) and HPV	Histopathology

TEST NAME	DEPARTMENT
Cytopathology Cerebral Spine Fluid (CSF)	Histopathology
Cytopathology Fine Needle Aspirate (FNA)	Histopathology
Cytopathology Hepatic Brush Biopsy	Histopathology
Cytopathology Sputum	Histopathology
D-Dimer	Haematology
Dehydro Epiandrosterone DHEA	Biochemistry
Dehydro Epiandrosterone DHEA (Urinary)	Biochemistry
Dehydro Epiandrosterone Sulphate DHEAS	Biochemistry
Dengue Virus Serology	Microbiology
Dexamethasone Suppression Test: Cortisol	Biochemistry
Di George Syndrome (Karotype/ FISH)	Histopathology
Digoxin	Biochemistry
Dihydropyrimidine dehydrogenase Gene Screening	Biochemistry
Dihydrotestosterone DHT	Biochemistry
Diptheria IgG (Immunity)	Microbiology
Direct Antiglobulin Test	Blood Bank
DOAC Level	Haematology
dsDNA Antibody	Immunology
Echinococcus Antibodies	Microbiology
EGFR (Calculation for Chemotherapy Only)	Biochemistry
Elastase	Biochemistry
Electrophoresis – Serum Protein Electrophoresis (SPE)	Biochemistry
Electrophoresis – Urine Immunoelectrophoresis	Biochemistry
EMA Screen for Hereditary Spherocytosis	Haematology
Endomysial IgA Antibodies (Confirmatory Test for tTG)	Immunology
Enteroviruses Culture (Faeces, CSF, Pleural Fluid, Viral Throat Swab)	Microbiology
Enterovirus PCR	Microbiology
Epstein-Barr Virus IgG	Microbiology
Epstein-Barr Virus IgM	Microbiology
Epstein-Barr Virus PCR	Microbiology
Erythrocyte Sedimentation Rate (ESR)	Haematology
Erythropoietin	Biochemistry
Ethosuzimide	Biochemistry
Extended Resp. Viruses	Microbiology
Extractable Nuclear Antigen (ENA)	Immunology
Fabry Disease Screen	Biochemistry

TEST NAME	DEPARTMENT
Factor II Prothrombin Gene Mutation	Haematology
Factor V Leiden DNA Studies	Haematology
Factor Xa activity (Heparin Assay)	Haematology
Faecal Calprotectin	Biochemistry
Faeces For Clostridium Difficile Toxin	Microbiology
Faeccoagules for Clostridium Difficile Antigens (GDH) Glutamate dehydrogenase	Microbiology
Faeces for Cryptosporidium	Microbiology
Faeces For Intestinal Pathogens	Microbiology
Faeces For Ova Cysts and Parasites	Microbiology
Faeces For Rotavirus and Adenovirus	Microbiology
Faeces Occult Blood	Microbiology
Familial Hypercholesterolaemia Genetics	Biochemistry
Farmers Lung Antibodies	Microbiology
Ferritin	Biochemistry
Fibrinogen	Haematology
Fibroblast Growth Factor 23	Biochemistry
Filaria Serology	Microbiology
Flecainide	Biochemistry
Fluid from Sterile Site for Culture and Susceptibility	Microbiology
Folate (Folic Acid)	Biochemistry
Follicle Stimulating Hormone (FSH)	Biochemistry
Fragile X DNA Studies	Histopathology
Francisella tularensis	Microbiology
Free Fatty Acids	Biochemistry
Very Long Chain Fatty Acids (VLCFA)	Biochemistry
Free T_3 (Triiodothyronine)	Biochemistry
Free T_4 (Thyroxine)	Biochemistry
Frozen Section (Tissue)	Histopathology
Fructosamine	Biochemistry
Full Blood Count (FBC)	Haematology
Full Blood Count Including Manual Blood Film Examination	Haematology
Fungal Culture (Mycology)	Microbiology
GABA and AMPA Receptor Antibodies	Immunology
Gamma GT	Biochemistry
Ganglionic Acetylcholine Receptor Antibody	Immunology
Ganglioside Antibodies	Immunology

TEST NAME	DEPARTMENT
Gastric Her2	Histopathology
Gastrin	Biochemistry
GCH1	Biochemistry
Gentamicin (Once Daily Dosing)	Biochemistry
Gentamicin (Multi Daily Dosing)	Biochemistry
GIST Panel	Histopathology
Gliadin Antibodies (IgA, IgG)	Immunology
Glomerular Basement Membranes Antibody (GBM)	Immunology
Globulin	Biochemistry
Globulin (CSF)	Biochemistry
Glucagon	Biochemistry
Glucose (Capillary)	Point of Care/ Near Patient Testing
Glucose (Fasting)	Biochemistry
Glucose (Non-Fasting)	Biochemistry
Glucose 2 hrs Post (Prandial)	Biochemistry
Glucose (CSF)	Biochemistry
Glucose (Fluid)	Biochemistry
Glucose 6 Phosphate Dehydrogenase (G6PD)	Haematology
Glucose Tolerance Test	Biochemistry
Glycine Receptor Antibody	Immuology
Glycosaminoglycans (Mucopolysaccharides)	Biochemistry
GQ1b	Immunology
Group and Crossmatch	Blood Bank
Group and Screen	Blood Bank
Growth Hormone	Biochemistry
Guthrie Card (New Born Screen)	Biochemistry
Haematology Profile	Haematology
Haemochromatosis DNA	Biochemistry
Haemoglobin Screening (Abnormal)	Haematology
Haemophilius influenzae Antibodies (Serum)	Microbiology
Haemophilus influenzae PCR	Microbiology
Haptoglobin	Biochemistry
HbA1c Glycosylated Haemoglobin	Biochemistry
hCG Total (Serum Quantitative as Tumour Marker)	Biochemistry
hCG Serum	Biochemistry

TEST NAME	DEPARTMENT
Helicobacter pylori IgG Antibodies	Microbiology
Helicobacter pylori Culture	Microbiology
Heparin Induced Thrombocytopenia screen (HITs)	Haematology
Hepatitis A Antibodies Total	Microbiology
Hepatitis A IgM	Microbiology
Hepatitis B (VRL Markers)	Microbiology
Hepatitis B Core Antibodies	Microbiology
Hepatitis B DNA	Microbiology
Hepatitis B Surface Antigen (HbsAg)	Microbiology
Hepatitis B Surface Antibodies (Immunity Check)	Microbiology
Hepatitis C Antibodies	Microbiology
Hepatitis C PCR (Polymerase Chain Reaction)	Microbiology
Hepatitis D Antibodies	Microbiology
Hepatitis E Antibodies	Microbiology
Her 2 FISH Analysis on Breast Carcinoma	Histopathology
Hereditary Transthyretin Mediated Amyloidosis Gene (h ATTR)	Biochemistry
Herpes simplex Antibodies	Microbiology
Herpes simplex PCR	Microbiology
Histamine (Serum)	Biochemistry
Histamine (Urine)	Biochemistry
Histopathology Specimens	Histopathology
Histoplasma Antibodies	Microbiology
HIV PCR	Microbiology
HIV Antigen/ Antibody Test	Microbiology
Homocysteine	Biochemistry
Homogentistic Acid	Biochemistry
HTLV 1 and 2	Microbiology
Human Herpes Virus 6	Microbiology
Human Leucocyte Antigen (HLA) Typing	Haematology
Human Leucocyte Antigen (HLA) Antibodies	Haematology
Huntington's Disease	Histopathology
Hydroxyproline	Biochemistry
Hypocretin (Orexin)	Biochemistry
IgA Immunoglobulin A	Biochemistry

TEST NAME	DEPARTMENT
IgA Subclasses	Biochemistry
IgD Immunoglobulin D	Biochemistry
IgE Immunoglobulin E	Biochemistry
IgG Immunoglobulin G	Biochemistry
IgG Immunoglobulin G Subclasses	Biochemistry
IgM Immunoglobulin M	Biochemistry
Immune Complexes	Biochemistry
Immunoglobulin Gene Mutation (IgVH Mutation)	Haematology
Immunoreactive Trypsin	Biochemistry
Infectious Mononucleosis Screening Test (Mono Spot)	Haematology
Inflammatory Bowel Disease (IBD Profile)	Microbiology
Infliximab Antibodies	Biochemistry
Influenzae A and B	Microbiology
Inhibin B	Biochemistry
Inhibitor Screen	Haematology
Insulin	Biochemistry
Insulin C-peptide	Biochemistry
Insulin Like Growth Factor Binding Protein 3 (IGF BP3)	Biochemistry
Insulin Like Growth Factor 1 (IGF1)	Biochemistry
Insulin Like Growth Factor 2 (IGF2)	Biochemistry
Interleukin-6	Biochemistry
International Normalised Ratio (INR)	Haematology
Intrinsic Factor Antibody	Immunology
Iron (Fe)	Biochemistry
Ischaemic Forearm Exercise Test (Dynamic): Lactate	Biochemistry
Islet Cells Antibody	Immunology
JAK 2	Haematology
Kappa Lambda Ratio	Biochemistry
Ketone (Capillary)	Point of Care/ Near Patient Testing
Lactate	Biochemistry
Lactate Dehydrogenase (LDH)	Biochemistry
Lactate Dehydrogenase Fluid	Biochemistry
Lactate Dehydrogenase Isoenzymes	Biochemistry
Lamotrigine	Biochemistry
Laxative Screen	Biochemistry
Lead	Biochemistry

TEST NAME	DEPARTMENT
Legionella pneumophila Urinary Antigen Test	Microbiology
Legionella Culture	Microbiology
Leishmania Antibodies	Microbiology
Leishmania Detection	Microbiology
Leptospira Antibodies	Microbiology
Leucocyte Immunopheno-Typing	Haematology
Leucocyte ImmunoPheno-Typing on CSF	Haematology
Levetiracetam (Keppra)	Biochenmistry
LGI1 Antibody	Immunology
LH/ RH Test (Dynamic): LH and FSH	Biochemistry
Lipase	Biochemistry
Lipoprotein (a)	Biochemistry
Lipoprotein Profile (Fasting)	Biochemistry
Lipid Profile (Non Fasting)	Biochemistry
Lithium	Biochemistry
Liver/ Renal/ Bone Profile	Biochemistry
Liver Function Test Profile	Biochemistry
Lung Panel	Histopathology
Lupus Anticoagulant	Haematology
Lupus Anticoagulant Profile	Haematology
Lutinising Hormone (LH)	Biochemistry
Lymes Disease (Borrelia Burgdorferi Antibodies)	Microbiology
Lymphoma Viral Screen	Biochemistry
Magnesium	Biochemistry
Magnesium (Urine)	Biochemistry
Malaria Parasites	Haematology
Manganese	Biochemistry
Mantoux Testing	Pathology
Maternally Inherited Diabetes and Deafness Genetic Screen	Biochemistry
MDSNGS Panel	Haematology
Measles IgG	Microbiology
Measles IgM	Microbiology

TEST NAME	DEPARTMENT
Measles RNA PCR	Microbiology
Melanoma Panel	Histopathology
MEN Type 2 Genetics	Biochemistry
Mercury	Biochemistry
Metabolic Screen - Childrens Ward Amino Acids (Blood) Amino Acids (Urine) Organic Acids	Biochemistry
Metanephrines (Plasma)	Biochemistry
Methaemoglobin	Biochemistry
Methotrexate	Biochemistry
Methylene Tetrahydrofolate Reductase Deficiency (MTHFR)	Haematology
Methylhistamine	Biochemistry
Methyl Malonic Acid	Biochemistry
Microalbumin Creatinine Ratio	Biochemistry
Microsatellite Instability	Histopathology
Mitotane	Biochemistry
MODY Genetics	Biochemistry
Molybdenum	Biochemistry
Monomeric Prolactin	Biochemistry
MPL Mutation Studies (MPLS)	Haematology
MRSA Screen	Microbiology
Mumps IgG, IgM	Microbiology
MUSK Antibody	Immunology
Myelin Associated Glycoprotein Antibody (MAG)	Immunology
Myelin Oligodendrocyte Glycoprotein Antibody (MOG)	Immunology
Myostis Marker Antibodies (Anti Synthetase Antibodies)	Immunology
Mycobacterium TB PCR	Microbiology
Mycology, Fungal Culture	Microbiology
Mycoplasma pneumoniae IgM	Microbiology
Myoglobin	Biochemistry
Myotonic Dystrophy	Histopathology
Neisseria meningitidis Antibodies	Microbiology
Neisseria meningitidis PCR	Microbiology
Neuroblastoma screen	Biochemistry

TEST NAME	DEPARTMENT
Neuronal Antibodies	Immunology
NMDA Receptor Antibody	Immunology
Norovirus (Previously SRSV, Winter Vomiting Bug)	Microbiology
N-telopeptide (NTx)	Biochemistry
Occupational Blood/ Body Fluid Exposure	Microbiology
Occupational Health Drugs of Abuse Screen	Biochemistry
Oestradiol	Biochemistry
Oligoclonal banding	Biochemistry
Oncomine	Histopathology
Organic Acids	Biochemistry
Osmolality	Biochemistry
Osteocalcin	Biochemistry
Ovarian Antibody	Immunology
Oxalate	Biochemistry
Oxalate/ Creatinine Ratio	Biochemistry
Pancreatic Polypeptide (PPP)	Biochemistry
Paracetamol	Biochemistry
Parainfluenzae virus Immunofluorescence	Microbiology
Parathyroid Hormone (PTH)	Biochemistry
Parathyroid Hormone Related Protein	Biochemistry
Parvovirus B19 IgG (Non Acute) Serology	Microbiology
Parvovirus B19 IgM (Acute) Serology	Microbiology
Pathology Profiles	Pathology
Patient Profile (Non Fasting)	Biochemistry
Patient Profile (Fasting)	Biochemistry
Perampanel (Fycompa)	Biochemistry
pH in Pleural Fluid	Biochemistry
Pharmacy Culture	Microbiology
Phenobarbital (Phenobarbitone)	Biochemistry
Phenytoin (Epanutin)	Biochemistry
Phosphate (Inorganic)	Biochemistry
Phosphate (Urinary)	Biochemistry
Phospholipid Antibodies (IgG and IgM Cardiolipin and β2 Glycoprotein Antibodies)	Immunology
Phytanic Acid	Biochemistry
Platelet Antibodies	Haematology

TEST NAME	DEPARTMENT
Platelet Function Assessment (PFA100)	Haematology
Platelet Genotyping by DNA	Haematology
Platelets (Blood Component)	Blood Bank
Pneumococcal Antibodies (IgG)	Microbiology
Pneumococcal Urinary Antigen	Microbiology
Pneumocystis carinii PCR (PCP)	Microbiology
PNH (Flow Cytometry)	Haematology
PNPO Pyramidine 5' Phosphate Oxidase	Biochemistry
Polyoma BK Virus	Microbiology
Polyoma Virus (JC)	Microbiology
Porphyrins (Blood)	Biochemistry
Porphyrins (Faeces)	Biochemistry
Porphyrins (Plasma)	Biochemistry
Porphyrins (Urine)	Biochemistry
Potassium (K)	Biochemistry
Prader Willi Syndrome (Karotype/ FISH)	Histopathology
Prealbumin	Biochemistry
Pregnanetriol	Biochemistry
Procalcitonin	Microbiology
Procollagen 3	Biochemistry
Progesterone	Biochemistry
Proinsulin	Biochemistry
Prolactin	Biochemistry
Prostate Specific Antigen (PSA)	Biochemistry
Prostate Specific Antigen Free (PSA)	Biochemistry
Protein (Urinary)	Biochemistry
Protein Creatinine Ratio	Biochemistry
Protein Total	Biochemistry
Protein Total (CSF)	Biochemistry
Protein Total (Fluid)	Biochemistry
Prothrombin Complex Concentrate (PCC Blood Component)	Blood Bank
Prothrombin Time (PT)	Haematology
PTH-Related Protein	Biochemistry
Pyruvate	Biochemistry
Pyruvate Kinase	Haematology
Quantiferon Test for MTB Complex	Microbiology

TEST NAME	DEPARTMENT
Quinidine	Biochemistry
Red Cells	Blood Bank
Red Cell Folate	Biochemistry
Reagent Strip Urinalysis	Microbiology
Renal/ Bone Profile	Biochemistry
Renin	Biochemistry
Respiratory Syncytial Virus Antigen (RSV)	Microbiology
Reticulocyte Count	Haematology
Reverse T_3	Biochemistry
Rheumatoid Screen	Immunology
Rickettsia Antibodies	Microbiology
Rubella IgG (Immunity)	Microbiology
Rubella IgM	Microbiology
Saccharomyces cerevisiae Antibodies	Microbiology
Salicylate	Biochemistry
Salivary Cortisol	Biochemistry
Schistosomal Antibodies	Microbiology
Selenium	Biochemistry
Serotonin	Biochemistry
Sex Hormone Binding Globulin (SHBG)	Biochemistry
Sickle Cell Screen (HBS)	Haematology
Sodium (Na)	Biochemistry
Solvent Detergent Plasma (SDP) (Frozen Plasma) (Blood Component)	Blood Bank
Somatostatin	Biochemistry
Sperm Antibodies	Biochemistry
Sputum	Histopathology
Sputum for Culture and Sensitivities Bronchial Lavage for culture and sensitivity.	Microbiology
Strep. pneumoniae PCR	Microbiology
Strongyloides Antibodies	Microbiology
Sulphonylureas	Biochemistry
Swabs for Culture and Sensitivity including ear, eye, mouth, throat, nasal, High vaginal swab (HVS), penile, cervical, urethral, wound and ulcer	Microbiology
Swabs for Whooping Cough (Bordetella pertussis)	Microbiology

TEST NAME	DEPARTMENT
Synacthen Test (Dynamic): Cortisol	Biochemistry
Tacrolimus (Prograf)	Biochemistry
T & B Lymphocytes	Haematology
T Cell Lymphocyte (T4, T8) Subset Levels (CD4, CD8)	Haematology
Testosterone with SHBG	Biochemistry
Testosterone (Free)	Biochemistry
Testosterone (Urinary)	Biochemistry
Tetanus IgG (Immunity)	Microbiology
Theophylline (Aminophylline)	Biochemistry
Thiopurine-S-Methyl Transferase (Red Cell) (TPMT)	Biochemistry
Thrombophilia Screen	Haematology
Thrombophilia Screen Profile	Haematology
Thyroglobulin	Biochemistry
Thyroglobulin Antibody	Immunology
Thyroid Function Test Profile	Biochemistry
Thyroid Peroxidase Antibody (TPO)	Immunology
Thyroid Stimulating Hormone (TSH)	Biochemistry
Thyroid Stimulating Hormone Receptor Antibody	Immunology
Tips for Culture and Sensitivity	Microbiology
Tissue for Culture and Sensitivity	Microbiology
Tissue Transglutaminase IgA Antibody, Coeliac Disease (TTG)	Immunology
Tobramycin	Biochemistry
Total Syphilis Antibodies	Microbiology
Toxicology Screen	Biochemistry
Toxocara Antibodies	Microbiology
Toxoplasma IgM	Microbiology
Toxoplasma IgG	Microbiology
Transferrin	Biochemistry
Transferrin Glycoform Analysis	Biochemistry
Transferrin Saturation (Calculation)	Biochemistry
Transfusion Reaction Investigation	Blood Bank
TRH Test (Dynamic) Tests Measured: Free T_4, TSH, Prl	Biochemistry
Trichinosis Antibodies	Microbiology
Triglycerides	Biochemistry
Troponin-I	Biochemistry
Tryptase	Biochemistry

TEST NAME	DEPARTMENT
UGT1A1 (Gilberts Syndrome)	Biochemistry
Urate (Uric acid)	Biochemistry
Urate (Urinary)	Biochemistry
Urea	Biochemistry
Urea/ Electrolytes/ Creatinine Profile	Biochemistry
Urea/ Electrolytes/ Creatinine/ Liver Profile	Biochemistry
Urinalysis (4 Panel)	Point of Care/ Near Patient Testing
Urinalysis (10 Panel)	Point of Care/ Near Patient Testing
Urinary Cotinine	Biochemistry
Urinary Electrolytes (24 Hour Collection) (Na, K, Cl, Urea)	Biochemistry
Urinary Electrolytes (Spot) (Na, K, Cl, Urea)	Biochemistry
Urinary hCG (Pregnancy Test)	Haematology
Urinary hCG (Pregnancy Test)	Point of Care/ Near Patient Testing
Urinary Lipase	Biochemistry
Urinary Na, K, Osmolality	Biochemistry
Urine Bilirubin	Microbiology
Urine for Microscopy, Culture and Sensitivities	Microbiology
Urine for Pneumococcal Antigen	Microbiology
Urine Purine and Pyrimidine Screen	Biochemistry
Valproic Acid	Biochemistry
Vancomycin	Biochemistry
Varicella zoster DNA	Microbiology
Varicella zoster IgG Antibodies	Microbiology
Vasoactive Intestinal Peptide VIP	Biochemistry
Vedolizumab Antibodies	Biochemistry
Vigabatrin	Biochemistry
Viral Culture	Microbiology
Viscosity	Biochemistry
Vitamin A (Retinol)	Biochemistry
Vitamin B_1 (Thiamine)	Biochemistry
Vitamin B_6 (Pyridoxal Phosphate)	Biochemistry
Vitamin B_{12}	Biochemistry
Vitamin C (Ascorbic Acid)	Biochemistry
Vitamin D	Biochemistry
Vitamin D_3	Biochemistry

TEST NAME	DEPARTMENT
Vitamin E (Tocopherol)	Biochemistry
Vitamin K (Phylloquinone)	Biochemistry
Voltage Gated Calcium Channel Antibody	Immunology
Von Willebrands Screen	Haematology
VRE Screen	Microbiology
Water Deprivation Test	Biochemistry
West Nile Virus IgM	Microbiology
Xylose	Biochemistry
Zinc	Biochemistry