PATHOLOGY LABORATORY USER MANUAL

2024

Important: 2024 edition supersedes all previous editions.
Please destroy earlier printed versions or return to laboratory.

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DEPARTMENT OF PATHOLOGY

The entrance to Pathology and Specimen Reception is situated on the ground floor of Noble's Hospital near to the hospital atrium.

Hospital Switchboard 01624 650 000

Pathology Manager

Mr Malcolm Goodwin	650642

Consultant Pathologists

Dr Rizwan Khan	Medical Microbiology	650622 (or via switch)
Dr Kelly Elliott	Histopathology, Cytology	650300
Vacant Post	Histopathology, Cytology	XXXXXX

Clinical Director

Mr Madhusudan Malikireddy	Via switchboard

Pathology Department Contacts

Department	Telephone	Department Manager	Telephone
Blood Transfusion	650644	Andy Quirk	650630
Chemical Pathology /Clinical Chemistry	650659/60	Ben Kelly	650661
Cervical Cytology	650638	John Nippress	650654
Haematology	650626/5	Michael Kinnish	650629
Histology/Cytology	650646	John Nippress	650654
Immunology/Serology	650623	Fiona Reynolds	650645
Pathology IT Manager	650662	Iain Taylor	650662
Microbiology	650655	Fiona Reynolds	650645
Mortuary	650617/8	Ian Hughes	650617
Pathology Office	650632	Lucy Quine	650416
Specimen Reception	650639	Iain Taylor	650662
Transfusion Practitioner Nurse	650988	Jo Oldfield	650988
Blood Donors	650637	Michelle Jones	650621
Quality / POCT Manager	650645	Janet Yates	650101

Normal Working Hours:

Monday – Friday 08.45 - 17.15

Saturday– Sunday 09.00-17.00 (Apart from Histology/Cytology/ Immunology)

All specimens for routine **blood tests** must be received in the laboratory before 16.30 each day (including weekends); routine specimens received after this time may not be examined until the next working day.

Samples for **Microbiology** must be in the laboratory before 16.00 (12.00 Saturday and Sunday); urgent samples can be received until 16.30 Monday to Friday and until 14.00 Saturday and Sunday. Microbiology must be contacted directly on 650653/5 for such samples.

Clinical Advice

Clinical advice, professional judgement and opinion for Professional users of the Pathology Service is available via telephone correspondence. Please contact the test performing laboratory (listed within the A-Z repertoire by test) for further information.

Department	Availability	Contact
Chemical Pathology	M-F 9am-5pm	Please contact the Chemical Pathology Laboratory
Haematology / Blood Transfusion	M-F 9am-5pm	Nobles clinical haematology team - smart page Haematology SD or haematology clinical nurse specialist 650046
	Out of Hours and Weekend	Switch – request Royal Liverpool University Hospital (RLUH) switchboard 0151 706 2000 and ask for the Haematology registrar on call
Histology/Cytology	M-F 9am-5pm	Dr Kelly Elliott 650300
Immunology/Serology	M-F 9am-5pm Out of Hours – *Emergency calls only*	Dr Rizwan Khan 650622 (or via switch)
Microbiology	M-F 9am-5pm Out of Hours – *Emergency calls only*	Dr Rizwan Khan 650622 (or via switch)

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Enquiries and Complaints

- Please contact the Laboratory for any enquires regarding the tests requested, cost or method. The laboratory welcome any suggestions or enquiries regarding the repertoire and methods of tests provided.

- The department is committed to fully investigating all complaints regarding the standard and quality of services that we offer. Please contact our Laboratory Manager(s).
- The Manx Care Advice & Liaison Service (MCALS) is a confidential and impartial service operated by Manx Care that's dedicated to driving positive change across the health and social care system by listening to feedback and acting on it.
- Access to this service is detailed on the Isle of Man Government Manx Care Website www.manxcare.im Tel (01624) 642642 Email MCALS@gov.im

- Complaints should be directed to the Manx Care Care Quality and Safety Team (CQS) Tel (01624) 650500 Email manxcarecomplaints@gov.im

Confidentiality and Data Protection

Information is an essential for the clinical management of individual patients. The quality of the data supplied with a specimen determines the accuracy of the subsequent examination result and the timely return of the report.

Personal information is strictly confidential and will not be disclosed without the patients' consent. Exceptional circumstances included where national reporting is a statutory legal requirement, such as where there would be a risk to public health. All staff should have an understanding of risks and responsibilities associated with incorrect data and the impact this can have on patient care.

The laboratory has policies covering the acceptance of specimens to ensure safe diagnosis and treatment, and that we act with the patient's consent. Specimens cannot be processed until any errors or omissions have been corrected and results will be delayed.

Requirements for Patient Consent

For the majority of routine laboratory activities, consent can be inferred or implied when a person willingly submits to sample collection procedure (eg, venepuncture). The responsibility to obtain appropriate informed consent for all tests requested resides with the individual requesting the test.

Informed consent should cover all the tests being requested, implications of their results and disclosure of clinical and personal details to personnel (in the requesting organisation and any other healthcare organisations involved in providing the test).

Please ensure that the appropriate request form is completed when requesting Genetic Tests. Request forms for these tests often contain further patient consent requirements.

Quality and Accreditation

The Pathology department aims to continually improve the repertoire of investigations, and co-operate in the implementation of guidelines, clinical pathways and protocols advising on the appropriateness of tests. The results which are issued are designed to be accurate, timely, and informative and quality assured. Quality assurance schemes such as EQA and IQA help make sure the department's high quality standards are maintained.

All practicing Biomedical Scientists and Clinical Scientists are registered with the Health and Care Professionals Council (HCPC). Training is accredited by the Institute of Biomedical Science (IBMS) for biomedical scientist specialist training, and by the Royal College of Pathologists for medical training.

Accreditation
The Pathology department aims to meet the requirements of the International Standard ISO15189 2022 Medical laboratories – Requirements for quality and competence.

The Pathology department are currently unaccredited by an accreditation body to ISO 15189 2022.

Result Uncertainty / Uncertainty Measurement
With every result produced by a laboratory there is an associated uncertainty, which may be attributed to a number of small variations arising at any stage of the total testing process, from specimen collection to analysis.

It is important to understand that uncertainty is not the same as an error. An error implies that there is a difference between a measured value and the true value caused by an unknown factor, whereas uncertainty is an acceptable interval (95% confidence limit) within which a result can fall. We are able to predict this interval by calculating the measurement uncertainty (MU) for each analyte in our repertoire.

Further information on the uncertainty measurement for all our laboratory tests is available by contacting the laboratories within routine working hours. Please also contact the laboratory if in there are any concerns regarding the accuracy of results.

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Specimen Collection and Packaging

Information detailing the best Practice for collection of specimens is described within the Royal Marsden Manual of Clinical Nursing Procedures – access to the e-manual is available to all ManxCare personnel via registration with the Keyll Darree Library (contact: librarykeydarree@gov.im) and subsequent Open Athens account.

Obtaining Specimen Containers and Supplies
All specimen containers can be ordered from the Pathology Department Stores within normal opening hours via completion and **return of the Pathology Order Sheet to Pathology Specimen reception**, or emailing the completed order sheet to pathologyconsumableorders@gov.im. Copies of the Order Sheets can be obtained from the same Pathology locations.

Containers and Suppliers will be sent to requested locations via the hospital porters or couriers.

The Minimum Data Set Policy (Policy for Acceptance and Rejection of Pathology Samples PL-POL-002) applies to ALL pathology specimens and request forms.

This document has been ratified by the Manx Care Operational Clinical Quality group and has been published on the **ManxCare sharepoint Pathology page** and the **Isle of Man government website Pathology page**.

The date and time of actual specimen collection must be written on the request form (especially where requests are e-ordered prior to specimen collection). Specimen integrity is affected by delayed transport for some tests, this information helps the laboratory assess the accuracy of the test results produced.

Specimen Packaging: Please ensure the following when packaging normal Pathology specimens, e.g. blood tubes, universal tubes, etc.

- All samples must be accompanied by an appropriate freshly generated ICE request (please do NOT use photocopied ICE requests).
- Requests must be completed correctly and comply with the Minimum Data Set Policy (see SharePoint for the most up-to-date version).
- Specimen containers must be labelled correctly, match the request form and fully comply with the Minimum Data Set Policy. Blood Transfusion specimen containers must be hand written.
- Lids must be fitted correctly to prevent potential specimen leakage and associated infection risks.
- Specimen request forms must be placed in the non-sealing side of the specimen bag with the information facing outwards.
- Specimens (Blood tubes, universal containers, swabs, etc) must be placed in the sealable side of the specimen bag with the top sealed correctly. **Do not place blood tubes, containers, swabs etc. in the non-sealing side.**
- **COVID swabs MUST be bagged, with the request in the outer pocket.**
- Samples must NOT be stored but should be sent to the laboratory immediately via porter or collection. Users must consider the time of the next transport as delays may compromise certain results - if unsure, contact the relevant laboratory.

Collection

Pathology specimens will be collected from wards Monday - Friday (excl. Bank Holidays) by the portering service at: **10.00 and 15.00 hours***

***Ward collections times may change or be cancelled at short notice according to service requirements and availability of staff.

Please bring samples to Pathology outside of these hours.

Urgent work *must* be delivered to Pathology and not left for collection. (Select "urgent" on ICE, and highlight to Specimen Reception staff when dropping to Pathology).

Pathology specimens are collected from the following locations:

Ward 2	Dirty Utility - Fridge and Tray
Ward 3 Children's	Dirty Utility - Fridge and Tray
Ward 4	Dirty Utility - Fridge and Tray
Ward 6	Dirty Utility - Fridge and Tray

Ward 8	Dirty Utility - Fridge and Tray
Ward 10 JCMW	Dirty Utility - Fridge and Tray
Ward 11	Dirty Utility - Fridge and Tray
Ward 12	Dirty Utility - Fridge and Tray
Ward 17 - ICU	Nurses Station - Tray
Ward 18 - CCU	Nurses Station - Tray

NB: Theatres have a direct arrangement with the laboratory for specimen collection.

***Ward collections times may change or be cancelled at short notice according to service requirements and availability of staff.

Specimens collected from GP practices are gathered into strong polythene bags which are sealed. The hospital transport drivers place these bags in the secure rigid sample transport boxes with sealable lids that they carry in their vans. These boxes must be labelled as "Diagnostic Specimens – UN3373" and have the department, hospital name and contact telephone number.

The laboratory has an arrangement with the Isle of Man Post Office to provide a transport system to collect specimens for analysis from GP surgeries around the Island. The service runs daily Monday to Friday morning. Contact the Laboratory Helpline if you require further information regarding this service.

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Phlebotomy Service (Managed by Scheduled Care)

Inpatient Phlebotomy Service

This covers all wards except ITU, HDU, Children's Ward and NNU.

It operates:

Monday – Friday: 08.30 - 12.00 hrs.

All Pathology requests should be produced using the hospital's ICE Order-Comms system, and those for the morning phlebotomy service must be created the previous evening or before the phlebotomy round commences. For routine requests after phlebotomy rounds, blood specimens must be taken and delivered to the laboratory as soon as possible after collection by medical or nursing teams.

Pathology requests must be made by, or on authority of, medical staff.

Pathology receives over 1000 samples in a typical working day, correct identification of urgent samples helps rapidly identify such work.

Outpatient phlebotomy service

Outpatient phlebotomy service (Noble's Blood Clinic) is managed by Scheduled Care and operates an appointment only blood collection service.

Opening times:

Noble's Hospital: Telephone: 650415

Monday – Thursday: 08:30 – 16:00 hrs;

Friday: 08:30 – 13:00 hrs.

Closed Saturdays, Sundays and Bank Holidays.

Ramsey and District Cottage Hospital (drop in only):

Monday – Friday: 08:00 – 10:00 hrs.

Closed Saturdays, Sundays and Bank Holidays.

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Order of Draw for Blood Samples*

Cap Colour	Tube Type	Determinations	Special instructions	
	Blood Cultures	Paediatric Microbiological blood cultures	Collect up to 4 mL per paediatric bottle	
	Blood Cultures	Adult Microbiological blood cultures	Fill aerobic bottle first (green) Collect 10 mL of blood per adult bottle	
	Sodium Citrate *Blue*	Coagulation screen, INR, D-Dimer, Thrombophilia screen, Factor Assays	For Thrombophilia screen and factor assays contact lab. This bottle MUST be filled to line. DO NOT overfill	MIX 3-4 TIMES
	Serum Gel *Yellow*	All routine Biochemistry, Endocrinology and Immunology	For specialised tests see Pathology Handbook and or ICE order comms	MIX 6 TIMES
	Lithium Heparin *Dark Green*	Carboxyhaemoglobin, Methaemoglobin, T-Spot Test for TB		MIX 8-10 TIMES
	PST™ II *Green*	Biochemistry tests for patients undergoing dialysis		MIX 8-10 TIMES
	EDTA *Purple*	FBC, Hb, WCC and Diff, Platelets, Reticulocytes, Malarial Parasites, Kleihauer, Haemoglobinopathy inc. Sickle Cell Test, HbA1C, Lead, Cadmium, Cyclosporin, Tacrolimus, Cell Markers, HLA-B27, NT- proBNP, Lymphocyte Subsets & Studies, PTH, Ammonia	For Ammonia, send promptly and inform Biochemistry	MIX 8-10 TIMES
	Crossmatch *Pink*	Blood Bank Tests- Group and Screen, X-Match		MIX 8-10 TIMES
	Fluoride Oxalate *Grey*	Glucose, Lactate, Ethanol		MIX 8-10 TIMES
	Trace Element *Navy*	Trace Elements- e.g. Copper, Zinc		MIX 8-10 TIMES

Determinations and Special Instructions contained within this guide have been provided by the named institute and are not BD recommendations or instructions for the BD products described. Please consult your organisation's guidelines or contact BD should you have any questions.

IMPORTANT MIXING GUIDELINES
All BD Vacutainer® tubes require immediate mixing following collection. Insufficient mixing can result in inaccurate test results and the need to re-draw. Correct mixing technique is to gently invert (180° and back) each tube the recommended number of times shown on the right hand side of the table.

NB: Latest tube type required will be printed on ICE OrderComms form – please match label and tube.

*Clinical and Laboratory Standards Institute (CLSI) Guidelines GP41-Ed7 (formerly H3-A6, 6th Edition)

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Minimum Data Set for Pathology Requests

IMPORTANT: This relates to ALL Pathology specimens and users are referred to the current Minimum Data Set (MDS) Policy on ManxCare SharePoint, and publically on the IOM gov Pathology webpage.

Blood Collection

Venepuncture

The 'Vacutainer' system (see page 10 for order of draw) is used for all blood samples except:

- Blood Gases (special syringe required);
- Blood Cultures (strict aseptic technique using a blood collection adapter and cap);
- Paediatric samples i.e. children under 10 years (small size containers available).

The vacutainer system ***must*** be used in accordance with the manufacturer's recommendations and instructions. Failure to follow instructions may affect sample quality and therefore patient results. It also has safety implications (needle stick injury).

It is important that the vacutainer tube is allowed to fill with blood as short sampling may cause erroneous results; in particular, where citrate tubes (blue tops) are used for coagulation studies. Haemolysed samples *will not* be analysed. ***The practice of filling vacutainers with a needle and syringe is unsafe and unacceptable***, as there is a higher risk of needle stick injury and sample tops may come off spontaneously causing contamination. It is a major factor leading to haemolysed specimens.

Health & Safety – Sharps

All members of staff have a responsibility to:

- o Familiarise themselves with the guidance regarding the safe use and management of sharps.
- o Adhere to safe working practice in order not to harm either themselves or others.
- o Familiarise themselves with the necessary action to take in the event of injury and unsafe disposal.
- o Report any incidents or unsafe practice

Particular care is required in sharp handling and during the disposal process: Sharps must always be handled carefully, and in accordance with the following principles;

1. Do not re-sheath used needles, scalpel or sharp objects.
2. Never pass sharps from person to person by hand.
3. Never walk around with sharps in your hand.
4. Never leave sharps lying around – always dispose of them yourself.

Use of Sharps Bins

1. Sharps must only be disposed of, in designated sharps bins that meet the requirements of the British Standard: BS 7320 (1990) UN3291
2. The correct size plastic container must be assembled correctly prior to use and staff must ensure the lid is secure.
3. The person assembling the sharps container must complete the relevant sections on the label before putting it into use. Site/date in use etc…

4. When placing the used sharps into the container, staff must ensure that all contents actually pass the plastic flap and enter the container.
5. The sharps container must be used and discarded as per the Manx Care Policy Safe Management of Sharps.

Test Requesting and Reports

Requests

ICE Order-Comms should be used for all Pathology requests. If the system is unavailable for any reason, do not use addressograph labels on any vacutainer or paediatric blood tubes, these are ***for use on request forms only.*** The use of labels may mean the sample will not fit in the analyser, and can jam equipment leading to analyser failure.

Photocopied and reprinted forms that do not possess a unique order number will not be accepted under any circumstances.

ICE sample labels must be attached to the correct sample tube as printed on the ICE request label – this is indicated on the ICE request label by 'colour' - please match the colour printed on the label to the colour of the collection tube top.

Additional Hand Written requests on printed ICE request forms will not be processed.

The date and time of actual specimen collection must be written on the request form (especially where requests are e-ordered prior to specimen collection). Specimen integrity is affected by delayed transport for some tests, this information helps the laboratory assess the accuracy of the test results produced.

Unidentified Patients

The agreed procedure outlined in section 8.2.2 of the Pathology Minimum Dataset Policy should be followed for unidentified patients brought into the Emergency Department who require pathology investigations.

'High Risk' Cases

Samples from patients with known or suspected infection with blood borne viruses (hepatitis B & C and HIV) require special precautions; consult the Infection Control Policy. Samples and forms must be clearly labelled High Risk.

High consequence infectious disease (HCID) - The duty Consultant Microbiologist and receiving laboratory MUST be informed prior to collection of specimens from patients suspected of a High consequence infectious disease (HCID), previously termed Viral Haemorrhagic Fever (VHF). Specimens must be risk assessed in accordance with the Manx Care Viral Haemorrhagic Fevers Policy. A change of evidence form may be required to ensure that specimen contact is appropriately recorded.

Laboratory Results and reports***

Same day reporting is provided for routine blood tests if the samples arrive in the laboratory within the times stated. To avoid unnecessary telephone calls, please use results enquiry on ICE. ***Electronic reporting of results is the primary method of reporting by Pathology.***

There are a number of tests which are referred and carried out in UK centres. The results from these tests may take at least 10 working days and up to 4 – 6 weeks before results are available. These tests are identified in the A-Z guide in the Appendix.

All pathology results are available via ICE; *electronic reporting is the primary means of reporting of laboratory results.*

Reports are issued in a number of other formats including EMIS (GPs) and hard copy (currently) within the hospital.

For further information on use of ICE and other electronic systems such as Hospital or GP Order Communications, please refer to the relevant sections in SharePoint.

Back up procedure for electronic results enquiry if ICE fails

- If ICE goes down an emergency look up method for results access within the hospital will be activated by the laboratory.
- Results access will be activated on Careflow and instructions on how to access this sent to users via email at the time.
- Emergency backup method will be de-activated once ICE is back on line.

- In the event, that the ICE order comms service is not available – addressograph labels on hard copy request forms should be used. Contingency Hard Copy Request forms are can be ordered from Central Stores. Addressographs labels MUST not be used to label specimens.

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Requesting further tests on specimens already in the laboratory (Add-Ons)

Specimens are kept for a limited period after testing, with the exception of Antenatal Screening samples which are stored for 24months.

Clinical Chemistry tests may be added onto received serum samples within 7 days of receipt providing they are clinically appropriate and the sample remains viable.

Immunology and Serology Tests may be added onto received serum samples within 6 weeks of receipt providing they are clinically appropriate and the sample remains viable.

Haematology and Coagulation test add ons are limited – please contact the laboratory for further information.

Please contact the appropriate Pathology department to verbally request additional tests. Stability limitations to some additionally requested tests are listed below.

Test	Add On (Stability) Limit
Ammonia	Cannot be added
Alcohol	Cannot be added
Beta 2 Microglobulin	3 days at 2-8°C
Bicarbonate (CO_2)	4 hours
D-Dimer	4 hours
Folate	2 days at 2-8°C
LDH	4 days at 2-8°C
Oestradiiol	2 days at 2-8°C
Parathyroid (PTH)	3 days at 2-8°C (EDTA required)
Phenytoin	4 days at 2-8°C
Phosphate	4 days at 2-8°C
Procalcitonin (PCT)	2 days at 2-8°C
PSA	3 days at 2-8°C
Theophyline	3 days at 2-8°C
Troponin-T	24 hours at 2-8°C
Vitamin B12	2 days at 2-8°C
Immuno/Serology Tests	Tests Cannot be added to EDTA/Lithium specimens

Factors affecting the results or processing of specimens

Where a specimen is not processed the requestor will be informed either by report comment or by telephone according to the urgency or specimen type.

Where there is a need for a repeat specimen due to analytical failure or additional specimens are required (insufficient primary sample available); the laboratory will telephone urgent locations (A/E, SDEC etc), otherwise an appropriate laboratory comment will be added to the report to inform the requestor.

The laboratory will inform A+E in the first instance where there will be significant delay in the sample results being available for whatever reason. Further communications with all users will be sent as appropriate.

Factor	Laboratory actions
Unable to unequivocally identify the patient	Repeatable specimens that are unlabelled or where there is insufficient information to link the specimen specifically with the patient will not be processed.
Leaked Specimens	In the interest of safety, specimens that leak inside the plastic specimen bag will not be processed.
Needles attached	Specimens with needles attached will not be processed
Incorrect Collection bottle/device	Specimens collected into the wrong bottles will not be processed.

Special Testing Requirements	Where the time of sample collection, the method of collection or the patient preparation for the test does not conform to the requirement for the investigation it may not be possible to continue with the analysis. Advice should be sought from the appropriate laboratory about the conduct of special investigations.
Transport Delay	Sample viability is limited to a short period of time for many tests, therefore transportation to the laboratory should not be delayed. For example; Coagulation tests must be tested within 4 hours of collection.
Temperature	Extreme temperatures (hot or cold) – may affect result validity
Specimen timing	The time of taking a specimen in relation to a person taking a drug will influence the concentrations and ability to interpret results for therapeutic drug monitoring.
Haemolysis, icteric and lipaemia can be caused by :- • Expelling blood through needle • Vigorous shaking • Extreme temperature	Haemolysis, icteric and lipaemia can interfere with certain analytes. These are indicated as comments on the report and no result for these parameters will be released. Common analytes affected include: sodium, potassium, bilirubin, magnesium, phosphate, AST, ALT, and troponin.
Contamination	Please use the correct tube and blood draw order to reduce the risk of interference – e.g. EDTA contamination with potassium, calcium and magnesium
Cerebrospinal Fluid (CSF)	Specimens for xanthochromia need to be protected from light
Coagulation test : Underfilled	Will not be processed
Coagulation test : Haemolysed	Will be processed, depending on degree of haemolysis
Coagulation test : Clotted	Will not be processed
Coagulation test : Lipaemic	Will be processed, depending on degree of lipaemia

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EMERGENCY ON CALL PATHOLOGY SERVICE

(Smart Page)

On call Hours:

Monday - Friday: 17.15-08.45

Saturday: 17:00-09:00

Sunday: 17:00-08:45

This service is provided outside normal hours for **emergencies only**.

It is not to be used as an out-of-hours pathology service for "routine" samples.

The requesting doctor **must** speak to the duty BMS about the emergency and investigations required. Nursing staff are **not** authorised to call in the duty BMS except during busy periods on ITU / Emergency Department.

NOTE: *The on call test repertoire is unavoidably restricted, as this service is provided by multidisciplinary staff who have undertaken additional comprehensive training, and are working single handed! Any requests for investigations other than those listed will require authorisation by the Pathology Manager.*

Results

Please use ward terminals to obtain results electronically on Medway or ICE. Most routine Clinical Chemistry and Haematology results are available electronically within 2 hours of sample receipt in Pathology.

Phoning the laboratory often removes scientific staff from analysing samples and delays results.

Tests available on call

The following investigations **only** are provided by the Emergency On-Call Service:

Processing Priority will be given to the most critical requests.

Haematology and Blood Transfusion
Full Blood Count
Coagulation Screen
Glandular Fever
Plasma Viscosity (?TA and paediatric irritable hip only)
Malaria Screen
INR and APTR
D dimer
Provision of blood and blood products

Biochemistry
Alanine Aminotransferase (ALT)
Aspartate Aminotransferase (AST)
Albumin
Ammonia
Amylase
Beta Human Chorionic Gonadotrophin (HCG)
Bicarbonate
Bilirubin (total, direct)
Calcium
Chlolinesterase
Cortisol * Urgent request via telephone required
Creatine Phosphokinase (CK)
Creatinine
CRP (C Reactive Protein)
CSF Protein/Glucose
Carboxyhaemoglobin – use blood gas analyzer
Digoxin
Drugs – paracetamol and salicylate
Ethanol
Ferritin
Gamma Glutamyl Transferase (GGT)
Gentamicin
Glucose
Iron
Lactate - or use blood gas analyzer
Lactate Dehydrogenase (LDH)
Lipid profile (Chol, Trig, HDL, LDL, NHDL) * Urgent request via telephone required
Lithium
Magnesium
Myoglobin
NT-proBNP * Urgent request via telephone required
Osmolarity (serum/urine) * Urgent request via telephone required
Paracetamol
Phosphate
Potassium
Salicylate
Sodium
Transferrin
Troponin T
Total Protein
TSH / FT4 * Urgent request via telephone required
Urea
Uric Acid/Urate **

Urine Protein – Pre-eclampsia screen
Valproic Acid/Valproate** Biochemistry laboratory must be prior contacted during routine working hours
Vancomycin** Biochemistry laboratory must be prior contacted during routine working hours

Microbiology
Cerebrospinal fluid (CSF) examination
Incubation of blood cultures
COVID rapid testing (until 8pm)

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COMMUNICATION OF CRITICAL RESULTS

Background

It is the responsibility of the requesting clinician, in charge of the care of the patient, to follow up on all pathology results. The preferred method for issuing or giving results is via the secure electronic networks.

There are clearly many situations whereby the rapid communication or raised awareness of a critical or unexpected laboratory test result can significantly alter the time taken for appropriate medical care to be initiated that would otherwise have been delayed, and in turn would likely to be detrimental to patient care and outcome. As a consequence, it is expected that all pathology providers have systems in place to both identify and communicate such results. Having an appropriate system in place to cover such communication of results is an explicit requirement of ISO15189:2022.

It is important to introduce a degree of consistency and to promote the general principle of the responsibility of laboratory services to communicate critical or unexpected results to the clinical teams responsible. In situations where it is not possible to report critical results to the requesting clinical team e.g. when a GP or outpatient request is reported out of hours, the laboratory BMS staff will contact the Accident and Emergency department to facilitate any clinical intervention as required.

Pathology staff will not give results to patients, their relatives or any unauthorised person.

Rapid communication of critical results

A markedly abnormal test result that may be deemed urgent or critical, is one that may signify a pathophysiological state that may be life threatening or of immediate clinical significance. The classification and explicit definition of such results are likely to be different, depending on the clinical setting and scenario.

The critical results lists and any associated specific criteria for expediting communication of such results for all departments within the Pathology Department at Noble's Hospital is shown in the separate sections for Haematology and Biochemistry.

Other factors have been be taken into account such as whether the markedly abnormal laboratory test result is a new first-time occurrence, an unexpected result for that particular clinical setting, or if an unacceptable time delay would normally occur if the decision to more rapidly communicate the said result was not made. Where possible, pathology uses electronic mechanisms for the automatic selection of results for urgent communication based upon these absolute results or associated changes from previous results.

Verbal reporting of critical results

The verbal transmission of results is a potential patient safety issue, due to the possibility of misinterpretation or transcription errors and the potential that verbal reports are either not

read or filed in the relevant patient's record. However, it is recognised that there are instances when verbal transmission of results is either desirable, or the only possible option available. When laboratory staff communicate results to the requesting team verbally the following procedure must be followed:

1. The patient must be accurately identified by the caller utilising the local minimum identification dataset for result enquiries.

2. All identification data will be checked against the information held on the laboratory information system (LIMS) by the reporting BMS staff.

3. The critical result(s) will be highlighted, and staff will be informed to review all results on their electronic result enquiry system where possible.

4. Staff taking the results will be asked to repeat results back to the BMS to ensure that information has been received correctly.

5. All telephoned results will be recorded on the electronic reporting systems, making note of the name of the staff member who the results were relayed to and their location. The laboratory system will record all other information required for audit purposes.

Biochemistry action limits / telephone criteria can be found on page 25.

Haematology action limits / telephone criteria can be found on page 30.

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PATHOLOGY DEPARTMENTS

BLOOD TRANSFUSION

For routine surgical lists, the request for cross-match must be received 48 hours before the operation, and on Friday morning for Monday's list. If requests are made at short notice for blood for planned operations, no guarantee can be given that the blood will be available in time. Patients with known antibodies may be subject to delays in the availability of blood for surgery so please give as much warning as possible to allow for reference laboratory assistance.

As much notice as possible must be given to the lab for those patients who have special requirements such as irradiated blood as this may have to be ordered from the UK.

Blood Sample: A pink top Vacutainer must be used for all blood transfusion investigations. The tube must be full: 7ml (1 tube).

Transport Requirements: Blood samples need to be transported to the lab in a timely fashion and given directly to a member of Pathology staff.

Emergency Cross-Matching: Must only be requested for clinical emergencies.

Fresh Frozen Plasma: Available from the laboratory - please allow at least 30 minutes for thawing before issue.

Human Albumin: Available from the laboratory at concentrations of 4.5% and 20% on a named patient basis only.

Platelet Concentrates: Two Group A RhD Positive units are always kept for trauma purposes. Apart from these, platelets are not stocked routinely and will have to be obtained from the UK. It is therefore essential to plan ahead when a patient possibly requiring platelets is being treated.

Beriplex: Available from the laboratory in 1000 IU AND 500 IU.

Voncento: Available from the laboratory in 2400 IU VWF/1000 IU FV111.

Anti-D Immunoglobulin: available in 500 IU and 1500 IU.

Access to Blood Banks - "Blood track System"
Blood Banks are located in Pathology, Theatre/ITU, Maternity delivery suite and Ramsey District Hospital. They all have electronic locks which can only be operated by staff who have had training in the use of the "Blood track" system and who have the necessary ID card with them. This training is available to all Registered Nurses, Midwives and ODA's via Jo Oldfield (Transfusion Practitioner Nurse).

EMERGENCY BLOOD: There are two group O RhD Negative units held at all times in the main Pathology Blood Bank. These are **only** to be used when there is no time to wait for group specific or fully compatible blood and must have a doctor's consent and be discussed with the transfusion laboratory first.

NB: These emergency units may **not** be compatible for patients with antibodies. Approximately 2-4% of hospital patients may have a red blood cell antibody which can cause a haemolytic transfusion reaction.

If used, immediately call the duty BMS. Each unit has an audit form that must be completed to ensure the complete traceability of this valuable product.

Sample timings for cross matching blood: Transfusion or pregnancy may stimulate the production of unexpected antibodies against red cell antigens through either a primary or secondary immune response. The timing of samples selected for cross matching or antibody screening should take account of this, it is not possible to predict when or whether such antibodies will appear. It is also important to note that all cellular blood components, such as platelets, contain residual red cells and may elicit an immune response.

BSH Guidelines 3.7 (2012) *state 'To ensure that the specimen used for compatibility testing is representative of a patients current immune status, serological studies should be performed using blood collected no more than 3 days in advance of the actual transfusion when the patient has been transfused or pregnant within the preceding 3 months.*

Patient not been transfused or pregnant in last 3 months	**=**	Sample valid for 7 days from time and date taken
Patient has been transfused or pregnant in last 3 months	**=**	Sample only valid for 72 hours from time and date taken

Related Transfusion Policies (available on SharePoint)

Policy for the Administration of Blood, Blood Components and Blood Products - this document also includes guidelines on the management of massive blood loss, also found here: Transfusion Management of Massive Haemorrhage in Adults

Ward 10 /JCMW also have related policies, which can be found in the OB/GYN section of SharePoint. These include guidance for the management of the availability of blood for obstetric patients with irregular red cell antibodies.

Single Unit Blood Transfusion Policy – this Policy describes the approach by which the number of units of red blood cells to transfuse is decided.

Two sample policy -This must be followed when a patient requiring cross-match does not have an historical blood group. The lab will telephone the ward to inform them that a second sample will need to be taken. This is to prevent 'Wrong Blood in Tube' incidents and is a SHOT recommendation.

Do not take two samples at the same time – ONLY TAKE THE SECOND SAMPLE IF THE LAB REQUESTS IT!

See Appendix for full (alphabetical) list of tests and turnaround times, and please contact Blood Transfusion on 650630 if further information required.

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CHEMICAL PATHOLOGY

Samples

One FULL SST (yellow) tube will provide serum for TEN profiles/tests requested, but please note:

- Where samples are for referral to the UK an additional sample must be sent with each separate request form.
- Results may be affected if a period of more than four hours elapses between collection and testing.
- Red Cell tests e.g. porphyrins; carboxyhaemoglobin will require an EDTA tube.
- NTPRO BNP, HbA1C and PTH also require EDTA purple tops.
- If an FBC (Haematology) is required, an additional sample *must* be provided for porphyrins, carboxyhaemoglobin, NTPRO BNP, HbA1c, etc.
- Blood samples should not be taken from IV lines unless absolutely necessary and then in accordance with guidelines.
- Screening for drugs of abuse requires a urine sample (MSU) and an ICE request detailing any therapeutic drugs.

Glucose, Lactate and Alcohol estimations will require a FLUORIDE oxalate (grey) tube.

Blood gas testing is available using the analysers located in ITU, A+E, NNU and AMU, and requires arterial heparinised blood left in the syringe without an air space. There is no longer a backup analyser available within the Biochemistry laboratory.

Haemolysed samples are not suitable for analysis due to chemical interference. A repeat sample should be submitted. Incorrect use of the vacutainer system increases the frequency of haemolysis.
Non-routine analyses need special procedures. When in doubt please contact the laboratory.

A table detailing urgent and on-call tests is on page 18.

CSF: Xanthochromia

Requests for Xanthochromia must indicate that there is a suspicion of sub-arachnoid haemorrhage. The sample must be taken 12 hours post event (otherwise there may be false negatives) and the result of CT scans given. In line with UK laboratories, this test is not available out of hours and will be analysed the next working day. The sample needs to be kept in the dark until analysis – either use an envelope or tin foil. Note this test cannot be performed on a subsequent lumbar puncture as there is a risk of false positive results. ***THIS IS NOT AN ON-CALL TEST.***

24 hour urine collections - Instructions

It is important that the sample is collected properly as the results can be affected.

1. The **start and end time** should be accurately recorded on the label to the nearest minute – try to keep as close to a 24 hour time period as possible.
2. On rising, **discard the first urine** and note the time as start time.
3. All urine passed over the next 24 hours to be transferred into the container, including the first sample next day.
4. Store in a cool dark place during collection.
5. If any urine is lost, the 24 hour collection is invalid and needs repeating.
6. Sample(s) **must** be in the lab on the day of completion; take the sample(s) to GP before 10am or Pathology Reception (**Monday – Thursday 9am – 3pm**)
7. IMPORTANT: Do not start a collection on a Friday or Saturday, as samples cannot be processed over the weekend.

Available at all times

Turnaround time is within 60 minutes of receipt in lab if sample marked **URGENT**.

ALP	Gentamicin*
ALT	Glucose
Albumin	HCG
Ammonia*	Iron
Amylase*	LDH*
AST*	Lithium*
Bicarbonate	Lactate*
Bilirubin (Direct)*	Magnesium
Bilirubin (Total)	Myoglobin*
Calcium	Paracetamol
Creatine Kinase (CK)*	Phosphate
Creatinine	Potassium
CRP	Protein (Total)
CSF Protein/Glucose*	Salicylate*
Digoxin*	Sodium
Ethanol*	Transferrin
Ferritin	Troponin T
GGT	Urea
Urine Protein (pre-eclampsia screen)*	Chemistry CSF analysis*

* may not be immediately available due to maintenance procedures on single analysers

Limited urgent availability

The following request items will be considered as NON-URGENT unless a telephone request is received.

Cortisol	Theophylline*
Lipid profile (Chol, Trig, HDL, LDL, NHDL)	Thyroid function tests (FT4, TSH)
NT-proBNP*	Uric acid*
Osmolality (serum and/or urine)	Valproate*
	Vancomycin*

* may not be immediately available due to maintenance procedures on single analysers

Telephone Action Limits for Biochemistry Results

The table on page 18 shows suggested cut points/thresholds for the communication of critical results to users, and should be viewed in the context of the specific services to which they apply. The guidance in the critical results table is relevant for adult patients only, unless otherwise stated. See also the responsibilities related to critical/action limits for results on page

Key to 'Communication type' column:

- A = rapid communication within 2 hours, usually by telephone.
- B = if out of hours (OOHs), then communication within 24 hours to GP or OOHs GP.

See Appendix for full (alphabetical) list of tests and turnaround times, please contact Chemical Pathology if further information required.

Biochemistry Action Limits – Telephone Criteria

Analyte (Serum/Plasma)	Units	Action Limits		Communication Type		Comments
		Lower	Upper	Primary Care	Secondary Care	
Sodium	mmol/L	120 (130 if <16y old)	160	A	A	Note particular concern of risk of death in children with hyponatraemia
Potassium	mmol/L	2.5	6.5	A	A	Exclude haemolysis/old samples/EDTA contamination first
Urea	mmol/L		30 (≥10 if <16y old)	A	A	
Creatinine	mmol/L		354 (≥200 if <16y old)	A	A	
Glucose	mmol/L	2.5	25 (≥15 if <16y old)	A	A	Glucose results <2.5 mmol/L from primary care may be less crucial to phone immediately
Calcium (corr)	mmol/L	1.8	3.5	B	A	Primary Care: If out of hours (OOHs) then communication next day to GP or GP OOHs service
Magnesium	mmol/L	0.4		A	A	
Phosphate	mmol/L	0.3		B	A	
AST	U/L		615 (15x ULN if <14y old)	A	A	
ALT	U/L		810 (15x ULN if <14y old)	A	A	
Total CK	U/L		≥5000	A	A	
Amylase	U/L		500	A	A	
Digoxin	nmol/L		3.2	B	A	Check timing >6hrs from last dose. More urgent if K+ <3.0 mmol/L. Phone immediately to primary care if OD suspected or K+ low
Theophylline	ug/mL		25	B	A	
Lithium	mmol/L		1.5	B	A	
CRP	mg/L		300	A	A	
hs Troponin T	ng/L		(5x ULN)	A	A	
Ammonia	umol/L		100	-	A	
Bicarbonate	mmol/L	10		-	A	
Cortisol	nmol/L	50		B	A	Unless part of overnight dexamethasone suppression test
Cortisol (SST 30min)	nmol/L	250		B	A	As part of short synacthen test
Ethanol	mg/dL		400	-	A	
Paracetamol	mg/L		f	A	A	f – All detectable levels
Salicylate	mg/L		300	A	A	
Bilirubin (conj)	umol/L		25	B	A	Neonates only
Urate	mmol/L		340	B	A	Antenatal indications only

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GYNAE CYTOLOGY

Cervical smears are now received in ThinPrep™ preservative solution from the GP surgeries and clinics. Once taken, the smear must be transported to the laboratory as soon as possible. A correctly completed cervical cytology request form must accompany each specimen. Cervical smears have a maximum life in the preservative solution of six weeks. In 2018, in line with the UK national screening programme, cervical smear screening converted to primary high risk HPV testing with reflex cervical cytology. The samples are transported twice weekly to the reference laboratory at Bristol Southmead Hospital where the screening is carried out using Hologic ThinPrep™ liquid based cytology. For further information on the screening programme at Bristol Southmead Hospital go to: https://www.nbt.nhs.uk/severn-pathology/pathology-services/cellular-pathology

Gynaecological cytology is a screening service, not a diagnostic service. All patients with worrying symptoms should be referred to gynaecology. Cervical samples are screened in the UK and have to adhere to UK NHS CSP guidelines (link below).

https://www.gov.uk/government/publications/cervical-screening-accepting-samples-in-laboratories/guidance-for-acceptance-of-cervical-screening-samples-in-laboratories-and-pathways-roles-and-responsibilities

Sample takers responsibilities include:

- they are adequately trained in line with NHS CSP guidance on taking cervical samples
- they have and use a unique PIN and do not share this number
- they have adequate and up-to-date knowledge about the screening test, results and management
- they are able to access Open Exeter, check next test due dates and download a request form (or use any local electronic requesting system)
- they have checked that the person is eligible for a test; they may be:
    - aged 24.5 to 64 and invited by call and recall
    - aged 24.5 to 64 and overdue a test
    - aged 65 or over, and under surveillance or follow-up
- a screening test is appropriate (or is referral to gynaecology or sexual health/genitourinary medicine (GUM) clinic required)
- the sample vial is in date, and has at least 14 days left before its expiry (the time period left must be at least equivalent to the average waiting time for results)
- the person's details on the request form and vial match, are correct and that all necessary information is given
- the registration of the person's address is correct
- the person receives the appropriate follow up and management
- adverse events and incidents are recorded, discussed and investigated
- they communicate appropriately with the person if their sample is rejected.

Samples will be rejected if they are:

- unlabelled
- with non-matching or incomplete patient details on the form and vial (major discrepancy)
- taken inappropriately from any source
- from uninvited women under 24.5 years
- from women over 65 (unless they are unscreened, missed their last invitation or are in follow up for a previous abnormal result

- from women on routine recall taken more than 3 months ahead of schedule
- taken at an inappropriate period after an HPV negative test
- taken at colposcopy contrary to the NHS CSP primary screening implementation guidance
- taken less than 3 months after a previous inadequate (HPV or cytology) or rejected test
- vault samples from women with total hysterectomy for non-cervical malignancy or benign conditions
- missing a request form or specimen

Hard copies of smear results are returned to the Isle of Man for reporting. Abnormal results are sent electronically for direct referral to colposcopy.

Turnaround times for Gynae Cytology specimens are fourteen days from receipt to authorisation.

NON GYNAE CYTOLOGY

Body fluids and other aspirates for cytology, barring urines, should be collected in universals containing red CytoRich FNA washout (except synovial fluids which must be collected in lithium heparin containers). Fluids taken without the red CytoRich fluid should be collected in sterile universals and forwarded to the lab as soon as possible to minimise degenerate changes to cellular content. If it is necessary to aspirate fluids outside normal working hours, they must be refrigerated until the laboratory opens, but bear in mind this will have a deleterious effect on the sample and result.

Urine specimens must be collected in a sterile universal and delivered on each of three consecutive days, omitting Saturday and Sunday when the department is closed. Typically the laboratory would only want to receive a universal with a maximum of 20mls of sample in.

The department also offers a Rapid On Site Evaluation (R.O.S.E.) service for evaluation of the cellular content of thyroid FNA samples in clinic. These must be booked in advance with at least 24 hours' notice.

The ICE request form must contain all relevant history and clinical information.

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HAEMATOLOGY

Specimen quality is vitally important in many areas of Haematology, poorly taken (e.g. haemolysed, clotted) or under filled samples may significantly affect results. In some cases such samples will not be analysed.

A small number of tests (e.g. CD markers, haematology oncology tests and some Antiphospholipid screen assays) are sent to the UK and turnaround time for such tests is outside our control. Please send these samples Monday to Thursdays only (Bank Holidays excluded). Send away samples *must* be received in Haematology no later than 13.00.

Some internal specialist tests within Haematology are batched and may take around 4 weeks before results are available.

Please help us by filling in ICE requests correctly, following local Minimum Data Set policy, include an appropriate clinical history to assist us in making relevant interpretive comments on our reports.

Essential Information Relating to Haematology Tests

Full Blood Count: A full EDTA (purple) vacutainer is required and will enable a blood film to be assessed if appropriate. FBC requests will be referred for blood film analysis following specific criteria agreed with the Clinical Haematology Team. If there is a specific reason to request a blood film this must be clearly stated on the request form e.g.? haemolytic anaemia.

Reticulocytes: Automated reticulocyte counts are available and will be done on an FBC sample if requested, please provide a relevant clinical history.

Plasma Viscosity: Providing the FBC sample is adequately filled, the PV will be performed on the same sample. ESR's are not routinely performed at Noble's Hospital – they can only be requested for Rheumatology patients on Anti-TNF therapy; if further details on plasma viscosity interpretation are required please consult the laboratory.

Coagulation Screen/D-dimer: A full citrate (blue) Vacutainer is required; under filled or haemolysed samples may lead to erroneous results and will not be tested. Always provide an appropriate clinical history. If requesting a D-dimer for ?DVT, a Well's score should be done and the result included on the request form (see DVT Pathway).

Coagulation (special investigations): A full range of specialist coagulation and thrombophilia tests are offered. All specimens must be correctly filled and a full relevant clinical history provided. Consult the laboratory for further advice and sample requirements as appropriate, also see the laboratory test list in the Appendix.

Anticoagulant Therapy: All samples for routine anticoagulant therapy monitoring must be done during normal laboratory opening hours and received as early as possible. Specimens for INR/APTT ratio must be correctly filled to avoid spurious results, and ICE requests must give relevant anticoagulant history, together with INR and/or APTT ratio clearly requested under "other tests". Do not request a coagulation screen on such routine patients, only the INR (warfarin) and/or APTT ratio (unfractionated heparin) are necessary for routine monitoring. New oral anticoagulant drugs e.g. Apixaban or Rivaroxaban can be monitored through consultation with the anticoagulant monitoring service.

The Anticoagulant Monitoring Service is now the responsibility of the Scheduled Care Group. For advice, telephone 650643.

Glandular Fever Screen: One EDTA (purple) or SST (yellow) sample required. FBC should always be performed concurrently; FBC and GFST can be performed on one EDTA sample.

Malaria Screen: One full EDTA (purple) vacutainer required, which will enable FBC, DNA molecular screening, rapid diagnostic test and a blood film for species identification if required. The following *must* be provided:

- **A completed UK Health Security Agency Malaria Reference Form**. Available from - https://assets.publishing.service.gov.uk/media/62176393d3bf7f4f0adec7f9/Malaria_Form_VS_v9_.pdf
- **Viral Haemorrhagic Fever Assessment** (*depending on country of origin and risk*) in accordance with Manx Care Viral Haemorrhagic Fever Policy; further information available from https://www.gov.uk/government/publications/viral-haemorrhagic-fever-algorithm-and-guidance-on-management-of-patients

Haemoglobinopathy Investigations: A full EDTA (purple) Vacutainer is required which will include FBC. Always provide a relevant clinical history, ethnic origin and in the case of Antenatal Screening, a Family Origin Questionnaire. *Iron studies should also be done.* Consult laboratory for further advice.

The Department is affiliated with the UK Antenatal Haemoglobinopathy Screening Programme (North West England).

Semen Infertility/Post Vasectomy: Instructions and appropriate containers are available from Pathology Specimen Reception. Samples are accepted Monday-Friday, *before midday,* excluding Bank Holidays.

Bone Marrow Biopsy and Trephine: Refer to the Clinical Haematology team at Nobles.

See Appendix for full (alphabetical) list of tests and turnaround times, and please contact Haematology if further information required.

Haematology Action Limits – Telephone Criteria

Parameter	In patient	Outpatient / GP
Haematology	**First instance**	**First instance**
Haemoglobin g/L	<70 or >200	<80 or >200
Platelets $x10^9$	<50 or <20 known or >1000	<50 or >1000
WBC $x10^9$	<2.0 or >25.0	<2.0 or >25.0
Neutrophils $x10^9$	<1.0 or >25.0	<1.0 or >25.0
Lymphocytes $x10^9$	>50	>50
Any potential new haematological malignancy	ALL	ALL
Malaria	Positive	Positive
PV (?,TA or irritable hip child)	>1.72	>1.72
Bacteria seen in blood film	ALL	ALL
All cases of suspected Haemolytic Anaemia / Thrombotic Microangiopathic Haemolytic Anaemia	ALL	ALL
Coagulation		
INR	>5.0	>5.0
APTT Ratio	>6.0	NA
D-dimers ng/ml		>500
Fibrinogen g/L	<1.0	<1.0
Anti-Xa Heparin IU/ml	>1.0	>1.0
Factor VIII	<20	<20
vWF Antigen	<20	<20
vWF Activity	<20	<20
HIT screen	Positive	Positive

This list is not exhaustive but highlights minimum requirements for telephoning abnormal results. All BMS staff must also use their own judgement on telephoning results which are outside these parameters but may warrant telephoning on an individual case basis.

First instance is defined by the FRC Path as no similar result within the previous seven days.

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HISTOLOGY

All specimens for routine histology must be totally immersed in 10 times their volume of 10% buffered formalin prior to transportation to the laboratory. Pre-filled biopsy pots in sizes of 60mls, 250mls or 500mls are available from the laboratory. Pre-filled buckets of the size 1 litre, 2.5 litres, 5 litres, and 10 litres are available on request to the Pathology Stores.

DO NOT REFRIGERATE SAMPLES.

Fixation time for tissue is required for subsequent molecular studies. The time placed in formalin should be recorded for all tissue samples. This is especially important for malignant biopsy specimens. Such biopsies require a minimum of 6 hours fixation. Specimens taken after 14.30 will not processed until the next day.

The ICE request must contain all relevant patient history and clinical information, and must comply with the minimum data set.

Requests for private pathology must be on the appropriate private Histology form with either information of insurance details or self-pay status clearly indicated. The requesting clinical consultant must authorise the form, which constitutes a contract.

Any request for urgent examination of frozen section, fine needle aspirate or histological specimen must be made by consultation with the Consultant Histopathologist.

The turnaround time is on average seven days from receipt to authorisation; however this can be extended by fourteen extra days if the case requires complex immunohistochemistry studies or referral to a reference laboratory.

In extremely complex cases this time limit may be extended.

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IMMUNOLOGY AND SEROLOGY

ICE requesting must be used, and all samples must be taken into yellow top tubes (except for PCR and HLA B27- use EDTA, and T-spot testing – use green top tube).

If there is a delay in transport to the laboratory, Immunology and Serology samples may be refrigerated at 2-8^{o}C, with the exception of samples for **Tissue Typing** (e.g. HLA B27) and **T-spot** testing. These specific samples should be received by the laboratory the same day that they are taken and transported at room temperature. Specimens for T-spot testing MUST NOT be sent on a Friday. Full Lithium Heparin sample required for T-Spot testing

Biotin interference: High biotin levels may affect patient serology results. Samples should not be taken from patients receiving therapy with high biotin does (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration.

Hepatitis: 'Hepatitis Screen' includes Hepatitis B antigen (HBsAg), Hepatitis B core antibody and Hepatitis C (HCV) antibody.

IgE/Allergy: Total IgE should not be used to screen for allergy. If specific allergens are required, please only request those that are clinically relevant.

Most tests are batched and processed up to 3 times a week so turnaround times can vary.

Samples referred for testing at external laboratories may take 2-3 weeks for return of results.

See Appendix for full (alphabetical) list of tests and turnaround times, please contact Immunology if further information required.

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MICROBIOLOGY

Specimen Collection and Transport

All requests must be made using ICE requesting. If you are unable to locate the specific test you require, please discuss with the laboratory.

- It is critical that all relevant clinical details are provided, including specimen site, relevant clinical history, symptoms and antibiotic therapy both current and recent. It is important to record the date and time of sampling. Specimens should be collected before antimicrobial therapy where possible.
- Details on transport and storage of Microbiology specimens are described on page 35.

Contact the Consultant Microbiologist or laboratory staff for advice on the investigation of infections and the specimens to take. Specialist advice on patient management is available from the Consultant Microbiologist.

- **Screening swabs for MRSA should be delivered to the laboratory by 16:00 to ensure turnaround for negative results within 24 hours.**

Blood cultures

Blood culture packs have been provided to all wards for blood culture collection, and the blood cultures may be returned in the yellow bag immediately following collection. Please contact the on call scientist if these arrive at the laboratory out of hours.

- DO NOT remove the detachable portions of the bar codes from blood culture bottles.
- DO NOT place the ICE labels over any portion of the bar codes, or the bottom of the bottle.

Peritoneal dialysis fluids

These must be transported immediately to the laboratory for processing, and the laboratory must be informed prior to its arrival.

- Receipt of the whole dialysate bag is preferable so that sampling under controlled laboratory conditions may be performed.
- Peritoneal dialysis fluids will be discarded if receipt is greater than 12 hours after collection.

If the laboratory is closed, it will be necessary to bleep the on call BMS to ensure adequate processing of these samples.

Cerebrospinal fluids

All CSF specimens being collected must be notified to the Microbiology Laboratory (650655) prior to sending. Once collected, they must be sent IMMEDIATELY to the laboratory, and specimen reception informed on its arrival.

- During core hours telephone the Microbiology laboratory to inform them of sample collection, if the sample is taken out of hours call the duty BMS - **DO NOT leave a CSF sample unannounced.**
- CSF should be sent in sterile universal containers, which must be numbered in the order in which they were collected. In addition, Biochemistry now require up to 500ul of CSF in a grey-top blood tube for glucose testing

- It is preferable that ALL samples from patients where there is a suspicion of subarachnoid haemorrhage (SAH) arrive in the laboratory protected from light (ie. in a brown envelope/wrapped in foil), to ensure that there is sufficient sample for xanthochromia testing.
- Cytology ICE requests should only be submitted if malignant cells are suspected. They are not for requesting a differential cell count – this is covered by the routine microbiology processing.
- The quality of sample is of paramount importance. If there are any queries regarding CSF samples, please contact the laboratory.

COVID testing

Please ensure the COVID swab is sent as early as possible to avoid a delay to results.
Rapid testing is only available in very specific circumstances, and requests must be notified to the laboratory to avoid any delay in processing.

Results

All results are available in Medway when completed. The Consultant Microbiologist or Infection Control will telephone any results of particular significance such as positive blood cultures, *Clostridium difficile* positives, multi-resistant Gram-negative organisms and MRSA as required.

Please refer to the expected turnaround times for all sample types detailed in the table on Page 36.

Microbiology Specimens, transport and storage

Ensure all specimens are correctly labelled with an ICE sticker and are accompanied with the ICE request. Failure to do so may lead to delay in processing, or refusal to process the specimen.

Ensure all specimens are transported to the lab as soon as possible. If transport is delayed, store the sample in the conditions indicated below. Specimens will not be processed if received by the laboratory more than 48 hours after the sample has been taken.

Specimen Type	Container	Storage
Urine for microscopy, culture and sensitivity	Universal	Fridge
Urine for TB	3 x 24hr urine containers, whole first void for 3 consecutive days	Fridge
Faeces for routine M,C & S and *Helicobacter pylori*	Universal with spoon (blue top)	Fridge
Bacterial culture swabs	Swab in Amies/charcoal (black top)	Fridge
Bacterial culture swabs (wire)	Swab in Amies/charcoal (orange top)	Fridge
Genital swabs requesting *Trichomonas vaginalis* (TV)	Swab in Amies/charcoal (black top)	Room temperature
Pus	Universal	Fridge
COVID / Influenza / RSV testing	Swab in viral transport medium (red top)	Fridge
Specimens for mycology (nail/skin/hair)	Paper transport pack or universal	Room temperature
Blood Culture	Blood culture paired bottles, use Paediatric bottle for <12yo	Immediate transport to lab
Peritoneal Dialysis Fluid	Whole dialysate bag	Immediate transport to lab
Sterile fluids (joint aspirates/pleural fluid etc.)	Universal	Immediate transport to lab
Sputum for culture and sensitivity	Universal/sterile semen pot	Fridge
Sputum for TB	At least 3 x universal, taken on consecutive days	Fridge
Semen	Sterile semen pot	Fridge
Swabs for molecular testing for Chlamydia, Gonorrhoea or *Mycoplasma genitalium*	Swab in TMA Aptima transport medium	Room temperature
Pernasal swab for *B. pertussis*	Contact lab prior to collection as other tests may be more suitable	Contact lab
Respiratory secretions for PCR	Sterile universal / NPA collection tube / swab in liquid viral transport media (red top)	Immediate transport to lab
CSF	Universal	Contact lab immediately after specimen has been taken
Corneal scraping	Contact lab	Contact lab
EDTA blood for *N. meningitidis* PCR	Purple top EDTA vacutainer	Fridge

If in doubt, please contact the lab prior to taking a specimen to ensure the correct container, etc. is being used.

Specimen Turnaround Times for Microbiology

Turnaround times are measured from the date and time of receipt in the microbiology laboratory to the production of an electronically generated report.

Some Microbiology specimens have a long period of incubation before they can be assumed to be negative. In certain instances an interim report is issued.

Specimen	Microscopy	Negative Report	Positive Report	Interim Report
Blood Culture	N/A	5 – 10 days	2 – 12 days	48-72 hours
***C. difficile* screen**	N/A	4 hours*	4 hours*	N/A
Chlamydia	N/A	4 working days	4 working days	N/A
COVID testing - rapid (08:00 to 20:00 only)	N/A	<2 hours	<2 hours	N/A
COVID testing - routine	N/A	<24 hours	<24 hours	N/A
CSF	2 hours	48 hours	2 - 4 days	2 hours **
Faeces culture	24-48 hours	2 - 3 days	2 – 4 days	48 hours ***
Faeces *H. pylori* Ag	N/A	24 hours	24 hours	N/A
FilmArray PCR	N/A	2 hours from request	2 hours from request	N/A
GUM swabs	Same day	2 - 4 days	2 – 4 days	24 hours ***
Influenza/RSV screens (08:00 to 17:00 only)^	N/A	2 hours	2 hours	N/A
MRGN and CPE screens	N/A	24 hours	48-72 hours	24 hours ****
MRSA	N/A	24 hours	48 hours	N/A
Mycology	72 hours	14 – 21 days	7 – 21 days	N/A
Norovirus	N/A	4 hours*	4 hours*	N/A
Post op & deep site swabs	Same day	5 days	2 – 7 days	48 – 72 hrs
Superficial swabs	N/A	2 days	2 – 4 days	N/A
Respiratory culture	Same day	2 days	2 – 3 days	N/A
Sterile fluids	2 hours	48 hours	2 – 4 days	48 hours***
TB / M*ycobacterium*	48 hours	6 – 12 weeks	2 – 12 weeks	N/A
Urine M,C & S	4 hours	24 hours	48 - 72 hours	N/A
Urinary antigens	N/A	Same day	Same day	N/A
Urine HCG	N/A	Same day	Same day	N/A
Urine for Schistosomes	Same day	N/A	N/A	N/A
Viral swabs	N/A	2-10 days	2-10 days	N/A

***** Sample must be received by 2pm for same day processing.
****** Cell count and Gram film result issued within 2 hours of receipt of CSF sample.
******* Interim report is issued if a pathogen is isolated prior to testing being fully complete.
******** 'Presumptive' report issued following risk assessment when there is a risk of Hospital Associated Infection
^ May be tested until 21:00 by arrangement with the lab in specific circumstances ONLY.

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MORTUARY

Mortuary: (east wing): This department is responsible for the dignified storage and subsequent release of deceased patients. In addition, all sudden/unexpected deaths in the community are transferred to the Mortuary for storage and post-mortem examination if required. The Mortuary also offers a dedicated viewing facility to bereaved relatives as well as the Coroner/Police.

Contact Details:

The Mortuary is staffed during Monday - Friday 08.00 - 16.30.

The Mortuary staff telephone numbers are:

Mortuary Manager	Phone 650617	Smartpage
APT	Phone 650618	Smartpage
APT	Phone 650618	Smartpage
Relatives Support Office	Phone 650615	

To Arrange for the Transfer of a Deceased Patient to the Mortuary Department

Following the completion of the End of Life Care (refer to Royal Marsden Nursing Manual):

- Ensure the patient is placed in a shroud and wrapped loosely in a sheet. Do not wrap the sheet tightly around the head or tape the sheet over the face as this can cause facial distortion.
- Use a body bag only if there is a potential for leakage or a known risk of infection.
- Arrange a mutually convenient time for patient collection by phoning/paging either the mortuary staff or the portering staff using the following guide.
    - Mortuary Staff - Monday - Friday 08.00 - 16.30.
    - Portering Staff - Any other time (through the main switchboard).
- Ensure bay/side room is clear of all items of furniture to allow sufficient and safe access for the concealment trolley.
- Ensure that all curtains are closed to provide patient dignity.
- Ensure that there are no relatives of the patient present – unless specifically requested otherwise.
- Ensure that two addressograph labels are available for the staff collecting the patient.

Patient Viewing

- **Requests** for viewing appointments must be made by the relevant staff contacting the mortuary/portering staff:
    - Mortuary Staff - Monday - Friday 08.00 - 16.30.
    - Portering Staff - Any other time (through the main switchboard).
- Viewing appointments must be undertaken at a mutually convenient time to all parties involved.

- Do not confirm a viewing appointment with relatives until checking with the mortuary/portering staff that the viewing facility is available.
- If necessary arrange to ring the relatives back after checking the above.
- Please note that at least one hours' notice is required for viewing appointments (under certain circumstances this may be longer).
- A member of ward/dept staff must accompany the viewing party at all times.
- Causes of death cannot and will not be disclosed by the mortuary staff to the bereaved relatives or hospital staff.

Relatives Support Service

Overseeing the procedures of death certification and deceased patient property, the Relatives Support Service (RSS) provides a dignified service for bereaved relatives at a time of need.

The RSS Team can be contacted on 650615 Monday - Friday 09.00 - 16.00 (excluding Bank Holidays). This number provides a single point of contact for bereaved relatives, funeral directors, Hospital staff and others. For appointments to handover death certification and deceased patient property to bereaved relatives, the RSS Office is available within the Scholl Day Centre of the Hospice Building.

Death Certification

All Medical Certificate of Cause of Death (MCCD) and Cremation Forms (apart from Obs and Gynae baby patients on Ward 4) are completed in Noble's Mortuary.

Families and/or funeral directors should contact either the RSS office and/or mortuary staff directly to inform of the family's/deceased patient's wishes. Once informed of whether the patient's service is to be a burial or cremation, the mortuary staff will oversee the completion of death certification. When the certificates are completed and checked the mortuary staff will make the families and/or funeral directors aware that they are ready for collection.

The family have the choice of collecting the death certification themselves by making an appointment with the RSS staff or requesting their appointed funeral directors to collect on their behalf.

Deceased Patient Property

When a patient passes away, all property present will be logged in a Patient Property Pad to provide a traceable record. If the property is being collected by the family it should be checked and signed for by both the member of staff releasing it and the next of kin. If the property is still situated on the ward the next working day the mortuary staff will collect, sign for and transfer to the mortuary.

As above - The family have the choice of collecting the property themselves by making an appointment with the RSS staff or requesting their appointed funeral directors to collect on their behalf.

Condolence Booklet

A condolence booklet (Information to Help you During a Bereavement) must be handed to a recently bereaved family as soon as possible. The booklet will explain all RSS contact details and times/places of appointments along with other extremely valuable information.

Overview of Death Certification

Introduction: Though most of medical training and practice is devoted to the care of the living patient, deaths are an inevitable part of both hospital and general practice. Mishandling of the relatively straight forward procedures which follow a death not only may cause a doctor to fall foul of the various officials such as the Coroner, Medical Referee or Registrar but, more importantly, adds to the problems of the bereaved family. ALL MCCD and Cremation Forms are completed in the Mortuary Department.

The completion of death documentation or referral to the Coroner should be carried out as soon as practicably possible.

Viewing: The doctor **MUST** always see the body after death. A doctor should not issue a Medical Certificate of Cause of Death (MCCD) or cremation form without an examination to make sure that the person actually is dead and that there are no suspicious characteristics. To view a deceased patient - refer to the contact details.

The MCCD: Once death is confirmed by the usual clinical tests, you must first decide whether to issue an MCCD or refer the case to the Coroner. When can you issue a MCCD without reference to the Coroner? You not only can, but **must**, if you:

- were the regular medical attendant of the deceased in his or her last illness; and
- either attended the deceased during the last 28 days prior to death; and
- are satisfied that you know the cause of death; and
- are satisfied that the death was due to natural causes.

If you can satisfy all of these criteria, you should complete the MCCD and also complete the counterfoil in the book of MCCD's for your own record. The funeral director or near relative usually collects the MCCD from the Mortuary/Relatives Support Office by appointment. When completing the MCCD, give as precise cause of death as facts allow. Give a logical sequence of cause and effect. Do NOT use abbreviations.

The ultimate responsibility for the correct completion of death certification lies with the Consultant in charge of the patient.

Reporting to the Coroner: It must be understood that referring or notifying a case with the Coroner does not automatically mean that an autopsy will be ordered by the Coroner. If you wish the Coroner to review a Cause of Death, an email or telephone call to the Coroners Officer will settle the matter speedily as the Coroner may advise you to certify in the normal way.

To contact the Coroners Officer via email, click on the Death Certification and Coroners' Referrals link on SharePoint.

Open the word document 'Notification to Coroner'. Following the guidance provided complete document as required.

Print a copy and place with patient notes.

Email a copy to CoronersOfficer.DHA@gov.im

Alternatively to contact the Coroner:

Monday - Friday 09.00 - 17.00	Coroners Officer: Phone 631284
Coroners Officer: Mobile 391086	Coroners Clerk: Phone 685474
Monday - Friday 17.00 - 22.00	Via Hospital Switchboard

Any other time or if the case has to be a full referral, complete 'Notification of Sudden or Violent Death' (blue form) and inform Police through Hospital Switchboard.

If the Coroner accepts a case for investigation (almost always with an autopsy) your legal responsibilities cease immediately and you should **not** issue an MCCD, sign a cremation form or request permission from the family for a hospital consent autopsy.

There is a statutory duty on a doctor to report any deaths in the following circumstances to the Coroner as soon as possible:

- Sudden or unexpected deaths where the doctor cannot certify the real, as opposed to the terminal, cause of death or where the doctor has not attended in the last illness or within 28 days prior to death.
- If a patient has been admitted to Hospital for 24 hours or less. Even if you are satisfied with the cause of death this should still be discussed with the Coroner.
- Abortion - other than natural.
- Accidents and injuries of any date if in any way contributing to the cause of death.
- Anaesthetics and operations - deaths whilst under the influence of anaesthetics and deaths following operation for injury or where the operation may have precipitated or expedited death. Including deaths following investigative procedures.
- Crime or suspected crime.
- Deaths due to alcoholism - whether acute or chronic.
- Drugs - therapeutic mishaps, drug addiction or solvent abuse.
- Ill-treatment - starvation or neglect or self-neglect.
- Industrial disease arising out of the deceased's employment, e.g. pneumoconiosis, asbestosis.
- Infant deaths - if in any way obscure.
- Patients detained under the Mental Health Act; other persons suffering from mental disorders are to be reported only if they fall in to one of the general categories.
- Pensioners receiving a disability pension, where death may be connected with the pensionable disability.
- Persons in legal custody - in a prison, young offender's institution or any detention quarters.
- Poisoning from any cause: occupational, therapeutic, accidental, suicidal, and food poisoning.
- Septicaemias - if originating from an injury.
- Stillbirths - where there may be any possibility of the child being born alive or where there is suspicion.

Cremation Certificates

Where cremation is desired by the family, two medical certificates are usually required and these are combined on the Cremation Form. Form B is completed by the doctor who signed the MCCD, who may be either provisionally or fully registered or have limited registration. You **MUST** view the body after death (even if you were unwise enough to do so earlier) and must disclose any relationship with the deceased or an interest in the estate. You must again certify the cause of death on Form B, and it is helpful if this as the

original MCCD. Advice on completing the MCCD can be sought from the Consultant in charge of the case or a Pathologist.

Form C is the confirmatory certificate signed by a doctor who has been registered for at least five years. This doctor **MUST NOT** be a member of the same medical team in hospital, from the same GP site or related to the first doctor or to the deceased.

Both these certificates are then seen by the medical referee of the crematorium, who approves them on Form F. If the death has been reported to the Coroner, Form B and C are replaced by Form E, which is issued by the Coroner. Doctors should not attempt to provide cremation forms in Coroners cases.

The ultimate responsibility for the correct completion of dearth certification lies with the Consultant in charge of the patient.

Pacemakers and Other Implants

Pacemakers must not be removed on the Hospital ward/dept. If a pacemaker or other implantable device is present and the patient is for cremation, the unit must be removed prior to cremation and is done so by the Mortuary staff.

If the unit is an Implantable Cardioverter Defibrillator (ICD), the Mortuary staff **must** be informed of this as the unit will be deactivated before removal.

A condolence booklet (Information to Help you During a Bereavement) must be handed to a recently bereaved family as soon as possible. The booklet will explain all RSS contact details and times/places of appointments along with other extremely valuable information.

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Nobles Hospital Pathology Laboratory – Alphabetical Test List (see pages 33-35 for Microbiology)

1. **TAT is from receipt in department to report - 95% of results available within time indicated, and are Analyser / staffing dependent.**
2. **Unless otherwise listed please ensure that specimens are transported to the laboratory within 24 hours and stored within the temperature range 16-25°C.**
3. **Send away TATs are dependent on referral labs.**
4. **Urgent requests significantly quicker – select on ICE and highlight to reception.**
5. **Contact lab for other TATs, or for queries regarding TATs. Some tests batched, TATs can vary.**
6. **Contact lab for details of tests required which are not listed**

Lab Key:
BT = Blood Transfusion
C = Chemistry
H = Haematology
I = Immunology
M = Microbiology

TEST	Sample tube	Turnaround Times (TATs)	Lab	Notes
17 beta Oestradiol - **See Oestradiol**		< 4 hours	**C**	
17 Hydroxyprogesterone	1 yellow		**C**	**Sent to UK**
25 hydroxy vitamin D - **See Vitamins D_2 & D_3**	1 yellow	< 4 hours	**C**	
A1C – **See HbA1c**			**C**	
ACE - **See Angiotensin converting enzyme**	1 yellow	< 72 hours	**C**	
Acetylcholine receptor antibodies	1 yellow		**I**	**Sent to UK**
ACRA - **See Acetylcholine receptor antibodies**			**I**	
ACTH	2 purple		**C**	Transport to Lab immediately (must be received within 4 hours of collection). Plasma sent frozen and can be kept overnight. **Sent to UK**
Acyltcarnitine	Newborn bloodspot or 1 dark green (LiHep)		**C**	Min 0.5mL. Transport to Lab immediately. **Sent to UK**

Adalimumab	1 yellow		**C**	**Sent to UK**
ADH – **see Copeptin**			**C**	Copeptin replaces ADH
Adrenal antibodies	1 yellow		**I**	**Sent to UK**
Adrenocorticotrophic hormone - **See ACTH**			**C**	
AFP	1 yellow	< 4 hours	**C**	
Agglutinins – **See Cold agglutinins**			**BT**	
Albumin (Bone or LFT profile)	1 yellow	< 2 hours	**C**	
Alcohol level	1 grey	< 2 hours	**C**	
Aldosterone	2 purple		**C**	1 sample taken before rising, then 2nd sample ½ hour ambulant. Contact Chemistry before sample collection. Take to lab immediately after collection. **Sent to UK**
Alloantibody investigation – **See Critical Antibodies**			**BT**	
Alkaline Phosphatase **– See LFT**			**C**	
Alpha 1 antitrypsin	1 yellow	3 days	**C**	
Alpha 1 antitrypsin genotype	1 purple		**C**	**Sent to UK**
Alpha 1 antitrypsin phenotype	1 yellow		**C**	**Sent to UK**
Alpha fetoprotein - **See AFP**			**C**	
Alpha galactosidase	1 purple		**C**	Transport to Lab immediately. **Sent to UK**
ALT – **See LFT**			**C**	
Aluminium	1 dark green (LiHep)			
AMA - **See Autoantibody screen**			**I**	
Amikacin	1 yellow		**C**	Pre and Post dose samples required. **Sent to UK**
Amino acids - blood	1 dark green (LiHep)		**C**	s **Sent to UK**
Amino acids - urine	EMSU Min 5 ml required		**C**	**Sent to UK.** EMSU samples are more Concentrated, more meaningful results generated. Sample only referred if urine creatinine >1 mmol/l
Amiodarone	1 yellow		**C**	**Sent to UK**

Ammonia	1 purple	< 1 hour	**C**	Contact Chemistry before sample collection. Take to lab on ice within 15 minutes of collection
Amoebic Dysentery antibody	1 yellow		**I**	**Sent to UK**
Amylase	1 yellow	< 2 hours	**C**	
Amyloid protein	1 yellow		**C**	**Sent to UK**
ANA - **See Autoantibody screen**			**I**	
ANCA	1 yellow		**I**	
Androgens	1 yellow		**C**	See individual tests
Androstendione	1 yellow		**C**	**Sent to UK**
ANF - **See Autoantibody screen**			**I**	
Angiotensin Converting Enzyme	1 yellow		**C**	
Antibodies – **see Critical antibodies**	1 pink		**BT**	
Anti-Beta2 Glycoprotein1 antibodies – **See Anti-phospholipid screen**			**H**	
Anti-Cardiolipin antibodies – **See Anti phospholipid screen**			**H**	
Anti-CCP antibodies	1 yellow	2 weeks	**I**	
Anti-Centromere Antibody	1 yellow		**I**	**Sent to UK**
Anti-Cw	1 pink		**BT**	
Anti-Cyclic Citrullinated Peptide – **See Anti CCP antibodies**			**I**	
Anti-D	1 pink		**BT**	
Anti-Diuretic Hormone - **See Copeptin**			**C**	
Anti-dsDNA antibody - **See Autoantibody screen**			**I**	
Anti-E	1 pink		**BT**	
Anti-Fya or Fyb	1 pink		**BT**	
Anti-Ganglioside Antibody	1 yellow		**I**	**Sent to UK**
Anti-Gastric Parietal Cell Antibody - **See Autoantibody screen**			**I**	
Anti-Glomerular Basement Membrane	1 yellow		**I**	**Sent to UK**
Anti-Hepatitis B Core antibody – **See Hepatitis screen**			**I**	
Anti-Hepatitis C Virus - **See Hepatitis screen**			**I**	
Anti-Insulin antibody	1 yellow		**I**	**Sent to UK**
Anti-Intrinsic factor	1 yellow		**I**	**Sent to UK**

Anti-MAG antibody	1 yellow		**I**	**Sent to UK**
Anti-Hepatitis B surface antibody	1 yellow	1 week	**I**	
Anti-Jo 1 Antibody - **See ENA screen**			**I**	
Anti-Mitochondrial antibody - **See Autoantibody screen**			**I**	
Anti-Mullerian antibodies	1 yellow		**C**	**Sent to UK**
Anti-Natalizumab antibodies (Tysabri)	1 red or yellow		**I**	Contact Immunology before sample collection. **Sent to UK**
Anti-neutrophil cytoplasmic antigens - **See ANCA**			**I**	**Sent to UK**
Anti-Nuclear Antibody - **See Autoantibody screen**			**I**	
Anti-Nuclear Factor - **See Autoantibody screen**			**I**	
Anti-Phospholipid Screen (APS) (includes Anti-cardiolipin antibody, Lupus Anticoagulant and Anti-beta 2 Glycoprotein 1)	4 blue	4 weeks	**H**	Samples must be received by lab before 1pm. Do not collect on a Friday or Bank Holiday (no post to UK). Some components **sent to UK**
Anti-Platelet antibodies	1 yellow + 1 purple		**I**	Contact Immunology before sample collection. Transport to Lab immediately. **Sent to UK**
Anti-Ribonuclear protein - **See ENA screen**			**I**	
Anti-Ro / Anti La - **See ENA screen**	1 yellow		**I**	
Anti-SCL 70 **– See ENA screen**	1 yellow		**I**	
Anti-skin basement membrane antibody	1 yellow		**I**	**Sent to UK**
Anti-Sm - **See ENA screen**			**I**	
Anti-Smooth Muscle Antibodies - **See Autoantibody screen**			**I**	
Anti-SSA / Anti-SSB - **See ENA screen**			**I**	
Antithrombin – **See Thrombophilia screen**			**H**	
Anti-Thyroid Peroxidase	1 yellow	3 days	**C**	
Anti-tissue transglutaminase - **See Coeliac screen**	1 yellow		**I**	
Anti-Xa heparin assay	1 blue	1 day	**H**	Contact the Haematology department to book an appointment for testing. Sample needs to arrive at laboratory within 30 minutes after collection. It is essential to have information regarding the timing of the sample in relation to the dose
Apixaban assay	1 blue	1 - 3 weeks	**H**	Contact the Haematology department to book an appointment for testing. Sample needs to arrive at laboratory within 30 minutes after collection. It is

				essential to have information regarding the timing of the sample in relation to the dose. **Sent to UK**
APTT ratio – (unfractionated heparin) **See Coagulation screen**	1 blue	<4 hours (urgent <1hour)	**H**	Specifically request "APTT ratio" and make sure the clinical history states 'patient on heparin infusion'
Aquaporin 4 antibodies	1 yellow		**I**	**Sent to UK**
Arginine Vasopressin - **See Copeptin**			**C**	
Arsenic level	1 green or purple		**C**	Can also be done on MSU. **Sent to UK**
ASMA - **See Autoantibody screen**			**I**	
Aspergillus precipitins	1 yellow		**I**	**Sent to UK**
AST	1 yellow	2 hours	**C**	
Autoantibody screen	1 yellow	3 working days	**I**	
Avian precipitins	1 yellow		**I**	**Sent to UK**
B. burgdorferi antibody	1 yellow		**I**	
B_{12} – **See Vitamin B_{12}**			**C**	
BCR/ABL	1 green	4 weeks	**H**	Contact Haematology laboratory. Liverpool Women's Cytogenetic form / HODS form required. **Sent to UK**
Beta 2 Glycoprotein 1 - **See Anti-phospholipid screen**			**H**	
Beta 2 Microglobulin	1 yellow	4 hours	**C**	
beta HCG	1 yellow	< 2 hours	**C**	
Bicarb (HCO_3) – or blood gas	1 yellow / ABG syringe	< 2 hours < 10 minutes	**C**	
Bile acids	1 yellow		**C**	**Sent to UK** To be collected in a Fasting State
Bilharzia	1 yellow		**I**	**Sent to UK**
Bilirubin	1 yellow	< 2 hours	**C**	
Biotinidase	1 green		**C**	**Sent to UK**
Blood film	1 purple	< 48 hours	**H**	Single sample will cover FBC + FILM, specific reason for film request **MUST** be given. This request is added by Haematology staff when required
Blood gases	Blood gas syringe	< 10 minutes	**C**	Analysers available on ITU / A+E / SCBU / MAU
Blood group and save serum – **See Group and Save**			**BT**	

B-Natriuretic Peptide - **See NTPRO BNP**				**C**	
NTPRO BNP		1 purple	< 2 hours	**C**	If FBC requested then separate purple top MUST be provided for NTPRO BNP
Blood Haematinic level – **See Vitamin B12**				**C**	
Bone Marrow – Aspirate / Trephine				**H**	Contact Clinical Haematology team at Nobles
Bone profile		1 yellow	< 2 hours	**C**	
Bordetella pertussis serology		1 yellow		**I**	**Sent to UK**
Borellia Burgdorferi antibodies - **See Lyme disease screen**		1 yellow		**I**	
Brucella antibody		1 yellow		**I**	**Sent to UK**
C1 Esterase Inhibitor		1 yellow		**C**	**Sent to UK**
C_3C_4		1 yellow	< 72 hours	**C**	
Ca 125		1 yellow	< 4 hours	**C**	
Ca 15.3		1 yellow		**C**	**Sent to UK**
Ca	19.9	1 yellow	< 4 hours	**C**	
Ca + PO_4 - **See Bone profile**					
CTx1 (beta carboxy terminal telopeptide type I)		1 purple		**C**	**Sent to UK**
Caeruloplasmin		1 yellow	< 72 hours	**C**	
Caffeine level		1 green or navy		**C**	**Sent to UK**
Calcitonin		1 navy or yellow		**C**	Preferably Fasting specimen. Contact Chemistry before collection. Transport to Lab immediately. **Sent to UK**
Calcium : Creatinine Clearance Ratio		24 hr urine	< 72 hours	**C**	
Calcium + Phosphate – **See Bone profile**					
Carbamazepine		1 yellow		**C**	Trough level, sample immediately before next dose. **Sent to UK**
Carbohydrate Deficient Transferrin		1 yellow		**C**	**Sent to UK**
Carbon monoxide - **See Carboxyhaemoglobin**				**C**	
Carboxyhaemoglobin		1 green / Blood gas syringe	< 2 hours < 10 minutes	**C**	Can be done as part of blood gas profile
Carcinoembryonic Antigen - **See CEA**				**C**	
Carnithine (Total and Free)		1 yellow		**C**	**Sent to UK**

CD markers	2 purple	1 - 2 weeks	**H**	Includes FBC, **CDM sent to UK**
CD4 / CD8	Contact lab for tube		**I**	Contact Immunology for collection tube. **Sent to UK**
CEA	1 yellow	< 4 hours	**C**	
Cefaclor level specific IgE	1 yellow		**I**	**Sent to UK**
Cephalosporin antibiotic level - **See Cefaclor level**	1 yellow		**I**	
Cerebrospinal Fluid (CSF) Protein/Glucose (see also Microbiology repertoire)	1 grey 1 universal	2 hours	**C**	Contact Chemistry & advise sample taken
Cerebrospinal Fluid (CSF) Xanthochromia	1 universal	24 hours	**C**	Must be protected from light (keep specimen in an envelope) * not performed on-call
Cerebrospinal Fluid (CSF) Oligoclonal Bands	1 universal (0.5mL) and 1 Yellow		**C**	**Sent to UK**
CF screen - **See Cystic Fibrosis screen**			**C**	**Sent to UK**
Chicken Pox – **See Varicella antibodies**			**I**	
Chlamydia antibody	1 yellow		**I**	**Sent to UK**
Cholesterol	1 yellow	< 4 hours	**C**	Overnight fasting required for a full lipid profile
Cholinesterase genotype	1 purple		**C**	**Sent to UK**
Cholinesterase inhibitor	1 yellow		**C**	**Sent to UK**
Cholinesterase level/Pseudocholinesterase	1 yellow	< 4 hours	**C**	Contact Chemistry & advise sample taken
Chromogranin A and B (Also part of Gut Hormone Screen)	1 purple if part of gut hormone screen otherwise 1 yellow		**C**	Transport to Lab Immediately. Plasma must be promptly separated and frozen. **Sent to UK**
Clauss Fibrinogen	1 blue	< 4 hours (urgent < 1 hour)	**H**	Reflex test if fibrinogen reduced on coag screen, done on same sample as coag screen. Please send to laboratory immediately upon collection.
Clozaril level	1 purple	4 weeks	**H**	Use special clozaril tubes. **Sent to UK**
CMV Antibody	1 yellow	1 week	**I**	
CMV PCR	1 purple		**I**	**Sent to UK**
CMV DEAFF	Urine		**I**	**Sent to UK**
Coagulation screen (Prothrombin Time, APTT, Fibrinogen)	1 blue	< 4 hours (urgent < 1 hour)	**H**	Sample MUST be fully filled

Coeliac screen – Anti-Tissue Transglutaminase	1 yellow	3 working days	**I**	
Cobalt + Chromium	1 purple		**C**	First take 2x10ml yellows and discard unless required for other tests. Only tested via Orthopaedic Surgeon. **Sent to UK**
Cold agglutinins	1 purple + 1 pink		**BT**	**Sent to UK**, relevance must be discussed with Transfusion Laboratory before sending
Complement - **See C_3C_4**			**C**	
Conjugated (Direct) Bilirubin	1 yellow	< 2 hours	**C**	
Copeptin (replaces ADH)	1 green + 1 yellow	1 week	**C**	Needs Osmolality value. **Sent to UK**
Copper	1 navy		**C**	**Sent to UK**
Cortisol	1 yellow	< 4 hours	**C**	
C-Peptide	1 yellow + 1 grey (for glucose)		**C**	Contact Chemistry before sample collection as needs to be in the lab ASAP. If request is for both Insulin and C-Peptide then only one green tube is required. **Glucose must be below 2.2 for analysis**. **Sent to UK**
CK / CPK	1 yellow	< 2 hours	**C**	
Creatine Phosphokinase - **See CK**			**C**	
Creatinine - blood part of U/E - urine	1 yellow MSU	< 2 hours	**C**	
Critical Antibodies – Complex and Antenatal Quantitation	2 pink	7 days	**BT**	**Sent to UK**
Cross match	1 pink	1 working day / Urgent <1 hour	**BT**	Patient with antibodies – contact BT
CRP	1 yellow	< 2 hours	**C**	
Cryoglobulin (Cryoproteins)	1 yellow + 1 purple	1 week	**C**	Only to be taken on Noble's site. Contact chemistry prior to sampling to organise procedure – to be keep at 37°C.
Cyanide level	1 purple		**C**	**Sent to UK**
Cyclosporin level	1 purple		**C**	**Sent to UK**
Cystic fibrosis screen	1 purple		**C**	Must be on a Molecular Genetics form. **Sent to UK**
Cytomegalovirus antibody - **See CMV Antibody**			**I**	
Cytotoxic antibodies	1 yellow		**I**	**Sent to UK**

D-dimer	1 blue	< 4 hours (urgent < 1 hour)	**H**	If coag screen requested 1 blue will suffice. If ?DVT, perform Well's Score. Please send to laboratory immediately upon collection.
D_2, D_3 - **See Vitamins D_2 & D_3**			**C**	Total Vitamin D analysed
DAT - **See Coombs test**			**BT**	
DCT - **See Coombs test**			**BT**	
Dehydroepiandrosterone Sulphate - **See DHEAS**			**C**	
Dengue fever	1 yellow		**I**	**Sent to UK**
DHEAS	1 yellow		**C**	**Sent to UK**
Differential (WBC) - **See FBC**	1 purple	< 2 hours (urgent < 1 hour)	**H**	Routine FBC includes automated differential
Digoxin *toxic patients treated with 'DIGIFAB' should have renal function monitored; digoxin levels invalid.	1 yellow	< 2 hours	**C**	Collect 8-24hrs after last dose, unless toxicity suspected
DNA autoantibodies – **See Autoantibody screen**			**I**	
Downs syndrome screen - **See Triple test**			**C**	**Sent to UK**
Drugs of Abuse screen - Urine only	MSU	1 week	**C**	

E2 - **See Oestradiol**			**C**	
EBV DNA PCR	2 purple		**I**	**Sent to UK**
Echinococcus	1 yellow		**I**	**Sent to UK**
EGFR	1 yellow	< 2 hours	**C**	
Electrolyte profile – **See U&E**			**C**	
ENA screen			**I**	Sent to UK, but only if ANA screen positive
Epilim - **See Valproate**			**C**	
Epstein Barr virus serology (EBNA)	1 yellow	4 days	**I**	
Erythropoietin	1 yellow		**C**	**Sent to UK**
ESR	1 black (5.0ml)	< 4 hours	**H**	Available for Dr R. Peshin and anti TNF therapy patients **ONLY** (Request form *MUST* state this). Otherwise request plasma viscosity
Estimated glomerular filtration rate - **See EGFR**			**C**	
Ethanol - **See Alcohol level**			**C**	
ETOH - **See Alcohol level**			**C**	
Extractable nuclear antigens - **See ENA screen**			**I**	

Factor assays (coagulation) Intrinsic: VIII, IX,XI,XII Extrinsic: II,V,VII,X	2–4 blue	4 weeks	**H**	Contact Haematology before sample collection for advice re sample requirements. Transport immediately.
Factor IX – **See Thrombophilia / Factor assays**			**H**	
Factor VIII – **See Thrombophilia / Factor assays**			**H**	
Factor V Leiden	1 purple	4 weeks	**H**	Contact Haematology before sample collection for advice re sample requirements
Faecal Elastase (Replaces faecal fat)	Faeces		**C**	**Sent to UK**
Free fatty acids (See also Very long chain fatty acids)	1 green		**C**	**Sent to UK**
FBC	1 purple	< 2 hours (urgent < 1 hour)	**H**	Reticulocytes can be done from same sample
Fibrinogen – **See Coagulation screen**			**H**	
Flecainide	1 navy		**C**	Contact lab about transport arrangements – sample analysed by drug manufacturer. **Sent to UK**
Fluoride level	1 yellow	< 2 hours	**C**	
Folate – **See Vitamin B12**			**C**	
Fragile X	1 purple		**I**	Must be on a Molecular Genetics form. **Sent to UK**
Free Androgen Index (needs SHBG + testosterone)	1 yellow	< 72 hours	**C**	
Free light chains	1 yellow		**C**	Only useful in early diagnosis of myeloma /monitoring treatment. **Sent to UK**
Free testosterone – **See Free Androgen Index**	1 yellow		**C**	
Free T3 Free T4 **– See TFT**	1 yellow	< 4 hours	**C**	
FSH/LH	1 yellow	< 4 hours	**C**	
Full blood count - **See FBC**			**H**	

Glucose 6 Phosphatase Dehydrogenase	1 purple	< 5 days	**H**	Contact haematology. **Sent to UK**
Galactose-1-Phosphate Uridyl Transferase	1 green		**C**	**Sent to UK**
Gamma GT – **See LFT**	1 yellow	< 2 hours	**C**	
Gastrin	1 purple + 1 yellow		**C**	Contact Chemistry before sample collection. Must be transported on ice. Need Urea & Calcium values and all drug history. **Sent to UK**

GBM - **See Anti Glomerular Basement Membrane**			**I**	
Gentamicin	1 yellow	< 2 hours	**C**	Pre – dose sample required
Glandular fever screen	1 yellow or purple	< 24 hours	**H**	Always do FBC in conjunction
Glucagon level - **See Gut hormones**			**C**	
Glucose	1 grey	< 2 hours	**C**	
Glycosylated haemoglobin – **See HbA1c**			**H**	
Gonadotrophins	1 yellow	< 4 hours	**C**	
Group and Save (Group and Screen)	1 pink	1 working day	**BT**	
Growth hormone	1 yellow		**C**	**Sent to UK**. Single GH test is of little use. Consider dynamic function test.
Gut hormones – **See Gastrin**			**C**	**Sent to UK**

H. influenzae + Pneumococcal antibodies	1 yellow		**I**	**Sent to UK**
Haematocrit - **See FBC**			**H**	
Haematology Oncology Diagnostic Service (HODS) testing			**H**	Refer to Clinical Haematology team at Nobles. Request forms available here
Haemochromotosis screen	1 purple	4 – 6 weeks	**H**	Must be on a North West Molecular Genetics form, copies available from Pathology specimen reception. **Sent to UK**
Haemoglobinopathy screen (FBC + HPLC)	1 purple	3 - 5 working days	**H**	Informed patient consent is required. Details of ethnicity and relevant family history is essential within the Family Origin Questionnaire (FOQ). **If DNA analysis required this is sent to UK**
Haptoglobin	1 yellow	< 4 hours	**C**	
HbA1c – Glycosylated Hb	1 purple	1 day	**C**	Cannot use FBC sample or PBNP/PTH samples
HBSAg – **See Hepatitis screen**				
HBV DNA	2 purple or 1 yellow		**I**	**Sent to UK**
HCV – **See Hepatitis screen**			**I**	
HCV PCR	2 purple or 1 yellow		**I**	**Sent to UK**
Hepatitis A IgG or IgM	1 yellow		**I**	**Sent to UK**

Hepatitis C viral load – **See HCV PCR**	2 purple or 1 yellow		**I**	**Sent to UK**
Hepatitis screen	1 yellow	< 3 hours	**I**	
Herbicides - **See Cholinesterase level**			**C**	
Herpes simplex virus	1 yellow		**I**	**Sent to UK**
Herpes zoster - **See Varicella antibodies**	1 yellow		**I**	
HCG	1 yellow	< 4 hours	**C**	
HCV Genotype – **See HCV PCR**			**I**	
HCV RNA – **See HCV PCR**			**I**	
HDL Cholesterol (in Lipid profile)	1 yellow	< 2 hours	**C**	
HIV	1 yellow	2 working days	**I**	Urgent testing available if required
HFE gene – **See Haemochromatosis screen**			**H**	**Sent to UK**
HLA B27	2 purple		**I**	Can be kept for up to 5 days at room temp. **Sent to UK**
HLA B*5701	1 purple		**I**	**Cannot** be kept overnight. Contact Immunology before collection
HLA tissue typing	1 green + 1 purple + 1 yellow		**I**	**Sent to UK**
Homocystine level	2 purple		**C**	Contact Chemistry before sample collection. Take to lab immediately after collection. **Sent to UK**
HTLV 1/2 Antibody	1 yellow	1 week	**I**	
HSV – **See Herpes Simplex Virus**			**I**	
HTLV-3 – **See HIV**			**I**	
Hydatid antibodies	1 yellow		**I**	**Sent to UK**

IgE / Allergy testing	1 yellow	1 week	**I**	**Less common allergens sent to UK**
IGF-1	1 yellow		**C**	**Sent to UK**
Immunoglobulins (IgG,IgA,IgM)	1 yellow	< 4 hours	**C**	
Immunoglobulin electrophoresis	1 yellow	1 week	**C**	Batched test
Immunoreactive trypsin – child	Blood spot card		**C**	Screening test for < 6 weeks old
Infectious Mononucleosis screen – **See Glandular Fever**			**H**	
INR (oral anticoagulant control)	1 blue	< 4 hours (urgent < 1 hour)	**H**	State clearly if patient is on warfarin, only INR,

				(not coagulation screen) required. Please send to laboratory immediately upon collection.
Insulin	1 green 1 grey (for glucose)		**C**	If request is for both Insulin and C-Peptide then only one green tube is required. Also collect 1 grey sample for fasting glucose. Send immediately to lab on collection. Contact Chemistry before sample collection. **Glucose must be < 2.2 for analysis**
Interferon antibodies	1 yellow		**I**	**Sent to UK**
Intrinsic coagulation factors – **See Factor assays**	2 blue		**H**	
Intrinsic growth factor - **See IGF-1**			**C**	
Iron profile (Iron, TIBC & Ferritin)	1 yellow	< 2 hours	**C**	
Islet cell antibody	1 yellow		**I**	**Sent to UK**
JAK2 p.V617F gene mutation	2 purple	4 – 6 weeks	**H**	Must be on a North West Molecular Genetics form, copies available from Pathology specimen reception. **Sent to UK**
Janus Kinase 2 mutation – **See JAK2**			**H**	
Jo-1 antibody level – **See ENA screen**	1 yellow		**I**	

Keppra – **See Levetiracetam**			**C**	
Kleihauer	1 pink or purple	1 working day	**BT**	Must be taken between 30 minutes and 2 hours post-delivery
Kleinfelter's screen	1 green		**I**	Must be on Cytogenetics form

Lactate	Grey top / Blood gas syringe	< 2 hours 10 minutes	**C**	Analyse ASAP, blood gas analyser available in ITU, NNU, MAU and A+E. Backup in lab
Lamotrigine	1 yellow		**C**	**Sent to UK**
LDH / LD / Lactate Dehydrogenase	1 yellow	< 2 hours	**C**	
Lead level	1 purple		**C**	**Sent to UK**
Leptospirosis antibody	1 yellow		**I**	**Sent to UK**
Levetiracetam	1 yellow		**C**	**Sent to UK**
LFT	1 yellow	< 2 hours	**C**	
LH – **See FSH/LH**	1 yellow	< 4 hours	**C**	

Lipid profile	1 yellow	< 2 hours	**C**	Must be fasting (14 hours)
Listeria	1 yellow		**I**	**Sent to UK**
Lithium	1 yellow	< 2 hours	**C**	Collect 12 hrs after last dose unless toxicity suspected
Liver function tests - **See LFT**			**C**	
LKM – Liver, Kidney Microsomal antibody – **See Autoantibodies**	1 yellow		**I**	
Lyme disease screen	1 yellow	1 week	**I**	
Lymphadenopathy screen	1 yellow	1 week	**I**	

Magnesium	1 yellow	< 2 hours	**C**	
Malaria screen (FBC, blood film and malaria antigen)	1 purple	< 4 hours	**H**	FBC, DNA molecular screening, rapid diagnostic test and a blood film for species identification if required. Clinical history, travel history, (lack of) prophylaxis information is essential. See link for list of malaria endemic areas before requesting malaria screen.
Mast Cell Tryptase	1 yellow		**C**	1 sample 30 minutes after onset then another 6 hours later. Record time on sample and form. **Sent to UK**
Measles	1 yellow		**I**	**Sent to UK**
Meningococcal antigen PCR	2 purple		**M**	**Sent to UK**
Mercury level	1 purple		**C**	**Sent to UK**
Methaemoglobin level	Blood gas syringe	10 minutes	**C**	Blood gas analysers available in ITU, A+E, MAU and NNU. Backup in lab
Methotrexate level	1 green		**C**	Monitor liver function tests & FBC. Contact Chemistry before sample collection. **Sent to UK**
Methyl tetrahydrate reductase - **See MTHR**				
Microalbumin (Urine)	MSU sample or 24 hr urine	1 day	**C**	
Mononucleosis screen – **See Glandular Fever screen**			**H**	
Monospot - **See Glandular Fever screen**			**H**	
Muscle cell specific kinase (MuSK) antibodies	1 yellow		**I**	**Sent to UK**
Mumps IgM IgG	1 yellow		**I**	**Sent to UK**

Myeloma screen	1 yellow	1 week	**C**	Batched test
Myoglobin (Blood)	1 yellow	< 2 hours	**C**	Blood only, no longer done on urine

Nebcin - **See Tobramycin**			**C**	

Oestradiol	1 yellow	< 4 hours	**C**	
Olanzapine	1 yellow or purple		**C**	**Sent to UK**
Organic acids	EMSU sample		**C**	**Min volume required = 5ml** **Sent to UK.** EMSU samples are more concentrated and more meaningful results are generated. Urine creatinine must be >1mmol/l
Osmolality - serum - urine	1 yellow MSU	< 24 hours < 24 hours	**C** **C**	

Paracetamol	1 yellow	< 2 hours	**C**	Collect samples at least 4 hours after ingection and immediately transport to laboratory.
Paraneoplastic Antibodies	1 yellow		**I**	**Sent to UK**
Parathyroid hormone (PTH)	1 purple	< 4 hours	**C**	Please immediately transport to laboratory upon collection
Parvovirus B19 Antibody	1 yellow		**I**	**Sent to UK**
Pemphigus antibodies	1 yellow		**I**	**Sent to UK**
Phenobarbitone	1 yellow		**C**	**Sent to UK**
Phenylalanine	1 yellow		**C**	**Sent to UK**
Phenytoin level	1 yellow		**C**	Does not have trough level. **Sent to UK**
Phosphate (in Bone profile)	1 yellow	< 2 hours	**C**	
Phytanic acid level	1 green		**C**	**Sent to UK**
PIIINP – **See Procollagen peptide type 3**				**Sent to UK**
Plasma viscosity	1 purple	< 4 hours	**H**	Request PV, not ESR which is not done on IOM. FBC and PV can be done on same sample
Platelet antibodies - **See Anti platelet antibodies**			**I**	
Pneumococcal antibodies	1 yellow		**I**	**Sent to UK**
Porphyrin screen	2 purple + MSU +		**C**	Protect from light. **Sent to UK**

	Faeces			
Post vasectomy – **See Semen**			**H**	
Potassium (part of Urea and Electrolytes)	1 yellow	< 2 hours	**C**	
Prednisolone	1 navy or green		**C**	Collect 2 hrs after last dose. **Sent to UK**
Pre-thrombotic screen - **See Thrombophilia screen**			**H**	
Procalcitonin	1 yellow	< 24 hours	**C**	
Procollagen peptide type 3	1 yellow or navy		**C**	**Sent to UK**
Progesterone	1 yellow	< 4 hours	**C**	
Prolactin	1 yellow	< 4 hours	**C**	
Protein electrophoresis	1 yellow	1 week	**C**	Batched test
Protein studies	1 yellow	1 week	**C**	Batched test
PSA	1 yellow	< 4 hours	**C**	

Q fever viral study	1 yellow		**I**	**Sent to UK**

Rabies antibody	1 yellow		**I**	**Sent to UK**
RAST – **See IgE / Allergy testing**	1 yellow		**I**	
Renin	2 purple		**C**	1 sample before rising and further sample after 30 mins ambulant. Contact Chemistry before sample collection. Transport to lab immediately. **Sent to UK**
Reticulocytes – **Also see FBC**	1 purple	< 2 hours	**H**	FBC and retics done on same sample
Rhesus antibodies – **See Critical antibodies.**			**BT**	
Rheumatoid factor	1 yellow	3 working days	**C**	
Ricketsia	1 yellow		**I**	**Sent to UK**
Rivaroxaban assay	1 blue	1 – 3 weeks	**H**	Contact the Haematology department to book an appointment for testing. Sample needs to arrive at the laboratory within 30 minutes. It is essential to have information regarding the timing of the sample in relation to the dose. **Sent to UK**
RNP - **See ENA screen**			**I**	
RPR			**I**	**Sent to UK**
Rubella IgG	1 yellow	7 days	**I**	

Rubella IgM	1 yellow		I	**Sent to UK For** Pregnancy - Please send to lab immediately.

Salicylate	1 yellow	< 2 hours	C	
Schistosomiasis antibody	1 yellow		I	**Sent to UK**
Scleroderma screen – **See Autoantibodies**	1 yellow		I	
Selenium	1 navy or yellow		C	**Sent to UK**
Semen infertility / post vasectomy analysis		< 4 hours	H	Contact Pathology Specimen Reception for instruction sheet and container
Sex hormone binding globulin - **See SHBG**			C	
SGPT – **See LFT**			C	
SHBG	1 yellow	1 week	C	Batch tested
Sickle screen - **Also see Haemoglobinopathy**	1 purple	< 4 hours (urgent < 1 hour)	H	
Sirolimus	1 purple		C	**Sent to UK**
Sodium Valproate - **See Valproate**	1 yellow		C	
Stone Risk	EMSU or 24 hr urine		C	**Sent to UK**
Syphilis antibodies	1 yellow	7 days	I	

Tacrolimus	1 purple		C	**Sent to UK**
Tay Sachs disease	1 purple		C	**Sent to UK**
TCR gene rearrangement studies	2 purple	4 – 6 weeks	H	**Sent to UK.** Follow up request made by Royal Liverpool ONLY
Tegretol – **See Carbamazepine**	1 yellow		C	**Sent to UK**
Teicoplanin	1 yellow		C	**Sent to UK**
Testosterone	1 yellow	< 4 hours	C	
Tetanus Antibody	1 yellow		I	**Sent to UK**
TFT (FT4+TSH)	1 yellow	< 4 hours	C	
Thalassaemia screen (alpha thalassaemia)	2 purple	4 – 12 weeks	H	**Sent to UK.** Details of ethnicity and family history essential. Do iron studies in conjunction
Theophylline	1 yellow	< 2 hours	C	

Thrombophilia screen (Protein S, Protein C, Antithrombin, Factor V Leiden, Prothrombin Gene Mutation.)	4 blue + 2 purple	4 weeks	**H**	Not available for inpatients or anticoagulated patient. If Antiphospholipid screen required as well then 6 blue + 2 purple required. **Samples must be received by lab before 1pm (within 4 hours of collection).** Do not collect on a Friday / Bank Holiday. (no post to UK). **Some tests sent to UK**
Thiopurine Methyl Transferase - **See TPMT**			**C**	
Thyroglobulin	1 yellow		**C**	**Sent to UK**
Thyroid peroxidase antibody	1 yellow	1 week	**C**	Batched test
Thyroid receptor antibody	1 yellow		**C**	**Sent to UK**
Thyroid releasing hormone - **See TRH**			**C**	
TIBC – **See Iron profile**			**C**	
Tissue typing – **See HLA tissue typing**			**I**	
Tobramycin	1 yellow		**C**	**Sent to UK**
Topiramate	1 yellow		**C**	**Sent to UK**
Torch screen	1 yellow		**I**	**Sent to UK**
Total protein (blood) (in LFT, Bone)	1yellow	< 2 hours	**C**	
Total Protein (Urine)	MSU	< 4 hours	**C**	
Toxoplasma antibodies - **See Torch screen**			**I**	
TPHA (or TPPA) Syphilis antibody	1 yellow		**I**	**Sent to UK**
TPMT	2 purple		**C**	**Sent to UK.** Once a patient has been tested for TPMT (deficiency) there is no need to repeat. Use Thiopurine metabolites for monitoring.
TRH Stimulation test	1 Yellow		**C**	Timed samples – see protocol sheet
Trichinella	1 yellow		**I**	**Sent to UK**
Transferrin (Iron Profile)	1yellow	< 4 hours	**C**	
Triglyceride (Lipid profile)	1yellow	< 2 hours	**C**	Overnight fasting required for a full lipid profile
Triple test **No longer available – Quad test instead**	1 yellow		**C**	Must be on a Birmingham 'Downs & NTD screening' form. **Sent to UK**
Troponin T levels (high sensitivity)	1 yellow	< 2 hours	**C**	
TSH - **See TFT**			**C**	
T Spot	1 green		**I**	Speak to Laboratory. **Sent to UK**
TTG – **See Coeliac screen**			**I**	

U&E	1 yellow	< 2 hours	**C**	
Urea & Electrolytes - **See U&E**			**C**	
Urate	1 yellow	< 2 hours	**C**	
Urine electrolytes (including osmolality)	MSU or 24 hr urine	< 24 hours	**C**	

Valproate	1 yellow (or plain)	< 2 hours	**C**	Trough level immediately prior to next dose.
Vancomycin	1 yellow	< 2 hours	**C**	Pre dose samples required
Varicella antibodies IgG	1 yellow		**I**	For Pregnancy – please send to laboratory asap
Varicella antibodies IgM	1 yellow		**I**	**Sent to UK**
Varicella zoster - **See Varicella antibodies**			**I**	
Vasopressin – **See Copeptin**			**I**	
VDRL – **See Syphilis antibodies**			**I**	
Venlafaxine	1 navy		**C**	**Sent to UK**
Very long chain fatty acids	1 green		**C**	**Sent to UK**
Viral studies – *no longer available, please specify individual test required.*	1 yellow		**I**	Full clinical details ESSENTIAL
Vitamin A	1 navy or yellow		**C**	Protect from light, separation and freezing required. Contact before sample collection and bring to lab ASAP. **Sent to UK**
Vitamin B_{12} and Folate	1 yellow	< 24 hours	**C**	Active B_{12} **sent to UK**
Vitamin D	1 yellow	< 4 hours	**C**	Total Vitamin D analysed. Please transport to laboratory immediately upon collection.
Vitamin D_2 & D_3	1 yellow	< 4 hours	**C**	Total Vitamin D analysed. Please transport to laboratory immediately upon collection.
Vitamin E	1 yellow		**C**	Protect from light, separation and freezing required. Yellow required for lipids. Contact Chemistry before sample

				collection and bring to lab ASAP. **Sent to UK**
Vitamin K	1 navy		**C**	Protect from light. **Sent to UK**
Von Willebrand's disease screen (von Willebrand's antigen, von Willebrand's Ristocetin co-factor activity, factor VIII.)	2 x blue	4 weeks	**H**	Contact Haematology before sample collection. Take to lab immediately after collection
VZV - **See Varicella antibodies**	1 yellow		**I**	

Wasserman reaction - **See VDRL**	**I**	
Weils disease – **See Leptospirosis antibody**	**I**	

X-match - **See Cross match**	**BT**	

Zika virus	1 yellow		**I**	**Sent to UK**
Zinc level	1 navy	7 days	**C**	**Sent to UK**
ZPP - **See Porphyrin screen**			**C**	**Sent to UK**

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