Primary Specimen Collection Manual

(Pathology User Manual)

[1 Introduction 5](#_Toc161909776)

[1.1 The Quality Policy of the Pathology Laboratory at the National Maternity Hospital 5](#_Toc161909777)

[1.2 Guide to Using this Manual 5](#_Toc161909778)

[1.2.1 Using the “Table of Contents” for Navigation 5](#_Toc161909779)

[1.3 Pathology Department Telephone Numbers 6](#_Toc161909780)

[1.3.1 General Pathology 6](#_Toc161909781)

[1.3.2 Anatomic Pathology 6](#_Toc161909782)

[1.3.3 Biochemistry 6](#_Toc161909783)

[1.3.4 Blood Transfusion 7](#_Toc161909784)

[1.3.5 Haematology 7](#_Toc161909785)

[1.3.6 Microbiology 8](#_Toc161909786)

[1.4 Location of Pathology Departments 8](#_Toc161909787)

[1.5 Pathology Department Opening Hours 9](#_Toc161909788)

[1.6 Advisory Services 9](#_Toc161909789)

[1.7 Requesting Tests 9](#_Toc161909790)

[1.7.1 Routine Requests 9](#_Toc161909791)

[1.7.2 Urgent Requests during Routine Hours 10](#_Toc161909792)

[1.7.3 Pathology On-Call Services 10](#_Toc161909793)

[1.7.4 Verbal Request Policy by Department 13](#_Toc161909794)

[1.7.5 Routine Cut Off Times for Specimen Acceptance/Processing 14](#_Toc161909795)

[2 Patient Identification 15](#_Toc161909796)

[2.1 Patient Consent 15](#_Toc161909797)

[2.1.1 Anatomical Pathology Patient Information and Consent 15](#_Toc161909798)

[2.2 Clinical Procedure for Patient Identification 15](#_Toc161909799)

[2.2.1 Neonates, Unconscious Patients and Patients Unable to Identify Themselves 15](#_Toc161909800)

[2.2.2 Identification of Foetus 15](#_Toc161909801)

[2.2.3 Urgent Specimen from a “Moribund” (Unidentified) Patient 16](#_Toc161909802)

[3 Safety 16](#_Toc161909803)

[3.1 General Safety Guidelines 16](#_Toc161909804)

[3.2 Venepuncture Procedure / Collection of Specimens 16](#_Toc161909805)

[4 Requesting Tests MN-CMS 18](#_Toc161909806)

[4.1 Electronic Requests MN-CMS 18](#_Toc161909807)

[4.2 How to Order Tests via the PowerChart 18](#_Toc161909808)

[4.2.1 Genetic Requests 19](#_Toc161909809)

[4.3 Specimen Collection MN-CMS 20](#_Toc161909810)

[4.4 Requests with No Specimen Collection 21](#_Toc161909811)

[4.5 Specimen Labelling MN-CMS 21](#_Toc161909812)

[4.6 Specimen Labelling in the Event of MN-CMS Printer Failure 22](#_Toc161909813)

[4.7 Processing Samples ‘Not Collected’ on MN-CMS 23](#_Toc161909814)

[5 Requesting Tests: Paper Request 23](#_Toc161909815)

[5.1 Consultant or Pathology Request Forms 23](#_Toc161909816)

[5.2 Labelling the Primary Specimen and Filling in the Request Form 24](#_Toc161909817)

[5.2.1 Request Form 24](#_Toc161909818)

[5.2.2 Primary Specimen 25](#_Toc161909819)

[5.2.3 Labelling Criteria for Community/GP Blood Transfusion Samples 25](#_Toc161909820)

[6 Storage and Transport of Specimens 26](#_Toc161909821)

[6.1 Pre-Analytical Specimen Storage 26](#_Toc161909822)

[6.2 Specimen Transport 26](#_Toc161909823)

[6.2.1 Specimen Transport: Anatomic Pathology 27](#_Toc161909824)

[6.2.2 Placental Samples 27](#_Toc161909825)

[6.2.3 Post Mortem 27](#_Toc161909826)

[6.3 Transport of Potentially High Infectious Risk Specimens 28](#_Toc161909827)

[6.3.1 Model Rules for Laboratory Porters and All Who Deliver Specimens to the Laboratory 28](#_Toc161909828)

[6.4 Specimen Location Delivery Instructions 28](#_Toc161909829)

[7 Specimen Acceptance Requirements 29](#_Toc161909830)

[7.1 Laboratory Criteria for Specimen Acceptance 29](#_Toc161909831)

[7.2 Laboratory Criteria for Rejection of Specimens 29](#_Toc161909832)

[7.2.1 Reasons for Rejecting a Specimen 29](#_Toc161909833)

[7.2.2 Factors that May Affect the Performance of the Test/Interpretation of Results 30](#_Toc161909834)

[7.2.3 Exceptions to Rejecting a Specimen 30](#_Toc161909835)

[7.3 Sample Receipt 30](#_Toc161909836)

[7.4 Secondary Sampling of Primary Specimen 30](#_Toc161909837)

[8 Reports 31](#_Toc161909838)

[8.1 Reporting of Results within the Hospital 31](#_Toc161909839)

[8.1.1 MN-CMS Reports 31](#_Toc161909840)

[8.2 Winpath Ward Enquiry 31](#_Toc161909841)

[8.2.1 Paper Reports 31](#_Toc161909842)

[8.3 Reports for External Locations 31](#_Toc161909843)

[8.4 Telephoned Reports 31](#_Toc161909844)

[8.5 Faxed Reports 32](#_Toc161909845)

[8.6 Urgent Reports 32](#_Toc161909846)

[8.7 Supplemental Reports 32](#_Toc161909847)

[8.8 Amended Reports 32](#_Toc161909848)

[8.9 Copy Reports 32](#_Toc161909849)

[8.10 Delayed Results 33](#_Toc161909850)

[8.11 Uncertainty of Measurement 33](#_Toc161909851)

[8.12 Reference Ranges 33](#_Toc161909852)

[8.13 Accredited and Non-Accredited Test Reporting 33](#_Toc161909853)

[8.14 Pre-Authorised Results 34](#_Toc161909854)

[8.15 Reports on Results from Referral Laboratories 34](#_Toc161909855)

[9 Post Analytical Storage, Retention and Disposal 34](#_Toc161909856)

[9.1 Anatomical Pathology 34](#_Toc161909857)

[9.2 Blood Sciences 34](#_Toc161909858)

[9.3 Microbiology 34](#_Toc161909859)

[9.4 Specimen Reception and Dispatch 35](#_Toc161909860)

[10 Policy on Protection of Personal Information 35](#_Toc161909861)

[11 Complaints Procedure 35](#_Toc161909862)

[11.1 Monitoring User Complaints 35](#_Toc161909863)

[12 Anatomical Pathology (Histology) Department 36](#_Toc161909864)

[12.1 Anatomical Pathology Tests 36](#_Toc161909865)

[12.2 Anatomical Pathology Specimen Requirements 36](#_Toc161909866)

[13 Biochemistry Department 38](#_Toc161909867)

[13.1 Tests and Specimen Requirements 38](#_Toc161909868)

[13.2 Stability of Routine Biochemistry Tests 38](#_Toc161909869)

[13.3 Specialised Biochemical Investigations 42](#_Toc161909870)

[13.4 Retrospective Requesting/Additional Requests 54](#_Toc161909871)

[13.5 Reference Ranges and Critical Alert Ranges 54](#_Toc161909872)

[14 Blood Transfusion Department 60](#_Toc161909873)

[14.1 Storage of Blood Specimens 65](#_Toc161909874)

[14.2 Specimen Request Form 65](#_Toc161909875)

[14.2.1 Antenatal Blood Grouping and Antibody Screen 65](#_Toc161909876)

[14.2.2 Crossmatch Request 65](#_Toc161909877)

[14.2.3 Blood Transfusion Laboratory Services at the National Maternity Hospital to Support Termination of Pregnancy Services 66](#_Toc161909878)

[14.2.4 Routine Antenatal Anti-D Prophylaxis (RAADP) at the NMH 66](#_Toc161909879)

[14.3 Maximum Blood Order Schedule 66](#_Toc161909880)

[14.4 Massive Haemorrhage Pathway 66](#_Toc161909881)

[14.5 Urgent Blood Product Requests 66](#_Toc161909882)

[14.6 Investigation Following Suspected Transfusion Reaction 66](#_Toc161909883)

[14.7 Reference Ranges and Critical Alert Ranges 67](#_Toc161909884)

[14.8 Collection/Delivery of Blood, Components and Blood Products 67](#_Toc161909885)

[14.9 Intra Uterine Transfusion 67](#_Toc161909886)

[15 Haemovigilance 68](#_Toc161909887)

[15.1 Patient Identification 69](#_Toc161909888)

[15.2 Positive Patient Identification Procedure 70](#_Toc161909889)

[15.3 General Haemovigilance Issues 70](#_Toc161909890)

[15.3.1 Traceability (Legal Requirement) 70](#_Toc161909891)

[15.3.2 Notification of Serious Adverse Events and Reactions (SAR and SAE) 70](#_Toc161909892)

[15.3.3 Following Suspected Transfusion Reaction 70](#_Toc161909893)

[16 Haematology 72](#_Toc161909894)

[16.1 Haematology Tests 72](#_Toc161909895)

[16.2 Stability of Routine Haematology Tests 73](#_Toc161909896)

[16.3 Blood Films Outside of Routine Hours 87](#_Toc161909897)

[16.4 Haematology Reference Ranges 87](#_Toc161909898)

[16.5 Haematology Critical Alert Ranges 93](#_Toc161909899)

[16.6 Retrospective/Add-On Requesting 94](#_Toc161909900)

[17 Microbiology 95](#_Toc161909901)

[17.1 Microbiology Specimens and Tests 95](#_Toc161909902)

[17.2 Microbiology Specimen Stability 95](#_Toc161909903)

[17.3 Reference Ranges and Critical Alert Ranges 109](#_Toc161909904)

[17.4 Mandatory Reporting 115](#_Toc161909905)

[17.5 Requesting Additional Examinations/Tests 115](#_Toc161909906)

[18 Specimen Referral/Dispatch 116](#_Toc161909907)

[18.1 Specimen Referral 116](#_Toc161909908)

[18.2 Reports from Referral Laboratories 116](#_Toc161909909)

[19 Virology Referral 117](#_Toc161909910)

[19.1 Retrospective Requesting/Additional Requests 126](#_Toc161909911)

[20 Appendices 127](#_Toc161909912)

[20.1 Appendix 1: Useful Referral Contact Numbers 127](#_Toc161909913)

[20.2 Appendix 2: Uncertainty of Measurement 127](#_Toc161909914)

[20.3 Appendix 3: Microbiology Orders MN-CMS 128](#_Toc161909915)

**Table of Figures:**

[Figure 1: General Pathology Telephone Numbers 6](#_Toc135754631)

[Figure 2: Anatomic Pathology Telephone Numbers 6](#_Toc135754632)

[Figure 3: Biochemistry Telephone Numbers 6](#_Toc135754633)

[Figure 4: Blood Transfusion Telephone Numbers 7](#_Toc135754634)

[Figure 5: Haematology Telephone Numbers 7](#_Toc135754635)

[Figure 6: Microbiology Telephone Numbers 7](#_Toc135754636)

[Figure 7: Department Location 8](#_Toc135754637)

[Figure 8: Department Hours 8](#_Toc135754638)

[Figure 9: Tests 'On-Call' 10](#_Toc135754639)

[Figure 10: Telephone Request Policy 12](#_Toc135754640)

[Figure 11: Specimen 'Cut off Times' 13](#_Toc135754641)

[Figure 12: Specimen Location Delivery Instructions 27](#_Toc135754642)

[Figure 13: Anatomical Pathology Tests 35](#_Toc135754643)

[Figure 14: Anatomical Pathology Specimen Requirements 35](#_Toc135754644)

[Figure 15: Routine Biochemistry Tests 37](#_Toc135754645)

[Figure 16 : Routine Biochemistry Profiles 40](#_Toc135754646)

[Figure 17: Glucose Testing 40](#_Toc135754647)

[Figure 18: Urine Biochemistry Tests 41](#_Toc135754648)

[Figure 19: CSF Biochemistry Tests 41](#_Toc135754649)

[Figure 20: Specialised Biochemical Investigations 42](#_Toc135754650)

[Figure 21: Reference Ranges for In House Testing 55](#_Toc135754651)

[Figure 22: Haematology Critical Values Management 93](#_Toc135754652)

[Figure 23: Stability of Microbiology Specimens 95](#_Toc135754653)

[Figure 24: Blood Cultures 96](#_Toc135754654)

[Figure 25: CSF Microbiology Examination 96](#_Toc135754655)

[Figure 26: Faeces Examination 96](#_Toc135754656)

[Figure 27: Fluids for Microbiology Examination 97](#_Toc135754657)

[Figure 28: Sputum Microbiology Examination 97](#_Toc135754658)

[Figure 29: Routine Swabs Microbiology Examination 98](#_Toc135754659)

[Figure 30: Surveillance Screens 99](#_Toc135754660)

[Figure 31: Urines Microbiology Examination 100](#_Toc135754661)

[Figure 32:Other Specimens Microbiology Examination 100](#_Toc135754662)

[Figure 33: Microbiology Referral Tests 102](#_Toc135754663)

[Figure 34: Normal values for WBC, RBC, Protein and Glucose for Various Age Groups in CSF 111](#_Toc135754664)

[Figure 35: Microbiology Critical Alert Ranges 112](#_Toc135754665)

[Figure 36: Referred Test for Serology/Virology 118](#_Toc135754666)

[Figure 37: Genetic Testing 127](#_Toc135754667)

**Appendices**

[20.1 Appendix 1: Useful Referral Contact Numbers 128](#_Toc135754890)

[20.2 Appendix 2: Uncertainty of Measurement 128](#_Toc135754891)

# 1 Introduction

This manual is designed to give an overall view of the services provided by the Department of Pathology and Laboratory Medicine. This manual is intended for users of the pathology service both within the hospital, and those from outside agencies. In January 2018, the National Maternity Hospital (NMH) implemented the Maternal Newborn–Clinical Management System (MN-CMS). This replaced the existing paper patient health record with an electronic Powerchart for obstetric and neonatal patients. This was further extended for all gynaecological patients in September 2019.

## The Quality Policy of the Pathology Laboratory at the National Maternity Hospital

The Department of Pathology and Laboratory Medicine is committed to promoting and providing the highest quality diagnostic and consultative services for all its users. The department is committed to the implementation of the National Maternity Hospital mission statement.

The quality policy is implemented by the following means:

1. Implementation of a quality management system, the purpose of which is to review and continuously improve the quality of the services provided.
2. Setting quality objectives and plans to implement the quality policy and ensure it is appropriate to the purpose of the hospital.
3. Ensuring that all staff are familiar with the quality policy through publication of the quality manual to ensure user satisfaction.
4. Treating health and safety as a prime focus for both staff and visitors.
5. Upholding professional values and good professional practice.
6. Complying with all environmental legislation.

The department will comply with the standards set by International Standard ISO 15189, AML-BB, EU Directive 2002/98/EC, HIQA and INAB for the services and tests defined in the quality manual and is committed to:

1. Staff recruitment, training and development at all levels to provide an effective and efficient service to its users.
2. Providing and managing resources to ensure that laboratory examinations are processed to produce the highest quality results possible and fit for intended use.
3. Reporting results in ways, which are timely, confidential, accurate and are supported by clinical advice and interpretation when required.
4. Implementation of internal quality control, external quality assessment, audit and assessment of user satisfaction to continuously improve the quality of the service.
5. The safe testing, distribution and transfusion of blood and blood components.

## Guide to Using this Manual

A controlled up to date electronic version of this manual is available hospital wide in Q-Pulse software. Any printed copies are uncontrolled documents.

### Using the “Table of Contents” for Navigation

One can navigate to any part of this document by holding down the CTRL key while also left clicking with the mouse in the appropriate area of the table of contents at pages 1-4 of this document.

## Pathology Department Telephone Numbers

Insert (01) 637 before extension number for direct access from outside the hospital.

Figure 1: General Pathology Telephone Numbers

|  |  |  |
| --- | --- | --- |
| General Pathology | **Contact Name** | **Phone/ Bleep** |
| Director of Pathology and Consultant Pathologist | Dr Susan Knowles | Ext: ????? or contact on mobile phone through hospital switch |
| Laboratory Manager | Damian Lally | Ext: 3313  Mobile: ~~086 7969647~~ |
| Laboratory Administration | Edel Connolly | Ext: 3531 |
| Pathology Department Fax Number | N/A | 01 6765048 |
| Quality Officer | Laura Kennedy | Ext: 3187 |
| Information Systems Scientists | Sarah Brady  Andrew O’Keeffe | Ext: 3383 |
| Specimen Reception/  Specimen Dispatch | Mariela Zalando | Ext:3178/3545  Fax: 01 6373410 |
| Medical Scientist Emergency On-Call | Rotational | Mobile: 086 385 3277\*  \**Current primary contact source* |

Figure 2: Anatomic Pathology Telephone Numbers

|  |  |  |
| --- | --- | --- |
| [Anatomic Pathology](#_Anatomical_Pathology_(Histology)) | **🡨 [CTRL + Click on link to go to dept. details]** | **Phone/ Bleep** |
| Consultant Pathologists | Dr Eoghan Mooney  Dr Paul Downey  Dr David Gibbons | Ext: 3181  Ext: 3135  Ext: 3531 |
| Chief Medical Scientist | Paula Whyte | Ext:3263 |
| Senior Medical Scientist | Declan Ryan  David Mahon | Ext: 3180 |
| Routine Laboratory |  | Ext: 3531/3180 |
| Senior Pathology Technician | John Long | Ext: 3531 |
| Reports/Administration | Edel Connolly | Ext: 3531 |
| Pathology Registrar | Rotational | Ext: 3252 |

Figure 3: Biochemistry Telephone Numbers

|  |  |  |
| --- | --- | --- |
| [Biochemistry](#_Biochemistry_DEPARTMENT) | **🡨 [CTRL + Click on link to go to dept. details]** | **Phone/ Bleep** |
| Consultant Clinical Chemist | Carel Le Roux | Ext: 3490/3546  SVUH: 01 2214607??? |
| Chief Medical Scientist | Catherine Doughty | Ext: 3546 |
| Senior Medical Scientist | Philip Clarke  Sarah Brady | Ext: 3546 |
| Routine Laboratory |  | Ext: 3546 |
| Emergency On Call | Medical Scientist On Call | Mobile: 086 385 3277\*  \**Current primary contact source* |

Figure 4: Blood Transfusion Telephone Numbers

|  |  |  |
| --- | --- | --- |
| [Blood Transfusion](#_BLOOD_TRANSFUSION_DEPARTMENT) | **🡨 [CTRL + Click on link to go to dept. details]** | **Phone/ Bleep** |
| Consultant Haematologist | Dr Joan Fitzgerald | **Routine**: 01 2213125  Ext: 3382(SVUH)  **Emergency**: On Call Haematology Consultant (Speed Dial) 17301(SVUH) |
| Specialist Medical Scientist | Aoife Reynolds | Ext: 3547 |
| Senior Medical Scientists | Donal Noonan  Carly Keegan  Christine Clifford | Ext: 3547 |
| Routine Laboratory |  | Ext: 3547 |
| Emergency On Call | Medical Scientist On Call | Mobile: 086 385 3277\*  \**Current primary contact source* |
| Major Haemorrhage Emergency Phone |  | Ext: 3584 Diverts to emergency mobile out of hours |
| Haemovigilance Officer | Bridget Carew | Ext: 3569  Bleep: 095 |

Figure 5: Haematology Telephone Numbers

|  |  |  |
| --- | --- | --- |
| [Haematology](#_HAEMATOLOGY) | **🡨 [CTRL + Click on link to go to dept. details]** | **Phone/ Bleep** |
| Consultant Haematologist | Dr Joan Fitzgerald | **Routine**: 01 2213125  Ext: 3382(SVUH)  **Emergency\***: On Call Haematology Consultant (Speed Dial) 17301(SVUH) |
| Chief Medical Scientist | Laura Kennedy | Ext: 3548 |
| Senior Medical Scientist | Sinead O’Brien | Ext: 3548 |
| Routine Laboratory |  | Ext: 3548 |
| Emergency On Call | Medical Scientist On Call | Mobile: 086 385 3277\*  \**Current primary contact source* |

Figure 6: Microbiology Telephone Numbers

| [Microbiology](#_Microbiology_Laboratory) | **🡨 [CTRL + Click on link to go to dept. details]** | **Phone/ Bleep** |
| --- | --- | --- |
| Consultant Microbiologist | Dr Susan Knowles | Ext: 3578 or  Contact on mobile phone through hospital switch |
| Chief Medical Scientist | Anya Curry | Ext: 3179/3533 |
| Specialist Medical Scientist | Gráinne O’Dea | Ext: 3179/2004 |
| Surveillance Scientist | Carol O’Connor | Ext: 3179/3533 |
| Senior Medical Scientist | Gwen Connolly  Andrew O’Keeffe | Ext: 3179/3533 |
| Microbiology Office |  | Ext: 3179 |
| Routine Laboratory |  | Ext: 3533 |
| Molecular Microbiology |  | Ext: 2004 |
| Emergency On Call | Medical Scientist On Call | Mobile: 086 385 3277\*  \**Current primary contact source* |
| Virology Dispatch |  | Ext: 3178 |
| Virology Results |  | Ext: 3178/3179/3533 |
| Microbiology Specialist Registrar | Rotational | Ext 2049 / bleep 315 |

## 

## Location of Pathology Departments

Figure 7: Department Location

|  |  |  |
| --- | --- | --- |
| **Department** | **Location** | **POD Station** |
| **Anatomic Pathology** | Above the outpatient clinic in the main hospital building. | **11** |
| **Biochemistry** | Blood Sciences laboratory on the ground floor in the new wing of the hospital. | **12** |
| **Blood Transfusion** | Blood Sciences laboratory on the ground floor in the new wing of the hospital | **12** |
| **Haematology** | Blood Sciences laboratory on the ground floor in the new wing of the hospital | **12** |
| **Microbiology** | The Microbiology Laboratory is located in the basement of the new wing of the hospital | **13** |
| **Specimen Reception** | Ground floor of the new wing of the hospital. Beside Blood Sciences laboratory | **12** |

## Pathology Department Opening Hours

Figure 8: Department Hours

|  |  |
| --- | --- |
| **Department/Activity** | **Opening Hours** |
| **Routine Service** |  |
| Monday to Friday All Departments with the exception of Anatomic Pathology | 08:00 - 18:00  08:00 - 17:00 |
| **Saturday**  (Biochemistry, Blood Transfusion, Haematology and Microbiology) | 09:30 -13:00  A reduced service is provided on Saturday  (Specimens should reach the laboratory before 12.00) |
| **Emergency out of hours’ service**  *(Biochemistry, Blood Transfusion, Haematology and Microbiology only)* | (On Call emergency diagnostic service)  **Pod Station 12** |
| **Monday to Thursday** | 18:00 – 08:00 the following day |
| **Friday** | 18:00 – 09:30 Saturday |
| **Saturday** | 13:00 –09:30 Sunday |
| **Sunday and Bank Holiday:** | 09:30 – 08:00 the following day |
| **Sunday of Bank Holiday Weekend** | 09:30 – 09:30 the following day |

## Advisory Services

Advisory services and clinical advice are available at Consultant level 24 hours a day, seven days a week via ‘on site’ Consultants or through telephone support either from the ‘in house’ Consultants or via agreed support.

Memoranda of understanding have been agreed between the Consultants in the Department of Pathology and Laboratory Medicine and Consultant colleagues.

Frequency of requesting examinations is a clinical decision and can be discussed at Consultant level (*see section 1.3 for contact details).*

## Requesting Tests

The requesting clinician can order a test(s)or blood product(s)either by using a request form and labelling the sample container, or by ordering electronically on MN-CMS and attaching the generated barcode label to the sample. MN-CMS is used for all patients of NMH. In the event that the MN-CMS system is unavailable or it is not possible to make a request through MN-CMS, staff can revert to use of paper request forms. The requesting clinician must complete the appropriate request in full, including clinical details. The personal information received is treated as confidential in line with the hospital policy on personal information.

It is the responsibility of the requesting clinician and person collecting patient specimens to ensure that the request is correctly completed, the sample is taken from the correct patient and that the correct label is attached.

### Routine Requests

For routine examination of specimens:

* Fill out the required fields on appropriate request form (either paper or electronic).

*Note: Anatomic Pathology require the electronic printed requisition form.*

* Attach addressograph label to paper request form (if used).
* Take specimen into correct container.
* Label specimen correctly using MN-CMS generated label or manually.
* Transport to laboratory via: Pneumatic chute POD system (except for **all** Anatomic Pathology specimens, and some specific specimens, see departmental tables in sections 13-19 for exceptions); direct delivery; porter’s collection.

### Urgent Requests during Routine Hours

* Urgent specimens should be clearly marked by writing or selecting ‘Urgent’ on the request form.
* Telephone the appropriate laboratory ([*for correct extension numbers see section 1.3*](#_Pathology_Department_Telephone)). Specimens may not be processed as urgent unless laboratory staff have been alerted by telephone.
* When the specimen arrives into the laboratory, it is brought to the attention of the medical scientistand processed in rapid mode according to local policies available in individual departments.

### Pathology On-Call Services

The Out of Hours service is reserved for **non-deferrable** analysis of specimens. The service should meet the clinical need for safe patient care. The necessity to take a sample prior to instituting treatment does not always imply that the result is required urgently. Before requesting a test to be analysed ‘Out of Hours’, a clinician should consider:

* Will the result, whether high, low or normal affect my diagnosis?
* Will the result, if available early, affect treatment?

For more information on the services provided Out of Hours, please see PP-CS-LM-24, the procedure for Laboratory Out of Hours Service and WI-CS-LM-28 Laboratory Contact Out of Hours

#### Scientist On-Call

The emergency ‘Out of Hours’ service is multidisciplinary covering the Biochemistry**,** Haematology, Blood Transfusion and Microbiology departments. The medical scientists providing the ‘Out of Hours’ service are ‘On Call’ and have already completed a full day’s work prior to starting On Call. There are two medical scientists covering the ‘Out of Hours’ service at all times. The medical scientists ‘On Call’ cover all laboratories rather than the department in which they are based during the day. While extensive training and competency assurance is in place, scientists cannot be expected to know the answers to all questions clinicians may have. Clinical advice is available 24/7 through telephone contact with Consultants. It is essential that requests are restricted to emergency samples only. Where demand is high, processing of samples will be prioritised and/or processed in batches.

#### Accessing the Service

The On-Call medical scientist requires notification of emergencies via on-call mobile. Please note that the mobile is the current primary contact point. **Send samples to Pod Station 12** (some specific specimens cannot be sent through the POD, see departmental tables in sections 13-19 for exceptions).

* **Mobile 086 3853277**

#### Tests Available ‘On-Call’

The tests outlined below are available ‘Out of Hours’. Please note the contents of the comment section for specific requirements. For tests not listed below, approval from the Laboratory Manager (mobile: 086 7969647) is required.

Figure 9: Tests 'On-Call'

| **Department / Test ‘On Call’** | **Comments** |
| --- | --- |
| **Blood Transfusion** |  |
| Group and Coombs Paediatric | Available when bilirubin is raised or result is required for blood or product issue.  When cord bloods were not received and the mother is RhD Neg and may require Anti-D urgently.  When a maternal antibody is present and cord bloods are not available for testing i.e. Maternal antibody first identified postnatal/transfer baby |
| Blood Group and Antibody screen | Request must be on the crossmatch request form. LF-BTR-XREQ Rev 3  or request form printed from MN-CMS.  Out of hours Type and Screen samples will only be processed for patients with the following clinical details:  1. Crossmatch request or request for the provision of Blood Products.  2. Unbooked or 1st time presentation.  3. Ectopic.  4. Placenta Previa.  5. Placenta Accreta.  6. Known immune antibody.  7. Transfusion reaction investigation.  8. For patients where blood products may be required e.g. PPH/Emergency LSCS and there is not a valid sample available. |
| Provision of Blood Products | In accordance with MBOS and Major Haemorrhage pathway or by specific request. Please note that the Blood Bank must be informed when patients with known immune antibodies are admitted to allow adequate time to source suitable blood products. |
| ***Please note on Sundays and Bank Holidays one batch of cord blood samples and Anti-D requests will be processed each morning for all samples received in the laboratory before 09.30 AM.*** | |
| Cord Blood | Not available except for the presence of maternal antibodies, where DCT is then urgent, or when approaching 72hrs postnatal. |
| Prophylactic Anti-D Ig Issue | Issued in response to suspected sensitizing event if approaching 72 hours or if there is an uncertainty about the patient’s commitment to return. Sample for group and screen must be drawn prior to request. |
| Transfusion Reaction Investigation | Limited testing can be made available based on the transfusion reaction type and the intention to continue to transfuse. |
| **Biochemistry** |  |
| **Note: PN bloods must be in the laboratory by 08:00 AM, results will be available by 09:30 AM. They should not be drawn before 07:00 AM.** | |
| Albumin |  |
| Alkaline Phosphatase(ALP) |  |
| Amylase |  |
| Aspartate Transaminase (AST) |  |
| Alanine Transaminase (ALT) |  |
| Bilirubin-Direct |  |
| Bilirubin-Total |  |
| Calcium |  |
| Chloride |  |
| Creatine Kinase (CK) |  |
| Creatinine |  |
| C Reactive Protein (CRP) |  |
| CSF : Glucose + Protein |  |
| Glucose |  |
| Lactate Dehydrogenase (LDH) |  |
| Magnesium |  |
| Osmolality (plasma + urine) |  |
| Phosphate- inorganic |  |
| Potassium |  |
| Sodium |  |
| Total Bile Acids |  |
| Total Protein |  |
| Triglycerides |  |
| Urate |  |
| Urea |  |
| Urinary Protein: Creatinine ratio |  |
| Hypoglycaemic Screen | Call the laboratory. See Hypoglycaemic Workup request form RF-CS-BIO-41, available on Q-Pulse for details of all samples required. |
| **Haematology** |  |
| Coagulation Screen | Specific factor assays available by Consultant request |
| FBC | Low platelet counts reviewed for clumping in accordance with protocol. Urgent film review available in accordance with protocol. |
| Blood Film | Available by Consultant request if urgent |
| **Microbiology** |  |
| **NMH and RVEEH** | |
| Blood Culture | Incubating bottles and processing of positive bottles; culture, Film Array and Gram stain |
| MSU | Microscopy and culture, upon request |
| Sars-CoV-2 / Flu A/B / RSV (GeneXpert) | On-call testing for symptomatic patients only (NMH and RVEEH). |
| **NMH Only** | |
| CSF | Cell count, Gram stain and culture |
| Paediatric urines | Microscopy and Culture |
| Pregnancy Test | POCT available in Casualty, OPD and Unit 4; manual hCG available as per policy |
| Rapid GBS (GeneXpert) | Monday – Friday: No On-Call runs available  Saturday: 1 run per day at 20:30  Sunday/Bank Holiday: 2 runs per day at 12:30, 20:30 |
| **RVEEH Only** | |
| Vitreous/Aqueous Tap in Paed Blood Culture | Incubating bottles and processing of positive bottles for culture, Film Array and Gram stain |
| Corneal Scrapings | Incubation of inoculated plates for bacterial and fungal culture |
| *Neisseria gonorrhoeae* culture | Incubation of inoculated plates |
| **Virology** |  |
| Varicella | Samples will be sent out @ 09:30 AM the following morning with the courier. Please phone the laboratory to inform them of the urgent sample. On occasion, if approaching 10 days’ post exposure event, the sample may be sent out before the next day. |
| Urgent Booking Bloods  (HIV, HEP B, HEP C) | For patients in labour only |
| Occupational Blood Exposure | Please phone the laboratory to inform them of urgent sample. Samples will only be processed up to 22.00 by the NVRL out of hours with approval by the NVRL medical team.  Samples will not be analysed if status of source is known. |

### 

### Verbal Request Policy by Department

Figure 10: Telephone Request Policy

| **Department** | **Policy** |
| --- | --- |
| **Anatomic Pathology (Histology)** | Anatomic Pathology will not accept telephoned requests as all requests must be accompanied by the appropriate request form. |
| **Biochemistry** | Routine specimens are retained in the Biochemistry laboratory for up to 5 days, refrigerated at 2-6˚C. Analyses of additional tests are subject to specimen integrity and analyte stability. Add on facility only available for routine Biochemistry samples up to 8 hours from sample draw. Telephone requests for additional analyses are accepted from clinicians but must be followed up with the appropriate add on request form. |
| **Blood Transfusion** | Urgent requests can be made by phone but should be followed up with the appropriate request. Request for crossmatch can only be accepted if the inpatient Type & Screen sample is <72 hrs old and initialled as drawn and checked against armband. |
| **Haematology** | Haematology and coagulation specimens are usually kept for one week at 2-6˚C after processing. Blood films are usually kept for 1 month after review or held at the request of the Chief/Consultant Haematologist. Analyses of additional tests are subject to stability of analyte. Refer to Section 7.3 regarding time restraints from time of sampling to time of testing. If a further test is required on a specimen that is already in the laboratory which falls within the necessary time limit for retrospective testing, requests for additional analyses are accepted from clinicians but should be followed up with the appropriate add on request form. |
| **Microbiology** | Additional tests can be requested by telephone provided specimen and request have already been received by the laboratory. Telephone requests are accepted from clinicians, but should be followed up with the appropriate request form or as add on test through MN-CMS. |

### Routine Cut Off Times for Specimen Acceptance/Processing

Figure 11: Specimen 'Cut off Times'

|  |  |  |
| --- | --- | --- |
| **Laboratory Discipline/Location** | **Receipt of Specimen** | **Routine ‘Cut Off’ Time for Same Day Processing** |
| **Anatomic Pathology** |  | [See Specimen Requirements in Figure 16](#_Histopathology_Specimen_Requirement_) |
| **Biochemistry** | For same day processing | Mon – Fri:16:30hrs  Sat: 12:00hrs |
| **Blood Transfusion** | For same day processing | Mon – Fri: 15:00hrs  Sat: 12:00hrs |
| Specimens from patients for elective surgery | Mon – Fri: 16:00hrs on the last normal working day prior to the scheduled surgery |
| Specimens from patients with PSE Anti-D Ig requests | Mon – Fri: 16:00hrs  Sat: 12:00hrs  Anti-D Ig requests outside these cut off times will be available at 11:00 AM Mon-Fri and 14:00 Sat and Sun the following day providing the patient does not have immune antibodies. |
| **Haematology** | FBC, reticulocytes and coagulation | Mon – Fri: 17:15hrs  Sat: 12:00hrs  Routine specimens arriving after the cut off times may not be analysed until the next routine working day. |
| Specimens for: Malaria, IM, sickle cell, Kleihauer and blood films for same day service. | Mon – Fri: 13:00hrs  Sat: 12:00hrs  Routine specimens arriving after the cut off times may not be analysed until the next routine working day. |
| **Specimens for Haematology Referral** |  | Specimens which reach the lab by 12:00hrs Mon – Fri will be referred on the same day. Routine referrals for St Vincent’s: before 15:00hrs.  Coagulation referrals that arrive after 15:00hrs are not guaranteed processing unless by prior arrangement. |
| **Microbiology** | For routine processing | Mon – Fri: 17:45hrs  Sat: 12:00hrs |
| C.S.F. specimens | Mon – Fri:16:30hrs, for full processing by Microbiology scientific staff. |
| **Specimen Reception** | Receipt of Specimens | Mon – Fri only:17.00hrs |
| Specimen Dispatch | Mon – Fri only:12:00hrs |

# Patient Identification

## Patient Consent

Please refer to the hospital guidelines for obtaining patient consent before taking primary specimens.

### Anatomical Pathology Patient Information and Consent

Patient information leaflets are given to the patients before consent is sought for post mortem. Post mortem consent forms may only be signed by medical staff who have attended the laboratory induction programme. Consent for post mortems is only required for in house cases not coroner’s cases. All other patient information supplied by appropriate hospital department.

## Clinical Procedure for Patient Identification

Positively identify the patient by requesting verbal confirmation of surname, forename and date of birth. Verify that the details provided match those indicated on the hospital ID band for in-patients. Check this name and date of birth matches the details on the laboratory request in the Electronic Health Record (EHR) request or request form. When the phlebotomist/clinician is satisfied that the patient has been fully and correctly identified, they can proceed to take the blood sample. Special vigilance is required for neonatal patients; as verbal confirmation of identity is not possible.

Details for labelling should be taken from the patient’s wristband if worn. This applies for all inpatients and for all specimens taken for Blood Transfusion. Confirm demographic details verbally with adult patients. High risk patients must be marked with a red sticker.

Verify that the patient meets pre-examination requirements e.g. fasting status, medication status (time of last dose, cessation), sample collection at predetermined time etc. Note: Please refer to the hospital guideline for positively identifying patients before taking primary specimens, PP-OG-CRR-2.

### Neonates, Unconscious Patients and Patients Unable to Identify Themselves

This includes adult patients who are undergoing general anaesthesia, unconscious, confused patients or patients whose first language is not English and neonates.

* Verify that the details provided match that indicated on the hospital ID band, forename, surname, unique hospital number, date of birth and gender in the case of an infant.
* Baby is sufficient as a forename for infant patients i.e. Baby Murphy.
* For twins or triplets, the forename may be Twin 1, Triplet 2 etc.
* This information must be identical with the information on the request and specimen tube sent to laboratory.

### Identification of Foetus

In order to uniquely identify a foetus, and link it to the mother the following is laboratory policy:

* Use the mother’s demographics for surname and address.
* Record the forename as “Foetus of” in front of the mother’s forename.
* Where more than one pregnancy is recorded in a given year add the suffix B. e.g. Foetus 2009 B etc.
* Where more than one foetus is present in a pregnancy the forename should be Foetus Twin 1, Twin 2 etc. e.g. Foetus Twin 1 2009, Foetus Triplet 2 2009.
* The hospital number must be left blank for completion when the baby is born. As for patients without a hospital number the 1st line of the mother’s address acts as a mandatory identifier.
* For intra-uterine transfusions (IUT), the date of birth is changed to the date of the IUT, and the sex is changed from F to Unknown.
* Reports should be filed in the mother’s chart.
* When the foetus is delivered, the baby is registered on the PAS system and assigned a hospital number, and the previous IUT Winpath record is updated.

### Urgent Specimen from a “Moribund” (Unidentified) Patient

In the occasional event of an urgent specimen from a “moribund” patient, where identity cannot be confirmed, the following essential information must be provided on both request form and specimen:

1. Allocated identifier e.g. “Jane Doe”
2. Gender (Sex)
3. Date of specimen
4. Unique hospital number obtained from PAS system is essential on their identification arm band for positive patient identification.

# Safety

The hospital safety statement, NMH Safety Statement, is available on Q-Pulse as PP-GS-HS-1. The laboratory uses standard precautions when handling all patient specimens.

## General Safety Guidelines

* Always use approved specimen collection containers and ensure lids are securely closed.
* Observe standard precautions when taking patient specimens.
* Always dispose of sharps appropriately and according to the NMH Safety Statement.
* Specimens must be placed in approved biohazard bag with request form placed separately in the sleeve provided as appropriate.
* Do not place specimen and form together in the same pouch of the biohazard bag.
* Always supply clinical information including known infection risk with each request.

Specific instructions on specimen transport are outlined in Section 6 of this document. Model rules to ensure staff safety during specimen transport are outlined in Section 6.2.2. Any spills must be dealt with in accordance with NMH Health and Safety Statement as well as the procedure for dealing with biological spills, LP-GEN-BIOSPILL, located in Q-Pulse.

## Venepuncture Procedure / Collection of Specimens

1. Wear appropriate PPE.
2. Observe the hospital consent policy.
3. Reassure the patient and briefly explain the tests being taken. Ensure patient is comfortably seated and relaxed.
4. Ensure patients identification details are checked and correct, in line with NMH Positive Patient Identification Policy.
5. Select the **correct** specimen tubes.
6. Always use sample collection tubes, swabs etc. that are in date. Specimens taken into expired collection tubes / containers may render the specimen unsuitable. Specimen tubes must **NOT** be pre-labelled.
7. Rest limb on pillow or arm support and identify vein (in ante cubital fossa) for phlebotomy procedure.
8. Apply tourniquet and cleanse patient’s skin with a sterile skin wipe.
9. Inform the patient when you are about to venepuncture (described as a scratch).
10. Anchor vein if necessary and insert needle with bevel facing up.
11. Hold the vacutainer needle holder securely to allow change of tubes and collect required specimens. **Please note**: Samples for Blood Culture investigation must be drawn first to avoid contamination. See SI-NOT-GEN1 and SI-NOT-GEN2 for Order of Draw charts on Q-Pulse.
12. When all specimens are collected, release tourniquet and withdraw needle smoothly and carefully.
13. Apply cotton wool to puncture site and ask patient to apply pressure for about 2 minutes keeping arm straight. This helps avoid bruising/haematoma.
14. Push safety guard over needle to render safe and dispose of used needle immediately into sharps bin.
15. Proceed to label the tube at the patient bedside.

The above procedure is designed for adult patients. For neonatal patients, the same general principles apply. Paediatric blood collection tubes are available.

To summarise, complete the procedure with each patient:

1. Check patient identification.
2. Complete request.
3. Venepuncture – collect specimens.
4. Label specimens correctly
5. Check specimens post collection to confirm Positive Patient Identification (PPID) and labelling are correct.
6. For all Blood Transfusion specimens, ensure that the specimen is initialled to confirm that the above checks have been performed.
7. Place specimens in designated bag.
8. Arrange for transport to laboratory.

Universal precautions should be observed when handling all pathological material. It is the responsibility of the requesting clinician to ensure that specimens which pose an infection risk to staff are clearly identified by a red sticker attached to the request form.

For Microbiology, do not put liquid based specimens in the same specimen bag as dry specimens, e.g. a urine specimen in with a swab. Liquid specimens can leak, rendering the other specimen in the bag unsuitable for analysis due to contamination.

For patient preparation for samples other than venepuncture, refer to relevant clinical care guidelines and relevant departmental data.

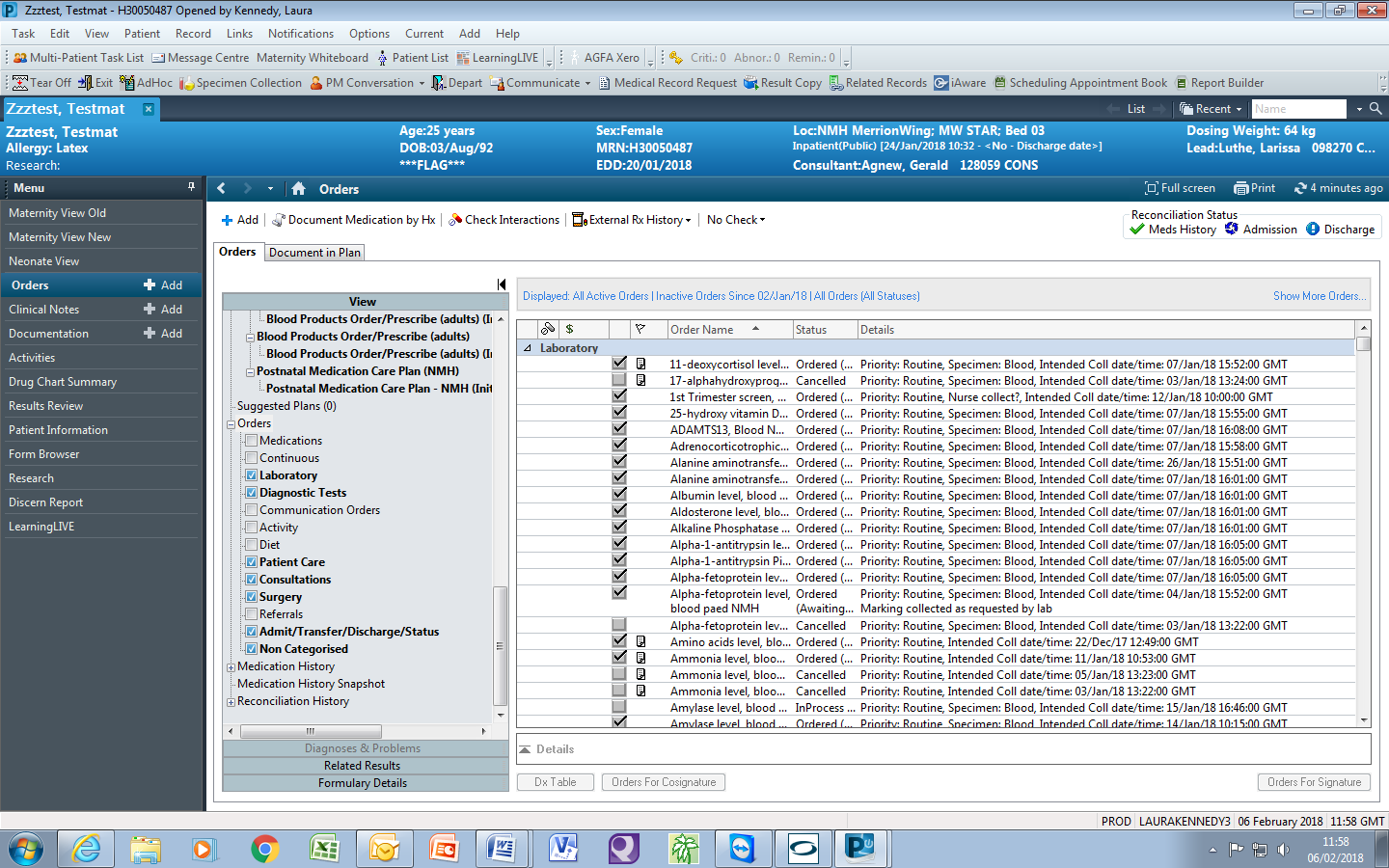
# Requesting Tests MN-CMS

## Electronic Requests MN-CMS

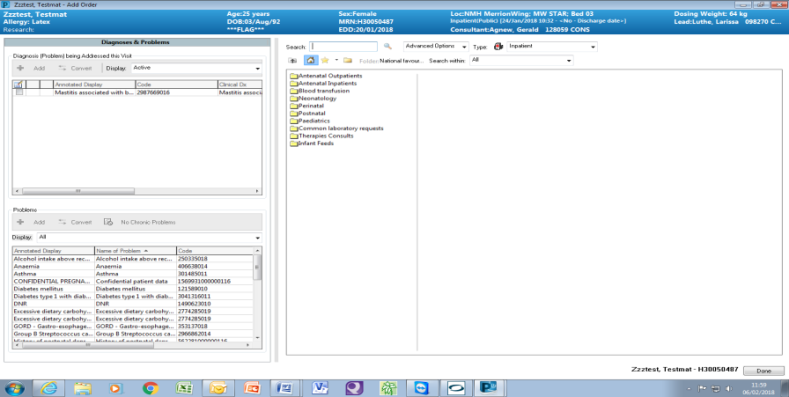
For obstetric, new born and gynaecological patients, requests are placed via the orders module of the electronic chart MN-CMS.

## How to Order Tests via the PowerChart

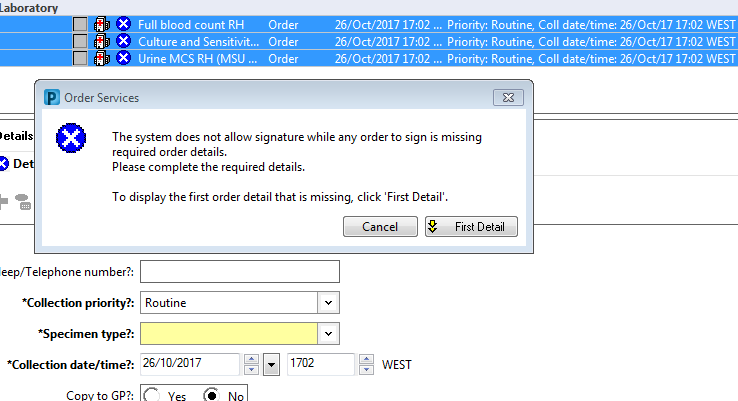
* All tests are ordered in the Orders tab on the left hand side.
* You can order a test by clicking on +Add in either of the places below



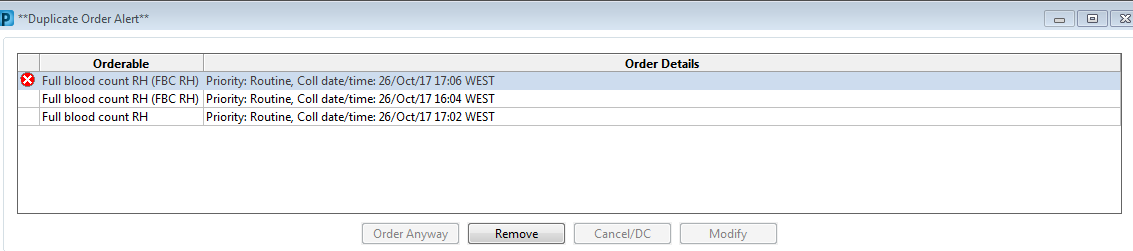
* Laboratory tests can be ordered using the search function. Type the name of the test required (see below for name of tests in each department) i.e. type FBC or Full Blood Count or using the folders option. Refer to Appendix 3 for the Microbiology orders list.
* You don’t always have to type in the full name as Millennium will filter as you type. Many of the NMH tests will have a suffix ‘N’ - This is to differentiate a test performed in the NMH from a test performed elsewhere if a patient is transferred.



* Special requirements:
  + If a test has any special requirements e.g. an external request form or frozen sample, a pop up alert will alert the user.
  + Click Ok to continue.
  + This can be viewed subsequently by clicking on the document icon in the orders list.
* Click ‘Done’ when **all** relevant tests have been selected. Failure to do so will mean that the tests were not saved for processing.
* Fill in the relevant clinical details appropriately. The laboratory will have to ring you for further information if not completed properly.
  + For Sars-CoV-2 requests, it is **mandatory** to supply the patient’s telephone number as per HSE and Public Health requirements. Please enter the phone number in the clinical details field.
* Please note all yellow fields / fields with **\*** are mandatory.
* Put in your bleep etc. if you wish to be informed of any critical results.
* Collection priority – **Routine or Urgent** are the most common options for in-patients.
* Specimen type should default unless there are several options i.e. CSF, Blood etc.
* Collection date and time should automatically fill in. Adjust if necessary.
* If you get the pop-up message below, it means that some of the tests require additional details.
* Click on **First Detail** to bring you to the next mandatory field.



* If a test has already been ordered on the patient, then an alert box will appear (see below). This is telling you that an FBC has **already been ordered** for this patient within a predefined period dependant on the test in question. For some tests this may be a few hours and for others it could be days or even weeks. This is to reduce the number of inappropriate tests being repeated.



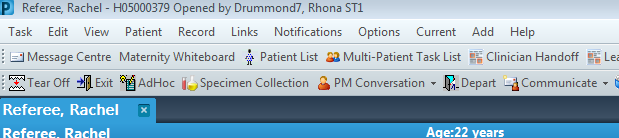
* For some tests you can select ‘**order anyway’** if you know this has been ordered already but you want a repeat sample.
* For other tests, such as genetic tests, you will not be allowed to re-order the test as there is no clinical reason to do the test more than once. In this instance you will be asked to remove the request as it is a duplicate order.
* When all the tests have been ordered and all the required clinical details have been filled in, click ‘sign’. This will pull all tests in together and will only request the amount of tubes necessary to process what has been requested.

### Genetic Requests

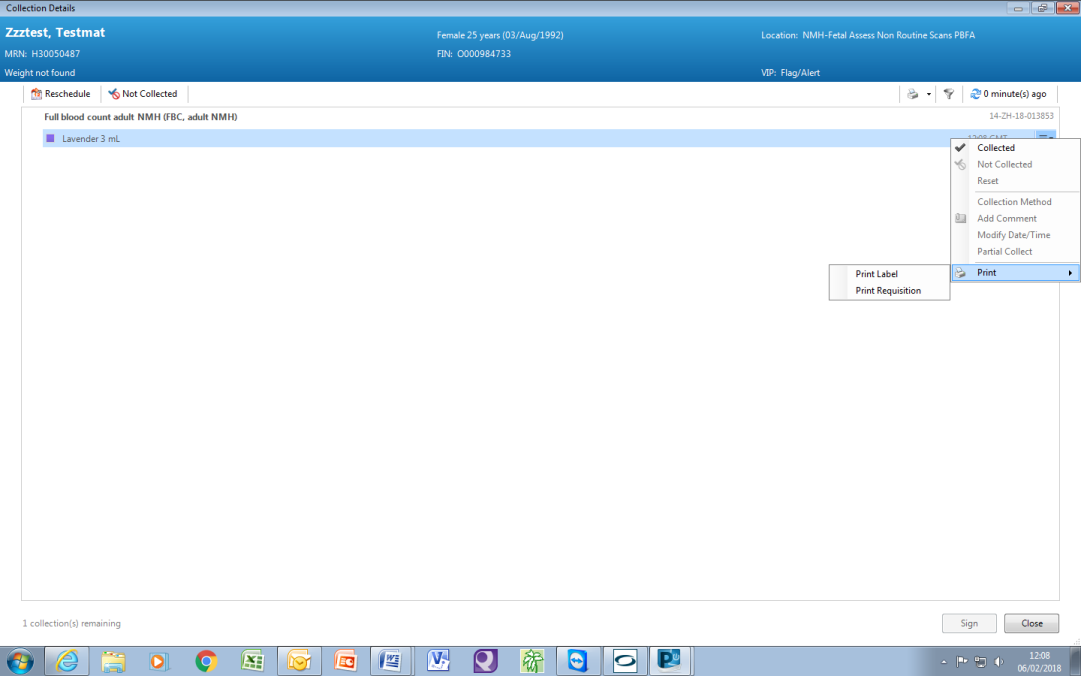
Requests for genetic analysis can be placed electronically. The referral laboratory specific request form must be completed in addition to the electronic request. Please ensure correct consent has been obtained.

## Specimen Collection MN-CMS

* Once you have ordered the tests then it is very important to tell the system that you are taking the sample. Select **Specimen Collection** on the top menu.



* **You should then scan the patient ID band**. Failure to scan the ID band for an inpatient will result in the test being rejected by the laboratory.
  + **For in-patients, the option to override the barcode scan has been removed.**
  + For out-patients, if the patient does not have an ID band then you can select Unable to Scan barcode on the bottom left of the screen.
* A list of all tests requested on the patient will appear. Please note that some of these may not be relevant so please take note of the date and time of the samples on the right hand side. Only select the ones you wish to take.
* If you no longer wish to take a sample or are unable to take the sample, you must remove it from this list by clicking on the sample and selecting **‘not collected’** and then stating why it is not being collected.
* The type of sample bottle required is also displayed on the left hand side. The volume is the volume of the sample container and not the volume of sample required. This will also print on the label.
* **To collect a sample, you must print the label -** Right click on the sample type and select ‘Print Label’.
* Print the labels after you have taken the samples.
* Please label the samples correctly, see Section 4.5.
* Check **ALL** samples post phlebotomy. Confirm samples have been labelled correctly; all patient demographics are present and confirm PPID between the patient and the labelled specimen.
* **Mark the samples as collected and sign.**
  + Failure to mark samples collected prevents the request being sent to the laboratory.
* Initial the label as a final check to confirm all steps have been completed correctly.
* **Any duplicate MN-CMS requests printed in error must be discarded.**



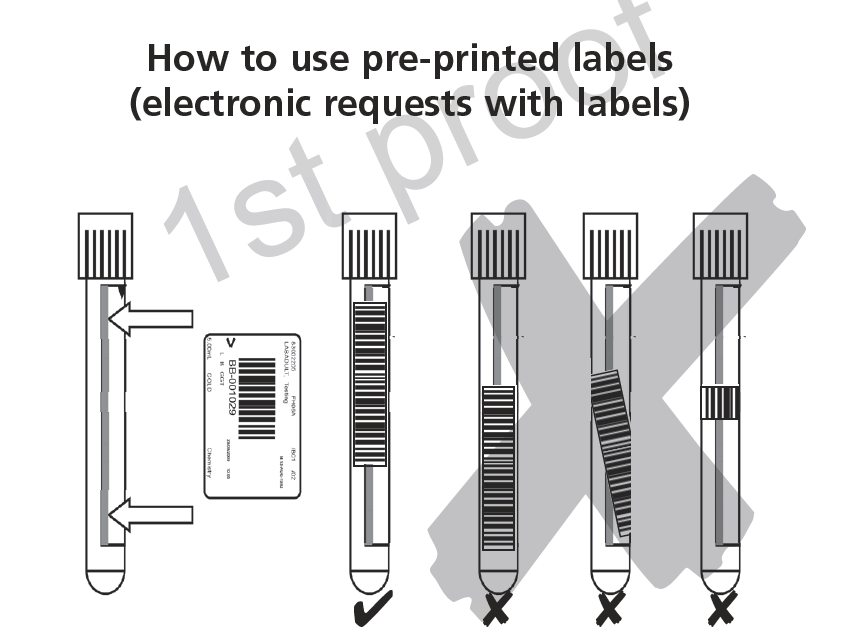
## Requests with No Specimen Collection

* Some requests do not require specimen collection. These tests require the printing of an A4 paper requisition, and include:
  + Blood Products
  + Blood Collection
  + Add On tests

**Unless a printed requisition is sent to the laboratory, no request has been received.**

* Complete the order as in Sections 4.2 and 4.3 above.
* The order is marked collected when signed.
* Right click on the order.
* Print the A4 requisition and send to the laboratory.

## Specimen Labelling MN-CMS



* MN-CMS labels must be printed on-demand/directly before sample phlebotomy and labelling. This must take place with the patient in-situ.
* **A general rule of thumb is to cover the paper label already on the sample tube/swab etc. Do not cover existing barcodes on Blood Cultures**.
* Following application of an MN-CMS label, review the labelled sample to ensure the entire MN-CMS label is legible, the correct MN-CMS request has been placed on the correct sample type (as prompted by MN-CMS), the MN-CMS label orientation is satisfactory (see above), and that the date and time of sample collection are correct.
  + **NB: Confirm that the patient demographics on the MN-CMS label applied to the sample match the demographics of the patient on whom the sample has just been collected from. Compare the labelled sample with patient wristband OR verbally confirm PPID if the patient is not an in-patient.**
* It is very important that you now change the status of the sample **to collected** and press sign. It is only after the sample is changed **to collected** that the request goes across to the laboratory information system. The laboratory cannot process any samples that have not been collected in MN-CMS, as the request will not transmit to the laboratory information system.
* If the status of the sample is **‘Ordered (Awaiting Collection)’** then you have not collected the sample in MN-CMS. The laboratory does not know that this sample has been ordered.
* The status of the sample will now change from **‘Ordered’** to **Ordered (Collected**). This means that the sample has been taken but the laboratory has not yet formally received the sample. When the laboratory formally receives the sample, the status changes from ‘**Ordered (Collected)** to **In Process (Collected**). This means the laboratory has received the sample.
* **‘Discontinued’** means that someone has chosen not to take the sample for the reason that is documented when the sample is cancelled.
* See Section 5.2.2 below for the minimum specimen acceptance criteria for MN-CMS requests.

## Specimen Labelling in the Event of MN-CMS Printer Failure

If a MN-CMS printer fails to print successfully the **first time** from the MN-CMS cart you are using at the patient bedside - **STOP. DO NOT send the MN-CMS request to any other label printer.** Complete the following steps:

* Perform PPID as per NMH PPID Policy, PP-OG-CRR-2.
* Manually label the specimen at the patient bedside from the patients’ wristband (in- patients)/MN-CMS EHR with the **patient name**, **hospital number**, **date of birth, date and time of sample phlebotomy and signature of the sample taker.**
* **NOTE: Samples for Blood Transfusion MUST be handwritten**.
* Print the requisition for the sample from MN-CMS to an A4 printer located in your clinical area.
* Check the specimen. Confirm that it is labelled correctly and correct PPID between sample/EHR/patient.
* Confirm sample collection by clicking the Collect Icon on MN-CMS EHR.
* The A4 requisition is then retrieved. You must crosscheck the patient identifiers on printed form against the patient handwritten identifiers on the sample tube.
* Check the date and time of the order on the A4 requisition form to ensure you have printed the correct order.
* Transfer the sample and form to the laboratory together.

If unable to perform the above process successfully, the sample collector **must** revert to filling in a manual request form (refer to section 5 below).

**This protocol applies for all samples where label printing at the patient’s side is not possible. Failure to adhere to this policy will be reported to Clinical Governance.**

**Follow Up:** Unused MN-CMS requests may print when printer failures are resolved. It is essential that these redundant labels are discarded. The fault with the MN-CMS printer **must** be reported to the ward manager and IT Department at extension 7999. Clinical areas are advised keep a record all printer failures.

## Processing Samples ‘Not Collected’ on MN-CMS

If a sample is received in the laboratory that has not been collected on MN-CMS (no information comes onto WinPath from MN-CMS), the following process applies:

1. The date and time of receipt will be added to the specimen. This is to ensure that the correct date and time of receipt is entered on WinPath when laboratory staff are able to book the specimen in.
2. The clinical area will be contacted requesting sample collection. If the area confirms that the sample is collected, the laboratory will contact IT to see if there is a problem with MN-CMS/WinPath.
3. If sample collection is not possible, the laboratory will request an A4 MN-CMS requisition for the test, or a written request form from the clinical area. The request form should contain the name and registration number of the requester.
4. The sample will be analysed, and then later booked into WinPath when collected on MN-CMS/when a completed request form has been received. The result will be authorised with the addition of the following comment: ‘No valid request received, subsequently collected in MN-CMS following informing the clinical area’.
5. With the exception of certain non-repeatable samples, if the sample is not collected within 24 hours, it will be rejected with the addition of the comment ‘No valid request received, please repeat’.

# Requesting Tests: Paper Request

Paper based requests are used for patients in the event of MN-CMS failure, and in external clinics without access to MN-CMS label printers.

## Consultant or Pathology Request Forms

The Pathology Department has a suite of controlled request forms which should be used to request investigations. The forms are department specific and are outlined in figure 10 below. Departmental forms may be obtained from the old laboratory and the current version of each departments’ forms are stored on Q-Pulse. Please use the document number from figure 10 below or contact the relevant department for further information. External GPs that require sample bottles or forms can contact the Specimen Reception Department.

Dedicated request forms are available for use in external clinics without access to MN-CMS label printers. These requests **must** contain the valid registration number (either MCRN or NMBI) of the requesting clinician in order for them to be booked into Winpath.

Figure 10: Pathology Request Forms

| **Department** | **Form** | **Document** |
| --- | --- | --- |
| **Anatomical Pathology** | Gender determination form | RF-CS-AP-59 |
| Coroners Notification Form Organ Disposition Education and Research | RF-CS-AP-46 |
| Consent for Post Mortem (in house) | EXT-CS-AP-64 |
| Surgical Request Form | LF-AP-SURGREQ |
| Placenta Request Form | LF-AP-PLACREQ |
| **Blood Transfusion** | Crossmatch Request Form, used for all inpatient requests | LF-BTR-XREQ |
| Group and Antibodies/ Group and Coombs Request Form | LF-BTR-GCREQ |
| Cord Blood (Group and Coombs) Request Form | LF-BTR-CRREQ |
| IBTS Fetal RhD Screen Referral Form | EXT-CS-BT-134 |
| **Biochemistry** | Biochemistry Request Form | LF-BIO-REQ |
| **Haematology** | Haematology Request Form | LF-HAE-REQ |
| **Microbiology** | Microbiology Request Form | LF-MIC-REQ |
| Microbiology Request Form from RVEEH | RF-CS-LM-78 |
| Microbiology External Clinics Request Form | RF-CS-LM-148 |
| **External Referral** | Serology Request Form | RF-CS-SR-2 |
| Blood Sciences External Clinics Request Form | RF-CS-LM-147 |
| RVEEH Serology Request Form | RF-CS-SR-4 |
| TDL Genetics Request Form | EXT-CS-SR-1 |
| OLHSC Children’s Health Ireland at Crumlin Genetic Request Form | EXT-CS-SR-3 |
| Maternal Serum Screening Test Form, Cambridge  IBTS BT345 Request for Red Cell Immunohaematology Investigation  NHIRL BT255-6 Request Form for Histocompatibility and Immunogenetics Investigation  Request for Foetal Genotyping IBGRL  NHSBT Non Invasive Prenatal Screening Request Form | Please contact Specimen Reception for further information |

## Labelling the Primary Specimen and Filling in the Request Form

### Request Form

Please complete all sections of request forms in a fully legible manner:

1. **Patients forename and surname**
2. **Hospital number**
3. Location/contact details of the patient. **For Sars-CoV-2: Contact telephone number is mandatory as per HSE/Public Health requirements please ensure it is added to the request form for this test.**
4. Date of birth (or gestational age)
5. Patient’s sex
6. Destination for report
7. Clinician
8. Specimen type
9. Anatomic site of origin
10. **Examination requested**
11. Clinical information/history/relevant therapy
12. Date and time of specimen collection
13. Date and time of sample receipt (laboratory only)

A, B, C and J are essential requirements. In the event that the patient has no NMH hospital number, the date of birth becomes an essential identifier.

Large addressograph labels may be used for patient identification on the request form.

For microbiology, specimen type or site, clinical details, antibiotic therapy details (including allergies) are required on the request form in order to process the specimens correctly. Failure to provide such information can affect testing of sample (resulting in reduced or incorrect testing of sample).

For Blood Transfusion samples, if no hospital number is available, the 1st line of the patient’s address must be present on the specimen, in addition to the patient’s forename, surname and date of birth, for the specimen to be accepted.

### Primary Specimen

#### Labelling of Primary Specimens

It is essential that all specimens are labelled with a minimum of three identifiers for Blood Transfusion, and two identifiers for other departments, in a legible manner on the specimen container. Always use sample collection tubes, swabs etc. that are in date. Blood taken into expired collection tubes may render the specimen unsuitable. Specimen tubes must **not** be pre-labelled. The following identifiers should be placed on the specimen:

1. **Patients forename and surname**
2. **Hospital number**
3. **Date of birth (or gestational age for MN-CMS requests)**
4. Destination for report
5. Date and time of specimen collection
6. **Identity of specimen collector**
7. Collection time
8. **Specimen type (for MN-CMS requests)**
9. **Examination requested (for MN-CMS requests)**
10. **Initials of Specimen Collector (for MN-CMS requests)**

A and B are essential requirements for all laboratory departments. A, B, C, F and J are essential requirements for Blood Transfusion. In the event that the patient has no NMH hospital number, the date of birth becomes an essential identifier.

For Blood Transfusion samples, if no hospital number is available, the 1st line of the patient’s address must be present on the specimen, in addition to the patient’s forename, surname and date of birth, for the specimen to be accepted.

All specimens for Blood Transfusion and Kleihauer testing must be hand written unless ordered via MN-CMS.

Specimens for other laboratories should be labelled with small addressograph labels. Where no addressograph labels are available, clear handwritten labelling is accepted.

### Labelling Criteria for Community/GP Blood Transfusion Samples

The Blood Transfusion laboratory will accept samples for Blood Group and RhD status from GPs and community based services like the Irish Family Planning Association for women within the NMH catchment area (South Dublin, Wicklow and Kildare) who are seeking termination of pregnancy. The purpose of this blood group is to identify women who are RhD Negative and who will require prophylactic Anti-D as part of her termination of pregnancy treatment.

Samples for blood group will be accepted from GP/community care provided they meet all of the criteria below. Where the samples and request forms do not conform to these requirements testing will not be possible.

|  |  |
| --- | --- |
| **Specimen** | **Request Form** |
| EDTA collection tube | Details of the GP, full address and health mail email address |
| Sample label (must be handwritten and signed by the person taking the sample) | Clinical details: Gestation is most important.  Please indicate if history of Anti-D administration within last 3 months |
| Patient full name | Patient full name |
| Date of birth | Date of birth |
| 1st line of address | Complete address |

# Storage and Transport of Specimens

## Pre-Analytical Specimen Storage

* Ideally all specimens should be transported to the laboratory in a timely manner.
* Where this is not possible, for example in an out of hours’ situation, samples may be stored in a fridge. Specimens should be transported to the laboratory at the earliest possible time. See departmental sections for sample stability. **Do not store the following sample types in the fridge:** PCR**,** routine biochemistry, coagulation, blood cultures, CSF samples, inoculated plates, surgical and placental specimens, Blood Transfusion samples for the Foetal RHD screen, and specimens in formal saline – Keep all at room temperature.
* Coagulation specimens must be sent to the laboratory ASAP as they are stable for only 4 hours.
* Bacterial culture of *Neisseria gonorrhoea* - Samples must be brought to the laboratory immediately and staff notified. **Processed during routine hours only.**
* Urine samples for Chlamydia/Gonorrhoea testing **must** be delivered to the laboratory within 24 hours.
* Fresh tissue specimens must be refrigerated until they can be delivered to the laboratory.
* Body for post mortem must be refrigerated.
* Blood samples for HIV, Hepatitis B and C for PCR and/or viral load, CMV PCR or Zika virus PCR must be separated and frozen within 24hours of sample collection.
* Any EDTA sample received for NVRL, check with the requesting unit if for PCR (in case EDTA sample taken in error). If so, spin, separate and freeze. EDTA samples are generally for PCR.
* The majority of specimens for Microbiology are stable for up to 3 days once stored at 4˚C.  Some exceptions apply for particular specimens and/or tests as per Section 17.

## Specimen Transport

During the process of transporting patient specimens to the laboratory it is essential that specimens are transported safely and efficiently in order to:

* Ensure safe custody and integrity of the specimen which must reach the laboratory in proper condition.
* Specimens must be transported within a timeframe appropriate to the nature of the requested examinations and the laboratory discipline concerned. See individual departments for specific time frames.
* Specimens must be transported within a temperature interval specified for sample collection and handling and with the correct preservatives to ensure the integrity of the samples. Specimens received in the laboratory that do not conform to these criteria will be rejected, see Section 3.
* Ensure the safety of staff transporting specimens.
* Ensure the safety of other staff, patients and members of the public.
* The pneumatic transport system (POD), if appropriate to the specimen type, is the preferred method of delivery of specimens to the laboratory.
* Blood culture bottles are plastic and may be transported via the POD.
* Specimens for Sars-CoV-2 must **NOT** be transported in the POD, deliver by hand, due to an infection control risk if the specimens should leak in the POD.
* **CSF samples must not be sent via the POD system, deliver to the laboratory by hand.**
* **Histology specimens must not be sent via the POD system, deliver to the laboratory by hand.**

Please follow the following guidelines:

* Use approved specimen bags which must be sealed.
* When a paper request form accompanies the specimen, place this in the separate pouch of the specimen bag, or attach to the bag. Do not place them in the bag with the specimen.
* Use approved specimen collection containers.
* Use the POD specimen transport system where available and appropriate to specimen type.
* Use the specimen transport boxes (closed) where appropriate.
* Do not try to carry multiple specimens by hand.
* Do not leave specimens in other locations en route to the laboratory.
* If there is a doubt about any aspect of specimen transport, please contact the appropriate department for advice.
* Do not transport broken or leaking specimens.

### Specimen Transport: Anatomic Pathology

#### Surgical Samples

* The laboratory porter collects samples twice daily from the Gynae Clinic.
* The theatre porter delivers samples to the laboratory twice daily, at 10:00 AM and 15:30, and samples are signed for in the theatre day book.
* Samples delivered otherwise must be brought to the department by the requesting department.
* A drop off box for Histology specimens is also available in the main reception area, for use during the routine hours and out of hours.
* Samples must **not** be sent via the POD.
* When possible place sample in plastic biohazard bag.
* All urgent requests must be clearly marked by ticking the priority box on the request forms and must include the relevant clinical details.
* Frozen sections must be arranged in advance with the Pathologist.
* All samples must be in adequate amounts of formalin. Exceptions to this are, suspected cases of molar pregnancy and POC’s of recurrent (i.e. 3rd or subsequent) miscarriage, which are sent up dry up until 17:00hrs Monday to Friday. All specimens after this time must be placed in fixative.

### Placental Samples

* An electronic order must be completed and sent to the laboratory with the specimen.
* The laboratory porter collects samples from the delivery ward in the morning.
* The theatre porter delivers the placental samples to the laboratory twice daily, 10:00 AM and 15:30, and these are signed for in the theatre day book.
* All placentas from normal deliveries are examined by a midwife in the delivery ward. If there is no abnormality of pregnancy, labour, the placenta itself, or the immediate post-natal period, the midwife places the labelled full placenta in the placenta storage fridge located in the delivery ward.  These placentas are kept for a period of seven days. Where a clinician is requesting a placenta be processed they must check that there is an electronic order for the placenta in Cerner (this confirms we have the placenta). They may then send a placenta triage form with details of the request to the laboratory.  Where there is no electronic order, one must be created and the placenta sample retrieved from delivery and sent with the order form to the laboratory.  All placenta requests must be made using the mother’s hospital chart.
* The placenta is retrived by the laboratory porter.
* The full placentas of all multiple pregnancies are submitted to the laboratory.
* Placentae for gross examination are placed in black bags, tied, labelled and placed in a biohazard bag. A placental triage form should be completed and sent with the specimen. Microscopic examination is based on findings of gross examination.
* Placentae from all high risk or sero-positive patients are placed in a suitable container filled with formalin and marked with a red hazard sticker. A placental triage form should be completed and sent with the specimen. Microscopic examination is based on findings of gross examination.

### Post Mortem

* Body must be placed in the mortuary fridge.
* Original forms must be sent to the laboratory.

## Transport of Potentially High Infectious Risk Specimens

*For patients at risk of haemorrhagic fever: The pneumatic transport system must NOT be used. Please contact the laboratory for specimen containment and transport boxes.*

### Model Rules for Laboratory Porters and All Who Deliver Specimens to the Laboratory

Refer to the Hospital Safety Statement. This policy applies to all porters working in the laboratory and to the porters and care assistants who deliver specimens to the laboratory. Some of the work carried out by laboratory/hospital porters and care assistants in the hospital may involve accidental contact with material that could be infectious. However, wherever they might be working they should observe the following guidelines:

1. Cover any cuts or grazes on your hands with a waterproof dressing.
2. Carry all specimens in the trays and boxes provided, not in your hands or pockets.
3. Touch specimen containers as little as possible. If you do touch them, wash your hands as soon as practicable afterwards.
4. Always wash your hands before meal breaks and at the end of duty.
5. If a specimen leaks into a tray or box, tell the laboratory reception staff and ask them to make it safe.
6. If you drop and break a specimen, do not touch it or try to clear up the mess. Stay with the specimen to prevent other people touching it and send someone to the laboratory for help. If you spill the specimen onto your overall, remove it at once and then wash your hands and put on a clean overall. Report the accident to your supervisor as soon as possible.
7. Handle specimen containers gently at all times.
8. Take care when carrying waste or rubbish from the laboratory as there may be broken glass or needles. If you find these tell your supervisor. Special “sharp” containers are provided for glass, syringes and needles – these must be handled carefully as leakage or penetration by sharp objects can occur.
9. All waste must be handled in accordance with all hospital health and safety policies.

## Specimen Location Delivery Instructions

Figure 12: Specimen Location Delivery Instructions

| **Location** | **Instruction** |
| --- | --- |
| Blood Sciences Laboratory (Routine)  Biochemistry, Blood Transfusion, Haematology and Specimen Reception | \*Via pod to Station 12 |
| Blood Sciences Laboratory **(Urgent/On Call)**  Biochemistry, Blood Transfusion and Haematology | \*Via pod to Station 12.Phone laboratory for urgent requests |
| Microbiology Routine and Urgent (during routine hours only)  (Except for CSF’s, Sars-CoV-2) | \*Via pod to Station 13. Telephone 3533 if sending urgent samples |
| Microbiology: Blood Culture | \*Via pod to Station 12 |
| Microbiology: CSF’s | Do not use the POD to deliver CSF specimens to laboratory, deliver by hand, see Section 6. Porter delivery (see Section 6.2.2) |
| Microbiology: Sars-CoV-2 | Do not use the POD to deliver Sars-CoV-2 specimens to laboratory, deliver by hand, see Section 6.2. |
| Microbiology On-Call | \*Via pod to Station 12 or delivery by hand to the Blood Sciences laboratory |
| Anatomic Pathology(Histology)  Frozen sections  Placental Specimens:  Post Mortem | Do not use the POD to deliver Histology specimens to lab. See Section 6.2.4.  Must be arranged in advance with the Pathologist.  Porter delivery (see Section 6.2.2)  Body must be placed in the mortuary fridge. Forms must be sent to the laboratory. |

*\*If the pod system is not working deliver specimens directly to the appropriate area. See*

*Figure 7: Department Location above.*

# Specimen Acceptance Requirements

## Laboratory Criteria for Specimen Acceptance

Specimens and request forms must be labelled/filled in as per section 4 and 5 of this document. See below for the rejection of specimens that do not meet the required criteria.

## Laboratory Criteria for Rejection of Specimens

Specimens that conform to the reasons listed below will be automatically rejected and will not be processed by the laboratory. A record of the specimen will be made in the Laboratory Information System (LIS) and the reason for its rejection noted. A report will be sent to the clinical area. Where specimens originate from ‘in patients’, the requester if known or the unit may be contacted and a repeat specimen requested.

### Reasons for Rejecting a Specimen

* Specimen received unlabelled.
* Specimen incorrectly labelled.
* Request form unlabelled.
* Electronic request not completed, as per section 4.7.
* Specimen and form do not contain minimum essential identifiers.
* Specimen and form do not contain the same essential identifiers.
* Specimen that has leaked extensively.
* Incorrect type of specimen.
* Incorrect volume of specimen.
* Specimen clotted inappropriately.
* Haemolysed specimens.
* Specimens received too old for analysis.
* Specimens taken into expired collection containers.
* Blood Transfusion specimens will be rejected if there is not an exact match between the essential identifiers on request and specimen.
* Blood Transfusion specimens with addressograph labels on specimens will be rejected.
* Blood Transfusion specimens require the signature of the person who took the specimen and will not be accepted until this is supplied.
* All non-MN-CMS specimens for Blood Transfusion and Kleihauer must be hand written.
* Specimens will be rejected if the essential requirements are missing from the primary specimen.

**Special Considerations:**

* Blood Transfusion specimens require date of birth (or gestational age) in addition to the full name and hospital number. Non MN-CMS Blood Transfusion samples must be signed by the collector.
* For Blood Transfusion samples, if no hospital number is available, the 1st line of the patient’s address must be present on the specimen, in addition to the patient’s forename, surname and date of birth, for the specimen to be accepted.
* Anatomical Pathology and Microbiology specimens must be labelled on the body of the container and not on the lid.
* TDL and OLHC genetic forms must be signed by the patient or person paying for the test.
* For post mortem examination, the body should be identified by means of wrist or leg band.

### Factors that May Affect the Performance of the Test/Interpretation of Results

* Incorrect volume of specimen.
* Specimen clotted inappropriately.
* Haemolysed/ Lipaemic specimens.
* Specimens received too old for analysis.

### Exceptions to Rejecting a Specimen

In exceptional circumstances, where there are problems with patient/sample identification, sample instability due to delay in transport/inappropriate container/insufficient sample volume, or where the sample is clinically critical or irreplaceable e.g. in the case of surgical specimens in Anatomical Pathology, CSF’s, amniotic fluid, CVS, pus from an abscess excised in theatre or other specimens (other than blood), the laboratory can choose to process the sample where both clinician and laboratory staff, following discussion, are confident regarding the identity of the specimen. In this case, the final report should indicate the nature of the problem and where applicable that caution is required when interpreting the result.

Corrections to labelling errors must be clear and unambiguous. Incorrect information must be indicated with a clear strikethrough. The correction must indicate the name of the clinical staff member contacted and bear their signature. It must be counter signed and dated by the laboratory staff member. A Pathology Specimen Non-Conformance Form, RF-CS-LM-20, must be completed and a comment entered in the report to alert the clinicians to the error. All samples with corrected labelling errors accepted for analysis are recorded as non-conformities and are subject to specific review.

The paper request forms are stored for three months in the laboratory and are then shredded. An exception to this is for Blood Transfusion and genetic request forms, where the request form is scanned and stored for 30 years. Anatomical Pathology request forms are stored for 30 years. Electronic requests are stored permanently in the patient chart.

## Sample Receipt

Trained laboratory personnel will evaluate the specimens to ensure that they meet the relevant acceptance criteria.MN-CMS samples are ‘booked in’ to the LIS on receipt into the laboratory using the unique bar coded number on the sample. The request date field in the LIS is the date and time the sample was received into the laboratory. In the event of MN-CMS printer failure – samples requested using MN-CMS are “booked in” to the LIS on receipt into the laboratory using the unique bar coded accession number on the A4 MN-CMS requisition. This unique accession number is then applied to the manually labelled specimen in the laboratory. Samples with request forms received in the laboratory have the date and time of receipt recorded on the request form. Specimens are then labelled with a unique laboratory accession number; they are then recorded in the LIS linking the unique laboratory accession number to the patient’s details provided on the request form.

## Secondary Sampling of Primary Specimen

If separation of the primary sample into a secondary container is required for any reason all portions of the primary sample must be an unequivocally traceable to the primary sample. This is achieved by ensuring all sample containers are labelled with the patient’s unique laboratory accession number.

# Reports

## Reporting of Results within the Hospital

Results, once authorised, are available electronically in MN-CMS or Winpath Ward Enquiry (LIS). Hard copy reports are issued as required on the day of test report release. Laboratory management shares responsibility with the requester for ensuring reports are received by the appropriate individuals within an agreed time interval, depending on the test requested. This is facilitated by the requester providing the necessary details on the request form, including clinical details. All clinicians have been alerted to this requirement via SI-MEM-LM-146.

### MN-CMS Reports

Reports are filed directly to the patient chart. In addition, a message is received to the ‘Inbox’ of the clinician placing the request and to the location pool message centre of the patient’s current, or last known, location. Review of results is via an endorsement process. Results are reviewed and accepted by the reviewing clinician or are forwarded directly to the ‘Inbox’ of a Consultant or other designated clinician for action.

Reports for external clinics will file directly to the patient’s MN-CMS chart. In order for a message to be sent to the inbox of the clinician requesting the test, the test request form must have been labelled with the valid registration number (wither MCRN or NMBI) of the requesting clinician. In the event the requesting clinician’s registration number has not been provided, it is the responsibility of the requesting clinician to review the report in the patient’s MN-CMS chart directly. Please note hardcopy reports are also issued to external clinics as standard (see section 8.3 below).

## Winpath Ward Enquiry

In general, results once authorised are available electronically on the ward PC’s, within 20 minutes from time authorised. These results are accessed via Winpath Ward Enquiry. The entry of area logon and password provides access.

### Paper Reports

Hardcopy reports are issued as required for requests received on paper request forms. These are delivered to the identified unit, or if none is given, to medical records twice daily (Monday to Friday) by the laboratory porter. Results are reviewed and accepted by the reviewing clinician or are referred to a Consultant or other designated clinician for action. No request should be processed without a named clinician being indicated.

## Reports for External Locations

Hard copy reports are issued as required on the day of test report release. Reports for locations outside the hospital will be posted on the day of reporting if results are available before 15:00hrs Monday to Friday.

## Telephoned Reports

* In general results are telephoned when:
* There is a comment on the request form requesting results to be telephoned.
* The results fall within established alert or critical intervals, as defined by procedure.
* The result deviates significantly from previous results.
* Urgent action by clinical staff is required.
* It is necessary to notify the requester that testing will be delayed, where it may compromise patient care.
* All telephoned results must be recorded in the LIS. Details recorded must include date and time of phoned report, staff member notified, and the results conveyed. Also any difficulties in notifying staff of results by telephone should be recorded.
* All telephoned reports shall be followed by a final report.
* While departments have internal criteria stipulating which reports should ideally be phoned to clinical staff, it remains the responsibility of the clinician who ordered the test to follow up and act upon its result.
* It is the policy of the Anatomic Pathology department not to give results over the telephone. A preliminary report may be phoned to a clinician by the department’s medical staff.
* It is the policy of the Blood Transfusion department not to give blood group results over the telephone. Urgent Anti-D quantitation results are phoned to Foetal Assessment when a telephoned result is received from the IBTS. This is recorded in Winpath.
* It is not usually necessary to phone abnormal results when the:
* Result is consistent with previous results on the patient.
* Result is not unexpected.
* Results delivered by telephone should only be delivered to authorised recipients. They are not communicated directly to the patient.

## Faxed Reports

Results should not be faxed from the laboratory. Faxing of results should be limited, and requests for same should be routed through a Consultant Pathologist or the Chief/Senior Medical Scientist. However, as per hospital policy, outlined in PP-OG-GEN-19, in certain circumstances it may be acceptable to transmit confidential personal data and sensitive personal data by fax as follows:

* **Medical Emergency**: Where a delay would cause harm to a patient/client or employee or the potential risk to a patient/client or employee is greater harm than the risk of disclosure of their personal information.
* In the case where a referring/transfer hospital needs a result where time would not allow for it to be posted, it is acceptable for it to be faxed. Blood group results would fall under this category.

## Urgent Reports

Requests marked urgent or priority are processed as a priority according to the protocol in each department. The laboratory must be contacted by phone when sending urgent sample. Where appropriate such results are brought to the immediate attention of the requesting clinician or staff in the clinical area.

## Supplemental Reports

Where additional information regarding a request comes to light which necessitates an additional report, a supplemental report is issued.

## Amended Reports

Where it is discovered that the original report issued is incorrect or contains false information, a revised or amended report is issued. The original report and the correct report are retained on Winpath. The original copy in the patient’s chart is marked as incorrect and the new amended report clearly outlines that it is a deviation from the original. For MN-CMS results, the amended report will have **‘c’** beside any results which have been corrected. The clinician should be aware when accessing patient results to interpret any corrected results with caution. Where a report has been amended the clinical area will be notified directly. The revised report shows the time and date of the change and the name of the person responsible for amendment, as per the laboratory procedure for Result Recall or Amendment, MP-GEN-RECALL.

## Copy Reports

There is a facility in every department to print copy reports to additional clinicians/locations as requested. Such request may occur at sample login or additional reports may be requested post authorisation and release of primary report. All additional reports issued after the primary report are marked ‘Copy’. Copy reports are not issued in MN-CMS.

## Delayed Results

In the event where a delay in examination results could compromise patient care each individual department will communicate this to the clinical area. This should be done by telephoning the clinical area and recording the call in the telephone log of the patient concerned. Where the issue affects a number of clinical areas/patients, a non-conformance should be raised in Q-Pulse. The call should be recorded as part of the immediate action.

## Uncertainty of Measurement

The measurement uncertainty components are those associated with the actual measurement process, starting with presentation of the sample to the measurement procedure and ending with the output of the measured value or test results. Sources that contribute to uncertainty may include sampling, specimen preparation, portion selection, calibrators, reference materials, input quantities, equipment, environment, specimen condition and operator skill. The laboratory must define the performance requirements for the measurement uncertainty of each measurement procedure. This is a key step in deciding whether a test is fit for purpose.

All laboratory investigations are subject to uncertainty of measurement. Please take this into consideration when interpreting results. Each department has a document listing the uncertainties calculated for its tests. For further information on performance specifications or indicators of uncertainty of measurement for internal tests, please contact the individual laboratory department if required.

## Reference Ranges

Results are compared with the Biological Reference Interval where appropriate. These ranges should be matched for age, sex, ethnicity and pregnancy where appropriate and possible. Reference ranges and alert ranges for investigation may be published for use by laboratory and clinical staff. Where results fall within accepted reference ranges, and such a result is consistent with the clinical details provided, it may be authorised. In any situation where the quoted range may not apply, a comment to this effect is included on the report. When reporting the result of trans-gender patients, a comment will be included that the reference ranges applied are female/male as appropriate.

Please contact individual department for further information on reference ranges.

## Accredited and Non-Accredited Test Reporting

The NMH is an INAB accredited testing laboratory (Reg. no. 240MT), for accredited tests please see: <https://inab.ie/Directory-of-Accredited-Bodies/Laboratory-Accreditation/Medical-Testing/The-National-Maternity-Hospital.html>. Tests that are not accredited by INAB are identified on reports.

1. The following text will be appended in the footer of all hardcopy printed reports for Haematology, Biochemistry and Microbiology, where accredited activities are being reported*: ‘An INAB accredited testing laboratory Reg No 240MT. Excludes tests performed in referral laboratories’.*
2. The following text will be appended in the footer of all hardcopy printed reports for Blood transfusion, where accredited activities are being reported: ‘*An INAB accredited testing laboratory Reg. No 240MT. Excludes tests performed in referral laboratories. ®Denotes tests performed in a non INAB accredited referral laboratory’.*
3. The following note will be added to the body of each Histology hard copy printed report and electronic report: *‘The NMH is an INAB accredited testing laboratory. Registration number 240MT. This covers testing carried out in this facility. For histology this excludes C9; Adipophilin; GATA 3; Alcian Blue; Grocotts; Alcian Blue/PAS; ZN; Reticulin; Elastin VG; MSB; Van Gieson; PAX8 and SARS CoV-2’.*
4. The following text will be visible on Blood Transfusion, Haematology, Biochemistry and Microbiology electronic reports for where accredited activities are being reported: ‘*The NMH is an INAB accredited testing laboratory (Reg.No. 240MT). Tests performed in referral laboratories are excluded from this scope’.*

## Pre-Authorised Results

All results leaving the laboratory have been validated and/or reviewed by a qualified medical scientist or Consultant. Pre-authorised results contain the electronic signature COMP, they are deemed authorised under the authority of the Consultant in charge of the department based on predefined criteria. Such results do not constitute clinical advice.

## Reports on Results from Referral Laboratories

Results from referral laboratories may be received electronically via MediBridge or by hardcopy.

* MediBridge results are attributed to the referral laboratory and authorised from Winpath. They are available in MN-CMS and on Winpath Ward Enquiry.
* Hardcopy results, where received, from referral laboratories are issued to the requesting clinician.
* Numeric results may be entered into the LIS for ease of access. Where this occurs they are flagged as originating from a referral laboratory. They are available in MN-CMS and on Winpath Ward Enquiry.
* For text based results in the case of the MN-CMS, the returned report is scanned and attached to the patient’s record. A message is sent to the requesting clinician.
* The results from referral laboratories when(re)printed on NMH paper are authorised by COMP as outlined in Section 8.13 above.
* The name of the referral laboratory is indicated in the body of the report, along with identification of the tests performed by the referral laboratory. The referral/back up laboratory report number is recorded internally on WinPath for reference.

# Post Analytical Storage, Retention and Disposal

Please refer to MP-GEN-CLINCON, the laboratory procedure for Control of Clinical Material. All clinical specimens are disposed of according to PP-EF-ENV-17.

## Anatomical Pathology

* Surgical specimens are held for four weeks post reporting.
* Surgical specimens that are all embedded are held for one-week post reporting.
* Blocks and slides are retained for 30 years.
* Placental specimens are held for 12 months.
* Post mortems are held as per consent.

## Blood Sciences

Blood and urine specimens are usually kept for up to one week at 2-6˚C after processing. Haematology and coagulation specimens are kept for one week at room temperature.

## Microbiology

* All CSFs and vitreous/aqueous taps are stored at 4°C for 1 month.
* All positive blood culture bottles are stored at 35°C, aerobically until complete (usually 5 days unless prolonged incubation or terminal sub-culture requested by Consultant Microbiologist).
* Urine samples are stored at 4°C for minimum of 2 days.
* All negative Sars-CoV-2 specimens are stored for 2 days. All positives/aliquot of are stored at -80˚C for a minimum of 3 months.
* All positive Influenzas are stored at 4°C for up to 1 week.
* All other specimens are stored at room temperature for 1 week.

## Specimen Reception and Dispatch

* Samples sent to the NVRL or other external laboratory and not retained in specimen reception.
* All antenatal booking blood specimens are stored frozen for 2 years in the NVRL in accordance with NVRL policy.
* Primary blood specimens that have been separated and a secondary sample sent for referral are stored in the fridge for up to 2 weeks.
* Primary urine specimens that have been separated and a secondary sample sent for referral are stored at room temperature for two days.

# Policy on Protection of Personal Information

The Department of Pathology and Laboratory Medicine follows the hospital policy on data protection. The scope of this policy is to ensure that the obligations in dealing with personal data by the organisation comply with the requirements of the relevant Irish legislation, namely the Irish Data Protection Act 2018, and the General Data Protection Regulation GDPR 2018. The NMH must comply with the data protection principles set out in the relevant legislation. This policy applies to all personal data collected, processed and stored by the NMH in relation to its staff, service users and service providers. The NMH makes no distinction between the rights of data subjects who are employees and patients, all are treated equally under this policy.

# Complaints Procedure

The Department of Pathology and Laboratory Medicine follows the hospital policy on Data Protection, PP-OG-QTY-3. All complaints written or verbal will be accepted by the Department of Pathology and Laboratory Medicine, and will be handled as outlined below.

## Monitoring User Complaints

All complaints, verbal or written, are recorded in the CA/PA module of Q-Pulse. Complaints are dealt with in the first instance by the Head of Department, or depending on the seriousness of the issue by the QMT. Clinical Governance is made aware of written complaints to ensure compliance with hospital policy. Feedback can be given through the following form:

<https://creator.zohopublic.eu/lukefeeney/feedback-mgmt-2019/form-perma/NMH_Patient_Feedback_Form/usBnGW4MT4FbHX1GE1NVVPX1R22vDTqFvXmMZOxVK9kM9GOhyfZJv5Vg0PuMPbjzwVNGCZEgj4BdNW4edT8p09hFs9Z7OUy6d0YX>

# Anatomical Pathology (Histology) Department

## Anatomical Pathology Tests

Figure 13: Anatomical Pathology Tests

|  |  |  |
| --- | --- | --- |
| **Test/Assay Name** | **Specimen Type/Requirements** | **Turnaround Time** |
| **Perinatal Post Mortem Examination** | Foetus/Infant body | 8 Weeks |
| **Tissue Processing and staining** | Fresh and fixed tissue | N/A |
| **Frozen Sections** | Fresh tissue | N/A |
| **Placentae** | Fresh tissue for gross examination.  Fixed tissue for high risk patients and placentae sampled in the delivery unit | 8 Weeks |
| **Non Gynae Cytology** | Fixed specimen | 6 Days |

## Anatomical Pathology Specimen Requirements

Figure 14: Anatomical Pathology Specimen Requirements

| **Specimen Type and/or Source** | **Container** | **Procedure** | **Accreditation Status** | **Turnaround Time** |
| --- | --- | --- | --- | --- |
| **Embryo or Foetus** | **Container appropriate to size (no fixative)** | **Transfer to Mortuary Fridge** | Not Accredited | N/A |
| **Theatre**  **Major Specimens**  **e.g. Uterus, Ovarian cysts, etc.** | **1 or 2 litre white** | **Immerse in Formalin**  (sufficient to cover specimen)  Transfer to Anatomical Pathology. | Accredited | 8 Days |
| **Molar Tissue**  **POC’s from cases of recurrent (i.e. 3rd or subsequent miscarriage)** | **1litre white** | **09.30 AM – 17:00hrs**Transfer **FRESH** to Anatomical Pathology as soon as possible.  **Other times store in fridge and transfer to Anatomical Pathology as soon as possible.**  **Please note samples stored in Formalin are not suitable for Cytogenetic Testing.** | Accredited | 8 Days  (Cytogenetic Testing 4-6 Weeks) |
| **Minor Specimens**  **e.g. POC’s, Curetting’s, Fallopian tubes, polyps etc.** | **90ml**  **or**  **1 or 2 litre white** | Immerse in formalin and transfer to Histology. | Accredited | 5 Days |
| **Placentae**  **(For examination in laboratory)** | **Black plastic bag inside large Biohazard bag** | Transfer **FRESH** to Histology.  If delayed store @ 2-40 C.  (For the purposes of labelling the black plastic bag is the container) | Accredited | 8 Weeks |
| **Placentae**  **(High risk)** | **2 litre white** | Immerse in Formalin and attach red sticker to both form and container before transfer to Histology. | Accredited | 8 Weeks |
| **Placentae**  **(Delivery Ward)** | **Black plastic bag inside large**  **Biohazard bag** | Store @ 2-40C. and transfer to pathology if required otherwise dispose after 7 days. | Accredited | 8 Weeks |
| **Foetal Assessment**  **Products of Conception** | **90-500ml container** | Immerse in Formalin and transfer to Anatomical Pathology  (not generally referred for cytogenetics testing). | Accredited | 5 Days |
| **Gynae Clinic/ Rooms**  **Lletz, Cervical and other Biopsies**  **Pipelle** | **40 ml prefilled Formalin container**  **Place Pipelle in Tissue Tek yellow mesh biopsy cassette** | Transfer to Anatomical Pathology  Immerse in Formalin in a 40ml prefilled container and transfer to Histology | Accredited | **Cervical Biopsies:** 80% reported within 4 weeks  **Other Biopsies:**  5 Days  **Lletz:**  5-7 Days |
| **If the specimen is not listed here please contact anatomical pathology on Ext: 3180 for information.** | | | | | |
| * **N.B.: PLEASE DO NOT USE THE POD TO DELIVER SPECIMENS TO ANATOMICAL PATHOLOGY.** * **All samples must be in adequate amounts of Formalin. Exceptions to this are, suspected cases of molar pregnancy and POC’s of recurrent (i.e. 3rd or subsequent) miscarriage which are sent up dry up until 17:00hrs Monday to Friday. All specimens after this time must be placed in fixative.** | | | | | |
| **Turnaround time is calculated on the basis of NMH data for 2012-2013 where applicable, and is the number of working days by which 90% of specimens are reported.** | | | | | |

# 

# Biochemistry Department

## Tests and Specimen Requirements

See Figure 11 for routine cut off times. Urgent specimens are accepted at any time. Specimens from adults are drawn into specific Greiner Vacutainers with appropriate additives as outlined below. Specimens from neonates are drawn into specific Sarstedt micro tubes with appropriate additives as outlined below.

## Stability of Routine Biochemistry Tests

Routine biochemistry samples may be analysed up to 8 hours after sample draw.

Figure 15: Routine Biochemistry Tests

| **Test/Profile** | **Adult: Cap**  **Additive (Vol)** | **Paediatric: Cap**  **Additive (Vol)** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** |
| --- | --- | --- | --- | --- | --- |
| **Albumin** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Alkaline phosphatase** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **ALT** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day | Patients treated with Sulfasalazine may generate a false low result for ALT | Accredited |
| **Amylase** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **AST** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Bilirubin - Direct** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Bilirubin -Total** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Calcium** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Chloride** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **CK** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Creatinine** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **CRP** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Total Bile Acids** | **Heparin 4ml** |  | Same Day |  | Accredited |
| **Gentamicin-Trough** | **Heparin 4ml** | **Heparin 0.6ml** | 24 Hrs |  | Accredited |
| **Gentamicin-Peak** | **Heparin 4ml** | **Heparin 0.6ml** | 24 Hrs |  | Accredited |
| **Glucose** | **Fluoride 2ml** | **Fluoride 0.6ml** | Same Day | See Figure 18 for information | Accredited |
| **LDH** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Magnesium** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Osmolality (Plasma)** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Phosphate** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Potassium** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Sodium** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Total Protein** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Triglyceride** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day | Fasting  Venepuncture immediately after or during the administration of  Metamizole (Dipyrone) may lead to falsely low results for Triglyceride. Venepuncture should be performed prior to the administration of Metamizole. | Accredited |
| **Urea** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day |  | Accredited |
| **Uric Acid** | **Heparin 4ml** | **Heparin 0.6ml** | Same Day | NAC interference may lead to falsely low results.  Venepuncture immediately after or during the administration of  Metamizole (Dipyrone) may lead to falsely low results for Uric Acid. Venepuncture should be performed prior to the administration of Metamizole. | Accredited |
| **Anti Mullerian Hormone** | **Plain 7ml** |  | 3 Days | Mon – Fri  Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **CA 125** | **Plain 7ml** |  | 3 Days | Mon – Fri  Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **Free bHCG and PAPP-A** | **Plain 7ml** |  | 3 Days | Clinical details must include gestation. Samples are only suitable for analysis between 10 weeks 0 days and 13 weeks 6 days. | Accredited |
| **sFlt-1/PlGF ratio** | **Plain 7ml** |  | 3 Days | Sample to be taken > 20 weeks. Note: The current NICE Guideline (DG23) only recommends the use of the ratio as a rule out (short term) for PE. | Accredited |
| **HCG** | **Heparin 4ml** |  | 48Hrs | Mon – Fri except by special request.  Sat a.m. only if sample received in lab before 11.30a.m.  Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **Oestradiol** | **Plain 7ml** |  | 48Hrs | Mon – Fri except by special request.  The Oestradiol assay used in the NMH should NOT be used when monitoring Oestradiol levels in patients being treated with fulvestrant.  Biotin may cause some concentration dependent positive interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **Progesterone** | **Heparin 4ml** |  | 3 Days | Mon – Fri  Biotin may cause some concentration dependent positive interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **Free T4 (FT4)** | **Plain 7 ml** | **Heparin 0.6ml** | 3 Days | Mon – Fri  Biotin may cause some concentration dependent positive interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **TSH** | **Plain 7 ml** | **Heparin 0.6ml** | 3 Days | Mon – Fri  Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |
| **Ferritin** | **Plain 7 ml** |  | 3 Days | Mon – Fri  Biotin may cause some concentration dependent negative interference in this assay if high dose supplements are taken. If this is suspected, a repeat request 8 plus hours off Biotin is recommended in the first instance. | Accredited |

Figure 16 : Routine Biochemistry Profiles

| **Profile** | **Adult: Cap Additive (Vol)** | **Paediatric: Cap Additive (Vol)** | **Tests Included** |
| --- | --- | --- | --- |
| **UE** | **Heparin 4ml** | **Heparin 0.6ml** | Sodium, Potassium, Chloride, Urea, Creatinine |
| **PN** | **Heparin 4ml** | **Heparin 0.6ml** | UE, Calcium, Magnesium, Phosphate, Triglyceride, Albumin, Corrected Calcium |
| **SBR** | **Heparin 4ml** | **Heparin 0.6ml** | Bilirubin Direct, Bilirubin Total |
| **LFT** | **Heparin 4ml** | **Heparin 0.6ml** | Total Protein, Albumin, AST, ALT, ALP, SBR |
| **PET** | **Heparin 4ml** | **Heparin 0.6ml** | UE, LFT, Urate |
| **REC** | **Heparin 4ml** | **Heparin 0.6ml** | UE, Calcium, Magnesium, Phosphate, Urate, Total Protein, Albumin, AST, ALT, ALP, SBR, Corrected Calcium |
| **GBL** | **Heparin 4ml** | **Heparin 0.6ml** | Calcium, Magnesium, Phosphate, Albumin, ALP, Corrected Calcium, Sodium, Potassium, Chloride, Urea, Creatinine |
| **CAL** | **Heparin 4ml** | **Heparin 0.6ml** | Calcium, Albumin, Corrected Calcium |
| **U8** | **Heparin 4ml** | **Heparin 0.6ml** | UE, Calcium, Magnesium, Phosphate, Albumin, Corrected Calcium |
| **U81** | **Heparin 4ml** | **Heparin 0.6ml** | UE, Calcium, Magnesium, Phosphate, Albumin, Corrected Calcium, SBR |
| **CSFB** | **Plain 2ml** | **Plain 2ml**  Note: Where only a fluoride specimen is received this can be analysed for CSF Glucose. | CSF Glucose |
| **Plain 2ml** | **Plain 2ml** | CSF Protein |

Figure 17: Glucose Testing

*All adult samples should be drawn into grey topped fluoride oxalate tubes*

| **Glucose Test/Profile** | **Special Requirements** | **Accreditation Status** |
| --- | --- | --- |
| **Fasting** | Fasting 12 hours. | Accredited |
| **Random** | No dietary restriction. | Accredited |
| **Post Prandial** | 2 hours following a meal. | Accredited |
| **Antenatal Oral Glucose Tolerance Test**  **(4 Specimens)** | Duration: 3 hours.   1. Fasting glucose (Fasting 12 hours)   Then glucose administration,   1. Specimen taken 1-hour post glucose administration 2. Specimen taken 2 hours post glucose administration. 3. Specimen taken 3 hours post glucose administration. | Accredited |
| **Postnatal Oral Glucose Tolerance Test**  **(2 Specimens)** | 1. Fasting glucose (Fasting 12 hours)   Then glucose administration,   1. Specimen taken 2 hours post glucose administration. | Accredited |
| **Gestational Diabetes Screen**  **(2 specimens)** | 1. Fasting glucose (Fasting 12 hours) 2. Specimen taken 1 hour post glucose administration. | Accredited |
| **Blood glucose series**  **(5 specimens)** | Times entered as per specimen/request form. | Accredited |
| **Glucose Challenge Test**  **(1 specimen)** | 1-hour post glucose administration. | Accredited |

Figure 18: Urine Biochemistry Tests

| **Urine Test/ Profile** | **Container** | **Additive** | **Turnaround Times** | **Special Requirements** | **Accreditation Status** |
| --- | --- | --- | --- | --- | --- |
| **Creatinine** | **Spot Universal or**  **24 hr Urine** | None | Same Day | \*If for Creatinine Clearance, the Plasma for Creatinine determination must be taken during the 24hr period of urine collection | Accredited |
| **Protein** | **Spot Universal or**  **24 hr Urine** | None | Same Day |  | Accredited |
| **Protein: Creatinine**  **Ratio** | **Spot Universal** | None | Same Day |  | Accredited |
| **Osmolality (Urine)** | **Spot Universal** | None | Same Day |  | Accredited |
| **Potassium** | **Spot Universal or**  **24 hr Urine** | None | Same Day |  | Accredited |
| **Sodium** | **Spot Universal or**  **24 hr Urine** | None | Same Day |  | Accredited |
| **Chloride** | **Spot Universal or**  **24 hr Urine** | None | Same Day |  | Accredited |
| **Calcium** | **Spot Universal or**  **24 hr Urine** | None | Same Day |  | Accredited |
| **Phosphate** | **Spot Universal or**  **24 hr Urine** | None | Same Day |  | Accredited |

Figure 19: CSF Biochemistry Tests

| **CSF Test/Profile** | **Container** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** |
| --- | --- | --- | --- | --- |
| **CSF Glucose** | **Plain**  Note: When only a fluoride specimen is received this can be analysed for CSF Glucose. | Same Day |  | Accredited |
| **CSF Protein** | **Plain** | Same Day |  | Accredited |

## Specialised Biochemical Investigations

These investigations are referred to external centres. Turnaround times, where quoted, reflect specialist nature and referral laboratory response time. For further information, contact specimen reception at Ext: 3178 for sample requirements and Biochemistry at Ext:3546 for result enquires

Figure 20: Specialised Biochemical Investigations

*Biotin may cause interference in some of our referral tests. If such interference is suspected, please contact the Biochemistry laboratory for a list of susceptible tests.*

| **Test** | **Code** | **Adult** | **Paed** | **TAT** | **Special Requirements** | **Referral Centre** |
| --- | --- | --- | --- | --- | --- | --- |
| **7-Dehydro-cholesterol** | **7DEH** | **Heparin 4ml** | **Heparin 0.6ml** | 3 Weeks | Protect from light at all times. Separate into 2° tube. Diagnosis of Smith-Lemli-Opitz syndrome | Camilla Scott , Chemical Pathology, Sheffield Children's Hospital [**(7)**](#_References:), Western Bank, Sheffield S10 2TH, UK  Tel: 00441142717305 (or 6306) |
| **11- Deoxycortisol** | **11DE** | **Plain 7ml** |  |  | Store at 2-8°C. In neonates the sample should be taken at least 48 hours post birth. | Reference Chemistry Laboratory at St Thomas' [(10)](http://www.viapath.co.uk/test-alphabetical?location=113&department=130&laboratory=146&letter=) Tel: +44 207 188 1264  4th floor, North Wing, St Thomas' Hospital, Westminster Bridge Road  London SE1 7EH |
| **17 OH Progesterone (Paed)** | **OHPP**\* |  | **Serum or Heparin accepted** | 14 Days | Ensure neonates are at least 48hrs old as baby will have mothers OHPP present and a false result will be obtained. Assay is run every 2nd Wednesday at 10.30am. Early morning specimens. Separate sample and store in fridge. **If sample received over weekend separate and freeze.** | Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **17 OH Progesterone (Adult)** | **OHP**\* | **Plain 7ml** |  | 5 Days | Spin to separate from cells. Stable on gel. Separate sample and store in fridge if not sent on the same day. **If sample received over weekend separate and freeze.** | Biochemistry Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel: 01 4162918 |
| **Angiotensin Converting Enzyme (ACE)** | **ACE**\* | **Plain 7ml** |  |  | Spin to separate from cells. Stable on gel. | Biochemistry Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel: 01 4162918 |
| **Acetylcholine Receptor Antibodies / MuSK antibodies** | **ACRA** | **Plain 7ml** | **Plain 2ml** | 3 Days | Spin and separate sample and fridge within4 – 8hrs of blood draw. | Protein Reference Unit[(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **ACTH** | **ACTH**\* | **EDTA 3ml** | **EDTA 1.3ml** |  | Separate immediately and freeze. | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **AcylCarnitine (Total, Free + Acyl)** | **CARN**\* |  | **Heparin 0.6ml** | 3 Weeks | Separate sample and fridge. Stable in the fridge over the weekend. | Camilla Scott, Chemical Pathology, Sheffield Children's Hospital[(7)](#_References:), Western Bank, Sheffield S10 2TH, England  Tel; 00441142717305 (or 7306) |
| **AcylCarnitine (Free + Interpretive comment)** | **ACAT**\* |  | **Guthrie Card** |  | Air dry for 2 hrs, avoid heat and humidity. Acylcarnitines profiling is always accompanied by urine for organic acids. | Biochemistry Dept Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Alcohol** | **ALC** | **Fluoride Oxalate** |  | 5 Days | Preferably Fluoride oxalate sample but serum acceptable. Send primary specimen. No need to separate adult samples. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:) Tel: 01 8092668 |
| **Aldolase** | **ALDO** | **Plain 7ml** | **Plain 2ml** |  | Spin to separate from cells. Stable on gel. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Aldosterone** | **ALD**\* | **Plain 7ml**  **Or**  **EDTA** | **Plain 2m** | 1 Week | Spin to separate from cells. Separate and freeze within 4 hours. Indicate patient’s posture | Eurofins Biomnis [(11)](https://www.eurofins-biomnis.com/en/services/test-guide/) Tel: 01 2958545 |
| **Alkaline Phosphatase Isoenzymes** | **ALPI** | **Plain 7ml** | **Plain 2ml** |  | Spin to separate from cells. Stable on gel. | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **Alpha 1 Anti-Trypsin** | **AATV**\* | **Plain 7ml** | **Plain 2ml** |  | Separate sample and fridge. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Alpha 1 Anti-Trypsin PI phenotype** | **AAP**\* | **Plain 7ml** | **Plain 2ml** | 2 Weeks | Serum phenotyping. | Alpha-1 Foundation Ireland, RCSI Smurfit Building, Beaumont Hospital, Dublin 9. 01-8093871 |
| **Alpha-fetoprotein**  **(as tumour marker)** | **AFP**\* | **Plain 7ml** |  | 2 Weeks | Adult: Stable on gel after spinning. | Biochemistry St. Vincent's. [(6)](#_References:)  Tel: 01 2214550 |
| **Alpha-fetoprotein**  **(for neural tube defect)** | **AFPP**\* |  | **Plain 2ml or Heparin 0.6ml** | 2 Weeks | Paed: Separate + fridge | Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **Amikacin** | **AMKI** | **Plain 7ml** |  |  | Samples must be analysed within 24 hours of collection. Patients on once-daily regimens should have specimens taken 12-24 after the dose is given. Single Daily Dose Regimen: Pre-Dose Level: <5.0 mgs/L. Separate sample and fridge. | Biochemistry St. Vincent's. [(6)](#_References:)  Tel: 01 2214550 |
| **Amino Acids - Urine** | **AMAU**\* | **Urine** | **Urine** | 10 Days | 5 ml random urine required transfer urine from MSU to 10 ml tube and freeze ASAP | Biochemistry Dept, Children’s Health Ireland at Temple St. [(4)](#_References:)  Tel : 01 8784272 |
| **Amino Acids- Blood** | **AMA**\* |  | **Heparin 0.6ml** | 5 Days | Separate immediately blood/CSF and store in fridge. Please note if CSF sample is haemolysed. | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Amino Acids- CSF** | **ACF**\* |  | **Plain tube or fluoride oxalate)** | 5 Days | CSF should be paired with plasma to calculate ratios. | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Amiodarone**  **(Cordarone)** | **AMIO** | **Plain 7ml Or EDTA** |  |  | Separate and freeze within 4 hours. | Eurofins Biomnis [(11)](https://www.eurofins-biomnis.com/en/services/test-guide/) Tel: 01 2958545 |
| **Ammonia** | **AMM**\* | **Heparin 4ml** | **Heparin 0.6ml** | 2 Days | Separate and freeze immediately. Avoid haemolysis | Biochemistry Dept, Children’s Health Ireland at Temple St. [(4)](#_References:)  Tel : 01 8784272 |
| **Androstenedione (Paed)** | **ANDP**\* |  | **Plain 2ml** |  | Spin to separate from cells. Stable on gel. Separate + fridge if not sent on the same day. | Endocrinology Dept. St James Hospital[(3)](http://search.stjames.ie/Labmed/) Tel : 01 416 2991 |
| **Androstenedione (Adult)** | **AND**\* | **Plain 9ml red topped serum tube** |  |  | Spin to separate from cells. Stable on gel. Separate + fridge if not sent on the same day. | Endocrinology Dept, St. Vincent's.[(6)](#_References:)  Tel : 01 2213107 |
| **Anti-Ovarian Antibodies** | **AOA** | **Plain 7ml** |  | 3 Days | (Anti-Adrenal Antibodies) Spin to separate from cells. Stable on gel. Separate + fridge if not sent on the same day. | Protein Reference Unit [(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **Anti-parietal cells antibody** | **PCA** | **Plain 7ml** |  | 10 Days | Spin to separate from cells. | Immunology Lab, St. Vincent's.[(6)](#_References:)  Tel: 01 2214550 |
| **β-Hydroxybutyrate** | **BHBY**\* |  | **Fluoride 0.6ml** |  | See RF-CS-BIO-41 Hypoglycaemia Workup Request Form - Separate and freeze | Biochemistry Dept, Children’s Health Ireland at Temple St[(4)](#_References:)  Tel : 01 8784272 |
| **Bile Acids (Paed)** | **BILP** | **N/A** | **Heparin 0.6ml** |  | Spin to separate from cells and store in fridge. For the diagnosis of bile acid synthesis disorders. | Camilla Scott, Metabolic Section,  Clinical Chemistry, Sheffield Children's Hospital [(7)](#_References:), Western Bank,  Sheffield S10 2 TH, England  Tel: +441142717305 |
| **Biotinidase Activity** | **BIOT**\* |  | **Heparin 0.6ml** | 4 Weeks | Separate and freeze | Chemical Pathology, Sheffield Children's Hospital [(7)](#_References:), Western Bank,  Sheffield S10 2 TH, England  Tel: +441142717305 (or 7306) |
| **Brain natriuretic peptide (BNP)** |  |  |  |  | See NT-BNP |  |
| **Brivaracetam** |  | **Plain serum (9ml red-top SST tube)** |  |  | Separate and freeze. | Therapeutic Drug Monitoring Unit (TDM),  Epilepsy Society,  Chalfont St Peter,  Chesham Lane, Buckinghamshire,  SL9 ORJ  Tel: +441494601424 |
| **C1 Esterase (Function & Total)** | **C1E** | **2 Sodium Citrate samples** |  |  | Separate and freeze sample within 4 – 6 hours | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **C1 Esterase Inhibitor** | **C1ES** | **Plain 7ml** | **Plain 2ml** | 6 Days | Spin to separate from cells. Stable on gel. Separate + fridge if not sent on the same day. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **CA 15.3** | **C153**\* | **Plain 7ml** | **Plain 2ml** |  | Spin to separate from cells. Stable on gel. | Biochemistry St Vincent’s Hospital [(6)](#_References:)  Tel : 01 2214550 |
| **CA 19.9** | **C199**\* | **Plain 7ml** | **Plain 2ml** |  | Spin to separate from cells. Stable on gel | Biochemistry St Vincent’s Hospital [(6)](#_References:)  Tel : 01 2214550 |
| **Caeruloplasmin** | **CER**\* | **Plain 7ml** |  | 5 Days | Spin to separate from cells. Stable on gel. Separate + fridge if not sent on the same day. | Biochemistry Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Caeruloplasmin (Paed)** | **CERP** |  | **Plain 2ml** |  | Transport at ambient temperature via courier | Protein Reference Unit [(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **Calcitonin** | **CALN**\* | **Plain 7ml** | **Plain 2ml** |  | Separate and freeze within 10 mins | Biochemistry Dept, The Mater Hospital, Tel: 01 8032383 |
| **Calcium Creatinine Ratio** | **CCR** |  | **Spot Urine** |  |  | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Carbamazepine (Tegretol)** | **CARB**\* | **Plain 7ml** | **Heparin 0.6ml** | 5 Days | Spin to separate from cells. Stable on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Carcinoembryonic antigen (CEA)** | **CEA**\* | **Plain 7ml** |  | 7 Days | Spin to separate from cells. Stable on gel. Most useful in colorectal cancer | Biochemistry St. Vincent's Hospital [(6)](#_References:)  Tel: 01 2214550 |
| **Carnitine (Total, Free & Acyl)** | **CARN**\* |  | **Heparin**  **0.6ml** | 3 Weeks | Separate and fridge. Stable in the fridge over the weekend | Chemical Pathology, Sheffield Children's Hospital [(7)](#_References:), Western Bank,  Sheffield S102TH, Tel: +44 1142717305 (or 7306) |
| **Catecholamines (Adult)** | **CAT**\* | **24 hr Urine (50% HCL)** |  |  | See WI-CS-BIO-17 | HPLC Dept, Beaumont Hospital [(9)](#_References:)  Tel : 01 8092351 |
| **Catecholamines (Paed)** | **CATP**\* |  | **5-10 ml Urine** |  | See WI-CS-BIO-17 | HPLC Dept, Beaumont Hospital. [(9)](#_References:)  Tel : 01 8092351 |
| **Cholesterol** | **LIP**\* | **Plain 7ml** |  | 5 Days | Fasting sample is preferable. Serum or heparin accepted. Serum sample stable after spinning on gel. If a Lithium heparin sample is received please separate sample into a 2° tube | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **Cholinesterase/ Pseudocholinesterase** | **CHOI**\* | **Plain 7ml** | **Plain 2ml** |  | Separate + fridge if not sent on the same day. (In preoperative screening, cholinesterase is used to detect patients with atypical forms of the enzyme and hence avoid prolonged apne caused by slow elimination of muscle relaxants.) | Biochemistry Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Clobazam (Frisium)** | **CLOB** | **Plain 7ml** |  | 1 Week | Spin and separate from cells. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Coeliac Screen (Tissue Transglutaminase Ab/Endomysial Abs )** | **COES** | **Plain 7ml** |  | 1 Week | **Referred out by Haematology laboratory.**  Note: Only samples that are positive for Tissue Transglutaminase (tTG) IgA will have an Endomysial Antibody (IgA) test performed. | Immunology Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162924 |
| **Clonazepam (Rivotril)** | **CLON**\* | **Plain 7ml** | **Plain 2ml** | 7 Days | Spin and separate from cells. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Copper** | **COP**\* | **Serum/**  **Urine** | **Serum/**  **Urine** |  | **Blood:** Trace metal tube required from Tallaght Hospital  **Urine :** 24 hour collection in acid washed containers received from Tallaght Hospital | Biochemistry Dept, AMNCH Tallaght Hospital [(8)](#_References:). Tel : 01 4143951 |
| **Cortisol (Paed)** | **CORP**\* |  | **Plain 2ml** |  |  | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Cortisol (Adult)** | **COR**\* | **Plain 7ml** |  | 7 Days | Note time of sample. Spin to separate from cells. Stable on gel. | Biochemistry Dept, The Mater Hospital, Tel: 01 8032383 |
| **C-Peptide (Paed)** | **PCP**\* |  | **Plain 2ml** |  | Separate and freeze ASAP. | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **C-Peptide (Adult)** | **CPEP**\* | **Plain 7ml** |  |  | Separate immediately and freeze. | Endocrinology Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/) Tel : 01 416 2991 |
| **Cystine** | **CYS**\* | **Heparin 4ml** | **Heparin 0.6ml** | 8 Weeks | Do not separate. Contact Temple St for sample details. | Metabolic Laboratory, Children’s Health Ireland at Temple St. [(4)](#_References:)  Tel : 01 8784272 |
| **Diazepam (Valium)** | **DIAZ**\* | **Plain 7ml** |  |  | Stable after spinning on gel. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **DHEA** | **DHEA**\* | **Plain 7ml** | **Plain 2ml** |  | Spin to separate from cells. Stable on gel. Separate if not sent within the day. | Endocrinology Dept, St. Vincent's Hospital [(6)](#_References:)Tel : 01 2214406 |
| **Dihydrotestosterone** | **DHTE** | **Plain 7ml** | **Plain 2ml** |  | In pre-pubertal patient’s values should be assessed before and after treatment with hCG. | Leeds SAS Steroid Centre [(16)](http://www.sas-centre.org/assays/hormones/5a-dihydrotestosterone), St James's University Hospital, Leeds |
| **Digoxin** | **DIG**\* | **Plain 7ml** |  | 4 Days | Samples must be taken pre-dose or at least 6 hours’ post-dose. State dose. Spin to separate from cells. Stable on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Electrophoresis** | **SPE** | **Plain 7ml** |  | 1 Week |  | Biochemistry Dept, St. Vincent's Hospital [(6)](#_References:) Tel: 01 2214550 |
| **Epanutin (Phenytoin)** | **PHN**\* | **Plain 7ml** | **Plain 2ml** |  | Stable after spinning on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Ethosuximide (Zarontin)** | **EXE** | **Plain 7ml** |  |  | Spin and separate from cells. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Flecainide** | **FLE**\* | **EDTA 3ml** | **EDTA 1.3ml** |  | Do not spin, send as whole blood | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Frisium (Clobazam)** | **CLOB** | **Plain 7ml** |  |  | Spin and separate from cells. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Fructosamine** | **FRUC** | **Heparin 4ml** |  |  | Spin and separate from cells. | Biochemistry Dept,  The Rotunda Hospital  Tel:018171739 |
| **FSH** | **FSH**\* | **Heparin 4ml / Plain 7ml** | **Plain 2ml / Heparin 0.6ml** | 7 Days | Spin to separate from cells in gel tubes. Remove from gel after 24 hours. Stable in 2° tubes in fridge for 7 days at 2 - 8°C. | **Adult:** Biochemistry Dept, The Mater Hospital,  **Paed :** Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **Glycosaminoglycans (GAG's)** |  | **Urine** |  |  | See below for Mucopolysaccharides |  |
| **Glutamic Acid Decarboxyalse (GAD) Antibodies** | **GAD** | **Plain 7ml** |  | 1 Week | Spin and separate. | Protein Reference Unit [(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **Gamma Gluyamyl Transferase (GGT-Paed)** | **GGTP**\* |  | **Heparin 0.6ml** |  |  | Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **Gamma Gluyamyl Transferase (GGT-Adult)** | **GGT**\* | **Heparin 4ml / Plain 7ml** |  |  | Serum or heparin accepted. Serum sample stable after spinning on gel. If Lithium heparin sample received separate into a 2° tube | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **Growth Hormone (Paed)** | **GHP**\* |  | **Plain 2ml** | 7 Days | Separate and fridge | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Growth Hormone (Adult)** | **GH**\* | **Plain 7ml** |  | 7 Days | Separate and fridge | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **HbA1c** | **HA1C**\* | **EDTA 3ml** |  | 7 Days | Send 1° tube unseparated. Stable over the weekend. | Endocrinology Dept, Vincent's [(6)](#_References:)  Tel : 01 2213107 |
| **Homocysteine (Total)**  **(Paed)** | **HOM**\* | **Haematology referral test.** | **3 x Heparin 0.6 ml** | 14 Days | Separate and freeze within 10 mins | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Hypoglycaemia Workup** |  |  |  |  | Care set orderable in Powerchart also see **RF-CS-BIO-41** |  |
| **IGE** | **IGE** | **Plain 7ml** | **Plain 2ml** |  | Separate sample and fridge. | Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **Immune Reactive Trypsin** | **IRT**\* | **Plain 7ml** |  | 2 Weeks | Separate and freeze sample within 1 hours of blood draw. | Eurofins Biomnis [(11)](https://www.eurofins-biomnis.com/en/services/test-guide/) Tel: 01 2958545 |
| **Immuno-globulins**  **(IgG, IgA, IgM, IgE)** | **IMM**\* | **Plain 7ml** | **Plain 2ml** | 7 Days | Separate sample and fridge. | Biochemistry Dept, OLHFSC Children’s Health Ireland at Crumlin, Tel : 01 4096427 |
|
|
| **IgG subclasses** | **IGGS** | **Plain 7ml** | **Plain 2ml** |  | Separate sample and fridge. | Protein Reference Unit [(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **Inhibin A** | **INA** | **Plain 7ml** |  | 1 Month | Send to referral lab ASAP. Sample must be separated and frozen if not sent on same day | MedLab Pathology (TDL) [(12)](https://tdlpathology.com/test-information/a-z-test-list/i/) Tel: 01 293 3690 |
| **Inhibin B** | **INH**\* | **Plain 7ml** |  | 4 Days | Separate sample and freeze. Sample from Day 3 of cycle required. Send sample Urgently | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Insulin (Paed)** | **INSP**\* |  | **Plain 2ml** |  | Separate and freeze ASAP | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Insulin (Adult)** | **INSU**\* | **Plain 7ml** |  | 3 Weeks | Separate and freeze ASAP | Endocrinology Dept, St James Hospital[(3)](http://search.stjames.ie/Labmed/) Tel: 01 416 2991 |
| **Insulin antibodies** | **IA** | **Plain 7ml** |  | 5 Days | Spin to separate from cells. | Protein Reference Unit [(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **Insulin Growth Factor / Somatomedin** | **IGF**\* | **Plain 7ml** | **Plain 2ml** |  | Separate and freeze ASAP | **Adult**: Biochemistry Dept, The Mater Hospital, Tel: 01 8032383  **Paed:** Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **Islet cell antibodies** | **ICA** | **Plain 7ml** |  | 1 Week | Spin to separate from cells. Stable on gel. | Protein Reference Unit [(5)](https://www.immqas.org.uk/pru.asp?ID=316)  Sheffield Northern General Hospital  +44 114 2715552 |
| **Isoelectric Focusing of Transferrin** | **IFTR**\* | **Plain 7ml** | **Plain 2ml** |  | Separate and store in fridge. **Do not send on a Friday**, leave in fridge to send on Monday. | Dept. of Neuroimmunology, Institute of Neurology, Queen Square House, London WC1N3BG.  Tel: 00442034483814 |
| **Keppra Levels (Leviteracetam)** | **KEPP**\* | **Plain 7ml** |  | 3 Days | Spin to separate from cells. Stable on gel | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Lactate (CSF)** | **CSFL**\* |  | **CSF** |  | Freeze sample before dispatch. | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Lamotrigine (Lamictal)** | **LAMO**\* | **Plain 7ml** |  | 5 Days | Spin to separate from cells. Stable on gel | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **LH** | **LH**\* | **Heparin 4ml / Plain 7ml** | **Plain 2ml / Heparin 0.6ml** | 7 Days | Spin to separate from cells in gel tubes. Remove from gel after 24 hours. Stable in 2° tubes in fridge for 7 days at 2 - 8°C. | **Adult:** Biochemistry Dept, The Mater Hospital,  **Paed :** Biochemistry Dept, Children’s Health Ireland at Crumlin[(1)](http://olchlab.return2sender.ie/Default.aspx) Tel : 01 4096427 |
| **Lipase** | **LIPE**\* | **Plain 7ml** | **Plain 2ml** | 1 Day |  | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Lipids** | **LIP**\* | **Heparin 4ml / Plain 7 ml** |  | 5 Days | Fasting sample is preferable. Serum or heparin accepted. Serum sample stable after spinning on gel. If a Lithium heparin sample is received please separate sample into a 2° tube | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **Lithium** | **LI**\* | **Plain 7ml** |  | 5 Days | Spin to separate from cells. Stable on gel | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Lysosomal Enzymes(Lysosomal storage disease/White cell enzymes)** | **WCE**\* |  | **EDTA 1.3ml x4** |  | Send primary sample unseparated | Heather Church,  Willink Unit Genetic Medicine [(13)](#_References:), 6th Floor, POD 1, St Mary's Hospital, Oxford Road, Manchester, M13 9WL.  Tel: +441617012137 |
| **Maple Syrup Urine Disease Screen (MSUD)** | **AMA**\* |  | **Heparin 0.6ml** |  | Separate and fridge. Carried out as part of an amino acid screen to include Branched chain amino acids(Leu, Iso, Val) | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Metabolic Workup** |  |  |  |  | Care set orderable in Powerchart also see **RF-CS-BIO-36** |  |
| **Methionine** | **METH**\* |  | **Heparin 0.6ml** |  | Separate and freeze | Metabolic lab, Children’s Health Ireland at Temple St. [(4)](#_References:) |
| **Microalbumin** | **MALB** | **Urine** |  |  | Early morning urine | Biochemistry St. Vincent’s. [(6)](#_References:)  Tel: 01 2214550 |
| **Mucopolysaccharides (MPS) screen** | **MUCO** | **Urine** |  | 4 Weeks | Random urine frozen. 5 ml required | Heather Church,  Willink Unit Genetic Medicine [(13)](#_References:), 6th Floor, POD 1, St Mary's Hospital, Oxford Road, Manchester, M13 9WL.  Tel: +441617012137 |
| **NT- Pro BNP (N-terminal portion of ProBNP)** | **NTPR**\* | **Plain 7ml** |  |  | Done as per part of Suspected Transfusion work up. If not received on same day, the sample needs to be separated. | Biochemistry St. Vincent's.[(6)](#_References:)  Tel: 01 2214550 |
| **Oestradiol (Paed)** | **OESP**\* |  | **Plain 2ml** |  | Separate and fridge if not sent on the same day. | SAS Endocrine Lab, Specialist Lab Medicine, Block 46,Beckett St. Leeds, LS97TF Tel: +44 1132067043 |
| **Oligosaccharides** | **OLIG** |  | **Urine** |  | Stable at 2 - 8ºC or RT | Heather Church,  Willink Unit Genetic Medicine [(13)](#_References:), 6th Floor, POD 1, St Mary's Hospital, Oxford Road, Manchester, M13 9WL.  Tel: +441617012137 |
| **Organic Acids** | **ORG**\* |  | **Urine** |  | Transfer urine from MSU to 10 ml tube and freeze ASAP.  Dipstick urine samples for organic acids for pH  If the urine is alkaline (pH≥8.5), continue to dispatch the alkaline urine sample to CHI Temple Street AND request a repeat urine sample on the patient and send on to Temple Street as soon as possible | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Orotic Acid** | **ORO** |  | **Urine** |  | Contact Metabolic Lab in Temple St. | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Oxcarbazepine** | **OXCA** | **Plain 7ml** |  |  | Separate and freeze | MedLab Pathology (TDL) [(12)](https://tdlpathology.com/test-information/a-z-test-list/i/)  Tel: 01 293 3690 |
| **Parathyroid Hormone (PTH)** | **PTH**\* | **2 x EDTA 3ml** |  | 7 Days | An EDTA whole blood sample is suitable for samples received Monday to Thursday. There is a requirement to separate and & freeze samples on Fridays, as samples are only stable for 48 hours. | Biochemistry Dept, The Mater Hospital, Tel: 01 8032383 |
| **Paediatric -Parathyroid Hormone (PTH)** | **PTHP** |  | **Plain Serum 1.3ml** | 5 Days | Separate from cells within 2hours of draw. Stable separated for 9hrs at RT and 72Hrs in fridge.  Serum/plasma sample suitable. | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Phenobarbitone (Paed)** | **PHBP**\* |  | **Plain /Heparin 0.6ml** |  | Separate and fridge | Biochemistry Dept, Children’s Health Ireland at Temple St. [(4)](#_References:)  Tel : 01 8784272 |
| **Phenobarbitone** | **PHB**\* | **Plain 7ml** |  | 2 Days | Stable after spinning on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Phenylalanine (PKU)** | **PHAL**\* |  | **Heparin 0.6ml** |  | Spin and separate sample | Biochemistry Dept, Children’s Health Ireland at Temple St. [(4)](#_References:)  Tel : 01 8784272 |
| **Phenytoin (Paed)** | **PHNP**\* |  | **Heparin 0.6ml** |  | Separate and fridge | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Phenytoin (Epanutin)** | **PHN**\* | **Plain 7ml** |  | 5 Days | Stable after spinning on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:)Tel: 01 8092668 |
| **Plasmalogens** | **PLMG** |  | **3 x EDTA 1.3ml** |  | 3 EDTA samples required. Send unseparated. Samples must be received in the Willink within 48 hours of blood draw. (Can be sent with white cell enzymes). | Heather Church,  Willink Unit Genetic Medicine [(13)](#_References:), 6th Floor, POD 1, St Mary's Hospital, Oxford Road, Manchester, M13 9WL.  Tel: +441617012137 |
| **Porphyrins** | **POR** | **EDTA 3ml** | **EDTA 1.3ml** |  | Send primary sample urgently during routine hours. If samples can't be sent immediately separate sample and freeze until next routine day. Cover in tinfoil at all times. | Biochemistry Dept, St James Hospital[(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Prolactin**  **(Macroprolactin)** | **PRO**\* | **Plain 7ml / Heparin 4ml** |  | 7 Days | Spin to separate from cells in gel tubes.  (Macroprolactin will be analysed if Prolactin is raised) | Biochemistry Dept, The Mater Hospital,  Tel: 01 8032383 |
| **Prostate Specific Antigen (PSA)** | **PSA**\* | **Plain 7ml** |  |  | Separate and fridge. | Biochemistry St. Vincent's.[(6)](#_References:)  Tel: 01 2214550 |
| **Pseudocholinesterase** | **CHOI**\* | **Plain 7ml** | **Plain 2ml** |  | Measured with Cholinesterase | Biochemistry Dept, St James Hospital[(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Purine / Pyrimidine** | **PUPY** |  | **Urine** |  | Transfer urine from MSU to 10 ml tubes. Freeze immediately | Purine Research Lab, Biochemical Sciences, 4th Floor, North Wing St Thomas Hospital [(10)](http://www.viapath.co.uk/test-alphabetical?location=113&department=130&laboratory=148&letter=&=Apply), London, SE1 7EH Tel: +442071881266 |
| **RAST for Latex** | **RAS**\* | **Plain 7ml** | **Plain 2ml** | 10 Days | Separate and fridge. Please write RAST for Latex if written on form to prevent full RAST profile being done. | Immunology Dept, St James Hospital[(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Renin** | **REN**\* | **EDTA 3ml** |  |  | Separate and freeze within 40 minutes | Eurofins Biomnis [(11)](https://www.eurofins-biomnis.com/en/services/test-guide/) Tel: 01 2958545 |
| **Rivotril (Clonazepam)** | **CLON**\* | **EDTA 3ml** |  |  | Spin and separate from cells. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Salicylate** | **SALI**\* | **Plain 7ml** |  | 5 Days | Stable after spinning on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:) Tel: 01 8092668 |
| **SHBG(Sex hormone binding globulin)** | **TEST**\* | **Plain 7ml** |  | 14 Days | Separate if not sent within the day. When SHBG is requested order a TEST profile. | Endocrinology Dept, St. Vincent's.[(6)](#_References:) Tel: 01 2213107 |
| **Tacrolimus (FK506 / Prograf )** | **TACR** | **EDTA 3ml** |  |  | Trough samples required, and to be sent to SVUH before 10:30am. Place in Fridge overnight if not sending until next day. | Immunology Lab, St. Vincent's.[(6)](#_References:)  Tel: 01 2214550 |
| **Tegretol (Carbamazepine)** | **CARB**\* | **Plain 7ml** | **Heparin 0.6ml** | 5 Days | Spin to separate from cells. Stable on gel. | Biochemistry Dept, Beaumont Hospital [(9)](#_References:) Tel: 01 8092668 |
| **Teicoplanin** | **TEIC**\* | **Plain 7ml** |  |  | Spin to separate from cells. Stable on gel | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **T3 Free**  **(Tri-Iodothyronine)** | **T3**\* | **Plain 7ml** |  | 7 Days | Spin to separate from cells in gel tubes. Remove from gel after 24 hours. Stable in 2° tubes in fridge for 6 days at 2 - 8°C. | Biochemistry Dept, The Mater Hospital, Tel: 01 8032383 |
| **Testosterone** | **TEST**\* | **Plain 7ml** | **Plain 2ml** | 14 Days | Separate if not sent within the day. | **Adult:** Endocrinology Dept, St. Vincent's. Tel : 01 2213107 [(6)](#_References:)  **Paed:** Endocrinology Dept, St James Hospital[(3)](http://search.stjames.ie/Labmed/) Tel: 01 416 2991 |
| **Thyroid Antibodies (Anti - TPO)** | **THYA**\* | **Plain 7ml** | **Heparin 0.6ml** | 7 Days | Adult: Spin to separate from cells in gel tubes. Remove from gel after 8 hours. Stable in 2 ° tubes in fridge for 72 hours at 2 - 8°C. | Biochemistry Dept, The Mater Hospital, Tel: 01 8032383 |
| **Thyroid Receptor Antibody (TRAB)** | **TRAB**\* | **Plain 7ml** |  |  | Spin to separate from cells in gel tubes. Stable on gel over the weekend. | Endocrinology Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/) Tel 01 4162991 |
| **Topiramate (Topamax)** | **TOPI**\* | **Plain 7ml** |  | 14  Days | Spin to separate from cells in gel tubes. | Eurofins Biomnis France |
| **Toxicology Screen** | **TOX**\* | **Urine** | **Urine** | 5 Days | 1 – 2 ml sufficient. Handwrite test on sample container. | Drug Treatment Centre[(17)](#_References:_1), Mc McCarthy Centre,30/31 Pearse Street  (01) 648 8600 |
| **Transferrin Isoforms** |  |  |  |  | See **Isoelectric Focusing of Transferrin** |  |
| **Quadruple Test (Second trimester screen)** | **TRT**\* | **Plain 7ml** |  | 21 Days | Serum must be taken at 15 - 20 weeks (usually 16 weeks). Separate and fridge. Requires special form. Only send out Mon - Thurs. For interpretation enquires contact Carol Mason at Tel: 0044 1223216447 | Clinical Biochemistry, Level 4, Addenbrookes Hospital, Cambridge CB2 2QQ.  Tel 00441223217157 |
| **Troponin T (Paed)** | **TROT**\* |  | **Heparin 0.6ml** |  | Separate if not sent within the day. Not a useful test until child is > 7 months old | Biochemistry Dept, Tallaght Hospital [(8)](#_References:) Tel: 01 4143951 |
| **Troponin T (Adult)** | **TROA**\* | **Plain 7ml** |  |  | Spin and separate from cells. **Send out urgently.** It is recommended that two Troponin specimens are taken for measurement, the first at presentation and the second at a minimum of 6 hours later. | Biochemistry Dept, St. Vincent's.[(6)](#_References:)  Tel 01 2214550 |
| **Tryptase** | **TRYP**\* | **Plain 7ml or EDTA** |  |  | Separate and freeze immediately. Samples should be collected up to 1 hr, 3 hr, 12 hrs and 24hrs post event. Label each sample with time and sample type. Samples should be accompanied with relevant clinical information. Lithium heparin samples are unsuitable. | Immunology Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162924 |
| **Urine Steroid Profile** | **UST**\* |  | **Urine** |  | If child on steroids, state clearly on request form. | Biochemistry Laboratory, King's College Hospital [(14)](http://www.viapath.co.uk/our-tests/urine-steroid-profile), Denmark Hill, London. SE5 9RS Tel : 00442077374000 or 00442073463445 |
| **Urine Sulphite Oxidase** | **USO** |  | **Urine** |  | Transfer urine from MSU to 10 ml tube and freeze 1ml of Urine frozen required. | IMD Section, Clinical Chemistry, Laboratory Medicine Block, Children’s Hospital , Whittall Street, Birmingham B46NL, Tel : 00441213339942 |
| **Unsuitable sample (Referral)** | **UXCR** |  |  |  | Test code to be used in the event of an unsuitable sample being received. Put in reason for sample unsuitability also. Phone clinical area and record in phone record of Winpath. | Not Sent |
| **Valproic Acid (Epilim)** | **VALP**\* | **Plain 7ml** | **Plain 2ml** | 5 Days |  | Biochemistry Dept, Beaumont Hospital [(9)](#_References:) Tel: 01 8092668 |
| **Vancomycin (Trough, Peak or Random)** | **VAN 1**\* **(Trough) VAN2**\* **(Peak) VANR**\* **(Random)** | **Plain 7ml** | **Plain 2ml** | 24 Hours | State if Trough, Peak or Random. Separate and freeze if not sent within 24 hours.  (Trough = Pre, Peak = Post) | Biochemistry Dept, St. Vincent's. [(6)](#_References:)  Tel: 01 2214550 |
| **Venlafaxine (Effexor)** | **EFF** | **Plain 7ml** |  |  | Spin to separate from cells. Stable on gel | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Vitamin A (Retinol)** | **VITA**\* | **Plain 7ml** | **Plain 2ml** |  | Light sensitive, ensure sample is covered in foil when taking the sample, spinning and separating. Separate and freeze covered in foil. | Biochemistry Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Very Long Chain Fatty Acid** | **LCFA**\* |  | **EDTA** |  | See Peroxisomal Disorders section below. |  |
| **Vitamin B6 (Pyridoxine)** | **VB6** | **EDTA 3ml** |  | 9  Days | Light sensitive, ensure sample is covered in foil when taking the sample, spinning and separating. Separate and freeze covered in foil. | Eurofins Biomnis France |
| **Vitamin D**  **(Vitamin D3)** | **VITD**\* | **Plain 7ml** | **Plain 2ml** |  | Serum sample, Spin to separate if on gel and store in fridge if being sent within 4 days. Separate and freeze if sample not due to be received in SVUH within 4 days | Metabolic Unit, Biochemistry, St. Vincent’s. Tel: 01 2214672 [(6)](#_References:) |
| **Vitamin E** | **VITE**\* | **Plain 7ml** | **Plain 2ml** |  | Light sensitive, ensure sample is covered in foil when taking the sample, spinning and separating. Separate and freeze covered in foil. | Dept, St James Hospital [(3)](http://search.stjames.ie/Labmed/)  Tel : 01 4162918 |
| **Vitamin K** | **VITK** | **Plain 7ml** |  |  | Sample must be kept protected from light at all times by tin foil. Spin and separate sample and it is stable in the fridge over the weekend. | MedLab Pathology [(2)](http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx) Tel: 01 293 3690 |
| **Zinc** | **ZINC**\* | **Serum/**  **Urine** | **Serum/**  **Urine** |  | **Blood:** Trace metal tube required from Tallaght Hospital  **Urine :** 24 hour collection in acid washed containers received from Tallaght Hospital | Biochemistry Dept, AMNCH Tallaght Hospital [(8)](#_References:). Tel : 01 4143951 |
| **Zonegram (Zonisamide)** | **ZONE** | **Plain 7ml** |  |  | Separate and freeze. | Biomnis Tel: 01 2958545 |

\*Test codes marked with an asterisk are orderable through the patients’ EHR - Cerner Powerchart.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hypoglaemia workup**: Please use the form **RF-CS-BIO-41** when labelling samples. | | | | | | | | | | | | |
| **Test** | | | **Code** | |  | **Paed: Cap** | | **TAT** | | **Special Requirements** | | **Referral Centre** |
| **Glucose,**  **β-OH Butyrate, Lactate** | | | **HGW** | |  | **Fluoride 0.6ml** | |  | | Separate and freeze immediately  **(within 20mins)** | | Biochemistry Dept, Children’s Health Ireland at Temple St.[(4)](#_References:)  Tel : 01 8784272 |
| **Insulin,**  **Cortisol &**  **Growth Hormone** | | | **INSP, CORP, GHP** | |  | **Plain 2ml** | |  | | Separate and freeze immediately. | |
| **C-Peptide** | | | **PCP** | |  | **Plain 2ml** | |  | | Separate and freeze immediately. | |
| **Amino Acids** | | | **AMA** | |  | **Heparin 0.6ml** | |  | | Separate and store in fridge. | |
| **Ammonia** | | | **AMM** | |  | **Heparin 0.6ml** | |  | | Separate and freeze immediately. | |
| **Acylcarnitine** | | | **ACAT** | |  | **Guthrie Card** | |  | |  | |
| **Organic Acids** | | | **ORG** | |  | **Urine** | |  | | NB - RecoTransfer urine to 10 ml secondary tube and freeze immediately. Dipstick urine samples for organic acids for pH  If the urine is alkaline (pH≥8.5),  continue to dispatch the alkaline urine sample to CHI Temple Street AND request a repeat urine sample on the patient and send on to Temple Street as soon as possible | |
| **Note**: A second fluoride (yellow) sample may be taken if Glucose is to be analysed in NMH laboratory. | | | | | | | | | | | | |
| **Peroxisomal Disorders** | | | | | | | | | | | | |
| **Test** | **Code** | | **Paed sample** | | | **TAT** | | **Special Requirements** | | **Referral Centre** | | | |
| **Very Long Chain Fatty Acids** | **LCFA** | | **EDTA 1.3ml X3** | | | 4 Working Weeks | | Separate and freeze ASAP  General peroxisomal disorders, VLCFA oxidation defects and X-Linked ALD.  To reach the laboratory within 72 hrs | | Heather Church,  Willink Unit Genetic Medicine [(13)](#_References:), 6th Floor, POD 1,  St Mary's Hospital, Oxford Road, Manchester, M13 9WL.  Tel: +441617012137  Fax: 0161-70-12303 | | | |
| **Phytanic and Pristinic Acid** | **PHY** | |  | | Send primary sample. **Do not separate.** | |
| **Plasmalogens** | **PLMG** | |  | | Send primary sample. **Do not separate.** Protect sample from light. Cover in tinfoil at all times. | |
| **Lysosomal Enzymes (Lysosomal storage disease/White cell enzymes)** | **WCE** | | **EDTA 1.3ml X3** | | |  | | Send primary sample. **Do not separate.** To reach the laboratory within 72 hrs | |

*References:*

1. Children’s Health Ireland at Crumlin online Lab manual: <http://olchlab.return2sender.ie/Default.aspx>
2. MedLab Pathology online Lab manual: <http://www.sonichealthcare.ie/test-information/tests-a-z/tests-a.aspx>
3. St James Hospital online Lab manual: <http://search.stjames.ie/Labmed/>
4. Children’s Health Ireland at Temple St DPLM Test requirements manual: EXT-CS-LM-42
5. Protein Reference Unit, Sheffield Northern General Hospital online Lab manual: <https://www.immqas.org.uk/pru.asp?ID=316>
6. St Vincent’s Hospital Pathology User Handbook: EXT-CS-LM-43
7. Sheffield Children's NHS Foundation Trust User's Handbook: EXT-CS-BIO-98
8. AMNCH Tallaght Lab user manual: EXT-CS-LM-53
9. Beaumont Hospital Lab user manual: EXT-CS-LM-52
10. Thomas’ Hospital online user manual: <http://www.viapath.co.uk/test-alphabetical?location=113&department=130&laboratory=146&letter>=
11. Eurofins Biomnis online user manual: <https://www.eurofins-biomnis.com/en/services/test-guide/>
12. TDL online user manual: <https://tdlpathology.com/test-information/a-z-test-list/a/>
13. Willink lab manual: EXT-CS-SR-8
14. Steroid laboratory at King's College Hospital: <http://www.viapath.co.uk/our-tests/urine-steroid-profile>
15. Dept. of Neuroimmunology, Institute of Neurology, UCL: <https://www.uclh.nhs.uk/OurServices/ServiceA-Z/Neuro/NEURI/Pages/Testdirectory.aspx>
16. St James's University Hospital, Leeds: <http://www.sas-centre.org/assays/hormones/5a-dihydrotestosterone>
17. HSE National Drug Treatment Centre Lab manual: EXT-CS-BIO-173

If the Biochemical investigation required is not listed in

Figure 20 above, please contact the Biochemistry laboratory directly at Ext: 3546.

## Retrospective Requesting/Additional Requests

Routine specimens are retained in the Biochemistry laboratory for up to one week, refrigerated at 2-6˚C.Analyses of additional tests are subject to specimen integrity and analyte stability. Add on facility only available for routine Biochemistry samples up to 8 hours from sample draw. Telephone requests for additional analyses are accepted from clinicians, but must be followed up with the appropriate add-on request form.

## Reference Ranges and Critical Alert Ranges

The reference ranges quoted for women on Biochemistry reports refer to the **pregnant** state, apart from AMH, Oestradiol and hCG. In general, levels of plasma analytes tend to be lower in pregnant women mainly due to haemodilution as a result of plasma volume expansion. However, there are some analytes that increase during pregnancy (eg plasma Alkaline Phosphatase, CRP, Urate, Triglycerides and Urinary Protein). The minor plasma concentration changes that occur during pregnancy of **Potassium, Chloride, Corrected Calcium,** **Inorganic Phosphate, Total and Direct Bilirubin, ALT, AST, CK, LDH, Amylase and Bile Acids** are considered not clinically significant and non-pregnant reference ranges can be used to interpret the results of these analytes. The table below is intended to act as a guide to the changes that occur to Biochemistry references ranges during pregnancy. However, care must be taken in the interpretation of results as there can be variation among pregnancies and also within trimester specific ranges particularly for analytes where there are changes in concentrations as pregnancy progresses e.g. Albumin, ALP.

Pregnancy related reference ranges are quoted on NMH Biochemistry reports and in Cerner (MN-CMS). **Please note**: Due to lack of IT flexibility, pregnancy related ranges are also quoted on reports of non-pregnant women; where ranges differ between pregnant and non-pregnant women, the non-pregnant ranges will be available as an added comment.

Due to the complexity of Biochemistry reference ranges throughout pregnancy, the provision of pregnancy reference ranges falls into three categories (refer to Figure 21 below for further details):

1. Quoted reference ranges will apply to both pregnant and non-pregnant women for the following tests: Plasma Potassium, Chloride, Phosphate, Corrected calcium, Total and Direct Bilirubin, Total Bile Acids, and Enzymes ALT, AST, LDH, CK, and Amylase.
2. Pregnancy specific reference ranges that span the entire pregnancy. This will apply to the following tests: Plasma Sodium, Urea, Creatinine, Total calcium, Magnesium, CRP, Triglycerides, osmolality and Urinary PCR and 24hr urinary protein excretion.
3. Trimester specific pregnancy reference ranges. **Second trimester ranges will be reported on reports/Cerner with an added comment detailing 1st and 3rd trimester ranges.** This will apply to the following tests: Plasma Total Protein, Albumin, Urate, ALP, TSH and Free T4.

In MN-CMS, for categories B and C tests, a comment will be attached to test results detailing applicable supplementary reference ranges. For category B tests, the attached comment will detail the corresponding non –pregnant reference range. For category C tests, the attached comment will detail the corresponding 1st and 3rd trimester ranges (and non-pregnant ranges).

For the correct interpretation of the results of category C tests (trimester specific ranges) in pregnancy, it is essential to click on the attached comment to access all three trimesters ranges- 2nd Trimester ranges are quoted with result.

Figure 21 below is intended to act as a guide to the changes that occur to Biochemistry references ranges during pregnancy. However, care must be taken in the interpretation of results as there can be variation among pregnancies and also within trimester specific ranges particularly where there are changes in concentrations as pregnancy progresses.

Figure 21: Reference Ranges for In House Testing

*Values in bold are the default adult ranges quoted on Winpath/MN-CMS.*

| **Analyte (Plasma)** | **Method** | **Reference Range** | **Units** | **Reference Source** |
| --- | --- | --- | --- | --- |
| **Sodium** | Indirect ISE | Neonate: 133 - 146  Adult:  **Pregnant: 130 - 143**  Non- Pregnant: 133 - 146 | mmol/L | Pathology Harmonisation UK  Gillian Lockitch  Pathology Harmonisation UK |
| **Potassium** | Indirect ISE | Neonate: 3.4 – 6.0  **Adult: 3.5 – 5.0** | mmol/L | Pathology Harmonisation UK  Kumar and Clark |
| **Chloride** | Indirect ISE | Neonate: 96 - 110  **Adult: 95-108** | mmol/L | Anne Green  Pathology Harmonisation UK |
| **Urea** | Kinetic urease | Neonate: 1.0 – 5.0  Adult:  **Pregnant: 1.9 – 5.0**  Non-Pregnant: 2.8 – 7.2 | mmol/L | Anne Green  Gillian Lockitch  Beckman Coulter |
| **Creatinine** | Traditional Kinetic Jaffe | Neonate:  Up to 7days:13 – 81  7days to 1 yr:10 – 60  Adult:  **Pregnant: 43 – 76**  Non-Pregnant:  58 – 96 (Female)  74-110 (Male <50 years)  72-127 (Male >50 years) | µmol/L | Anne Green  Anne Green  Gillian Lockitch  Beckman Coulter  Beckman Coulter  Beckman Coulter |
| **Urate** | Endpoint uricase | Adult:  1st Trimester: 110 – 270  **2nd Trimester: 110 – 270**  3rd Trimester: 150 – 380  Non pregnant: 140 – 360 (Female)  200 – 430 (Male) | µmol/L | Gillian Lockitch  Pathology Harmonisation UK  Pathology Harmonisation UK |
| **Glucose** | Hexokinase + G6PD | Neonate: 3.9 – 5.6  Adult:  **Fasting: 3.9 – 5.6** | mmol/L | ADA/ EXT-CS-BIO-165  ADA |
| **Glucose Challenge Test (GCT)** | Hexokinase + G6PD | **Adult: < 7.8** | mmol/L | PP-CS-DB-2 Antenatal Screening for Gestational Diabetes |
| **Antenatal Glucose Tolerance Test** | Hexokinase + G6PD | Adult:  Fasting: <5.3  1 Hour: <10.0  2 Hours: <8.6  3 Hours: <7.8 | mmol/L | PP-CS-DB-2 Antenatal Screening for Gestational Diabetes |
| **Total Calcium** | Arsenazo III | Neonate: 2.00 – 2.70  Adult:  **Pregnant: 2.1 – 2.5**  Non Pregnant: 2.2 – 2.6 | mmol/L | Pathology Harmonisation UK  Gillian Lockitch  Pathology Harmonisation UK |
| **Corrected Calcium** | Calculated | Neonate: 2.00 – 2.70  **Adult: 2.2 – 2.6** | mmol/L | Pathology Harmonisation UK  Pathology Harmonisation UK |
| **Phosphate** | Phosphomolybdate UV | Neonate: 1.30 – 2.60  **Adult: 0.80 – 1.60** | mmol/L | Pathology Harmonisation UK  Kumar and Clark |
| **Bilirubin-Direct** | Diazo | Neonate:  0 to 10 days: <20  **Adult: <4** | µmol/L | Anne Green  Beckman Coulter |
| **Bilirubin-Total** | DPD | Neonate:  0 to 1 day: 24 - 149  1 to 2 days: 58 - 197  3 to 14 days: 26 - 205  **Adult: < 21** | µmol/L | Beckman Coulter  Beckman Coulter  Beckman Coulter  Pathology Harmonisation UK |
| **Total Protein** | Biuret | Neonate: 46 -70  Adult:  1st Trimester: 55 -74  **2nd Trimester: 52 -68**  3rd Trimester: 50 - 66  Non-Pregnant: 60 - 80 | g/L | Tietz  Gillian Lockitch  Pathology Harmonisation UK |
| **Albumin** | BCG | Neonate: 30 - 45  Adult:  1st Trimester: 33 – 47  **2nd Trimester: 29 - 41**  Non-Pregnant: 35 – 50  3rd Trimester: 27 – 39 | g/L | Pathology Harmonisation UK  Gillian Lockitch  Pathology Harmonisation UK |
| **Magnesium** | Xylidyl Blue( M and Y) | Neonate: 0.60 – 1.00  Adult:  **Pregnant: 0.62 – 0.9**  Non-Pregnant: 0.70 – 1.00 | mmol/L | Pathology Harmonisation UK  Gillian Lockitch  Pathology Harmonisation UK |
| **Osmolality** | Freezing Point/VP | Neonate: 275 - 295  Adult:  **Pregnant: 275 – 289**  Non-Pregnant: 275 - 295 | mOsm/kg | Anne Green  EXT-CS-BIO-228  Pathology Harmonisation UK |
| **AST** | Tris buffer without PLP | Neonate: 25 - 75  **Adult: < 40** | IU/L | Beckman Coulter  Kumar and Clark |
| **ALT** | Tris buffer without PLP | Neonate: 13-45  **Adult: 0 - 35** | IU/L | Beckman Coulter  Beckman Coulter |
| **LDH** | L to P glucamine [IFCC] | Neonate:  0-4days: 290 - 775  4-10days: 545 - 2000  10d-1yr: 180 – 430  **Adult: <247** | IU/L | Beckman Coulter  Beckman Coulter  Beckman Coulter  Beckman Coulter |
| **CK** | NAC[IFCC] | Neonate: 0 - 171  If the level is greater than 171 the following comment should be added ' Note: Adult reference range quoted. Higher levels may be seen in neonates (up to 10 fold those in adults) with a marked fall occurring during the first week of life reaching adult levels by 6 - 10 weeks.'  **Female: 0 – 145**  Male: 0 – 171 | IU/L | Beckman Coulter  Anne Green  Beckman Coulter  Beckman Coulter |
| **ALP** | AMP Buffer | Neonate:  Up to 1 month: 70 – 380  1 mth to 12 mths: 60 – 425  Adult:  1st Trimester: 27 – 120  **2nd Trimester: 30 – 130**  3rd Trimester: 80 – 360  Non pregnant: 30 – 130 | IU/L | Pathology Harmonisation UK  Gillian Lockitch  Pathology Harmonisation UK |
| **Amylase** | G7 substrate [IFCC] | **Adult: 0 - 100** | IU/L | Beckman Coulter |
| **Triglycerides** | GPO | Neonate: 0.0 – 1.90  Adult:  **Pregnant: 0 - 4.5**  Non- Pregnant: 0.0 – 1.90 | mmol/L | Anne Green  EXT-CS-BIO-228  Irish Heart Foundation |
| **CRP** | Immuno-turbidimetric | Neonate: <5  Adult:  **Pregnant: 0 - 19**  Non-Pregnant: <5 | mg/L | Beckman Coulter  EXT-CS-BIO-229  Beckman Coulter |
| **Gentamicin** | EIA | Neonate:  Trough: 0-2  Peak: 5-10  Adult:  Trough: <1  Peak: 10-20 | mg/L | PP-CS-NEO-123 Administration of Gentamicin to a Neonate  PP-CS-IC-17 Adult Antimicrobial Guideline |
| **Total Bile Acids** | Thio NAD-Thio NADH | **0-10** | µmol/L | Audit Diagnostics |
| **Oestradiol** | Electrochemiluminescence immunoassay | Female:  Follicular phase: 45.4 – 854  Ovulation phase: 151 – 1461  Luteal phase: 81.9 – 1251  Post menopause: < 505  Male: 41.4 - 159 | pmol/L | Roche |
| **CA125** | Electrochemiluminescence immunoassay | 0-35 | U/mL | Roche |
| **HCG** | Electrochemiluminescence immunoassay | <5.3 | mIU/mL | Roche |
| **Anti-Mullerian Hormone** | Electrochemiluminescence immunoassay | 20 – 24 years 8.7 – 83.6  25 – 29 years 6.4 – 70.3  30 – 34 years 4.1 – 58.0  35 – 39 years 1.1 – 53.5  40 – 44 years 0.2 – 39.1  45 – 50 years 0.2 – 19.3 | pmol/L | Roche |
| **sFlt-1/PlGF ratio** | Electrochemiluminescence immunoassay | Ratio <39 (20-40wks gestation): Rule out PE for at least 1 week  Ratio 39 - 84 (20-33+6 wks gestation): Moderate/High risk of developing PE  Ratio 39 - 109 (≥34 wks gestation): Moderate/High risk of developing PE  Ratio >84 (20-33+6 wks gestation): Very high risk of developing PE  Ratio >109 (≥34 wks gestation): Very high risk of developing PE | Ratio | Roche |
| **Free T4** | Electrochemiluminescence immunoassay | Neonate:  0 – 6 days: 11.0 – 32.0  >6 days–3 mths:11.5– 28.3  >3 – 12 mths: 11.9 – 25.6 | pmol/L | Roche |
| Adult:  Non-pregnant: 11.9–21.6  Trimester specific:  First Trimester: 12.1-19.6  **Second Trimester: 9.6-17.0**  Third Trimester: 8.4-15.6 | Roche |
| **TSH** | Electrochemiluminescence immunoassay | Neonate:  0 – 2 days 5.0 –40  3 days – 11 years 0.7 – 5.5 | mIU/L | Roche/National Newborn Screening Programme |
| Adult:  Non-pregnant: 0.27 - 4.2  Trimester specific:  First Trimester: 0.1- 3.1  **Second Trimester: 0.2 - 3.3**  Third Trimester: 0.4-3.6 | EXT-CS-BIO-161 |
| **Ferritin** | Electrochemiluminescence immunoassay | Adult:  Female: 13 – 150  Male: 30 – 400 | µg/L | Roche |
| **Free ßHCG**  **PAPP-A** | Electrochemiluminescence immunoassay | Reference ranges are not applicable. Results are used in conjunction with ‘Viewpoint’ software for the calculation of risk for foetal aneuploidy. | IU/L  U/L |  |
| **Progesterone** | Electrochemiluminescence immunoassay | Adult:  Follicular: < 0.64  Ovulation: 0.64 – 13.2  Luteal: 13.1 – 46.3  Post Menopause: < 0.64 | nmol/L | Roche |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Analyte (CSF)** | **Method** | **Reference range** | **Units** | **Reference Source** |
| **CSF Protein** | Pyrogallol Red | <28 days: 0.65 - 1.5  28 to 56 days: 0.5 - 0.9  56 days to 18 yrs: 0.05 - 0.35  18 to 60 years: 0.15 - 0.45  Over 60 years: 0.15 - 0.6 | g/L | EXT-CS-BIO-152 UK Standards for Microbiology Investigations Investigation of Cerebrospinal Fluid |
| **CSF Glucose** | Hexokinase + G6PD | <28 days 1.9 - 5.6  28 to 58 days 1.6 - 5.6  58 days to 1 year 1.9 - 5.0  1 year + 2.2 - 4.4 | mmol/L |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Analyte (Urine)** | **Method** | **Reference Range** | **Units** | **Reference Source** |
| **Spot Sodium** | Indirect ISE | No Range Quoted.  Interpret in conjunction with corresponding plasma result. | mmol/L |  |
| **Spot Potassium** | Indirect ISE | mmol/L |
| **Spot Chloride** | Indirect ISE | mmol/L |
| **Creatinine Clearance** | Calculation | 1st Trimester: 69 – 140  **2nd Trimester: 55 – 136**  3rd Trimester: 50 – 166  Non pregnant: 90-130 | ml/min | EXT-CS-BIO-228  Jacques Wallach |
| **24h Urine Protein** | Pyrogallol Red | Adult:  **Pregnant: <0.30**  Non Pregnant <0.15 | g/24h | NICE Guideline (ng 133)  Tietz |
| **Protein: Creatinine Ratio** | Calculation | Adult:  **Pregnant: < 30**  Non Pregnant < 15 | mg/mmol | NICE Guideline (ng 133) |
| **Osmolality** | Freezing Point/VP | No Range Quoted.  Interpret in conjunction with plasma osmolality. | mOsm/kg |  |

A critically abnormal result may or may not be unexpected. It may be due to a disease process, the effect of treatment or it may be artifactual. A critically abnormal result is reported urgently by telephone to clinical staff, as per PP-CS-BIO-10. The telephoning of reports is documented in the telephone audit log on WinPath. Refer to Figure 22 below for critical phone limits.

Figure 22: Test Results for Telephoning in Biochemistry

|  |  |  |  |
| --- | --- | --- | --- |
| **Analyte** | **Lower Limit** | **Upper Limit** | **Comment/ Ref** |
| **Sodium** | ≤125 mmol/L  ≤130 mmol/L | ≥150 mmol/L Adult  ≥150 mmol/L Neonate | 1  1 |
| **Potassium** | ≤2.9 mmol/L# | ≥6.0 mmol/L# | 2  See # comment below |
| **Urea** | - | ≥15.0 mmol/L Adult  ≥ 10.0 mmol/L Neonate | 1  1 |
| **Creatinine** | - | ≥200 µmol/L | 1 |
| **Urate** | - | ≥450 µmol/L | 1 & 3 |
| **Calcium** | ≤1.80 mmol/L | ≥ 2.80 mmol/L | Always check for EDTA contamination  (Low calcium level) 1 |
| **Magnesium** | ≤0.4 mmol/L | ≥1.70 mmol/L | 1 |
| **Phosphate** | ≤0.45 mmol/L | - | 2 |
| **Triglycerides** | - | ≥20 mmol/L Adult  >3 mmol/L Neonate\* | If neonate on PN, quote result comment.  2(Adult), 4(neonate)  See \* commentbelow |
| **Albumin** | ≤16 g/L |  |  |
| **Direct Bilirubin** | - | ≥ 25 µmol/L (Neonate only) | 1 |
| **Total Bilirubin** | - | ≥ 100 µmol/L Adult  ≥ 240 µmol/L Neonate | 5(Adult), 6(Neonate) |
| **AST** | - | ≥150 IU/L | 1 |
| **ALT** | - | ≥150 IU/L | 1 |
| **CK** | - | ≥500 IU/L | 1 |
| **LDH** | - | ≥500 IU/L | 1 |
| **Total Bile Acids** | - | ≥40 µmol/L on first finding | 7/8 |
| **Amylase** | - | ≥100 IU/L | 3 |
| **CRP** | - | ≥ 100 mg/L Adult  ≥30 mg/L Neonate | 1  3 |
| **CSF glucose &**  **protein** |  |  | Always phone CSF results |
| **Gentamicin (Trough)** |  | ≥ 1 mg/L | 8 |
| **Gentamicin (Peak)** | - | ≥10 mg/L Neonate  ≥20 mg/L Adult |  |
| **Glucose** | ≤2.5 mmol/L | ≥ 15.0 mmol/L | 1 |
| **Glucose Challenge Test (GCT)** | - | >10.0 mmol/L |  |
| **Oral Glucose Tolerance Test (OGTT)** | - | Any result > 15.0 mmol/L |  |
| **Gestational Glucose (GEST)** | - | Fasting ≥ 7.0 mmol/L and/or 1Hr PP ≥ 11.1 mmol/L |  |
| **Serum Osmolality** | ≤ 250 mOsm/kg | ≥320 mOsml/kg | 9 |
| **Urinary Protein/ Creatinine Ratio (PCR)** | - | > 300 mg/mmol | 8 |
| **Adult Free T4 (FT4)** | <7 pmol/L | > 29 pmol/L | 8 |
| **Paediatric Free (FT4)** | Any result outside the reference range | Any result outside the reference range |  |
| **Adult TSH** | <0.01 mIU/L | > 5.0 mIU/L | 8 |
| **Paediatric TSH** | < 0.1 mIU/L | > 10 mIU/L | 3 |
| **CA125** | - | >100 KU/L | 9 |

# 14 Blood Transfusion Department

Figure 23: Blood Transfusion Tests

| **Test/Profile and Request Form**  **(if not using MN-CMS)** | **MN-CMS Test Profile** | **Container Type(Vol)** | **Turnaround  Times**  from time of specimen receipt in laboratory | **Special Requirements**  All specimens must be handwritten with the hospital number, patient name date of birth and signed by the collector | **Accreditation Status** |
| --- | --- | --- | --- | --- | --- |
| **Cord Blood Group and Coombs**  **LF-BTR-CRREQ Rev 2** | Cord Blood Group and DAT, blood NMH | **EDTA 6ml** | 1-36 hours as per special requirements | Cord specimens. Specimens analysed once daily in the morning. Contact laboratory if urgent due to maternal antibodies. | Accredited |
| **Group and Coombs**  **Paediatric**  **LF-BTR-XREQ Rev 3** | Blood Group and DAT, Paed NMH | **EDTA 3ml** | Same day | **PATIENT MUST BE WEARING AN ID ARMBAND.**  **Out of hours:**  Available when bilirubin is raised and result is required for blood or product issue.  When Cord Bloods were not received and the mother is RhD Neg and may require Anti-D urgently.  When a maternal antibody is present and Cord bloods are not available for testing i.e. Maternal antibody first identified postnatal/transfer baby | Accredited |
| **Group and Antibodies**  **(Type and Screen)**  **LF-BTR-XREQ Rev 3** | Inpatient Group and Antibody Screen NMH | **EDTA 9ml** | 24 hours  Urgent 1 hour\* | **PATIENT MUST BE WEARING AN ID ARMBAND**  BT lab / on-call scientist to be phoned if the group and antibodies is deemed urgent.  \*The presence of a positive antibody screen will increase turnaround times.  These samples remain suitable for x-matching blood up to 72 hrs from the time of phlebotomy. | Accredited |
| **Outpatient Group and Antibodies**  **LF-BTR-GCREQ Rev 3** | Outpatient group and antibody screen NMH | **EDTA 9ml** | 1 routine day | These patients do not have to wear an ID armband and therefore the PPID override function can be used in MN-CMS. However, manual PPID procedures should be followed.  In the case of community/GP samples please see section 5.2.3 above. These patients EDTA samples can be in 6 / 9ml tubes.  **THESE SAMPLES ARE NOT SUITABLE FOR BLOOD COMPONENT PROVISION** | Accredited |
| **Crossmatch**  **LF-BTR-XREQ Rev 3** | Red cells NMH or Crossmatch Red Cells NMH | **EDTA 9ml** | Electronic crossmatch (if eligible as per lab policy) = 5-10 minutes  Serological crossmatch requests = 3 hours.  Urgent 1 hour\* | BT/on-call scientist to be phoned if the crossmatch is deemed urgent.  \*The presence of a positive antibody screen will increase turnaround times.  A current valid inpatient group and antibodies sample is required prior to crossmatch requests with ID armband in place.  Blood Product Requests created in MN-CMS must be printed and sent to the lab.  The clinical area must inform the Blood Bank when a patient with known immune antibodies is admitted to allow adequate time to source suitable blood products. | Accredited |
| **Uncrossmatched Blood** | Uncrossmatched, group specific RCC NMH or  Uncrossmatched, O Neg Red Cells NMH | **EDTA 9ml** | **Group specific = approx. 15 minutes**  **O negative = STAT\*** | The request for uncrossmatched blood must be authorised by a member of the medical staff. | Accredited |
| **Neonatal Crossmatch** | Paed Pack (1-5 NMH) | **EDTA 9ml from mother**  **EDTA 3ml from Neonate** | Up to 3 hours (Depending on blood stock arrival from IBTS) | Crossmatched against maternal specimen (correctly labelled with maternal details).  Please check if a current valid sample is available on the mother prior to maternal sample collection. The baby must be transfused the first pedi pack split within the first five days of the unit’s shelf life. For this reason, paedi-packs should only be ordered where there is an immediate clinical requirement.  Blood Product Requests created in MN-CMS must be printed and sent to the lab. | Accredited |
| **Transfusion Reaction Investigation** | Transfusion Reaction Investigation Adult/Paed NMH | **See section 14.9 below** | Preliminary 2 hours  Final 7 days | See Section 14.9 below. | Accredited |
| **Antenatal Booking** | Booking Visit | **EDTA 9ml** | 1 routine working day | If patient is not wearing an ID armband an Outpatient Group and antibodies must be selected or if handwriting the sample use form LF-BTR-GCREQ Rev 3. | Accredited |
| **28 Week Antibody Check** | Outpatient group and antibody screen NMH | **EDTA 9ml** | 1 routine working day | It is policy for all RhD negative women and women with antibodies to have a 28 week antibody check. | Accredited |
| **Antibody Identification** | N/A | **EDTA 9ml** | 0-5 days | Test initiated by the laboratory.  Depending on the complexity and the requirement for blood or blood products. | Accredited |

Figure 24: Blood Transfusion Referral Tests

| **Test/Profile** | **MN-CMS Test Profile** | **Container Type(Vol)** | **Turnaround  Times**  from time of  specimen receipt  in laboratory | **Special**  **Requirements**  All specimens must be handwritten with hospital number, patient name date of birth and signed by the collector | **Referral Laboratory** | **Accreditation Status** |
| --- | --- | --- | --- | --- | --- | --- |
| **Anti-D/Anti-c**  **Quantitation** | Anti-D or Anti-c blood level, NMH | **9ml EDTA x2** | 1 week for verbal report  2 weeks for written report | Please provide EDD when requesting Anti-D/-c quantitation. | IBTS | Reference Laboratory |
| **HLA typing** | Group and Antibodies Inpatient / Outpatient | **9ml EDTA** | 2 weeks | Test request must be accompanied by associated referral form. Contact the Blood Bank to request form | IBTS | Reference Laboratory |
| **HLA antibodies** | Group and Antibodies Inpatient / Outpatient | **9ml serum sample (clotted)** | 2 weeks | Test request must be accompanied by associated referral form. Contact the Blood Bank to request form | IBTS | Reference Laboratory |
| **Platelet**  **Alloantibodies** | Group and Antibodies Inpatient / Outpatient | **9ml serum sample (clotted)** | 2 weeks | Test request must be accompanied by associated referral form. Contact the Blood Bank to request this form | IBTS | Reference Laboratory |
| **NAITP** | NAITP investigation, Maternal/ Paed/ Paternal blood NMH | **Mother:9ml EDTA 2X9ml Serum (clotted)** | 2-3 weeks | Request must be authorised by Consultant/Haematologist.  Test request must be accompanied by associated referral form. Contact the Blood Bank to request this form. | IBTS | Reference Laboratory |
| **Father:**  **2 x9ml EDTA** |
| **Neonate: 1ml Paediatric EDTA** |
| **Foetal Genotyping**  **in maternal blood**  **samples of patients with immune antibodies must be handwritten and only to be collected Mon – Thur before 12:30 PM to accommodate transport requirements** | Fetal genotyping, blood NMH | **9mlx2 EDTA** | 2-3 weeks | Test request must be accompanied by associated referral form. Contact the Blood Bank to request this form | NHS Blood and Transplant | Reference Laboratory |
| **Platelet Crossmatching**  **Samples must be handwritten and only to be collected Mon – Thur before 12:30 PM to accommodate transport requirements** | N/A | **Mother:**  **9ml EDTA** | 2-3 weeks | Test request must be accompanied by associated referral form. Contact the Blood Bank to request form. | NHS Blood and Transplant | Reference Laboratory |
| **Mother:**  **2X9ml Serum (clotted)** |
| **Father:**  **2 x9ml EDTA** |
| **Fetal RHD screen (cffDNA testing) by the IBTS** | Fetal RHD Screen (IBTS), blood NMH | **Mother 1 x 9 ml EDTA** | 2 weeks | **STORE SAMPLE AT ROOM TEMPERATURE.**  Sample must be accompanied by associated referral form. Contact the Blood Bank to request this form or available on Q-Pulse. MN-CMS printed request forms also appropriate | IBTS | Reference Laboratory |
| **Non-invasive**  **HPA-1A foetal genotyping** |  | **Mother 1 x 9 ml EDTA** | 2-3 weeks | **STRECK TUBES REQUIRED.**  Consultant/Consultant Haematologist request | Sanquin Diagnostics, Amsterdam | Reference Laboratory |

Figure 25: Blood Transfusion Blood Product Requests

| **Blood Product** | **Test/Profile and Request Form**  **(if not using MN-CMS)** | **MN-CMS Test Profile** | **Container Type(Vol)** | **Turnaround  Times**  from time of specimen receipt in laboratory | **Special Requirements**  All specimens must be handwritten with hospital number, patient name date of birth and signed by the collector | **Accreditation Status** |
| --- | --- | --- | --- | --- | --- | --- |
| **Anti-D (Potentially Sensitising Event - PSE)** | Outpatient Group and Antibodies  LF-BTR-GCREQ Rev 3 | Antenatal (PSE) Anti-D Immunoglobulin NMH | **9ml EDTA** | 1 routine day | Indicate the EDD and the reason for request e.g. Antenatal Fall.  If requesting Anti-D using MN-CMS the Anti-D must be ordered, the requisition printed and sent to the Blood Bank | Accredited |
| **Anti-D (RAADP)** | Outpatient Group and Antibodies  LF-BTR-GCREQ Rev 3 | RAADP Anti-D Immunoglobulin NMH | **9ml EDTA** | 1 routine day | Indicate sample is a 28 week / RAADP sample | Accredited |
| **Anti-D (Post Natal)** | Group and Antibodies  (Type and Screen)  LF-BTR-XREQ Rev 3 | Post Natal Anti-D Immunoglobulin NMH | **9ml EDTA** | 1 routine day | If requesting Anti-D using MN-CMS the Anti-D must be ordered, the requisition printed and sent to the Blood Bank | Accredited |
| **Blood Products (non-red cells)**  **Refer to Figure 25 for red cells** | Group and Antibodies  (Type and Screen)  LF-BTR-XREQ Rev 3  Sample may already be available – contact lab | Blood Products Order /Prescribe Adults and Neonates | **9ml EDTA** | TAT is dependent on product required and availability – contact lab for approximate estimation | When requesting blood products using MN-CMS the blood product must be ordered, print the requisition and sent to the Blood Bank. | Accredited |

## Storage of Blood Specimens

Blood specimens can be stored for 24 hours at 4˚C if there is a delay in transport to the laboratory. The exception to this is the storage of samples collected for the Fetal RhD screen, which must be stored at room temperature.

## Specimen Request Form

Please refer to Figure 23, Blood Transfusion Tests, for appropriate requests forms if not using MN-CMS. The request form must have the relevant details as outlined below:

1. Patient details: Surname, first name, hospital number, date of birth, ward.
2. Clinical details: Surgical procedure, transfusion and pregnancy history.
3. Signature of person making the request.
4. Signature of the person taking the specimen.
5. GP bloods must indicate the full address of the patient on both specimen and request form.

### Antenatal Blood Grouping and Antibody Screen

Please refer to PP-CS-AN-24, Antenatal Blood Grouping and Red Cell Antibody Screening Policy, for frequency and details of tests required.

Cord bloods should be sent for Group and DCT on infants of all RhD negative women/blood group unknown to assess requirement for postnatal Anti-D Ig injection. Anti-D Ig will be issued to RhD negative women based on these results. Cord blood must also be sent for Urgent Group and DCT on infants of women with irregular red cell antibodies and suspected Haemolytic Disease of the Fetus/Newborn (HDFN). Paper request form must supply the demographic details of both the mother and the infant. Please inform the Blood Transfusion laboratory/On Call scientist when sending these sample to the laboratory.

### Crossmatch Request

In addition to the information required under Section 14.2 ‘Specimen Request Form’, please supply the following:

1. Relevant clinical information, antenatal history, blood transfusion history, transfusion reaction etc., patient diagnosis (special conditions require special blood - example sickle cell disease requires special antigen negative blood).
2. If specific blood components/products are required i.e. CMV negative, irradiated, this should be requested.
3. The specific surgery or reason for a transfusion request should be indicated.
4. A clear indication as to whether the tests/components/products requested are **urgent** or **routine**. All urgent requests must be made by contacting the Blood Transfusion department during routine hours or the medical scientist On Call at all other times. Where a verbal request is made it must be followed up by a written/printed request form.
5. For paediatric/neonatal crossmatch requests, a valid maternal sample taken within 72hours of delivery must be available.
6. A current valid inpatient Type & Screen sample is required for adult red cell requests. This is one that is collected within 72 hours of the transfusion event being completed. A formal exception to this rule exists for Placenta Praevia and Accreta patients, providing they do not have any alloantibodies.
7. It is recommended that a second sample should be taken for the confirmation of the ABO group of a first time patient prior to transfusion, where this does not impede the delivery of urgent red cells or other components. However, it is important that the two samples are taken independently of one another. This recommendation is an important step in mitigating the risks associated with Wrong Blood in Tube (WBIT).

### Blood Transfusion Laboratory Services at the National Maternity Hospital to Support Termination of Pregnancy Services

The Blood Transfusion laboratory will accept samples for Blood Group and RhD status from GPs and community based services like the Irish Family Planning Association for women within the NMH catchment area (South Dublin, Wicklow and Kildare) who are seeking abortion. The purpose of this blood group is to identify women who are RhD Negative and who will require prophylactic Anti-D Ig as part of her abortion treatment. The Blood Bank returns the results of the blood group via encrypted email. GPs must register with the department and provide their registration number and health mail email account. Details on sample acceptance requirements are issued to each GP along with information on Anti-D Ig for this patient cohort.

If the patient is RhD Negative, Anti-D Ig prophylaxis is recommended following therapeutic termination of pregnancy after 10 weeks’ gestation to prevent sensitisation and to safeguard any further pregnancy. This Anti-D Ig may be given post administration of the first tablet and should be given no later than 72 hours post ingestion of the second tablet. Service users should contact the Annex Clinic at the NMH to arrange for Anti-D Ig administration for their patients.

### Routine Antenatal Anti-D Prophylaxis (RAADP) at the NMH

A RAADP service at approximately 28 weeks’ gestation is offered to all RhD Negative mothers at the NMH in an effort to reduce sensitisation and the production of immune Anti-D. However, approximately 40% of pregnant RhD Negative women will carry a RhD Negative foetus that poses no risk of sensitisation to the mother. This results in these women receiving at least one dose of Anti-D Ig unnecessarily, which has ethical and cost implications. To avoid this, the NMH, via the Irish Blood Transfusion Service (IBTS), offers all known RhD Negative mothers cell free foetal DNA (cffDNA) analysis from their maternal blood sample in order to determine the RhD gene (RHD) status of the foetus. This allows a targeted RAADP and Anti-D Ig prophylaxis approach to the antenatal care of RhD negative women at the NMH.

## Maximum Blood Order Schedule

A maximum blood order schedule is in effect. Please refer to PP-CS-BT-1, Maximum Blood Ordering Schedule, for details. The Blood Bank must be informed when a patient with known immune antibodies is admitted to allow appropriate time to source suitable blood products for the patient.

## Massive Haemorrhage Pathway

Please refer to PP-CS-PN-15, Massive Haemorrhage in Obstetrics, andCG-GYN-INPAT-18, Blood Transfusion Management of Major Haemorrhage in Gynaecology.

## Urgent Blood Product Requests

Urgent blood product requests, e.g. the request for ‘Pack 1’, can be made verbally. All blood product requests can be sent to the laboratory retrospectively either via request forms or MN-CMS printed requisitions.

## Investigation Following Suspected Transfusion Reaction

All implicated blood/product packs with giving set attached must be returned to the Blood Transfusion laboratory with the relevant specimens and completed transfusion reaction form. Two copies of the NMH Transfusion Reaction Form should be printed from MN-CMS and sent to the laboratory. In the event MN-CMS is down, a hardcopy is available on Q-Pulse, RF-CS-HV-1, Suspected Transfusion Reaction Form. Blood product packs should be stored at room temperature while awaiting investigation.

| **Transfusion Reaction Investigation Test/Profiles** | **Container (Vol)** | **Special Requirements**  **Take all samples post suspected Transfusion reaction.** | **Accreditation Status** |
| --- | --- | --- | --- |
| **Type/Screen or Inpatient Group and Antibodies** | **9ml EDTA** | Specimens must be correctly labelled with hospital Number, patient name and date of birth. Include signature of collector | Accredited |
| **FBC** | **EDTA 5ml** |  | Accredited |
| **COAG** | **Citrate 3.0ml** |  | Accredited |
| **UE, LFT’s, LDH** | **Lithium Heparin4ml** |  | Accredited |
| **Haptoglobins** | **Plain 7ml** |  | Accredited |
| **MSU** | **MSU Jar** | 1st voided urine | Accredited |
| **Blood Cultures Adult** | **BacT Alert aerobic and anaerobic vials** |  | Accredited |
| **Blood Cultures Baby** | **BacT Alert Paeds vial** |  | Accredited |
| **All Blood Packs including giving sets (used and unused)** |  | All Blood Packs and Giving Sets are sent to The IBTS for culture | Referred Test |

Figure 26: Suspected Transfusion Reaction Specimen Types

## Reference Ranges and Critical Alert Ranges

* The results are abnormal or unexpected.
* The result deviates significantly from previous results.
* Grouping discordance.
* In the case of a rise in Anti-D quantitation that doubles the previous quantitation, and/or reaches an estimated risk level (i.e. >4 IU).
* In the case of a rise in Anti-c quantitation that doubles the previous quantitation, and/or reaches an estimated risk level (i.e. >7.5 IU).
* In the case of a rise in antibody titration that doubles the previous and/or reaches an estimated risk level (i.e. >1/32).
* Positive DCT (not related to prophylactic Anti-D Ig administration).
* The presence of a clinically significant irregular antibody will be notified to the clinical area in the event of crossmatched blood requests.

## Collection/Delivery of Blood, Components and Blood Products

All movement of blood and platelets is monitored by Blood Track, please refer to the procedure PP-CS-HV-11 for further details.

Three emergency O RhD Negative units for adult use and one emergency O RhD Negative unit for neonatal use are available from the theatre blood fridge.

## Intra Uterine Transfusion

Intrauterine transfusion (IUT) of donor red cells is the primary treatment for significant foetal anaemia in pre-term pregnancies where delivery is not appropriate. The process requires excellent communication between the Blood Bank and the Fetal Assessment Unit (FAU). The foetal anaemia can be the result of maternal red cell alloantibodies causing HDFN or, more rarely, foetal anaemia due to Parvovirus B19 infection. An IUT of platelets is also available when there is foetal alloimmune thrombocytopenia.

Following the request for the first IUT from the FAU, the Irish Blood Transfusion Service (IBTS) will perform an extended phenotype on the most recent sample from the mother to include Fya, Fyb, Jka, S and s types and where time allows source donors to match the patients extended phenotype as far as possible. Once an IUT date has been scheduled, the patient must present to the FAU to have two 9ml EDTA inpatient Group and Antibody (Type and Screen) samples collected. The timing of this sample collection must be discussed between the FAU and the Blood Bank. The samples are required for crossmatching and referral to the IBTS and must be collected no sooner than 72 hours prior to the transfusion event.

At the first IUT it is important to always do a foetal Group and DCT and a foetal FBC using a pre-transfusion sample. Depending on the clinical picture, other pre-transfusion samples may be taken for Cytogenetics, Parvovirus or a TORCH screen. It is the responsibility of the attending clinician to request these. At subsequent IUTs, the only pre-transfusion foetal sample collected is an FBC. The sample requirements for the above tests are as follows:

* Group and SCT – 3ml EDTA
* FBC – 1.3ml EDTA
* Cytogenetics - 1.3 ml Lithium Heparin
* Parvovirus - 1.3 ml Serum
* Torch Screen - 1.3 ml Serum

At all IUTs, the clinician will take numerous foetal 1.3ml EDTA FBC samples for the estimation of foetal haemoglobin using a point of care testing device. The results of this testing will guide the required transfusion volume. A Kleihauer test on the mother may be required on post-transfusion samples after multiple IUT’s. In the case of first time platelet IUTs for foetal alloimmune thrombocytopenia, a sample may also need to be further referred to the IBTS HLA laboratory for platelet genotype as per the Consultant Haematologist.

# Haemovigilance

The definition of Haemovigilance is “A set of organised surveillance procedures relating to serious adverse or unexpected events or reactions in donors or recipients and the epidemiological follow-up of donors (EC Directive 2002/98/EC)”. At hospital level, the main objectives of the Haemovigilance system are:

* To ensure the safety of the transfusion system.
* Educate staff in best transfusion practice.
* Show that problems are recognized and effectively managed.
* Ensure compliance with legal requirements,
* Improve public confidence in the safety of blood and blood components.

Misidentification at blood sampling may lead to fatal ABO-incompatible blood transfusion, especially if the patient has not previously had their blood group documented in the laboratory system. The error will not be picked up.

Great care must be taken to ensure that the patient record open in MN-CMS is that of the patient requiring the sample collection, especially noting that there may be two patients with the same name and date of birth. The unique patient hospital number (MRN) on the **patient identification band must be checked against the MRN on the banner bar of the record open for all inpatient sampling.**

For outpatient blood sampling clinical staff must ensure that positive identification of the patient has been undertaken prior to sampling. Again ensure that the record open in MN-CMS is that of the out-patient requiring the blood sample collection. Noting that there may be two patients with the same name and date of birth.

Inadequately or mislabelled samples carry a significantly increased risk of containing blood from the wrong patient. Risk of misidentification may be reduced by staff adhering to the following principals below:

1. Patients must be positively identified (see Sections 15.1-15.2) and their details must match those on the request form for all sampling (manual or electronic forms).
2. All inpatients must wear an identity band.
3. In the event of an ID band being removed from a patient, it is the responsibility of the clinician (nurse/midwife/doctor) removing the ID band to replace it.
4. Collection of the sample and labelling of the sample tubes must be performed as one uninterrupted process involving one member of staff and one patient at the patient bedside.
5. Sample labels must not be printed away from the patient bedside when using the MN-CMS system for sample collection/labelling.
6. Sample tubes must never be pre-labelled.
7. If MN-CMS is down or not available, the sample tube label must be handwritten with the minimum patient identifiers by the sample collector (identifiers exactly matching those on the identity band worn by the patient) at the patient bedside. The date and time of sampling and the identity of person taking the sample must also be recorded on the sample tube. The request form must have identical identifiers. See Section 4.6 for specimen labelling in the event of MN-CMS printer failure.
8. Labels printed away from the patient (e.g. addressograph labels) must not be used on the transfusion sample but printed addressograph labels are acceptable on the manual request form only if available.
9. All handwritten details must be legible.
10. For samples ordered and collected using the MNCMS, follow procedures outlined in this document, see Section 4.3 Specimen Collection MN-CMS. Verification of the match between the patient and the computer record and printing of the sample label must be performed at the bedside at the time of phlebotomy. Samples must be labelled at the bedside using the correct printed label after PPID (e.g. FBC label on FBC sample tube).
11. Prior to taking a blood specimen from a patient the following actions should be undertaken:

* Inform patient of reason for collection of specimen, and any follow up/results of same.
* Observe hospital consent policy.
* Observe hospital phlebotomy (preparation of patient), and health and safety guidelines.
* The blood sample should not be obtained from an arm being used for the infusion of intravenous fluids because these may alter the blood specimen and invalidate the crossmatch.
* Observe infection control procedures.
* Give the patient any relevant printed information leaflets and record this in patients’ medical chart (e.g. Rhesus Negative leaflet, Blood Transfusion Information leaflet).
* BSH guidelines recommend that laboratories have a ‘zero tolerance’ policy for rejecting samples that do not meet the above minimum requirements.

## Patient Identification

A patient identification band must be worn by all in patients at time of sampling and receiving a blood transfusion. The patient is instructed not to remove the identification band because it is also required for pre-transfusion bedside checking. To ensure accuracy and legibility, the ID band should be printed, from the hospital’s computerised patient administration system. The minimum identifiers on the identification band are:

1. Last name.
2. First name or Baby (also if applicable include Twin 1, Twin 2).
3. Date of birth.
4. Unique patient hospital number.

## Positive Patient Identification Procedure

Wherever possible, patients for blood sampling or transfusion should be asked to:

* State their full name and date of birth and this must exactly match the information on the identification band worn by the patient. Check spellings are correct.
* Patients who cannot confirm their identity are at particular risk.
* Great care must be taken in identifying neonates (twins/triplets) and unconscious or anaesthetized patients who cannot aid in the identification process. Identification discrepancies at any stage of the transfusion process must be investigated and resolved before moving to the next stage.
* If not using MN-CMS, all in-patient samples **MUST** be hand labelled from patient identification armband after performing PPID at the bedside for Blood Transfusion department (e.g. crossmatch sample, Group and Antibodies) applicable to obstetric, neonatal and gynaecology patients, or labelled with printed labels from MN-CMS if available after performing PPID and scanning the patient barcoded ID band at the patient bedside.
* Please note in all cases when using printed labels from MN-CMS, **verification of the match between the patient and the computer record and printing of the sample label must be performed at the bedside at the time of phlebotomy - *Is this the RIGHT PATIENT?* This verification is applicable to both inpatient and outpatient settings.** **EACH label printed using MN-CMS must be checked before applying to the sample tube to avoid wrong blood in tube (WBIT).**
* If not using MN-CMS before sending a sample to laboratory, check that the identifiers on patient identification armband, sample tube and manual form or printed order form from MN-CMS are identical. Great care must be taken when recording the date of birth and hospital number to avoid transcription errors which will lead to rejection of sample and a repeat been requested.
* See PP-CS-HV-16 for blood transfusion sample phlebotomy in Covid-19 patient clinical areas.
* Complete all sections of request form - include gestation, reason for request, previous doses of Anti-D Ig, date and time of sensitizing event, surgical procedure, etc.

## General Haemovigilance Issues

### Traceability (Legal Requirement)

A traceability tag is attached to each blood component (red cells, plasma and platelets) issued. The administrator of the product must sign the bottom half of the tag with date and time and return the tag to the Blood Transfusion department. In cases where the emergency group O RhD Negative uncrossmatched blood is used, complete the patient identifiers on the traceability label. Traceability of all blood is a mandatory requirement and failure to comply with the traceability system will result in a non-conformance being generated and investigated to close out. See the Blood Transfusion Administration Guideline, PP-CS-HV-7, for the records required in patient chart.

### Notification of Serious Adverse Events and Reactions (SAR and SAE)

Any serious adverse events (accidents and errors) related to the collection, testing, processing, storage and distribution of blood and blood components which may have an influence on their quality and safety, as well as any serious adverse reactions observed during or after transfusion which may be attributed to the quality and the safety of blood and blood components must be notified to the competent authority. See Mandatory Reporting of SAR/SAE/IBCT/Non Mandatory in PP-CS-HV-5, and the Blood Transfusion Administration Guideline, PP-CS-HV-7, available in Q-Pulse.

### Following Suspected Transfusion Reaction

In cases of suspected transfusion reaction, retain and send all used blood packs (in that transfusion episode) with the administration set attached, sealed with a sterile cap to prevent spillage in a sealed bag to the Blood Transfusion laboratory with the necessary samples and suspected transfusion reaction report form completed by the clinician reviewing the patient at the time of the reaction. A Suspected Transfusion Reaction investigation can be ordered in MN-CMS as an adult or infant care set as applicable. Two copies of the NMH Transfusion Reaction Form should be printed from MN-CMS and sent to the laboratory. In the event MN-CMS is down, a hardcopy is available on Q-Pulse, RF-CS-HV-1 Suspected Transfusion Reaction Form. All adverse reactions must be reported as per pertinent Haemovigilance policy.Refer to the Management and Investigation of Adverse Transfusion Reactions, PP-CS- HV-2, available in Q-Pulse.

# 

# Haematology

## Haematology Tests

Correct filling of Sodium Citrate (Coagulation) tubes is essential. See Figure 13 for routine cut off times. Urgent samples will be processed ASAP as per LP-GEN-SPECREC. All Haematology samples are stored at room temperature.

Figure 27: Routine Haematology Tests

| **Test/Profile** | **Adult: Cap**  **Additive (Vol)** | **Paediatric: Cap**  **Additive (Vol)** | **Frequency of Testing/**  **Turnaround  Times** | **Special Requirements** | **Accreditation Status** |
| --- | --- | --- | --- | --- | --- |
| **Full Blood Count** | **EDTA 3.0ml** | **EDTA 1.3ml** | **Routine:**  Same day  **Urgent (Haemorrhage):**  15 minutes | Clotted specimens cannot be processed. Send within 24 hours of phlebotomy - No FBC samples are processed after 24 hours of phlebotomy. | Accredited |
| **Manual Differential** | **EDTA 3.0ml** | **EDTA 1.3ml** | Mon – Fri only: Same day if received before 13:00.Saturday before 11:00. | Clotted specimens cannot be processed | Accredited |
| **Coagulation** | **Sodium Citrate 3.0ml** | **Sodium Citrate 1.3ml** | **Routine:**  Same day  **Urgent (Haemorrhage):**  30 minutes | Send within 4hrs. Correct volume essential  Relevant clinical details must be provided.  **Paeds with HCT >0.60 require citrate adjusted specimen tube (contact Haematology lab).** | Accredited |
| **D-dimer** | **Sodium Citrate 3.0ml** | **Sodium Citrate 1.3ml** | Same day | Send immediately Correct volume essential. D-dimers on antenatal women available on Consultant request only. | Accredited |
| **Kleihauer** | **EDTA 3.0ml** |  | Mon – Fri only: Same day if received before 13:00.  Kleihauer samples are refrigerated and disposed of after 7 days. | **NB:** All specimens for Kleihauer testing must be hand written unless ordered via MN-CMS.  Only patients >20 weeks’ gestation  Relevant clinical details must be provided.  Kleihauer samples should be taken > 20 minutes post delivery | Accredited |
| **Sickle Screen** | **EDTA 3.0ml** |  | Same day |  | Accredited |
| **Infectious Mononucleosis** | **EDTA 3.0ml** |  | Same day | Can be requested by laboratory in response to WBC results | Accredited |
| **Malaria** | **EDTA 3.0ml** |  | 2 hrs for RDT  Mon – Fri only.  5 hrs for Blood films (referred to SJH or SVUH for review). | Blood films to be made less than 3 hours after the blood was drawn.  Blood films are referred to SVUH on the direction of the Consultant Microbiologist | Not Accredited |

**Referral Coagulation Samples**

All referral coagulation samples out of hours must be ordered on a clinician to clinician basis. When this is confirmed, the medical scientist on call must contact the medical scientist in the referral laboratory to inform them that the samples are on the way. The samples must reach the destination lab with 4 hours of phlebotomy.

**Platelet Counts and Covid Vaccinations**

Ref: EXT-CS-HAE-175. Recently there has been specific concern around people post vaccination where they may have a platelet consuming condition which may lead to clots which may be fatal. Therefore, particular attention needs to be paid to low platelet counts.

**Haematology Report Comment for Fibrinogen**

Please refer to the current literature for trimester specific ranges. Please note the difference in Fibrinogen levels in pregnant vs. non-pregnant patients:

* 1.5 – 4.0 g/l: Non-Pregnant
* 4.0 – 6.5 g/l: Pregnant

## Stability of Routine Haematology Tests

The following tests need to be processed within the stated timeframes.

Figure 28: Stability of Routine Haematology Samples

|  |  |
| --- | --- |
| **Test/Profile** | **Sample Stability** |
| **FBC** | Within 24 hours of phlebotomy |
| **Coagulation/D-dimer Samples** | Within 4 hours of phlebotomy |
| **Kleihauer Requests** | Within 48 hours of phlebotomy |
| **Sickle Screen** | Within 48 hours of phlebotomy |
| **Infectious Mononucleosis** | Within 48 hours of phlebotomy |
| **Malaria Screen** | Within 3 hours of phlebotomy |

Figure 29: Additional Haematology Investigations

*These are referred to external agencies. Turnaround times reflect specialist nature and referral laboratory response time*

| **Test Investigation** | **Test Code** | **Container Type** | **Turnaround Time** | **Referral Laboratory** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| **Anaemia Screen ADULT**  **Includes:**  **Serum Iron, Serum Transferrin, TIBC (calculated), and % Iron Binding Saturation, B12 and Folate.** | **ANE** | **1 x 4ml Lithium Heparin** | **10 days** | **St. Vincent’s Biochemistry** | **Send on same day as received.**  **If this is not possible the sample needs to be spun down and plasma removed from the cells.**  **A vial is labelled with the patients’ hospital number, patient’s name, D.O.B., small lab number sticker and today’s date and stored in the fridge until sent.** |
| **ADAMTS13** | **ADAM** | **Contact Consultant Haematologist for advice on ADAMTS13 Testing** | **Contact Consultan~~t~~ Haematologist for advice on ADAMTS13 Testing** | **Contact Consultan~~t~~ Haematologist for advice on ADAMTS13 Testing** | **Contact Consultan~~t~~ Haematologist for advice on ADAMTS13 Testing** |
| **Anti Cardiolipin Antibodies** | **ACAV** | **1 x 7ml plain** | **10 days** | **St. Vincent’s Immunology** | **Assay includes IgG and IgM antibodies.** |
| **Anti-CCP**  **(Anti-Cyclic Citrullinated Peptides)** | **CCPV** | **1 x 7ml plain** | **14 days** | **St. Vincent’s Immunology** | **CCP antibody appears to be more specific (approx 90%) for Rheumatoid Arthritis than Rheumatoid factor.** |
| **Anti-dsDNA** | **DDNA** | **1 x 7ml plain** | **10 days** | **St. Vincent’s Immunology** | **Performed when ANA is positive with a titre of 1:800 or greater.**  **Strongly positive anti-dsDNA is suggestive of SLE.** |
| **Anti-Neutrophil Cytoplasmic Antibody** | **ANCV** | **1 x 7ml plain** | **14 days** | **St. Vincent’s Immunology** | **This test is available on an urgent basis by arrangement with the laboratory.** |
| **Anti-Nuclear Antibodies** | **ANA** | **1 x 7ml plain** | **7 days** | **St. Vincent’s Immunology** | **Samples are screened at 1/80 dilution. Staining pattern and titre are reported on positive samples.** |
| **Antiphospholipid Screen/ Lupus Screen**  **Includes:**  **Lupus Anticoagulant**  **Anti Cardiolipin Antibodies**  **Beta-2-Glycoprotein** | **LASV** | **2 x 3ml Sodium Citrate** | **15 days**  **7 days**  **7 days** | **St. Vincent’s Coagulation Laboratory**  **St. Vincent’s Immunology**  **St. James’s immunology** | **SEND STRAIGHT AWAY**  **Ensure coagulation samples are sufficiently filled.**  **The screen must arrive into the lab before 3pm as it will not be processed in St Vincent’s if it arrives in the Coagulation lab after 4pm.**  **Sodium Citrate samples must be processed within 4 hours of collection.**  **It may be required to phone for an urgent courier to collect sample in order for them to be processed in time.** |
| **ACAV** | **1 x 7ml plain** |
| **B2GP** | **1 x 7ml plain** |
| **Auto Antibody Screen**  **Includes:**  **Smooth Muscle Antibody (SMA)/**  **Parietal Cell Antibody/ Mitochondrial Antibody/ Liver Kidney Microsomal Antibody (Anti-LKM)** | **AAS** | **1 x 7ml plain** | **30 Days** | **St. Vincent’s Immunology** | **Order AAS for any one antibody requested.**  **When ANA is positive 1:800 or greater, an anti-ENA screen is performed.**  **When positive, sample is further tested for antibodies to the individual antigens.** |
| **Anti Thrombin** | **ATSV** | **1 x 3ml Sodium Citrate** | **4-6 weeks** | **St. Vincent’s Coagulation Laboratory** | **SEND STRAIGHT AWAY**  **Tests done in batches unless requested urgently.** |
| **Anti Thrombin URGENT** | **ATJ** | **1 x 3ml Sodium Citrate** |  | **NCHCD**  **St. James’s Hospital** | **SEND STRAIGHT AWAY**  **The Coagulation Lab NCHCD James’s Hospital must receive the samples by 4pm Mon-Fri.** |
| **Anti-Xa**  **(Heparin Assay, Anti Factor Xa Assay)** | **XAJ** | **2 x 3ml Sodium Citrate** | **7 days** | **NCHCD**  **St James’s Hosptial** | **SEND STRAIGHT AWAY**  **The Coagulation Lab NCHCD James’s Hospital must receive the samples by 4pm Mon-Fri.**  **The type of heparin treatment must be specified in the clinical details.** |
| **APCR + FV Def. Plasma**  **(Activated Protein C Resistance + Factor V Leiden)** | **APCJ** | **2 x 3ml Sodium Citrate** | **8 weeks** | **NCHCD**  **St James’s Hospital** | **SEND STRAIGHT AWAY**  **The Coagulation Lab NCHCD James’s Hospital must receive the samples by 4pm Mon-Fri.** |
| **BCR-ABL Mutation (p190/p210)** | **BCR** | **1 x 9ml EDTA** | **10-15 days** | **St. James’s Cancer Molecular Diagnostics** | **Consultant Haematologist approval required.**  **Samples should arrive in St. James’s Cancer Molecular Diagnostics laboratory as soon as possible post collection and within 24 hours of sampling.**  **Available Mon - Fri 9.30am – 5pm.**  **Samples should be refrigerated until dispatched.**  **St. James’s Cancer Molecular Diagnostics Request form must be received with samples. Available on Q-Pulse as EXT-CS-HAE-190.** |
| **Beta 2 Glycoprotein 1 Antibodies (IgG)** | **B2GP** | **1 x 7ml plain** | **7 days** | **St. James’s Immunology** | **Tests done in batches unless required urgently.**  **This test is always performed in conjunction Anti-Cardiolipin IgG antibody.**  **Anti-β2-Glycoprotein-1 antibodies are more specific for anti-phospholipid syndrome than Anti-Cardiolipin antibodies.** |
| **Blood Film Review ADULT** | **MDH** | **Film is made using a glass slide and EDTA sample received.**  **A second film is made from the EDTA sample to retain in NMH** | **Available in 2 hours if Urgent or**  **4 hours if Routine.**  **Hard Copy Report 10 Days** | **St. Vincent’s Haematology** | **During the routine day or out of hours: Adult films are referred to St. Vincent’s Hospital at the request of a clinician/consultant or by a medical scientist for review and/or confirmation of blood film morphology.**  **Slides are stained as per PP-CS-HAE-17. They are packed into a slide holder to be sent.** |
| **Blood Film Review (PAED)** | **MDC** | **Glass slide - as above.**  **A second film is made from the EDTA sample to retain in NMH** | **Available in 2 hours if Urgent or**  **4 hours if Routine.**  **Hard Copy Report 10 Days** | **Children’s Health Ireland at Crumlin Haematology** | **As above.** |
| **Coeliac Screen**  **OR**  **Tissue Transglutaminase Antibody (Anti-tTG)**  **(included in a Coeliac Screen)** | **COES** | **1 x 7 ml plain** | **14 days** | **St. Vincent’s Microbiology** | **Referred to Immunology Dept, St. James's Hospital.**  **Anti-tTG antibodies are strongly associated with Coeliac disease. An anti-EMA test will follow all positive tests.** |
| **Complement**  **(Total C3 + Total C4)** | **COMP** | **1 x 3 ml EDTA**  **OR** | **10 days** | **St. Vincent’s Biochemistry** |  |
| **1 x 7 ml plain** |
| **D-Dimers**  **ADULT**  **(In event of analyser failure)** | **DDIV** | **1 x 3ml Sodium Citrate ADULT** | **Available in 2 hours if Urgent or**  **4 hours if Routine.**  **Hard Copy Report 10 Days** | **St. Vincent’s Coagulation Laboratory** | **D-Dimers are processed in Haematology NMH but in the case that the samples must be referred out i.e Failure – Send straight away.**  **D-Dimers must be processed within 4 hours of collection.**  **Contact St. Vincent’s Coagulation laboratory before sending.**  **D-Dimer requests on antenatal women available on consultant request only.**  **Can send Paediatric samples to SVUH if required.** |
| **2 x 1.3ml Sodium Citrate**  **PAED** |
| **D-Dimers**  **(PAED)**  **(In event of analyser failure)** | **DDIC** | **1 x 1.3ml Sodium Citrate** | **Performed Urgently** | **Children’s Health Ireland at Crumlin Haematology** | **SEND STRAIGHT AWAY**  **Phone before sending.** |
| **ENA Screen**  **(Rheumatoid Investigation)**  **Includes:**  **Anti La/ Anti Ro/ Anti RNP/ Anti SM/ Anti Scl-70/ Anti JO Antibodies** | **ENAS** | **1 x 7ml plain** | **30 days** | **St. Vincent’s Immunology** | **When ANA is positive 1:800 or greater, an anti-ENA screen is performed.**  **When anti-ENA screen is positive, further tests for antibodies to individual antigens are performed.** |
| **Endomysial Antibodies (IgA)**  **(Part of Coeliac Screen)** | **EMA** | **1 x 7ml plain** | **14 days** | **St. Vincent’s Immunology** | **Assay only performed if anti-tTG is positive. Anti-EMA antibodies are highly specific for Coeliac disease.** |
| **EMA Screen**  **(Membrane Screen, Osmotic Fragility, Spherocytosis)** | **EHS** | **1 x 3ml EDTA** | **Available in 2-4 Hours if Urgent**  **Hard copy report 10 days** | **St. James’s Haematology** | **Fresh EDTA anti-coagulated blood required (analysis must be within 24hours of collection). FBC and blood film required.**  **Phone ahead when sending test.** |
| **Erythropoietin**  **(EpO)** | **EPOJ** | **1 x 7ml plain** | **7 days** | **St. James’s Haematology** | **Fresh sample required.**  **Available during routine hours (Mon-Fri).**  **Urgent Analysis on Request.** |
| **Erythrocyte sedimentation rate**  **ADULT** | **ESRV** | **1 x 3ml EDTA** | **Available in**  **4 hours**  **Hard Copy Report 10 Days** | **St Vincent’s Hospital** |  |
| **Erythrocyte sedimentation rate**  **PAED** | **ESRT** | **1 x 3ml EDTA** | **3 hrs for samples received within routine hours. 24 hrs for samples outside of routine hours**  **Hard Copy Report 10 Days** | **Children’s Health Ireland at Temple St.** |  |
| **Factor Assays**  **ADULT**  **Includes:**  **Factor V**  **Factor VII**  **Factor VIII**  **(Chromogenic Assay)**  **Factor IX**  **Factor XI**  **Factor XII** | **FVJ**  **F7J**  **F8J**  **F9J**  **F11J**  **F12J** | **All adult factor assays require**  **2 x 3ml Sodium Citrate** | **10 days** | **NCHCD St. James’s Hospital** | **SEND STRAIGHT AWAY**  **Samples must be received in NCHCD by 4pm Monday – Friday.**  **If factor assays are received OOH – refer to**  **RF-CS-HAE-81 for instructions.**  **If patients with a history of coagulation defects are awaiting delivery, clear instructions will be available on RF-CS-HAE-81 which will be on the table in the Haematology laboratory.**  **Under the instruction of the Consultant Haematologist some factor assays may be sent to SVUH instead – Use test code F8V/F9V if so.** |
| **Factor Assays**  **PAED**  **Includes:**  **Factor VIII**  **Factor IX** | **F8C**  **F9C** | **All paediatric factor assays require**  **1 x 1.3ml Sodium Citrate** | **14 days** | **Children’s Health Ireland at Crumlin**  **Haematology** | **SEND STRAIGHT AWAY**  **If factor assays are received OOH – refer to**  **RF-CS-HAE-81 for instructions.**  **If patients with a history of coagulation defects are awaiting delivery, clear instructions will be available on RF-CS-HAE-81 which will be on the table in the Haematology laboratory.** |
| **Factor Five Leiden**  **(Factor V Leiden mutation/ Genetic tests for Thrombophilia)** | **FVLJ** | **2 x 3ml Sodium Citrate**  **(for FVL)** | **8 weeks** | **NCHCD**  **St. James’s Hospital** | **SEND STRAIGHT AWAY**  **Samples must be received by Coag Lab, NCHCD by 4pm Mon-Fri.**  **Requests for Factor V Leiden must be accompanied by either samples for APCR analysis or an APCR result from an external source.**  **FV Leiden requests must be accompanied by request form EXT-CS-HAE-151 with box ticked to indicate patient consent received.** |
| **1 x 3ml EDTA**  **(for APCR)** |
| **Factor Five Leiden**  **(Factor V Leiden mutation, Genetic tests for Thrombophilia)** | **FVLC** | **1 x 1.3ml Sodium Citrate** | **14 days** | **Children’s Health Ireland at Crumlin Haematology** | **Factor V Leiden is not indicated at birth; consult Consultant Haematologist if requested.**  **SEND STRAIGHT AWAY**  **IF REQUIRED** |
| **FBC ADULT**  **(In event of analyser failure)** | **Contact Haematology lab** | **1 x 3ml EDTA** | **Available in 4 hours if Urgent or**  **24 hours if Routine.**  **Hard Copy Report 10 Days** | **St. Vincent’s Haematology** |  |
| **FBC PAED**  **(In event of analyser failure)** | **Contact Haematology lab** | **1 x 1.3ml EDTA** | **Available in 4 hours if Urgent or**  **24 hours if Routine.**  **Hard Copy Report 10 Days** | **Children’s Health Ireland at Crumlin Haematology** |  |
| **Ferritin (PAED)** | **FERC** | **1 x 1.3ml plain** | **7 days** | **Children’s Health Ireland at Crumlin Haematology** | **Send on same day as received.**  **If this is not possible:**  **The sample needs to be spun down and plasma removed from the cells.**  **A vial is labelled with the patients’ hospital number, patient’s name, D.O.B., small lab number sticker and today’s date.** |
| **Flow (for Leukaemia)**  **(Immunophenotyping)** | **FLOV** | **1 x 3ml**  **EDTA** | **48 hours**  **(Provisional results)**  **Hard Copy Report 10 Days** | **St. Vincent’s Haematology** | **Consult Haematology Medical Team for immunophenotyping requests. Prior arrangement with Haematology lab at St. Vincent’s is essential.** |
| **Folate** | **FOLV** | **1 x 4ml Lithium Heparin** | **10 days** | **St. Vincent’s Biochemistry** |  |
| **Glucose-6-phosphate dehydrogenase deficiency ADULT** | **G6PD** | **2 x 3ml EDTA** | **7 days.**  **Urgent: service available (48 hours) by arrangement** | **St. James’s Haemolytic**  **Laboratory** | **Available during routine hours (Mon- Fri).** |
| **Glucose-6-phosphate dehydrogenase deficiency (PAED MALE)** | **G6PC** | **1 x 1.3ml EDTA** | **2 – 3 weeks** | **Children’s Health Ireland at Crumlin Haematology** |  |
| **Glucose-6-phosphate dehydrogenase deficiency (PAED FEMALE)** | **Consult Haematology Lab** | **1 x 1.3ml EDTA** |  | **Red Cell Centre Protein Laboratory, Synnovis, King’s College Hospital, London** | **Sample must be received with the appropriate King’s College Hospital referral form, available in Q-Pulse EXT-CS-HAE-188.** |
| **Haptoglobin**  **(Serum Hp)** | **HAPT** | **1 x 7ml plain** | **10 days** | **St. James’s Haemolytic Laboratory** | **Consult with a Haematologist before taking the sample for Haptoglobin.**  **Available during routine hours (Mon-Fri).**  **Do not measure levels in children < 1 yr old.** |
| **Haemoglobin S Levels** | **HBSL** | **1 x 3ml EDTA** | **14 days** | **St. James’s Haemolytic Laboratory** | **Sample must be received before 12:00 with FBC result and 2 unstained slides.** |
| **Haemoglobinopathy Screen ADULT** | **HBE** | **1 x 7ml plain** | **14 days** | **St. James’s Haemolytic Laboratory** | **Available during routine hours Mon – Fri.**  **Urgent analysis available on request.**  **Send a copy of the most recent FBC and Ferritin result if available.** |
| **1 x 3ml EDTA**  **(for FBC – not essential)** |
| **Haemoglobinopathy Screen (PAED)** | **PHBE** | **1 x 1.3ml EDTA** | **14 days** | **Children’s Health Ireland at Crumlin Haematology** | **Send most recent FBC report (if available) with request.** |
| **Heparin Induced Thrombocytopenia Screen**  **(HIT Screen)** | **HIT** | **2 x 7ml plain** | **PF4 Anti IgG Elisa – 3 days**  **Heparin Induced Platelet Aggregation (HIPA) test – 2 days post receipt in referral laboratory**  **Hard copy report 14 days.** | **NCHCD**  **St. James’s Hospital** | **1 Vial of patients Heparin to be included with samples.**  **The Coagulation Lab NCHCD James’s Hospital must receive the samples by 4pm Mon-Fri.**  **Routine hours Mon-Fri or out of hours only by authorisation by Coagulation Consultant.**  **Request form EXT-CS-HAE-152 must accompany all requests.** |
| **Hereditary Spherocytosis (PAED)** | **HSSC** | **1 x 3ml EDTA** | **Available in 2-4 Hours**  **Hard copy report 10 days** | **Children’s Health Ireland at Crumlin Haematology** |  |
| **HHT Genetic Testing**  **(Hereditary Hemorrhagic Telangiectasia)** | **HHT** | **2x 9ml EDTA or 4 x 3ml EDTA (>10mls EDTA samples required)** | **8 weeks** | **Molecular Genetic Service**  **David Brock Building**  **Western General Hospital**  **Crewe Road South**  **Edinburgh**  **EH42XU**  **Scotland**  **Tel: 0044 1315 371116** | **Consultant Haematologist approval required.** |
| **Homocysteine** | **HCYS** | **1 x 3ml EDTA** | **10 days** | **St. Vincent’s Biochemistry** | **Please send full clinical details.**  **The Homocysteine sample must be centrifuged and plasma removed from the cells. The plasma must be frozen in a 1.8ml appropriately labelled vial.**  **A vial is labelled with the patients’ hospital number, patient’s name, D.O.B., small lab number sticker and today’s date. This sample is sent frozen to the Biochemistry Lab in St Vincent’s once a week.** |
| **Intrinsic Factor *Screen***  **ADULT**  **(Factor VIII, Factor IX, Factor XI, Factor XII, Factor 8, Factor 9, Factor 11, Factor 12)** | **IFS** | **6 x 3ml Sodium Citrate** | **10 days** | **NCHCD**  **St. James’s Hospital** | **SEND STRAIGHT AWAY**  **The Coagulation Lab NCHCD James’s Hospital must receive the samples by 4pm Mon-Fri.**  **Routine hours Mon-Fri or out of hours only by authorisation by Coagulation Consultant.** |
| **Intrinsic Factor *Screen***  **(PAED)**  **(Factor VIII, Factor IX, Factor XI, Factor XII, Factor 8, Factor 9, Factor 11, Factor 12)** | **IFSC** | **Minimum 7mls required in 1.3ml Sodium Citrate Containers** | **14 days** | **Children’s Health Ireland at Crumlin Haematology** | **SEND STRAIGHT AWAY**  **Clinical details required.**  **Samples are run in batches. Urgent analysis available on request by Consultant.** |
| **Intrinsic Factor *Antibody*** | **IFAJ** | **1 x 7ml plain**  **(Serum sample to be taken >14 days post B12 injection)** | **7 days** | **St. James’s Haematology** | **Available during routine hours (Mon-Fri).**  **Urgent analysis available on request.** |
| **Iron Studies ADULT**  **Includes :**  **Serum Iron, Serum Transferrin, TIBC (calculated), % Iron Binding Saturation** | **FES** | **1 x 4ml Lithium Heparin** | **10 Days** | **St. Vincent’s Biochemistry** | **Send on same day as received.**  **If this is not possible centrifuge and remove serum from red cells.**  **A vial is labelled with the patients’ hospital number, patient’s name, D.O.B., small lab number sticker and today’s date.** |
| **Iron Studies (PAED)** | **FESP** | **1 x 7ml plain** | **7 days** | **Children’s Health Ireland at Crumlin Haematology** | **Send on same day as received.**  **If this is not possible centrifuge and remove serum from red cells.**  **A vial is labelled with the patients’ hospital number, patient’s name, D.O.B., small lab number sticker and today’s date.** |
| **Lymphocyte Subsets ADULT and PAED**  **If associated with immunodeficiency**  **Lymphocyte Subsets Paed** | **LS**  **LSP** | **1 x 3ml EDTA** | **10 days** | **St. James’s Immunology**  **Children’s Health Ireland at Crumlin Haematology** | **Fresh sample required (<24hrs).**  **Samples must be kept at room temperature until analysis.**  **Cut-off time for receipt of samples in 3pm.**  **The request ‘Lymphocyte Subsets’ only provides T-Cell quantitation. If B-cell and Natural Killer (NK) cell quantitation is required this must be specified on request form.** |
| **1 x 1.3ml EDTA** |
| **Myeloproliferative Neoplasms Panel**  **Includes:**  **JAK2-V617F,**  **JAK2 exon 12,**  **CALR and MPL mutation analysis.** | **CALR**  **JAK2** | **1 x 9ml EDTA** | **20 days** | **St. James’s Cancer Molecular Diagnostics** | **Consultant Haematologist approval required.**  **Available Mon - Fri 9.30am – 5pm. Samples must be received before 3pm on Fridays.**  **Samples should be sent as soon as possible post collection or if appropriate, refrigerated until dispatch.**  **St. James’s Cancer Molecular Diagnostics Request form must be received with samples. Available in Q-Pulse as EXT-CS-HAE-190.**  **If either Jak2/CALR are requested, a full MPN panel will be processed.** |
| **Platelet Function Assay**  **(PFA-100 Test)** | **Contact Haematology Lab** | **2 x 3ml Sodium Citrate** | **10 days** | **St Vincent’s Haematology** | **SEND STRAIGHT AWAY**  **Samples must arrive in Coagulation Laboratory SVUH before 2pm Mon - Fri.**  **Screening test only.** |
| **1 x 3ml EDTA** |
| **Protein C** | **PTC** | **1 x 3ml Sodium Citrate** | **4-6 weeks**  **6 hours**  **(URGENT)** | **St. Vincent’s Coagulation Laboratory** | **SEND STRAIGHT AWAY**  **Tests done in batches as part of the Thrombophilia screen every 4 - 6 weeks, unless requested urgently.** |
| **Protein S** | **PS** | **1 x 3ml Sodium Citrate** | **4-6 weeks** | **St. Vincent’s Coagulation Laboratory** | **SEND STRAIGHT AWAY**  **Test done in batches as part of the Thrombophilia screen every 4-6 weeks.** |
| **Prothrombin Mutation**  **(PTGA, G20210A, Genetic testing for Thrombophilia)** | **PMUT** | **1 x 3ml EDTA** | **8 weeks** | **NCHCD**  **St. James’s Hospital** | **Samples can be refrigerated and sent with routine couriers within 5 days of phlebotomy.**  **Available during routine hours (Mon-Fri).**  **PMUT requests must be accompanied by request form EXT-CS-HAE-151 with box ticked to indicate patient consent received.** |
| **Pyruvate Kinase**  **(PK Screen)** | **PKA** | **2 x 3ml EDTA** | **7 days** | **KCH** | **Chris Lambert**  **Red Cell Centre ,**  **Dept. Haematology**  **King’s College Hospital**  **00442032993576**  **Sent from Specimen reception**  **Include a copy of FBC and Reticulocyte count and blood film interpretation (if applicable).** |
| **Red Cell Folate** | **RCFJ** | **1 x 3ml EDTA** | **Available in 48 hours**  **Hard copy report 10 days** | **St. James’s Nutrition Laboratory** | **Fresh sample required.**  **Available during routine hours (Mon-Fri).** |
| **1 x 7ml plain** |
| **Rheumatoid Factor** | **RFSV** | **1 x 7ml plain** | **10 days** | **St. Vincent’s Immunology** |  |
| **Thrombophilia Screen ADULT**  **TPSL Includes:**  **Protein C,**  **Protein S,**  **Anti-Thrombin,**  **Activated Protein C Resistance,**  **Fibrinogen,**  **Lupus Screen,**  **Factor VIII** | **TPSL**  **ACAV**  **B2GP**  **HCYS**  **PMUT** | **5 x 3ml Sodium Citrate** | **4-6 weeks** | **St. Vincent’s Coagulation Laboratory**  **St. Vincent’s Immunology**  **St. James’s Immunology**  **St. Vincent’s Biochemistry**  **NCHCD**  **St. James’s**  **Hospital** | **SEND STRAIGHT AWAY**  **5 Sodium Citrate Samples are sufficient for the TPSL.**  **The Thrombophilia screen must be sent straight away. The screen must arrive into the lab before 3pm as it will not be processed in St. Vincent’s if it arrives in the Coagulation lab after 4pm.**  **The Homocysteine (HCYS) sample must be centrifuged and plasma removed from the cells. The plasma must be frozen in a 1.8ml appropriately labelled vial. A vial is labelled with the patient’s hospital number, patient’s name, D.O.B., small lab number sticker and today’s date. This sample is sent frozen to the Biochemistry Lab in St. Vincent’s once a week.**  **The sample is placed into a frozen container provided by Biomnis. The relevant printed referral form and frozen container are then placed into a Styrofoam container and then into a card board box containing the UN3373 label. The boxes are located in Specimen Reception. The labels are stored in the referral folder in the Haematology Dept.**  **The Prothrombin mutation (PMUT) sample is sent to the NCHCD in St. James’s Hospital. This may be the next routine day. Sample can be refrigerated until sent.**  **PMUT requests must be accompanied by request form EXT-CS-HAE-151 with box ticked at the bottom of the form to indicate patient consent received.** |
| **1 x 7ml plain** |
| **1 x 7ml plain** |
| **1 x 3ml EDTA** |
| **1 x 3ml EDTA** |
| **Thrombophilia Screen (PAED)** | **TPSC** | **6 x 1.3ml Sodium Citrate** | **4 Weeks** | **Children’s Health Ireland at Crumlin Haematology** | **SEND STRAIGHT AWAY**  **Clinical details required.** |
| **1 x 1.3ml EDTA (can be booked in for PFBC if received)** |
| **Thrombin Time** | **TT** | **1 x 3ml Sodium Citrate** | **Available within 4 hours**  **Hard copy**  **10 Days** | **St James’s Haematology**  **Laboratory** | **Can be performed on same sample as coagulation screen. This test is requested only through the coagulation team.** |
| **Vitamin B12** | **B12V** | **1 x 4ml Lithium Heparin** | **10 days** | **St. Vincent’s Biochemistry** | **Please state if patient is receiving exogenous Vitamin B12.** |
| **Von Willebrand *Factor***  **ADULT**  **(Von Willebrand Ristocetin Co-Factor)** | **VWF** | **4 x 3ml Sodium Citrate** | **14 days** | **NCHCD**  **St. James’s Hospital** | **SEND STRAIGHT AWAY**  **The screen must arrive into the lab before 3pm as it will not be processed in St James if it arrives in the lab after 4pm.**  **Available during routine hours (Mon-Fri).** |
| **Von Willebrand Screen ADULT (>16 years)**  **Includes:**  **Factor VIII:C, VWF Antigen, VWF Ristocetin Co-factor, VWF Collagen Binding.**  **(VWF Multimers and VWF:VIIIB assays available also only in specific circumstances or on request by Coagulation Consultant)** | **VWS** | **4 x 3ml Sodium Citrate** | **See individual tests for Von Willebrand disease for test specific turn around times**  **3 weeks (Including Multimers 6 weeks)** | **NCHCD**  **St. James’s Hospital** | **SEND STRAIGHT AWAY**  **The screen must arrive into the lab before 3pm as it will not be processed in St James if it arrives in the lab after 4pm.**  **Routine hours Mon-Fri or out of hours only by authorisation by Coagulation Consultant.** |
| **Von Willebrand Screen (PAED) (<16 years)** | **VWSC** | **3 x 1.3ml Sodium Citrate** | **3 – 4 Weeks** | **Children’s Health Ireland at Crumlin Haematology** | **SEND STRAIGHT AWAY** |

## ****Blood Films Outside of Routine Hours****

* Scientists ‘On Call’ prepare films for review. They are trained to recognise platelet clumping. All other urgent film review ‘Out of Hours’ is referred to Consultant Haematologist.
* Paediatric blood films are referred to the Haematology service at Children’s Health Ireland at Crumlin on a Consultant to Consultant request.
* Adult blood films are referred to the Haematology service at St. Vincent's University Hospital on Consultant to Consultant Request.
* In both cases the requesting Consultant discusses the case with the Consultant Haematologist On Call, and the blood films are referred on request to the named Consultant.

## Haematology Reference Ranges

|  | **Full Blood Count Reference Ranges (WinPath)** | | | | |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Units** | **M/F** | **Age** | **Range** | **Reference** |
| **Haemoglobin** | **g/dl** | F/M | D0 - D2 | 13.5 – 19.5 | GOSCH |
| F/M | D3 - D4 | 14.5 – 22.5 | GOSCH |
| F/M | D5 - D8 | 13.5 – 21.5 | GOSCH |
| F/M | D9 - D21 | 12.5 – 20.5 | GOSCH |
| F/M | D22 - D35 | 10.0 – 18.0 | GOSCH |
| F/M | D36 - D63 | 9.0 – 14.0 | GOSCH |
| F/M | D64 - 18M | 10.0 – 13.5 | GOSCH |
| F/M | 18M - 3Y | 10.5 – 13.5 | GOSCH |
| F/M | 3Y - 7Y | 11.5 – 14.5 | GOSCH |
| F/M | 7Y - 13Y | 11.5 – 15.5 | GOSCH |
| M | 14Y - 19Y | 13.0 – 16.0 | GOSCH |
| F | Adult | 11.0 – 15.0 | BSH^ |
| M | Adult | 13.0– 17.0 | SVUH |
| **RBC** | **x10^12/l** | F/M | D0 - D2 | 3.9 - 5.3 | GOSCH |
| F/M | D3 - D4 | 4.0 - 6.6 | GOSCH |
| F/M | D5 - D8 | 3.9 - 6.3 | GOSCH |
| F/M | D9 - D21 | 3.6 - 6.2 | GOSCH |
| F/M | D22 - D35 | 3.0 - 5.4 | GOSCH |
| F/M | D36 - D63 | 2.7 - 4.9 | GOSCH |
| F/M | D64 - D98 | 3.1 - 4.5 | GOSCH |
| F/M | D99 - 3Y | 3.7 - 5.3 | GOSCH |
| F/M | 3Y - 7Y | 3.9 - 5.3 | GOSCH |
| F/M | 7Y- 13Y | 4.0 - 5.2 | GOSCH |
| F/M | 13Y - 19Y | 4.1 - 5.1 | GOSCH |
| F | Adult | 3.8 - 4.8 | SVUH |
| M | Adult | 4.5 - 5.3 | SVUH |
| **Haematocrit** | **L/L** | F/M | D0 - D1 | 0.42 - 0.6 | GOSCH |
| F/M | D2 - D4 | 0.45 - 0.67 | GOSCH |
| F/M | D5 - D8 | 0.42 - 0.66 | GOSCH |
| F/M | D9 - D21 | 0.39 - 0.63 | GOSCH |
| F/M | D22 - D35 | 0.31 - 0.55 | GOSCH |
| F/M | D36 - D49 | 0.34 - 0.4 | GOSCH |
| F/M | D50 - D63 | 0.28 - 0.42 | GOSCH |
| F/M | D64 - D98 | 0.29 - 0.41 | GOSCH |
| F/M | D99 - 3Y | 0.33 - 0.39 | GOSCH |
| F/M | 3Y - 13Y | 0.35 - 0.45 | GOSCH |
| F | Adult | 0.33 - 0.47 | BSH^ |
| M | Adult | 0.4 - 0.5 | SVUH |
| **MCV** | **fl** | F/M | D0 - D2 | 98 - 118 | GOSCH |
| F/M | D3 - D4 | 95 - 121 | GOSCH |
| F/M | D5 - D8 | 88 - 126 | GOSCH |
| F/M | D9 - D21 | 86 - 124 | GOSCH |
| F/M | D22 - D35 | 85 - 123 | GOSCH |
| F/M | D36 - D63 | 77 - 115 | GOSCH |
| F/M | D64 - D98 | 74 - 118 | GOSCH |
| F/M | D99 - 3Y | 70 - 86 | GOSCH |
| F/M | 3Y - 7Y | 75 - 87 | GOSCH |
| F/M | 7Y - 13Y | 77 - 94 | GOSCH |
| F/M | 13Y - 19Y | 78 - 102 | GOSCH |
| F/M | Adult | 80 - 100 | SVUH |
| **MCH** | **pg** | F/M | D0 - D4 | 31 - 37 | GOSCH |
| F/M | D5 - D35 | 28 - 40 | GOSCH |
| F/M | D36 - D63 | 26 - 34 | GOSCH |
| F/M | D64 - D98 | 25 - 35 | GOSCH |
| F/M | D99 - 3Y | 23 - 31 | GOSCH |
| F/M | 3Y - 7Y | 24 - 30 | GOSCH |
| F/M | 7Y - 13Y | 25 - 33 | GOSCH |
| F/M | 13Y - 19Y | 25 - 35 | GOSCH |
| F/M | 19Y - Adult | 26 - 34 | GOSCH |
| F/M | Y7 – Y12 | 25 - 33 | GOSCH |
| F/M | Y13 – Y18 | 25 - 35 | GOSCH |
| F/M | Adult | 27 - 32 | SVUH |
| **MCHC** | **g/dl** | F/M | D0 – D1 | 30.0 – 33.0 | CHI@Crumlin |
| F/M | D2 – D13 | 29.0 – 34.0 | CHI@Crumlin |
| F/M | D14 – D56 | 28.0 – 35.0 | CHI@Crumlin |
| F/M | D56 – 2Y | 29.0 – 34.0 | CHI@Crumlin |
| F/M | 2Y – Adult | 30.0 – 33.0 | CHI@Crumlin |
| F/M | Adult | 30 – 35.5 | CHI@Crumlin |
| **RDW** | **%** | F/M | 0Y - Adult | 11.0 - 16.0 | GOSCH |
| **White Cells** | **x10^9/l** | F/M | D0 - D7 | 10 - 26 | GOSCH |
| F/M | D7 - 1Y | 6 - 18 | GOSCH |
| F/M | 1Y - 8Y | 5 - 15 | GOSCH |
| F/M | 8Y - 13Y | 4.5 - 13.5 | GOSCH |
| F | Adult | 3.5 - 14.6 | Lower SVUH  Upper-Paper\* |
| M | Adult | 3.5 - 11.0 | SVUH |
| **Neutrophils** | **x10^9/L** | F/M | 0Y - 2Y | 1.0 - 8.5 | GOSCH |
| F/M | 2Y - 6Y | 1.5 - 8.5 | GOSCH |
| F/M | 6Y - 12Y | 1.5 - 8.0 | GOSCH |
| F/M | 12Y - 16Y | 1.8 - 8.0 | GOSCH |
| F | Adult | 2.0 - 11 | Lower SVUH  Upper-Paper\* |
| M | Adult | 2.0 - 8.0 | SVUH |
| **Lymphocytes** | **x10^9/L** | F/M | Y0 - Y2 | 3.0 - 13.5 | GOSCH |
| F/M | Y2 - Y6 | 2.0 - 9.5 | GOSCH |
| F/M | Y6 - Y12 | 1.5 - 7.0 | GOSCH |
| F/M | Y12 - Y16 | 1.2 - 5.2 | GOSCH |
| F/M | Adult | 1.0 - 4.0 | SVUH |
| **Monocytes** | **x10^9/l** | F/M | 0Y - 6Y | 0.3 - 1.5 | GOSCH |
| F/M | 6Y - 16Y | 0.1 - 0.8 | GOSCH |
| F/M | Adult | 0.2 - 1.0 | SVUH |
| **Eosinophils** | **x10^9/l** | F/M | 0Y - 2Y | 0.1 - 0.3 | GOSCH |
| F/M | 2Y - 6Y | 0.3 - 0.8 | GOSCH |
| F/M | 6Y - 16Y | 0.1 - 0.8 | GOSCH |
| F/M | Adult | 0 - 0.5 | SVUH |
| **Basophils** | **x10^9/l** | F/M | 0Y - 16Y | 0 - 0.2 | GOSCH |
| F/M | Adult | 0 - 0.2 | SVUH |
| **Platelet Count** | **x10^9/l** | F/M | 0Y - Adult | 150 - 450 | GOSCH |
| F/M | Adult | 150 - 400 | SVUH |
| **Reticulocyte Count** | **x10^9/l** | F/M | OD – 1 D | 110 - 450 | CHI@Crumlin |
| F/M | 2D – 7D | 18 - 80 | CHI@Crumlin |
| F/M | 8D – 30D | 10 - 65 | CHI@Crumlin |
| F/M | 31D – 60D | 35 – 200 | CHI@Crumlin |
| F/M | 61D – 5M | 15 – 110 | CHI@Crumlin |
| F/M | 5M – 1Y | 30 – 130 | CHI@Crumlin |
| F/M | 1Y - Adult | 20 - 100 | CHI@Crumlin |
| F/M | Adult | 16 - 80 | SVUH |

***^****The default displayed reference range for Hb and HCT is for pregnant patients and is taken from BSH Guidelines on the Management of Iron Deficiency in Pregnancy.*

***\*****The default displayed reference ranges for the upper limit for total and differential leucocyte counts percentiles are those for normal pregnancy as per paper by Samuel Lurie 2006 in the European Journal of Obstetrics and Gynaecology.*

*The non-pregnant upper range is provided in the tables below.*

***SVUH:*** *St Vincent’s University Hospital*

***CHI@Crumlin:*** *Children’s Health Ireland at Crumlin*

***GOSCH****: Great Ormond Street Children’s Hospital*

**The following comments are reported with these tests:**

|  |  |
| --- | --- |
| **Test** | **Comment** |
| **Haemoglobin** | Pregnant ref. range is quoted and applies to later gestations (>24 weeks).  Anaemia Diagnosis for Haemoglobin:  1st Trimester: <11.0 g/dL, After 12 wks: <10.5g/dL  Immediately postpartum: <10.0 g/dL  HB Non-pregnant range: 11.5 - 15 g/dl |
| **White Cell Count** | Pregnant ref. range is quoted and applies to later gestations (>24 weeks).  Trimester specific ranges:  1st Trimester: 5.7-13.6, 2nd Trimester: 6.2-14.8  3rd Trimester 5.9-16.9  Non-pregnant range: 4 - 10 |
| **Neutrophil Count** | Pregnant ref. range is quoted and applies to later gestations (>24 weeks).  Trimester specific ranges:  1st Trimester: 3.6-10.1, 2nd Trimester: 3.8-12.3  3rd Trimester 3.9-13.1  Non-pregnant range: 2 - 7 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Coagulation Reference Ranges (WinPath)** | | | |
| **Age** | **APTT (seconds)** | **Prothrombin Time (seconds)** | **Fibrinogen (g/L)** |
| **D1 – D5** | 31.3 – 53.6 | 10.14 – 15.86 | 1.67 – 3.99 |
| **D5 – D30** | 25.36 – 59.84 | 9.48 – 15.32 | 1.62 – 4.62 |
| **D30 – D90** | 25.56 – 55.24 | 9.3 – 14.3 | 1.62 – 3.78 |
| **D90 – D180** | 24.06 – 50.14 | 9.6 – 14.2 | 1.07 – 3.79 |
| **D180 – 1Y** | 28.08 – 42.92 | 10.72 – 13.86 | 1.15 – 3.87 |
| **1Y – 5Y** | 24 - 36 | 10.6 – 11.4 | 1.70 – 4.05 |
| **6Y – 10Y** | 26 - 36 | 10.1 – 12.1 | 1.57 – 4.0 |
| **11Y – 16Y** | 26 – 37 | 10.2 – 12.0 | 1.54 – 4.48 |
| **Adult** | 25.1- 36.5 | 9.6 - 12 | 4.0 – 6.5 |
| **Adult Non-pregnant** |  |  | 1.5 – 4.0 |

**References**

**Paediatric****:** *Paed ranges Day 1-Day180 (Andrew et al, Blood, Vol 70, No. 1 (July), 1987:pp 165-172. Paed ranges Year 1-16 (Andrew et al, Blood, Vol 80, No. 8 (Oct), 1992:pp 1998-2005)*

**Adult pregnant and non-pregnant Fibrinogen:** *Abbassi-Ghanavati M, Greer LG, Cunningham FG. Pregnancy and laboratory studies: a reference table for clinicians. Obstet Gynecol. 2009 Dec;114(6):1326-31. PMID:*[*19935037*](http://www.ncbi.nlm.nih.gov/pubmed/19935037?)

**Adult APTT range:** *ACL-TOP-550 APTT Reagent Product insert*

**Published Ranges for Infants, Adults and Pregnant Females (Trimester Specific)**

*Haematological values for normal infants from birth - 6 months (Practical Haematology, Dacie and Lewis; 10th Edition).*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Birth** | **Day 3** | **Day 7** | **Day 14** | **1 Month** | **2 Months** | **3-6 Months** |
| **RBC (x1012/l)** | 5 - 7 | 4 - 6.6 | 3.9 - 6.3 | 3.6 - 6.2 | 3.0 - 5.4 | 3.1 - 4.3 | 4.1 - 5.3 |
| **Hb (g/dl)** | 14 - 22 | 15 - 21 | 13.5 - 21.5 | 12.5 - 20.5 | 11.5 - 16.5 | 9.4 - 13 | 11.1 - 14.1 |
| **HCT (l/l)** | 0.45 - 0.75 | 0.45 - 0.67 | 0.42 - 0.66 | 0.31 - 0.71 | 0.33 - 0.53 | 0.28 - 0.42 | 0.30 - 0.40 |
| **MCV (fl)** | 100 - 120 | 92 - 118 | 88 - 126 | 86 - 124 | 92 - 116 | 87 - 103 | 68 - 84 |
| **MCH (pg)** | 31 - 37 | 31 - 37 | 31 - 37 | 31 - 37 | 30 - 36 | 30 - 36 | 24 - 30 |
| **MCHC (g/dl)** | 30 - 36 | 30 - 37 | 28 - 38 | 28 - 38 | 29 - 37 | 28.5 - 35.5 | 30 - 36 |
| **WBC (x109/l)** | 10 - 26 | 7 - 23 | 6 - 22 | 6 - 22 | 5 - 19 | 5 - 15 | 6 - 18 |
| **Neutrophils (x109/l)** | 4 - 14 | 3 - 5 | 3 - 6 | 3 - 7 | 3 - 9 | 1 - 5 | 1 - 6 |
| **Lymphocytes (x109/l)** | 3 - 8 | 2 - 8 | 3 - 9 | 3 - 9 | 3 - 16 | 4 - 10 | 4 - 12 |
| **Monocytes(x109/l)** | 0.5 - 2.0 | 0.5 - 1.0 | 0.1 - 1.7 | 0.1 - 1.7 | 0.3 - 1.0 | 0.4 - 1.2 | 0.2 - 1.2 |
| **Eosinophils(x109/l)** | 0.1 - 1.0 | 0.1 - 2.0 | 0.1 - 0.8 | 0.1 - 0.9 | 0.2 - 1.0 | 0.1 - 1.0 | 0.1 - 1.0 |
| **Basophils\*(x109/l)** | 0.02 - 0.12 | | | | | | |
| **Platelets(x109/l)** | 100 - 450 | 210 - 500 | 160 - 500 | 170 - 500 | 200 - 500 | 210 - 650 | 200 - 550 |
| **Reticulocytes(x109/l)** | 120 - 400 | 50 - 350 | 50 - 100 | 50 - 100 | 20 - 60 | 30 - 50 | 40 - 100 |
| **NRBCs\*(x109/l)** | 0 - 5.4 | 0 - 5.4 | 0 - 5.4 | 0 – 0.1 | 0 - 0.1 | 0.0 | 0.0 |

\*Basophil count reference range taken from *Blood Cells, A Practical Guide, Barbara J. Bain, 3rd Edition. Range is from 9 days - 1 year*

*\*NRBC count reference range taken from GOSH, London*

**Haematological Values for Normal Adults (Practical Haematology 10th Edition)**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Female** | **Male** |
| RBC (x1012/l) | 3.8-4.8 | 4.5-5.5 |
| **Hb (g/dl)** | 12-15 | 13-17 |
| **HCT (l/l)** | 0.36-0.46 | 0.4-0.5 |
| **MCV (fl)** | 83-101 | 83-101 |
| **MCH (pg)** | 27-32 | 27-32 |
| **MCHC\* (g/dl)** | 31-37 | 31-37 |
| **RDW (CV %)** | 11.6-14 | 11.6-14 |
| **WBC (x109/l)** | 4-10 | 4-10 |
| **Neutrophils (x109/l)** | 2-7 | 2-7 |
| **Lymphocytes (x109/l)** | 1-3 | 1-3 |
| **Monocytes(x109/l)** | 0.2-1.0 | 0.2-1.0 |
| **Eosinophils(x109/l)** | 0.02-0.5 | 0.02-0.5 |
| **Basophils(x109/l)** | 0.02-0.1 | 0.02-0.1 |
| **Platelets(x109/l)** | 150-410 | 150-410 |
| **Reticulocytes(x109/l)** | 50-100 | 50-100 |
| **Reticulocytes(%)** | 0.5-2.5 | 0.5-2.5 |
| **NRBCs(x109/l)** | 0.0 | 0.0 |

**\****MCHC reference range taken from Blood Principles and Practice of Haematology; Handin, R.I., Lux, S.E., Stossel T.P. 1995.*

**Haematological Values during Pregnancy**

*Blood Cells. A Practical Guide Barbara J. Bain; 3rd Edition*

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **First Trimester** | **Second Trimester** | **Third Trimester\*** |
| RBC (x1012/l) | 3.52-4.52 | 3.20-4.41 | 3.10-4.44 |
| **Hb (g/dl)** | 11.0-14.3 | 10.0-13.7 | 9.8-13.7 |
| **HCT (l/l)** | 0.31-0.41 | 0.30-0.38 | 0.28-0.39 |
| **MCV (fl)** | 81-96 | 82-97 | 91-99 |
| **WBC (x109/l)** | 5.7-13.6 | 6.2-14.8 | 5.9-16.9 |
| **Neutrophils(x109/l)** | 3.6-10.1 | 3.8-12.3 | 3.9-13.1 |
| **Lymphocytes(x109/l)** | 1.1-3.5 | 0.9-3.9 | 1.0-3.6 |
| **Monocytes(x109/l)** | 0.0-1.0 | 0.1-1.1 | 0.1-1.1 |
| **Eosinophils(x109/l)** | 0.0-0.6 | 0.0-0.6 | 0.0-0.6 |
| **Basophils(x109/l)** | 0.0-0.1 | 0.0-0.1 | 0.0-0.1 |
| **Platelets(x109/l)** | 174-391 | 171-409 | 155-429 |
| **NRBCs(x109/l)** | 0.0 | 0.0 | 0.0 |

\* Third trimester reference range is applicable for 6 weeks post delivery

## Haematology Critical Alert Ranges

Figure 22: Haematology Critical Values Management

*The following results are to be phoned to the requesting clinician / teams soon as possible. For notes see next page*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Test** | **Lower Limit** | **Upper Limit** | **Phone To** | **Comments** |
| **Adult Coagulation:**  **Pregnant/Non Pregnant,**  **not on anticoagulant** | **PT** | - | > 20 seconds | **Requesting Clinician (& Haematology team for INR>4)** | After all investigations carried out as per  PP-CS-HAE-29 |
| **APTT** | - | > 40 seconds | **Requesting Clinician**  **(& Haematology team for APTT>150sec)** | After all investigations carried out as per  PP-CS-HAE-29 |
| **Fibrinogen** | Pregnant  < 2.0 g/L  Non-Pregnant  <1.0 g/L | - | **Requesting Clinician**  **(& Haematology team if <0.5)** | After all investigations carried out as per  PP-CS-HAE-29 |
| **D-Dimer** | - | >4 ug/ml FEU | **Requesting Clinician** |  |
| **Adult** | **Haemoglobin** | < 7.0 g/dl | > 17 g/dl | **Clinical area** |  |
| **Platelets** | < 80 x10^9/l | > 800 x10^9/l | **Requesting Clinician** | If platelet count suppressed due to platelet clumping ward should be informed of this. |
| **Neutrophils** | < 1 x10^9/l | - | **Requesting Clinician & Haematology team (During routine hours)** | - New onset.  If neutrophil count is < 1 after manual differential report to haematology team |
| **WCC** | < 3 x10^9/l | > 17 x10^9/l | **Clinical area** | - New onset.  - In the event of a substantial, clinically significant change in WCC of **rapid** onset -inform clinical team. |
| **Kleihauer** | - | > 4mls FMH | **Haematology team and Clinical area** |  |
| **Malaria** | - | - | **Clinical area and Consultant Microbiologist** | All Malaria requests are phoned to the consultant microbiologist |
| **Paediatric** | **PT** | - | > 20 seconds | **Requesting Clinician** | After all investigations carried out as per  PP-CS-HAE-29 |
| **APTT** | - | > 70 seconds | **Requesting Clinician** | After all investigations carried out as per  PP-CS-HAE-29 |
| **APTT** | - | >150seconds | **Paediatric registrar** & **Haematology team** | After all investigations carried out as per  PP-CS-HAE-29 (confirmed sample not taken from a heparinised line) |
| **Fibrinogen** | < 1 g/L | - | **Requesting Clinician**  **& (Haematology team if <0.5)** | After all investigations carried out as per  PP-CS-HAE-29 |
| **Haemoglobin** | < 9.0 g/dl | > 26 g/dl | **Requesting Clinician** |  |
| **Platelets** | < 80 x10^9/l | > 800 x10^9/l | **Requesting Clinician** |  |
| **Neutrophils** | < 1 x10^9/l | - | **Paediatric Registrar** |  |

* The Haematology team is defined as the Haematology CMS, Haematology registrar (contactable through St Vincent’s University Hospital switch), Dr Joan Fitzgerald (Consultant Haematologist) and the Haematology Medical rota contactable through St Vincent’s University Hospital switch.
* Adult/paediatric unsuitable samples reported as UXCH are phoned to the clinical area if appropriate as per the telephoning of results procedure outlines in LP-GEN-TELREP.
* Adult/paediatric external test results are phoned to the clinical area if abnormal as per LP-GEN-TELREP. This is not necessary for flow cytometry results <4mls FMH.
* All medical scientists working in the Haematology laboratory, including On Call staff, may telephone authorised results.
* Any other phoned results are left up to the discretion of the medical scientist.

## Retrospective/Add-On Requesting

Haematology and coagulation specimens are usually kept for one week at 2-6˚C after processing. Blood films are kept for 1 month after review unless requested to be stored by the Chief/Consultant Haematologist. Analyses of additional tests are subject to stability of analyte. All add-on requests require a requisition form and are entered in the laboratory information system. Analyses of additional tests are subject to stability of analyte. Appropriate additional tests can be added onto an FBC sample depending on sample volume and integrity. Common Additional tests:

* Reticulocytes within 24 hours
* Blood film within 24 hours
* Kleihauer within 48 hours
* Flow cytometry (FMH) within 3 days

# Microbiology

## Microbiology Specimens and Tests

Follow the instructions in section 2.2 above for labelling of specimen and form (paper or electronic).

* **Please note**: Samples for Blood Culture investigation **must be drawn first** to avoid contamination. See SI-NOT-GEN1and SI-NOT-GEN2 for Order of Draw charts on Q-Pulse.
* Blood cultures, CSF samples and any sample requiring urgent testing whether during routine hours or On-Call (as applicable) must be transported to the laboratory without delay.
* Routine specimens for culture must be stored at 4°C, if there is any delay in transport to the laboratory (excludes blood cultures and CSF, keep at room temperature and transport to laboratory without delay).
* Inoculated agar plates from corneal scrapings, blood cultures, ocular fluid inoculated into paediatric blood culture bottle and inoculated chocolate agar plates for *N. gonorrhoeae* culture are processed immediately. Any remaining sample from ocular fluids (vitreous tap, AC tap, aqueous fluid) is then stored at 4°C. Other specimens transferred from RVEEH are stored at 4°C in NMH Microbiology laboratory upon receipt until such time as they are processed.
* See also document PP-CS-MIC-64, Clinical Indication for Micro Specimens, available in Q-Pulse.

## Microbiology Specimen Stability

The majority of specimens for Microbiology are stable for up to 3 days once stored at 4°C.  Some exceptions apply for particular specimens and/or tests as follows:

Figure 23: Stability of Microbiology Specimens

|  |  |
| --- | --- |
| **Test / Profile** | **Sample Stability** |
| **Blood Cultures** | Send ASAP - Max 4 hours at room temperature |
| **CSF** | Send ASAP – Store at room temperature |
| **Inoculated Plates (Corneal scraping, gonorrhoeae)** | Send ASAP - For incubation upon arrival |
| **Endocervical swab for gonorrhoeae culture** | Send ASAP – Max 30 minutes. During routine hours only |
| **Environmental settle plates** | Send ASAP – Store at room temperature |
| **Urine for Chlamydia / Gonorrhoeae** | Maximum of 24 hours – Store at 4˚C |
| **Faeces – All tests (excl. ova and parasites)** | 4 days, store at 4˚C |
| **Faeces - Ova and Parasites** | Send ASAP, store at 4˚C |
| **All other specimens** | 3 days, store at 4˚C |

Figure 24: Blood Cultures

| **Blood Culture** | **Container** | **Volume** | **Turnaround  Times** | **Special**  **Requirements** | **Accreditation Status** | **Referred Test** |
| --- | --- | --- | --- | --- | --- | --- |
| **Adult** | **Aerobic and**  **anaerobic vials** | 8-10 mls  per bottle | Interim negative to date results at 24 and 48 hours for adults and 36 and 48 hrs for paeds.  Full negative results after 5 days.  Positive results available 48- 96 hours from time bottle flagged positive.  TAT for blood cultures, for reporting of Gram stain from time flagged positive in BacT Alert is <=4 hours | Specimens should be taken before commencement of antimicrobial therapy. Send to laboratory immediately. | Accredited | No |
| **Neonate** | **Paeds vial** | ≥ 1 ml | Accredited | No |

Figure 25: CSF Microbiology Examination

| **CSF** | **Container** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred Test** |
| --- | --- | --- | --- | --- | --- |
| **Culture** | **3 X Sterile CSF tubes** | Minimum: ≤48hrs.  Maximum: 96 hrs. | Specimens should be taken before commencement of antimicrobial therapy. Send to laboratory immediately.  PCR only performed under certain criteria as laid down by IMSRL | Accredited | No |
| **Microscopy, Gram** | Cell count: 2 hrs  Gram stain: 4 hrs | Accredited |
| **GBS, *E.coli* and *Listeria* sp. PCR (IMSRL) or CSF FilmArray (Temple Street)** | 1 day | Accredited | **Yes:** IMSRL |
| **Viral studies** | ≤1 week | Accredited | **Yes:** NVRL |

Figure 26: Faeces Examination

| **Faeces** | **Container** | **Specimen Volume** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred**  **Test** |
| --- | --- | --- | --- | --- | --- | --- |
| **Faeces PCR** |  |  | Minimum: 1 days  Maximum: 3 days |  | Accredited | No |
| **Ova and Parasites** | 1 - 9 days | Test not indicated on neonates.  Clinical details essential | Accredited | **Yes:** Microbiology, St. Vincent’s Hospital |
| **Bloody Stools** | ≤2 weeks | Clinical details essential. Sent for VTEC isolation | Accredited | **Yes:**Public Health Lab, Cherry Orchard Hospital |
| **Occult Blood** | 9 hrs – 3 days |  | Accredited | **No** |

\*Please note there is no set run time for processing of specimens for *C. difficile* or Norovirus. They will be processed as soon as possible, depending on availability of resources for testing.

Figure 27: Fluids for Microbiology Examination

| **Fluid from**  **Normally Sterile**  **Sites** | | **Container** | **Specimen Volume** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred Test** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Fluid from any site processed in NMH** | **Culture and Gram stain and / or cell count** | **Sterile container** | >5ml | Minimum: 48hrs  Maximum:  96hrs | Please indicate if any specific infection is suspected. Send specimen to laboratory as soon as possible. | Accredited | No |
| **T.B.** | **Culture, ZN stain** | 6 - 8 weeks |  | Accredited | **Yes:** Microbiology, St Vincent’s Hospital |
| **EBM** | **Culture** | Min. 1ml | Minimum: 72hrs  Maximum:  96hrs |  | Accredited | No |

Figure 28: Sputum Microbiology Examination

| **Sputum** | **Container** | **Specimen Volume** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred**  **Test** |
| --- | --- | --- | --- | --- | --- | --- |
| **Culture** | **Sterile container** | Deep cough purulent specimen.  1 ml | Minimum: 48hrs  Maximum: 96hrs | Specimens should be taken before antimicrobial therapy started.  Salivary and perinasal secretions are unsuitable | Accredited | No |
| **Legionella** | 1 ml | 1 week |  | Accredited | **Yes:** Microbiology, St Vincent’s Hospital |
| **ZN Stain** | Early morning specimen on 3 consecutive days | 1 week | Accredited |
| **T.B Culture** | 6 - 8 weeks | Accredited |
| **Bloodstained Sputa** | 1 ml | Routine Culture: 10 days.  TB: 6 - 8 weeks | Any bloodstained sputa are referred to SVUH for ZN stain, TB culture and routine culture if required | Accredited |

Figure 29: Routine Swabs Microbiology Examination

| **Swabs** | **Container** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred**  **Test** |
| --- | --- | --- | --- | --- | --- |
| **HVS: Microscopy** | **Amies transport swab (blue top)** | Gram stain:  Minimum: 24 hours  Maximum: 96 hours |  | Accredited | No |
| **All swabs (see RF-CS-MIC-40 for all swabs processed in NMH)** | Vary depending on swab type, see individual procedures for reporting times | Accredited | No |
| ***Neisseria gonorrhoeae* Culture** | **Amies transport swab (blue top)** | Minimum: 48 hrs  Maximum: 96 hrs | Endocervical swab, send immediately to Microbiology and Contact Micro Laboratory. Available during routine hours only | Accredited | **No:** Culture  **Yes**: For susceptibility testing when isolated. Referred to Microbiology, SJH |
| **Rapid GBS Screen (GeneXpert) – Combined HVS/Rectal** | **Red Copan collection device (double swab)** | Same day | As per guidelines and/or as per Consultant Microbiologist. | Accredited | No |
| **PCR test for Chlamydia trachomatis,**  ***N. gonorrhoeae,***  ***Trichomonas vaginalis, Mycoplasma genitalium*** | **Aptima swab** | 7 - 10 Days | Mycoplasma testing is only available for patients attending Preterm Surveillance Clinic | Accredited | **Yes:** NVRL |

**Rapid GBS Screen – Run Times:**

* During routine hours:
  + Monday – Friday: 10:00, 12:30, 16:30
  + Saturday: 11:45
* Out of hours (including Bank Holidays):
  + Monday – Friday: No run out of hours
  + Saturday: 20:30
  + Sunday and Bank Holidays: 12:30, 20:30

Any samples received after the scheduled run time will not be processed until the next scheduled run. If specimens miss the 16:30 Monday - Friday run, they will not be processed until the next scheduled run the next day. We would advise that if a sample is being taken near the last run time (16:30, Monday - Friday) and is deemed too urgent to wait until the next day, please contact the Microbiology laboratory at Ext. 3533 to inform them that urgent sample on way and if possible to hold the run for a few minutes. It is only possible to hold the run for a maximum of 10 minutes, if the sample(s) are not down within the allotted time, they will not be processed until the next scheduled run.

Figure 30: Surveillance Screens

| **Screen** | **Container** | **Specimen** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred Test** |
| --- | --- | --- | --- | --- | --- | --- |
| **MRSA: Adults** | **Amies transport swabs (blue top)** | Nasal, throat, perineal / groin, eye, ear | Minimum : 24hrs  Maximum: 72hrs |  | Accredited | No |
| **MRSA: Neonatal Screen** | Nasal, Groin and Umbilical | All babies in the unit are screened every Tuesday. All new admissions and re-admissions to the unit should be screened on arrival. | Accredited | No |
| **MRSA:**  **Occupational Health Screen\*** | Nasal |  | Accredited | No |
| **Gentamicin Resistant Enterobacterales Neonates** | **Sterile container OR**  **Amies transport swab (blue top)** | Stool or Rectal Swab | Minimum : 24hrs  Maximum: 72 hrs | All babies in the unit are screened every Monday.  Faecal matter required on swab.  All new admissions and re-admissions to the unit should be screened on arrival. | Accredited | No |
| **ESBL Screening Neonates** | Minimum: 24hrs  Maximum: 96 hrs | Not Accredited |
| **VRE Neonates** | Minimum : 48hrs  Maximum: 120 hrs | Accredited | No |
| **CPE Neonates** | Minimum : 24hrs  Maximum: 72 hrs | Accredited | No |
| **VRE Adults** | Minimum : 48hrs  Maximum: 120 hrs | All patient transfers or recent hospital admissions screened.  Pre-op screening not required. | Accredited | No |
| **CPE Adults** | Minimum : 24hrs  Maximum: 72 hrs |  | Accredited | No |

**\*Note:** Occupational health screen results are not available to view on Winpath Ward Enquiry.

Figure 31: Urines Microbiology Examination

| **Urine** | **Container** | **Specimen Volume** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred Test** |
| --- | --- | --- | --- | --- | --- | --- |
| **Adults: Culture and microscopy** | **Sterile MSU Jar** | Midstream urine, catheter - 10 ml | Minimum:  24 hrs  Maximum:  96 hrs | Specimens should be taken before antimicrobial therapy initiated. Specimens should be ≤ 48 hours old upon receipt in lab. | Accredited | No |
| **Paediatric: Culture and microscopy** | CCU, bag - 1 ml | Accredited | No |
| **Microscopy** |  | Same day | Accredited | No |
| **Pregnancy Test** | 1 ml early morning specimen | Same day | Early morning specimens preferred | Accredited | No |
| **ZN Stain** | 60 ml | 1 week | Complete early morning specimens from 3 consecutive days | Accredited | **Yes:** Microbiology, St. Vincent’s Hospital |
| **TB Culture** | 6 - 8 weeks | Accredited |
| **Chlamydia trachomatis,**  ***N. gonorrhoeae* PCR** | 60 ml | 7 – 10 days | First void specimen | Accredited | **Yes:** NVRL |

Figure 32:Other Specimens Microbiology Examination

| **Specimen** | **Container** | **Specimen Volume** | **Turnaround  Times** | **Special Requirements** | **Accreditation Status** | **Referred Test** |
| --- | --- | --- | --- | --- | --- | --- |
| **Abscess and Pus** | **Sterile container** | > 1ml | Minimum : 48hrs  Maximum: 6 days | Send to lab as soon as possible for anaerobic culture | Accredited | No |
| **I.U.C.D.** | IUCD | **Routine C/S:**  Minimum:48 hrs Maximum: 96 hrs  **Actinomyces**  Minimum: 10 days  Maximum: 14 days | Leave all material on IUCD | Accredited | No |
| **Environmental swabs / water** | **Amies transport swab (blue top) / sterile container** | 1ml | Minimum: 5 days  Maximum: 7 days |  | Accredited | No |
| **Environmental settle plates** | **SDA / TSA agar** |  | Minimum: 5 days  Maximum: 7 days  Minimum: 14 days  Maximum: 16 days | When extended incubation requested | Accredited | No |
| **Bacterial PCR (e.g. GBS, E. coli, Listeria etc.)** | **EDTA** | >0.5ml | Verbal: 1 Day  Written: 2-3 Days | N/A | Accredited | **Yes:** IMSRL |
| **\*Influenza A/B, RSV PCR** | **Copan universal transport medium** | Ensure swab is present in the container | Same day | As per clinical guidelines | Accredited | No |
| **Sars-CoV-2** | **Copan universal transport medium** | Ensure swab is present in the container | Urgent: 3 hours  Routine: 48 hours | As per clinical guidelines | Not accredited | No |

\*Please note there is no set run time for processing of specimens for Influenza A/B/RSV.

All specimens will be processed as soon as possible, depending on availability of resources for testing.

**Sars-CoV-2:**

* Only symptomatic patients are processed urgently.
* All other patients and staff are processed the same day or within 48 hours of receipt of the sample.

Figure 33: Microbiology Referral Tests

| **Test** | **Code** | **Container Type/ Sample requirements** | **Investigation required** | **TAT** | **Lab Series** | **Referral Centre** | **Specific Form Required and Location** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **16s rRNA Bacterial Gene Detection** | 16SR | Fluid from normally sterile site e.g. ocular fluid, CSF | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| 18s rRNA Fungal Gene Detection | 18SR | Fluid from normally sterile site e.g. ocular fluid, CSF | PCR | 1 week | M |
| 16s Gene Sequencing | REFL | Suitable agar plate / slope (for identification of unknown organisms) | PCR | 10 days | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| ***Acanthamoeba*** | ACAN | Dry corneal swab | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Adenovirus DNA** | ADVD | Ocular fluid | PCR | 1 week | M |
| **A.S.O. Titre** | ASO | Serum 7 ml  Only send after approval by  Consultant Microbiologist | Titre |  | M | **Microbiology Laboratory, SVUH** | No |
| ***Aspergillus* DNA** | ASPD | EDTA, BAL, Sputum.  Only send after approval by  Consultant Microbiologist | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Atypical Pneumonia** | ATYA | Respiratory type samples in sterile container | PCR | 5 days | D | **National Virus Reference Laboratory** | No |
| **Bartonella DNA** | BART | EDTA, tissue | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Borrelia DNA** | BORD | EDTA, serum, tissue | PCR | 1 week | M |
| ***Bordetella pertussis* PCR Screen** | BPPC | Perinasal swabs (from Micro Lab)  Serum sample for Serology. Also accept NPA, sputum & perinasal swab for PCR | Serology more useful for ongoing symptoms and no vaccinations | 1 week | M | **Microbiology Dept, CHI, Crumlin** | No |
| ***Campylobacter* typing** | TYPE | Stool Sample  Campylobacter isolate (send on Amies swab) | Typing | 1 week | M | **Public Health Laboratory (Cherry Orchard)** | Yes  Available through website:  [www.hse.ie](http://www.hse.ie) (Services – Public Health – Public Health Lab – Cherry Orchard – Request Forms) |
| ***Candida* species** | CANS | Pure subculture on Nutrient agar slope | Susceptibility and M.I.C. tests | 3 days | M | **Microbiology Laboratory, SVUH** | No |
| ***Candida* DNA** | CAND | Ocular fluid, CSF, EDTA  Only send after approval by  Consultant Microbiologist | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Carbapenamase Producing Enterobacterales** | TYPE | Pure subculture on Nutrient agar slope | Confirmation of CPE results | ≤15 working days | M | **Carbapenemase Producing Enterobacterales (CPE) Reference Laboratory** | Yes  Available through website:  [www.saolta.ie](http://www.saolta.ie) |
| **Chlamydia trachomatis DNA** | CHLD | Ocular fluid, dry corneal swab | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***Clostridium difficile* Typing** | TYPE | Stool Sample | Typing | 1 week | M | **Public Health Laboratory (Cherry Orchard)** | Yes  Available through website:  [www.hse.ie](http://www.hse.ie) (Services – Public Health – Public Health Lab – Cherry Orchard – Request Forms) |
| **CMV DNA** | CMVD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **COVID 19** | NCOV | Red respiratory viral transport media | PCR | 48-72 hours | M | **National Virus Reference Laboratory** | No |
| ***Cryptococcus neoformans* DNA** | CRYD | CSF, EDTA  Only send after approval by  Consultant Microbiologist | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Cryptosporidium** | CRYP | Stools | Identification by Staining methods | 3 days | M | **Public Health Laboratory (Cherry Orchard)** | No |
| **EB Virus (EBV) DNA** | EBVD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***E. coli* 0157 (Bloody stools or clinical H.U.S)** | E157 | Stools | Culture for 0157 | 4 days | M | **Public Health Laboratory (Cherry Orchard)** | Yes  Available through website:  [www.hse.ie](http://www.hse.ie) (Services – Public Health – Public Health Lab – Cherry Orchard – Request Forms) |
| ***E. coli* PCR** | ECOP | C.S.F .400 µL | P.C.R.  Urgent send ASAP within working day or refrigerate immediately if at the weekend | Samples are run each day 11am Mon-Fri. Results in late p.m. | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **Enterovirus DNA** | ENVD | Ocular fluid, dry corneal swab | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Epidemiological testing** | TYPE | Pure subcultures on slopes | Isolates for confirmation of outbreak | As per HPA reference laboratory | M | **Reference Laboratories with Specialist Expertise in the Diagnoses and Characterisation of Particular Micro organisms. See www.hpa.org.uk for individual laboratory contact details** | Yes  Through website:  [www.hpa.org.uk/SRMTests](http://www.hpa.org.uk/SRMTests) for various request forms |
| **Fungi** | FUN | Scrapings, nail, lesions | Isolation and identification of fungi from clinical samples | ≤2 weeks | M | **Microbiology Laboratory, SVUH** | No |
| **Fungal isolate** | SJHF | Pure subcultures on SDA agar seal with parafilm | *Aspergillus* identification only.  Other fungal isolates and *Aspergillus* for AST refer to Bristol | ≤2 weeks | M | **Microbiology, SJH** | No |
| **Fungal and non-Candida yeast isolate** | BRIF | Pure subcultures on nutrient agar slope | Identification and susceptibility testing (all fungi) | ≤2 weeks | M | **PHE Mycology Reference Laboratory (Bristol)** | Yes  Through website:  [www.gov.uk/government/publications/mycology-identification-and-susceptibility-testing-request-form](http://www.gov.uk/government/publications/mycology-identification-and-susceptibility-testing-request-form) |
| **G.B.S. PCR** | GBSP | C.S.F .400 µL  EDTA samples 1 ml | P.C.R.  Urgent send ASAP within working day or refrigerate immediately if at the weekend | Samples are run each day 11am Mon-Fri. Results in late p.m. | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **Group A / B *Streptococci* DNA** | GABS | CSF, EDTA/citrated whole blood, tissue | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***Haemophilus influenzae* DNA** | HINP | C.S.F .400 µL  EDTA samples 1 ml | PCR | 10 working days | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **Hepatitis DNA** | HED | Ocular fluid, dry corneal swab | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **HSV DNA** | HSVD | Ocular fluid, dry corneal swab | PCR | 1 week | M |
| **Influenzae surveillance and typing** | TYPE | Red respiratory viral transport media | PCR | 1 month | M | **National Virus Reference Laboratory** | No  Use surveillance sticker on form |
| **Invasive isolates of Anaerobes for AST** | ANES | Pure subculture on blood agar plate | Susceptibility testing | 10 working days | M | **Microbiology Laboratory, SVUH** | No |
| **Invasive Isolates Of *Haemophilus influenzae*** | TYPE | Pure subculture onto choc agar slope. | Serotyping | 10 working days | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **Invasive isolates of *Streptococcus pneumoniae*** | TYPE | Pure subculture on Chocolate agar slopes | Serotyping | 7 working days | M | **Epidemiology and Molecular Biology Unit (CHI, Temple St.)** | No |
| **Isolate Identification** | MAL1, ID 2, 3…7 | Pure subculture on suitable agar plate  In event VITEK MS Maldi-TOF out of service, back up provision for organism identification | Organism identification | 2 days | M | **Microbiology Laboratory, SVUH** | No |
| **Legionella Antigen** | LEG | Urine | Immunochromatography | 2 working days | M |
| ***Listeria* species** | TYPE | Pure subculture on nutrient agar slope | Typing | 1-2 weeks | M | **NSSLRL** | Yes  Through website:  <http://www.nuigalway.ie/salmonella_lab> |
| ***Listeria monocytogenes* DNA** | LIMD | CSF, EDTA | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Meningitis / Encephalitis FilmArray Panel** | FAME | CSF | PCR | 3 days | M | **Microbiology Dept, CHI Temple Street** | No |
| **Meningococcal PCR** | MENP | CSF - 400µl  EDTA – 1ml | Collect specimen as close to time of onset and prior to antibiotic administration  Urgent send ASAP within working day, store at 4˚C if delay in transporting | 1 week | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **MRSA Isolates** | MRST | Pure subculture on nutrient agar slope. | Typing and confirmation of Methicillin resistance | 2 weeks | M | **National MRSA Reference Laboratory** | Yes  Through website:  <http://www.stjames.ie/nmrsarl/index.html> |
| ***Mycoplasma pneumonia* Antibody** | MPAB | Serum sample | Serology | 3 working days | D | **Eurofins Ireland** | No |
| ***Neisseria gonorrhoeae* DNA** | NEGD | Ocular fluid, dry corneal swab | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***Neisseria* *gonorrhoeae*** | NESS | Pure subculture on chocolate agar. | Susceptibility testing | 1 week | M | **Microbiology, SJH** | Yes  [www.stjames.ie](http://www.stjames.ie)  Healthcare Professionals – Referral Forms - Laboratory |
| ***Neisseria meningitidis*** | NESS | Pure subculture on chocolate agar | Susceptibility testing | 1 week | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| ***Neisseria meningitidis*** | TYPE | Pure subculture on chocolate agar | P.C.R. | Samples are run each day 11am Mon-Fri. Results in late p.m. | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **Ova and parasites** | OAP | Stools | Test for ova and parasites | 1 week | M | **Microbiology Laboratory, SVUH** | No |
| **Pneumococcal PCR** | PNEP | C.S.F or EDTA | P.C.R. | Samples are run each day 11am Mon-Fri. Results in late p.m. | M | **Irish Meningococcal and Sepsis Reference Laboratory** | Yes  www.cuh.ie – Healthcare Professionals – Departments – Laboratory – IMSRL Request Form |
| **Pneumoncoccal Antigen** | PNEU | Urine | Immunochromatography | 2 working days | M | **Microbiology Laboratory, SVUH** | No |
| ***Propionibacterium*DNA** | PROD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***Pseudomonas* DNA** | PSAD | Ocular fluid | PCR | 1 week | M |
| **Rubella DNA** | RUBD | Ocular fluid | PCR | 1 week | M |
| ***Salmonella* species** | TYPE | Pure subculture on nutrient agar slope | Serotyping and identification | 1 week | M | **NSSLRL** | Yes  Through website:  <http://www.nuigalway.ie/salmonella_lab> |
| ***Shigella* species** | TYPE | Pure subculture on nutrient agar slope | Typing | 1-2 weeks | M |
| **Specimen for routine culture and susceptibility** | SPRC | Any specimen type not performed in NMH for routine culture and AST e.g. lymph nodes, pleural fluid, sputum when bloodstained / for TB also | Culture and Sensitivity | ≤ 2 weeks | M | **Microbiology Laboratory, SVUH** | No |
| **Specimen for Referral** | REFL | For sample types, tests , isolates rarely tested for in most laboratories | Any | Up to 1 month | M | **Relevant centre for where tests required are performed.**  See Q:\2 Microbiology\Referral labs “Referral labs for unusual organisms” for any that have been previously sent/used for details. Add any new cases to this. | |
| ***Staphylococcus* DNA** | STGD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***Streptococcus pneumoniae* DNA** | SPND | Ocular fluid | PCR | 1 week | M |
| **T.B.** | TB | Sputa, tissue samples (all neck nodes) and urine | Z.N. or auromine-phenol stain and culture | Microscopy in 4 days. Culture in 6-8 weeks | M | **Microbiology Laboratory, SVUH** | No |
| **TB DNA** | TBD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| **Toxocara** | TOXC | Ocular fluid | IgG / Western Blot | 1 Week | M | **PHE National Parasitology Reference Laboratory** | No |
| **Toxoplasma gondii DNA** | TOGD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |
| ***Treponema pallidum* DNA** | TREP | Ocular fluid | PCR | 1 week | M |
| ***Trichomonas vaginalis*** | MCGT | Urine  Only refer when possible *Trichomonas* seen in the urine microscopy for confirmation  (*Set CT/NG to ‘returned’ on LIS prior to sending)* | PCR | 1 week | W | **National Virus Reference Laboratory** | No |
| **Varicella zoster DNA** | VZVD | Ocular fluid | PCR | 1 week | M | **Micropathology Ltd.** | Yes  [www.micropathology.com](http://www.micropathology.com) |

## Reference Ranges and Critical Alert Ranges

Generally Biological Reference Intervals do not apply to Microbiology, however, please see below for exceptions. Clinical decision values are listed below for both the NMH and RVEEH.

Figure 34: Normal values for WBC, RBC, Protein and Glucose for Various Age Groups in CSF

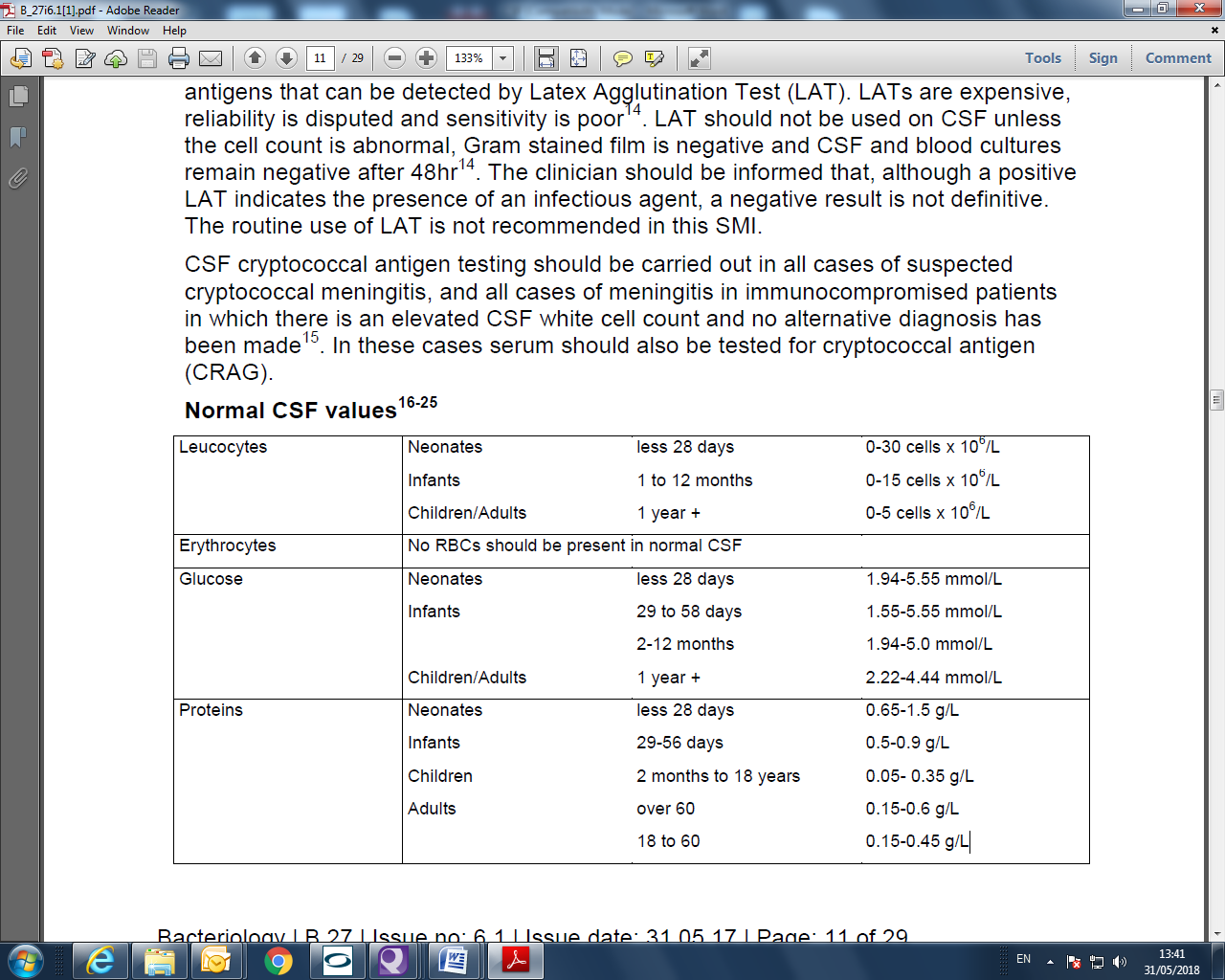


Figure 35: Microbiology Critical Alert Ranges

|  |  |  |  |
| --- | --- | --- | --- |
| **NMH** | | | |
| ***Organism*** | ***Notify*** | ***When*** | ***Notes*** |
| MRSA | * Consultant Microbiologist /SpR * Infection Control | * In-Patient: Notify at presumptive and when confirmed * Out-patient: Notify when confirmed | Consultant will decide action of “presumptive MRSA”. Strongly consider infection control precautions if presumptive MRSA case is an in-patient. |
| * Relevant Unit / Clinic | * In-Patient: * NICU: Notify at presumptive and when confirmed * All others: Notify when confirmed * Out-patient (adults and neonates): Notify when confirmed |
| Gentamicin-Resistant Enterobacterales | * Consultant Microbiologist /SpR * Infection Control * NICU (when applicable) | Once confirmed |  |
| VRE, CPE, ESBL | * Consultant Microbiologist /SpR * Infection Control * Relevant unit / clinic * Surveillance Scientist |
| *Clostridium difficile* |
| Norovirus |
| Influenza A / B / RSV | By Microbiology and On-Call (to relevant unit/clinic) |
| Faecal pathogens | * Consultant Microbiologist /SpR * Infection Control * Surveillance Scientist | Any positive result from the Film Array GI panel |
| SARS-COV-2 | * Consultant Microbiologist /SpR * Infection Control * Surveillance Scientist | Confirmed Detected | By Microbiology  By On-Call (to relevant unit/clinic, Occ Health) |
| * Relevant unit / clinic (Patients) * Occupational health (Staff) | All Detected results from all locations (including ED, pre-op, clinics and occupational health)  If no answer contact ADOM bleep 022 |
| Group A *Streptococci* | * Consultant Microbiologist /SpR * Relevant unit / clinic * Surveillance Scientist | Once confirmed |  |
| *Listeria* monocytogenes |
| *Neisseria gonorrhoeae* | When isolated from culture or by PCR. |
| *Pseudomonas* aeruginosa | Any neonate or eye patient | From any eye and neonate related specimens |
| Group B *Streptococci* | * Unit 3, Delivery Ward | Isolated for the first time from all antenatal / peripartum in-patients |  |
| * Relevant unit / clinic | All paediatric patients; or specimens related to / impact on neonates (e.g. EBM) |
| Rapid GBS | * Unit 3 | All results (Detected and Not Detected) | By Microbiology and On-Call |

|  |  |  |  |
| --- | --- | --- | --- |
| **NMH** | | | |
| ***Sample Type*** | ***Notify*** | ***When*** | ***Notes*** |
| Blood Cultures | * Consultant Microbiologist or SpR | **Routine Day:** Inform Consultant of any positives | By Microbiology and On-Call |
| **Out of hours:** Send pseudo-anonymised text message with positive Gram stain and photograph of FilmArray result to Consultant Microbiologist.  If unable to interpret the Gram stain contact the Consultant Microbiologist by phone.  If locum is covering - text message not required – clinical staff may phone locum | By On-Call |
| * Relevant Unit / Clinic | **Adults:**  **Routine Hours:** Contact the relevant unit  **OOH:** Bleep Obs/Gy Reg, if no answer, bleep Obs/Gy SHO.  **Paediatric Anytime:** Bleep Paeds Reg, if no answer, bleep Paeds SHO  If no answer contact ADOM on duty, bleep 022  *Exception: When Gram stain = “No Organisms Seen” – Telephoning not required.* | By Microbiology and On-Call |
| * Infection Control | Next working day with any positive **adult** blood cultures | By Microbiology |
| ***CSF*** | * Consultant Microbiologist /SpR | WCC: ≥20 (neonate) – lower WCC (≥5) threshold for older patients | By Microbiology and On-Call |
| Positive Gram Stain |
| * Relevant Unit / Clinic | Cell count and Gram stain; Bleep the relevant Reg / SHO for paed / obsgynae. If no answer contact the ADOM on bleep 022. |
| * Consultant Microbiologist * Relevant Unit / Clinic | Culture positive |
| Faecal Occult Blood | * Relevant Unit / Clinic | Positive |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **RVEEH** | | | |
| ***Organism*** | ***Notify*** | ***When*** | ***Notes*** |
| MRSA | * Relevant Clinic / Unit | In-Patient: Notify at presumptive and when confirmed |  |
| * Infection Control (by e-mail) | * In-Patient: Notify at presumptive and when confirmed * Out-Patient: Notify when confirmed |
| VRE, CPE, ESBL | * Consultant Microbiologist /SpR * Infection Control (Mon – Fri) * Relevant unit / clinic * Surveillance Scientist | Once confirmed |
| *Clostridium difficile* | Once confirmed |
| Norovirus | Once confirmed |
| Influenza A / B | Once confirmed |
| Faecal pathogens | * Consultant Microbiologist /SpR * Infection Control * Surveillance Scientist | Once confirmed | Any positive result from the FilmArray GI panel |
| SARS-COV-2 | * Consultant Microbiologist /SpR * Infection Control (Mon-Fri) * Surveillance Scientist * Relevant unit/clinic | Confirmed Detected | By Microbiology  By On-Call (to Relevant Unit/Clinic) |
| Group A *Streptococci* | * Consultant Microbiologist /SpR * Infection Control (Mon – Fri) * Relevant unit / clinic * Surveillance Scientist | Once confirmed |  |
| *Listeria* sp. | Once confirmed |
| *Neisseria gonorrhoeae* | Once confirmed | When isolated from culture or by PCR. |
| *Pseudomonas* aeruginosa | * Consultant Microbiologist /SpR * Relevant unit / clinic | Any eye patient, presumptive identification | From any eye specimen |
| Acanthamoeba | * Consultant Microbiologist /SpR * Relevant unit / clinic | Any positive result |  |
| ***Sample Type*** | ***Notify*** | ***When*** | ***Notes*** |
| Blood Cultures, including ocular fluid in paediatric blood culture bottles | * Consultant Microbiologist or SpR | Routine day: with any positives. | By Microbiology and On-Call |
| Out of hours: Send pseudo-anonymised text message with positive gram stain and photograph of film array result to Consultant Microbiologist. If unable to interpret the gram stain contact the Consultant Microbiologist by phone.  If locum is covering - text message not required – clinical staff may phone locum | On-Call |
| * Relevant Unit / Clinic | Phone in-patient ward (634 3655 / 3657) with any positives and Gram stain. If no reply, contact the Consultant Microbiologist 24/7 (exception to above).  *Exception: When Gram stain = “No Organisms Seen” – Telephoning not required.* | By Microbiology and On-Call |
| Corneal Scrapings | * Consultant Microbiologist or SpR * Relevant Unit / Clinic | Positive Gram stain | By Microbiology |
| Culture positive as soon as preliminary identification is available |
| Vitreous / Aqueous Fluids | * Consultant Microbiologist or SpR * Relevant Unit / Clinic | Positive Gram stain |
| Culture positive as soon as preliminary identification is available |
| Faecal Occult Blood | * Relevant Unit / Clinic | Positive |
| Environmental Screening | * Pharmacy | >5 colonies of any types present on settle plates from glove, isolator or finger dab  >20 colonies of any types present on settle plates from clean room |

Unless otherwise indicated, all results are phoned by Microbiology scientific staff. NMH results are reported to the infection control nurse by entering details on a protected shared Excel sheet. RVEEH results are reported to the infection control nurse by e-mail. Any other clinically significant organisms may also be telephoned as required.

Significant isolates in other specimens and from known ill patients are telephoned to the Consultant Microbiologist before susceptibility tests are finalised. In the event of the NMH Consultant Microbiologist being on leave, locum cover is provided as arranged by NMH Consultant Microbiologist. Advise the person taking the result that NMH Consultant Microbiologist is on leave, that cover is in place and that they may be contacted if required.

Out of hours, the scientist On-Call is not required to contact the locum Consultant Microbiologist covering as per protocol above, informed clinical staff that NMH Consultant Microbiologist is on leave, that cover is in place and they may be contacted if required.

Record all evidence of phoning results in the telephone log on the LIS as per LP-GEN-TELREP.

## Mandatory Reporting

The Microbiology laboratory reports all significant isolates and diagnoses from referral laboratories in accordance with the Infectious Diseases (Amendment) Regulations2020 (S.I. No. 53/2020). The surveillance scientist in conjunction with the Consultant Microbiologist keeps a record of all infections reported by the laboratory.

## Requesting Additional Examinations/Tests

* Additional tests may be requested by clinical staff and added onto some samples. The ability of the Microbiology laboratory to perform these additional tests depends on the test being requested and viability of the sample for that test.
* Additional examinations, if possible, may be requested following consultation with consultant microbiologist or senior scientific staff. All add on requests are entered in the laboratory information system.
* Post processing of samples in Microbiology:
  + - CSFs are kept for 1 month refrigerated.
    - All other samples are kept for 1 week at room temperature. Due to the storage conditions of these samples, it is generally **NOT** possible to perform additional testing when the sample is >24 hours old from time processed.
    - Please check with the Microbiology department prior to ordering additional tests if possible to perform.
* Additional examinations also may be initiated by Consultant Microbiologist or senior scientific staff based on the results of initial examinations.

# Specimen Referral/Dispatch

## Specimen Referral

Where an investigation is not available in the Department of Pathology and Laboratory Medicine at the NMH, it may be referred to a third party laboratory for testing. Where possible, work is referred to INAB or CPA accredited laboratories. Referral occurs in cases where there is a request for:

* The provision of a unique or unusual service.
* Provision of a service not available in the NMH.
* Confirmation of initial findings.
* Backup service in the event of an unplanned interruption of the service.
* Where a Consultants second opinion in Histopathology and Cytology is required.
* It is policy to refer certain investigations to reference laboratories.

## Reports from Referral Laboratories

Reports from referral laboratories are managed in accordance with MP-GEN-RESREL, the procedure for the Review and Release of Results:

1. Test results are received in the Pathology Department of the NMH from the referral laboratory.
2. Results are logged into the LIS and an added comment identifies the referral laboratory. Tests that have been performed by the referral laboratory are highlighted within the NMH report. The referral/back up laboratory report number is recorded internally on Winpath for reference.
3. Where possible results are received electronically via Medibridge.
4. Results of external examinations entered into Winpath are authorised by scientific or medical staff. Additional comments may be added by senior or Consultant staff if appropriate. This authorisation process is controlled.
5. Where the referral laboratory report is sent by the laboratory to the ward, a copy of the report is kept in the department. This may be in hardcopy, electronic copy or transcribed into Winpath.
6. Genetic reports received from a referral laboratory are not entered into Winpath due to the complexity of the report. The following comment is attached to all results in Winpath: ‘*The original report has been sent to the requesting doctor or consultant or may be together with the patient's chart. To retrieve a file/report, please contact chart retrieval on extension 3421/3422 or medical records officer on extension 3208. Or alternatively contact the appropriate referral laboratory.*
7. The original report is sent to the requesting clinician and/or unit and filed in the patient’s chart. A copy is retained in the laboratory.

# Virology Referral

Requests must be from a hospital clinic or Consultant, and must be submitted on the appropriate form with clinical details and signature. Requests should be classified as follows:

* Routine (before 30 weeks’ gestation): 1-2 weeks reporting time.
* Late booking (after 30weeks’ gestation): Within 48 hours reporting time.
* Urgent: 4 hours reporting time (HIV) or within 24 hours (Hepatitis B, Varicella IgG, source blood from needle stick injury).
* The laboratory should be contacted when urgent specimens are being sent. **Note:** The urgent category has significant staff and cost implications for the National Virus Reference Laboratory (NVRL) and must only be used where necessary.

Figure 36: Referred Test for Serology/Virology

| **Test** | **Code** | **Tube type** | **Special Requirements** | | **Referral Centre** |
| --- | --- | --- | --- | --- | --- |
| **Adenovirus PCR** | **ADEN** | **Faeces / Eye / CSF / Swab / Nasal**  **Aspirate / EDTA** | Change sample type on WinPath to suit specimen type received. | | **NVRL** |
| **Anti-Hep B Core Total** | **HBC** | **Adult: Serum gel** |  | |
| **Anti-Pertussis Toxin IgG** | **COMS** | **Adult: Serum gel** | Clinical details are required. | | **Microbiology, CHI Crumlin** |
| **Atypical Pneumonia** | **ATYA** | **Adult: Serum gel** | Mycoplasma IgM | | **NVRL** |
| **Paed: Serum** |
| **Brucella ( RVEEH Only)** | **BRUC** | **Serum** | Spin to separate from cells. Stable on gel.  Separate + fridge if storing over the weekend | | **Eurofins Biomnis** |
| **Cat Scratch Serology (Bartonella)**  **(RVEEH Only)** | **CATS** | **Serum** |
| **Rubella, Syphilis, HBsAg, HIV, Hep C Abs** | **BKBB** | **Adult: Serum gel** | When gestation >38 weeks or if requested urgently by phone enter Urgent comment in the clinical details field of LIS and phone NVRL to inform them it’s en route.  Send on same day where possible. Otherwise keep in fridge and send the following day first thing. | | **NVRL** |
| **Rubella, Syphilis, HBsAg, HIV, Hep C Abs, Varicella** | **BKBV** |
| **Chlamydia and Gonorrhoeae** | **MCG** | **Eye Swabs (non-genital sites)** | White APTIMA specimen collection kit gen probe for RNA testing  ***Green top viral swabs are not suitable.*** | |
| ***+Trichomonas vaginalis***  (for all genital / urinary specimens only) | **MCGT** | **Urine**  **Genital Swabs** | * Urine: Transfer from MSU jar to Chlamydia / Gonorrhoea transport containers within 24 hours. * Use relevant Aptima Specimen collection kit gen probe for RNA testing * Endocervical / Urethral: White APTIMA swab * HVS: Orange APTIMA swab * In Winpath enter sample type: * Endocervical: ***ECS*** * Urethral: ***US*** * Urine:  ***U*** * Vaginal Swab: ***HVS*** or ***LVS*** (as indicated) | |
| ***+Trichomonas vaginalis and Mycoplasma genitalium when:***   * From Preterm Surveillance Clinic * Clinical details are Pelvic Inflammatory Disease (PID), Tubo-Ovarian Abscess (TOA), Epididymorchitis * When M. genitalium specifically requested (for genital specimens only) | **MCGP** | **Genital Swabs** |
| **CMV IgG and IgM** | **CMBL** | **Adult: Serum gel** |  | |
| **CMV PCR** | **CMVP** | **Urine, Saliva, EDTA, CSF, Amniotic Fluid** | * **For EDTA samples**: They stable at room temperature for 24 hours from collection. Samples are sent to the NVRL as soon as possible (reach NVRL with 24 hours of blood draw). * If samples cannot be sent to the NVRL within 24 hours, they must be separated, frozen and transported at -20°C. * All samples can be sent with the next scheduled courier. * Change sample type on WinPath screen to suit specimen type received. | | **NVRL** |
| **Enterovius PCR (e.g. hand, foot + mouth, also known as Coxsackie, Echo)** | **ENTV** | **Faeces /**  **Rectal / Throat Swabs / CSF / Serum** | Always order ENTV on Meconium samples.  Change sample type on request screen to suit specimen. | |
| **Epstein Barr Virus Screen** | **EBVS** | **Serum / Plasma** |  | |
| **Eye and Ear Viral Screen** | **RVEE** | **Viral Eye Swab** | Green top viral swab | |
| **Helicobacter pylori Abs (IgG) / Ag** | **REFL** | **Faeces (Ag only)**  **Serum (IgG only)** | * Faeces: Freeze when >72 hours before sending * Record in internal notepad in Results Entry, test(s) sample referred for | | **Eurofins Biomnis** |
| **Hepatitis A** | **HEPA** | **Adult: Serum Gel** |  | | **NVRL** |
| **Paed: Serum** |  | |
| **HBsAg** | **HBSC** | **Adult: Serum gel / EDTA plasma** | * When gestation >38 weeks or if requested by phone urgently. Enter Urgent in the clinical details of the LIS and phone NVRL to inform them it’s en route. Send on same day where possible. Otherwise keep in fridge and send the following day first thing. * Hepatitis C antigen: Request if clinical details of exposure to bodily fluids (e.g. blood donation, drug user) or if specifically requested. | |
| **Paed: Serum /**  **EDTA plasma** |
| **Hepatitis C Antigen** | **HCRT** | **Serum Gel** |
| **Hepatitis Screen (Hep B + Hep C)** | **HEPN** | **Adult: Serum gel** |
| **Paed: Serum** |
| **Hepatitis B Antibody Titre** | **HTIT** | **Adult: Serum gel** |  | |
| **Hepatitis B PCR / Viral Load** | **HBPC** | **Adult: EDTA** | * Samples are stable at room temperature for 24 hours from collection. Samples are sent to the NVRL as soon as possible (reach NVRL with 24 hours of blood draw). * If samples cannot be sent to the NVRL within 24 hours, they must be separated, frozen and transported at -20°C. * EDTA is the preferable sample for both paeds and adults however serum is accepted by NVRL. | | **NVRL** |
| **Paed: EDTA** |
| **Hepatitis C PCR / Viral Load** | **HCPC** | **Adult: EDTA** |
| **Paed: EDTA** |
| **Hepatitis B or C Genotying** | **HBGT**  **HCGE** | **EDTA Plasma** |
| **Hepatitis B and C Serology Work-Up (RVEEH Only)** | **HBC**  **HBSC**  **HCSC** | **Adult: Serum** | The following tests should be given; Anti Hep B core Total, Hep B s  Surface Antigen and Hep C antibodies. | |
| **Hepatitis C Abs** | **HEPC** | **Adult: Serum Gel / EDTA Plasma**  **Paeds: Serum /**  **EDTA Plasma /**  **Lit Hep Plasma** |  | |
| **Hepatitis D (Delta) Screen** | **HEPD** | **Adult: Serum Gel** | Spin to separate from cells. Stable on gel.  Separate + fridge if storing over the weekend | |
| **Hepatitis E Screen** | **HEPE** | **Adult: Serum Gel** | Spin to separate from cells. Stable on gel.  Separate + fridge if storing over the weekend | |
| **Herpes Simplex Virus 1 + 2 PCR** | **HERP** | **CSF / EDTA**  **Paed: Serum sample is acceptable** | * **Urgent** send CSF ASAP within working day or freeze immediately if at the weekend. Change sample type on request to suit specimen. * **For EDTA: If samples cannot be sent to the NVRL within 24 hours, they must be separated, frozen and transported at -20°C.** | |
| **SHSV** | **Viral Swab (genital / eye) / Fluid** |
| **Herpes Simplex Virus Serology** | **HSER** | **Adult: Serum** |
| **Adult: EDTA**  **Paed: EDTA** |
| **HIV Antigen / Antibody** | **HIV** | **Adult: Serum Gel** |  | |
| **Paed: Serum** |
| **HIV PCR / Viral Load** | **HIVP** | **Adult: EDTA** | * Samples are stable at room temperature for 24 hours from collection. Samples are sent to the NVRL as soon as possible (reach NVRL with 24 hours of blood draw). * If samples cannot be sent to the NVRL within 24 hours, they must be separated, frozen and transported at -20°C. * NB: If any EDTA sample received for NVRL, check with requesting unit if for PCR (in case EDTA sample taken in error), if so, spin, separate and freeze. EDTA samples are generally for PCR. | | **NVRL** |
| **Paed : EDTA** |
| **HIV, Hepatitis Screen, Hep B Core** | **IVF** | **Adult: Serum Gel** | Only order if gold sticker is ticked. For all IVF patients use the code @IVFT in the clinical details field in LIS. | |
| **HTLV Screen (1 + 2)** | **HTLV** | **Adult: Serum Gel / EDTA Plasma**  **Paed: EDTA Plasma** |  | |
| **Influenza / Parainfluenza / RSV / Respiratory Panel** | **MRSC** | **Green Viral Swab /**  **E.T. Secretions** | Influenza, RSV and SARS CoV2 testing is available in NMH; Refer full respiratory panel to NVRL | |
| **Immunoblot BORC (Confirmation Test for Lyme Disease)** | **COMS** | **Adult: Serum** | In the result entry field type the following “ Test being carried out” | |
| **Leptospira IgM (Leptospira screen)** | **LEPS** | **Adult: Serum** |  | |
| **Lyme Disease (also known as Borrelia) (RVEEH and NMH Requests)** | **LYME** | **Adult: Serum** | Clinical details are a requirement for RVEEH requests. | |
| **Measles and Mumps** | **MMSC** | **Adult: Serum** |  | |
| **Measles Screen** | **MEAS** | **Adult: Serum** |  | |
| **Measles, Mumps or Rubella RNA PCR** |  | **Oracol Swab** | Swabs stored in specimen reception in laboratory | |
| **Mumps Screen** | **MUMS** | **Adult: Serum** |  | |
| **Needle Stick Source** | **NSS** | **Adult: Serum** | **URGENT!!** Send to NVRL ASAP, phone to inform them it’s en route.  If needle stick source and recipient come together, order a HOLD on the recipient sample and send with the source sample. | In LIS, in clinical details field of the source's request entry, enter laboratory accession number of the recipients sample and vice versa. | **NVRL** |
| **Needle Stick Recipient (Hold)** | **HOLD** | **Adult: Serum** | Note: If there is no needle stick Source sample it can wait to the next routine day, it’s not urgent.  Check the request form for any additional tests that may be requested and add to request on LIS. |
| **Norovirus / Winter Vomiting** | **SRSV** | **Stool** |  | |
| **OHD SCREEN (Rubella, Anti-HBs Ab Titres, HBsAg, Anti-HB Core Total, Varicella, Measles + Mumps)** | **OHDS**  **HTIT**  **HBSC**  **HBC** | **Adult: Serum Gel** |  | |
| **IVS (Sample ID Validated by OHD)** | **IVS** | **Adult: Serum Gel** | Only order if written on OHD forms. Brings in comment: SAMPLE ID VALIDATED BY OCC HEALTH | |
| **Parvovirus Screen** | **PARV** | **Adult: Serum Gel**  **Paed: Serum /**  **Plasma** | If requested urgently by phone, send ASAP. Otherwise send with next courier. | |
| **Parvovirus DNA** | **MPAR** | **Amniotic Fluid** |  | |
| **Parechovirus** | **PARE** | **Green Viral Throat or Rectal Swab / Faeces / CSF / Serum** |  | |
| **Quantiferon (TB)** | **QUTB** | **Special blood tubes (x4) from Biomnis** | Once sample is taken it must be kept @RT. Must be incubated 16 hours after collection. Has to be centrifuged within 3 days @3000RPM for 15 minutes.  Quantiferon TB Information form stored in Specimen Reception folder on desktop. Fill out form and send sample with routine courier. Quantiferon blood collection tubes are stored in fridge HH22 in specimen reception. | | **Eurofins Biomnis** |
| **Rotavirus** | **ROTS** | **Stool** |  | | **NVRL** |
| **RSV Screen** | **RSVS** | **Naso-Pharyngeal Aspirate or swab** |  | |
| **Rubella IgG** | **RUBN** | **Adult : Serum gel** |  | | **NVRL** |
| **Rubella IgM Screen** | **RUB** | **Adult : Serum gel** | Usually ordered as part of TORCH screen or specifically request Rubella IgM | |
| **Paed : Serum** |
| **Syphilis (Also Known as RPR, TPPA , VDRL, Treponema pallidum)** | **WRO** | **Adult : Serum gel** |  | |
| **Paed : Serum** |
| **Torch + Syphilis (Maternal)** | **TORM** | **Adult: Serum gel**  **Plasma (Lit Hep)** | * Request Rubella IgM as add-on test through NVRL website | |
| **Torch + Syphilis (Paed)** | **TORP** | **Paed : Serum** | * Paeds <1yr old: Not performed on Architect in NVRL   Report Architect as ‘Not Tested’. Add RPR1 and RTPA   * Request Rubella IgM as add-on test through NVRL website | |
| **Tetanus** |  | **Adult : Serum gel** | For assessing response. | | **Immunology, SJH** |
| **Toxocara Abs (RVEEH Only)** | **TOCA** | **Serum** | Spin to separate from cells. Stable on gel.  Separate and fridge if storing over the weekend. | | **Eurofins Biomnis** |
| **Toxoplasmosis** | **SWTS** | **Serum**  **Amniotic Fluid** | Consult with the Consultant Microbiologist  Complete the Toxoplasma reference form | | **Toxoplasma Reference Unit, Public Health Wales** |
| **Toxoplasmosis** | **TOX.** | **Adult : Serum gel** | Most requests are sent to NVRL.  If mother and baby paired samples – send to **Toxoplasma Reference Laboratory, Swansea, UK.** | | **NVRL** |
| **Varicella Screen (Also Known as Chickenpox or Shingles or Varicella Zoster Virus)** | **VARS** | **Adult: Serum Gel / EDTA Plasma**  **Paed: Serum / EDTA Plasma** | Separate and refrigerate serum/plasma/EDTA Plasma for both Adults & Paeds. If molecular testing is requested and the sample is received over the weekend, separate and refrigerate sample. | |
| **Viral Culture** | **VCUL** | **Viral swab**  **(Green Lid)** |  | |
| **Viral PCR / PM Culture** | **VCUL** | **Tissue in viral transport medium** | Green top swab required for NMH (Viral swab). | |
| **CSF Viral Screen: HSV, Varicella, CMV, Enterovirus, Parechovirus and Human Herpes Virus 6 PCR** | **HERP**  **VARS**  **CMVP**  **ENTV**  **HHV6** | **Paed: CSF / EDTA** | IF CSF viral screen is received over the weekend, please freeze sample.  For HPV 6 PCR paediatric plasma and serum can also be accepted. | | **NVRL** |
| **RVEEH Viral Screen (swab):**  **HSV, Varicella, Adenovirus** | **RVEE** | **Viral Swab**  **(Green Lid)** | * Eye swabs or skin * When only one / two of the three tests on the panel requested, order test request as RVEE. In results entry set those not required as ‘returned’ (ctrl + R) prior to sending the request to the NVRL (electronic / paper) and ‘Not Tested’ for the parameter(s) in question. | |
| **Viral Panel (RVEEH Only)** | **TOX**  **HSER**  **VARS**  **WRO**  **CMBL**  **EBVS** | **Adult: Serum** |  | |
| **Zika Virus RNA** | **ZIKA** | **Serum**  **EDTA**  **Urine** | * Change sample type on request entry. * Relevant travel and clinical details are mandatory prior to referring of sample. * **Clinical history:** Location and dates of travel **must** be included. Contact Consultant Microbiologist if no relevant information. * Serum is the preferred specimen of choice. * Separate and freezer serum / plasma within 24 hours (or aliquot of) | |

**Note:** All request forms received out of hours must be date and time stamped.

When a number of tests are requested that form part of a profile, and is easier to request the profile test code than the tests individually, any parameter of the profile that is not required can be set ‘returned’ (ctrl + R) in Results Entry prior to sending requests to the referral laboratory and ‘Not Tested’ for the parameter(s) in question.

**Molecular Testing**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test** | **Code** | **Tube Type** | **Special Requirements** | **Referral Centre** |
| **Congenital Myasthenia Gene Panel** | **COMS** | **5ml EDTA** | Refrigerate if not being sent over the weekend. | **DNA Laboratory, Oxford Medical Genetics Laboratory** |
| **Cystic Fibrosis** | **COMS** | **EDTA** |  | **National Centre for Medical Genetics, Crumlin** |
| **Cytogenetics** | **CHCT** | **CVS** | **Urgent** send ASAP with next courier.  Send sample urgently if after 15.30hrs to ensure delivery to Crumlin by 16.30hrs. If < 15.30 hrs send with routine courier. Retain a photocopy of the request form.  Change sample type on Win-Path to suit specimen type received. Retain a photocopy of the request form. If sent over the weekend, date and time stamp form and store at room temperature. Leave a note for Specimen Reception staff to inform them that there is a sample present. It will be sent on Monday morning. | **National Centre for Medical Genetics Crumlin** |
| **Cytogenetics** | **CHRA** | **Amniotic Fluid** |  |
| **Cytogenetics** | **CHRH** | **Heparin 4ml** | Send 1° sample. Retain a photocopy of the request form |
| **Cytogenetics** | **TDL** | **Heparin 4ml or Products of Conception (POC)** | Lithium Heparin or POC required depending on test requested.  Change sample type on Winpath to suit specimen type received.  EDTA sample required for querying CF or Y deletions.  Send on same day where possible. Otherwise keep in fridge and send the following day. Change sample type on Winpath to suit specimen type received. Retain a photocopy of the request form. | **TDL Genetics** |
| **DNA Storage (Genetic Samples)** | **HOLD** | **EDTA / Serum** | Must include consultants name and clinical details on request form. Use comment code **@ HOCH** in Win-Path. **Send sample to Genetics Dept, OLHSC, Crumlin, Dublin 12.** | **National Centre for Medical Genetics Crumlin** |
| **Microarray** | **TDL** | **EDTA** | If Dr. W. Reardon patient, send to Crumlin | **National Centre for Medical Genetics, Crumlin** |
| **MOLE** | If not a Dr. W. Reardon patient, send to TDL | **TDL Genetics** |
| **Molecular Genetics** | **MOLE** | **EDTA / K3 Crossmatch EDTA** | If not sent out that day, keep in fridge and send the following day. Retain a photocopy of the request form. If sent over the weekend, store in fridge as it is delivered to the lab. It will be sent on Monday morning. | **National Centre for Medical Genetics, Crumlin** |

**Referral Laboratory Details**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Referral Centre** | **Address** | | **Phone Number** | |
| **Children’s Hospital Ireland (CHI), Crumlin** | Children’s Hospital Ireland,  Crumlin, Dublin 12 | | 01 409 6970 | |
| **National Centre for Medical Genetics, Crumlin** |
| **DNA Laboratory, Oxford Medical Genetics Laboratory** | DNA Laboratory,  Oxford Medical Genetics Laboratory,  Churchill Hospital,  Headington,  Oxford, 0X3 7LE | | 0044 (0)300 304 7777 | |
| **Eurofins Biomnis** | Unit 3 Sandyford Business Park,  Burton Hall Road,  Sandyford Business Park,  Dublin 18, D18 E528 | Three Rock Road, Sandyford Industrial Estate, Dublin 18, D18 A4C0 | 01 293 3690 | 01 295 8545 |
| **NVRL** | UCD,  Belfield, Dublin 4 | | 01 716 4415 | |
| **Immunology, SJH** | St. James’s Hospital, Dublin 8 | | 01 416 2928 | |
| **TDL Genetics** | TDL Genetics,  The Doctors Laboratory,  60 Whitfield Street,  London, W1T 4EU | | 0044 207 307 7373 | |
| **Toxoplasma Reference Unit, Public Health Wales** | Toxoplasma Reference Unit, Public Health Wales  Microbiology,  Singleton Hospital,  Swansea, SA2 8QA | | 0044 (0)1792 285 055 | |
| **West of Scotland Regional Genetic Service** | West of Scotland Regional Genetic Service.  Level 2 B Laboratory Medicine,  Southern General Hospital,  1345 Govan Road,  Glasgow G514TF | | 0044 141 354 9300 | |

For other virology requests, please consult WI-CS-SR-2 or The NVRL User Manual at the following link: <http://nvrl.ucd.ie/routine>

If both serology and molecular test requests are made, please collect a separate specimen for each request.

## Retrospective Requesting/Additional Requests

Samples are sent to NVRL and not retained in Specimen Reception. Additional tests may be requested within a year period by completion of a Serology request. Highlight on the form that it is add on request to a previous sample sent to the laboratory and send form to the Specimen Reception department. Samples are stored in the NVRL for 12 months. All add on requests are entered into the LIS.

**Molecular Genetics:**

* Specimens for cytogenetics are handled by Specimen Reception and enquiries should be directed to Ext: 3178/3545.
* Specimen Reception must be informed in advance of any amniotic fluid or CVS specimen.
* Samples are sent to the referral centre the same day (Monday–Thursday) if received in the laboratory before 12:00hrs. On Friday, samples can be received up until 14:15. Samples received after this time will be sent the following routine working day. Our courier provides a next day delivery to the referral centres.
* No samples for molecular genetics should be sent outside of routine hours (Monday-Friday 08:00-17:00).
* Please contact specimen reception for further information on specimen requirements for molecular genetics.

Figure 37: Genetic Testing

| **Test/Profile** | **Adult: Sample Type (Vol)** | **Paediatric: Sample Type (Vol)** | **Referral Centre** | **Turnaround  Times** | **Special Requirements** |
| --- | --- | --- | --- | --- | --- |
| **Prenatal Diagnosis**  **QF PCR** | **Amniotic Fluid**  **Or CVS** | **N/A** | Genetics OLHSCC  and / or  TDL UK | 3 working days | Please do not take samples after 14:15 on a Friday as specimens must be transported to UK overnight |
| **Prenatal Diagnosis**  **Culture** | **CVS** |  | Genetics OLHSCC  and / or  TDL UK | 3 working days | Please do not take samples after 14:15 on a Friday as specimens must be transported to UK overnight |
| **Molecular Genetics** | **EDTA**  **3ml** | **EDTA 1.3ml** | Genetics OLHSCC | 14-21 working days | Monday to Friday only |
| **Karyotyping** | **Lithium Heparin 3ml** |  | TDL UK | 14-21 working days | Please do not take samples after 14:15 on a Friday as specimens must be transported to UK overnight |
| **Karyotyping**  **(Baby)** |  | **Lithium Heparin**  **1.3ml** | OLHSCC | 14-21 working days | Monday to Friday only |
| **Harmony Test** | **EDTA**  **3ml** | **N/A** | TDL UK |  |  |
| **Fragile X** | **EDTA 3ml** | **EDTA 1.3ml** | TDL UK | 14-21 working days | Please do not take samples after 14:15 on a Friday as specimens must be transported to UK overnight |

# Appendices

## Appendix 1: Useful Referral Contact Numbers

| **Referral Laboratory** | **Address** | **Phone/Fax Number** |
| --- | --- | --- |
| **Haematology Laboratory Children’s Health Ireland at Crumlin** | Children’s Health Ireland at Crumlin Dublin 12 | Phone:01-4096432  Fax: 01-4559014 |
| **National Centre for Medical Genetics** | Department of Clinical Genetics  Children’s Health Ireland at Crumlin Dublin 12 | Phone: 01-4096089 |
| **Haemolytic Laboratory** | Central Pathology Dept  St James Hospital Dublin 8 | Phone: 01-4162394  01-4162909 |
| **Special Coagulation Laboratory (NCHCD)** | Central Pathology Dept  St James Hospital Dublin 8 | Phone: 01-4162956 |
| **St. James Immunology Dept** | Central Pathology Dept  St James Hospital Dublin 8 | Phone: 01-4162925  Fax: 01-4113008 |
| **St. Vincent’s Haematology Laboratory** | St. Vincent's University Hospital  Elm park Dublin 4 | Phone: 01-2774280 |
| **St. Vincent’s Coagulation Laboratory** | St. Vincent's University Hospital  Elm park Dublin 4 | Phone: 01-2774395 |
| **St. Vincent’s Immunology Laboratory** | St. Vincent's University Hospital  Elm park Dublin 4 | Phone: 01-2774598  01-2773825 |
| **St. Vincent’s Biochemistry Laboratory** | St. Vincent's University Hospital  Elm park Dublin 4 | Phone: 01-2214550 |
| **Nuclear Medicine Department** | St. Vincent’s University Hospital  Elm park Dublin 4 | Phone: 01-2214378 |
| **St. James Nutrition Laboratory** | Central Pathology Dept  St James Hospital Dublin 8 | Phone: 01-4162394 |
| **Cancer Molecular Diagnostics Laboratory** | Central Pathology Dept  St James Hospital Dublin 8 | Phone: 01-4103588 |
| **National Virus Reference Laboratory(NVRL)** | University College Dublin,  Belfield, Dublin 4 | Phone:01 7164414  Web: [www.ucd.ie/nvrl](http://www.ucd.ie/nvrl) |
| **TDL** | The Doctors Laboratory,  60 Whitfield Street, London  W1T 4EU | Phone: 0044207307740900442073077373 |
| **Children’s Health Ireland at Temple Street Biochemistry:**  **(Lactate, Organic Acids, Amino Acids)** | Children’s Health Ireland at Temple Street Children’s HospitalDublin 1 | Phone: 01 878 4272  / 4273 / 4458 |
| **Biomnis Laboratories** | Three Rock Road, Sandyford  Industrial Estate, Foxrock | Phone: 01 - 2944108 |
| **The Rotunda Hospital** | Parnell Square, Dublin 1 | 01-8171700 |

## Appendix 2: Uncertainty of Measurement

Performance specifications and indications of uncertainty of measurement for internal tests are recorded in the laboratory form RF-CS-LM-90, Calculated Uncertainty of Measurement for Laboratory Procedures, and are available from the individual laboratories (where appropriate) on request.

## Appendix 3: Microbiology Orders MN-CMS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MRSA Paediatric** | | | | **MRSA Adult** | |
| **Search Field** | | **Specimen Type** | | **Search Field** | **Specimen Type** |
| **MRSA Screen MCS Paed NMH** | | Nasal, Groin MRSA (Mon screen U8) | | **MRSA Screen MCS Adult NMH** | Groin Swab (MRSA) |
| Nasal, Groin, Umb MRSA (Mon screen U8) | |
|  | | Throat Swab MRSA |
| If MRSA **(+)** order individual swabs: | |
| Nasal Swab MRSA | | Nasal Swab MRSA Adult |
| Groin Swab MRSA | |
| Umbilical Swab MRSA (If applicable) | |
| **Rectal Swabs Paediatric (VRE, CPE,ESBL, Gent Res GNB)** | | | | **Rectal Swabs Adult** | |
| **Search Field** | | **Specimen Type** | | **Search Field** | **Specimen Type** |
| **VRE Screen MCS NMH** | | Rectal Swab Paed (Tues Screen U8) | | **CRE screen MCS NMH** | Rectal swab |
| Faeces |
| **VRE screen Adult** | Rectal swab |
| Faeces |
| **Blood Cultures Paediatric** | | | | **Blood Cultures Adult** | |
| **Search Field** | **Specimen Type** | | | **Search Field** | **Specimen Type** |
| **Blood Culture MCS Paed NMH** | Blood Culture MCS Paed NMH | | | **Blood Culture MCS Adult NMH** | Blood Culture MCS Adult NMH |
| **Urine Paediatric** | | | | **Urine Adult** | |
| **Search Field** | | **Specimen Type** | | **Search Field** | **Specimen Type** |
| **Urine MCS Paed NMH** | | Urine MCS Paed NMH | | **Urine MCS NMH** | Urine MCS NMH |
| Urine Catheter |
| hCG Detection, Urine NMH | hCG Detection, Urine NMH |
| **Faeces Paediatric for Molecular Testing** | | | | **Faeces Adult for Molecular Testing** | |
| **Search Field** | **Specimen Type** | | | **Search Field** | **Specimen Type** |
| **GI Panel, Faeces NMH** | Faeces Paed MCS NMH | | | **GI Panel, Faeces NMH** | Faeces |
| **Vaginal swabs for C&S** | | | | **Endocervical swab for C&S** | |
| **Search Field** | **Specimen Type** | | | **Search Field** | **Specimen Type** |
| **High vaginal swab Antenatal MCS NMH** | High vaginal swab | | | **Endocervical Swab MCS NMH** | Endocervical Swab MCS NMH |
| Low vaginal swab | | |
| **High vaginal swab Postnatal & Gynae NMH** | High vaginal swab | | | Urethral swab MCS NMH |
| Low vaginal swab | | |
| **GBS Screening Adults** | | | | | |
| **GBS CULTURE ONLY** | | | | **GBS Rapid Molecular Test (Unit 3)** | |
| **Search Field** | **Specimen Type** | | | **Search Field** | **Specimen Type** |
| **Low vaginal swab GBS MCS NMH** | Low vaginal swab | | | **Rapid GBS** | LVS & Rectal Group B |
| **Rectal swab for GBS MCS NMH** | Rectal swab for GBS MCS NMH | | |
| **Other Rapid/Molecular Testing** | | | | | |
| **Rapid Influenza** | | | | Nasal swab | |
| Nasopharyngeal swab / aspirate | |
| **SARS-CoV-2-RNA** | | | | Nasopharyngeal swab | |
| **Cerebrospinal Fluid Paediatric** | | | | **Eye swab for C&S** | |
| **Search Field** | | | **Specimen Type** | **Search Field** | **Specimen Type** |
| **Cerebrospinal Fluid MCS Paed NMH** | | | Cerebrospinal Fluid MCS Paed NMH | Eye Swab MCS NMH | Left Eye Swab |
| Right Eye Swab |
| **Wound Swabs/Episiotomy for C&S** | | | | **Expressed Breast Milk/Nipple Swabs for C&S** | |
| **Search Field** | | **Specimen Type** | | **Search Field** | **Specimen Type** |
| **Wound Swab MCS NMH** | | Abdominal Wound | | **Expressed Breast Milk MCS NMH** | Expressed Breast Milk Left |
| Laporoscopy Wound Swab | | Expressed Breast Milk |
| LSCS | | Expressed Breast Milk Right |
| Suture from Wound | | **Microbiology Culture NMH** | Breast Abscess |
| Wound Swab | | Breast Swab |
| **Microbiology Culture NMH** | | Episiotomy | | Left Breast Abscess |
| Right Breast Abscess |
| Nipple Swab Left |
| Nipple Swab Right |
| **Endotracheal Samples/ Secretions for C&S** | | | | **Tips and Devices for C&S** | |
| **Search Field** | | **Specimen Type** | | **Search Field** | **Specimen Type** |
| **Endotracheal MCS, NMH** | |  | | **Tips and Devices MCS NMH** | Arterial Line Tip |
| E.T Aspirate | | Central Line Tip |
| ETT Secretions | | CVP Tip |
| Nasal Aspirate | | E.T. Tube Tip |
| Nasal Secretions | | Long Line Tip |
| Nasopharyngeal Aspirate | | PICC Line |
| Nasophayngeal Secretions | | PICC Line Tip |
|  | | UAC Tip |
| UVC Tip |
| **Fluids for C&S** | | | | | |
| **Search Field** | **Specimen Type** | | | **Specimen Type** | **Specimen Type** |
| **Fluid MCS NMH** | Abdominal Fluid | | | Drain Fluid | Peritoneal Fluid |
| Ascitic Fluid | | | Fluid | Pleural Fluid |
| Body Fluid | | | Joint Fluid | Synovial Fluid |
| Breast Cyst Fluid | | | Ovarian Cyst Fluid | Vesicle Fluid |
| Cyst Fluid | | |  |  |
| **Miscellaneous Samples** | | | | | |
| **Search Field** | **Specimen Type** | | | **Specimen Type** | **Specimen Type** |
| **Microbiology Culture NMH** | Abdominal Swab | | | Labial Swab | Pus Swab |
| Abscess | | | Lesion ( Back ) | Rectal Abscess Swab |
| Abscess Pus | | | Lesion ( Chest ) | Retained Tampon |
| Abscess Swab | | | Lesion ( Face ) | Scalp Swab |
| Aspirate | | | Lesion ( Groin ) | Scrotal Aspiration |
| Bartholins Abscess | | | Lesion ( Left Leg ) | Semen |
| Bartholins Cyst | | | Lesion ( Leg ) | Serous Fluid |
| Blister Swab | | | Lesion ( Rectal ) | Sinus Aspirate |
| Boil | | | Lesion ( Right Leg ) | Sinus Swab Left |
| Bronchial Aspirate | | | Lip Swab | Sinus Swab Right |
| Bronchial Brushings | | | Liquor | Skin Scrapings |
| Bronchial Washings | | | Meconium | Stomach Swab |
| Burns Swab | | | Oesophageal Swab | Suprapubic Swab |
| Buttock Swab | | | Other (Not Coded) | Swab |
| Cervical Swab | | | Penile Surface Swab | Trachael Swab |
| Cheek Swab | | | Penile Swab | Tracheostomy Discharge |
| Cyst Swab | | | Perianal Swab | Ulcer Swab |
| Discharge | | | Perineal Swab | Ulcer Swab (Left Leg) |
| Gastric Aspirate | | | Peritoneal Fluid Swab | Ulcer Swab (Right.Leg) |
| Gastric Brushings | | | Peritoneal Swab | Umbilical Swab |
| Gastric Contents | | | Peritoneal Washings | Uterine Swab |
| **Microbiology Culture NMH** | Gastric Washings | | | Placental Swab | Vaginal Cyst |
| Groin Swab | | | Post-Coital Aspirate | Vesicle Swab / Scraping |
| Intrauterine Swab | | | Pressure Sores | Vulval Swab |
| IV Site | | | Pus |  |
| **Search Field** | **Specimen Type** | | | **Search Field** | **Specimen Type** |
| **Intra-Uterine Device MCS NMH** | Intra-Uterine Device | | | Mouth or Throat General MCS NMH | Mouth Swab |
|  |  | | |  | Throat Swab |
| **Mycoplamsa / Ureaplasma MCS NMH** | HVS | | |  |  |
|  | Swab | | | Sputum MCS NMH | Sputum |
|  |  | | |  |  |
| **Ear and Nose, General MCS NMH** | Ear Swab | | | Tuberculosis Investigation NMH | Tuberculosis Investigation |
|  | Ear Swab Paed | | |  |  |
|  | Left Ear Swab | | | Legionella Antigen Blood NMH | Legionella Antigen Blood |
|  | Left Ear Swab Paed | | | Legionella Antigen Urine NMH | Legionella Antigen Urine |
|  | Right Ear Swab | | |  |  |
|  | Right Ear Swab, Paed | | |  |  |
|  | Nasal Swab Adult | | |  |  |
|  | Nasal Swab | | |  |  |
|  | Nasopharyngeal Swab | | |  |  |
|  | Skin Swab | | |  |  |
|  | Tongue Swab | | |  |  |