User Guide 2023

HEALTH SERVICES LABORATORIES

Contents

About Health Services Laboratories (HSL) 2

HSL Locations 3

Quality assurance 4

Data protection 8

Measurement of uncertainty 10

Complaints policy 10

HSL referral laboratories 11

HSL Genetics referral laboratories 13

How to order a test 14

Guidance on specimen collection 16

Specimen transport 18

Sample rejection criteria 20

Sample requirements 22

Cervical Screening London 23

HSL Advanced Diagnostics 32

HSL Biochemistry 39

HSL Cellular Pathology 51

HSL Manual Haematology (Immunophenotyping and Immune Monitoring) 63

HSL Genetics 67

HSL Haematology 97

HSL Manual Haematology (Red Cells) 103

HSL Immunology 106

HSL Microbiology 118

HSL Parasitology 130

HSL Rapid Response Laboratories 155

HSL Virology 173

Request Forms 185

About Health Services Laboratories (HSL)

Health Services Laboratories (HSL) is a clinically-led provider of pathology and diagnostic services.

Our purpose is to deliver medically-led diagnostics, innovation, value and long-term investment to healthcare.

HSL is a progressive partnership between The Doctors Laboratory, the Royal Free London NHS Foundation Trust (the Royal Free London), and University College London Hospitals NHS Foundation Trust (UCLH).

We combine The Doctors Laboratory's specialist pathology expertise with the Royal Free London and UCLH's internationally recognised heritage of continual research, development and academic excellence. We maintain rigorously high standards of quality, while delivering efficiencies to healthcare through careful workforce planning, pioneering technology, and significant investment in infrastructure and IT.

OUR PROMISE

Our aim is to develop and deliver a sustainable business that delivers quality and value for everyone we work with.

We recognise that this must be achieved in a responsible manner and are committed to ensuring that our activities have a positive impact on both the communities in which we operate and the wider healthcare sector.

To achieve this we will:

- play a key part in the development of healthcare in the UK. We will listen carefully to the requirements of NHS commissioners and the people they are commissioning for, and develop quality-based solutions that reflect their needs;
- engage with staff to ensure that they are treated fairly, enable them to realise their full potential, and have an active role in developing the UK's clinical pathology workforce;
- minimise any negative impact our business has on the environment. We have implemented a documented Environmental Management System based on the requirements of ISO 14001.

HSL Locations

HSL has a network of clinical laboratories across the country.

HALO

Spread over 11 floors with five split-level basements, the Halo facility is home to more than 1000 staff working within a connected suite of laboratories spanning more than 100,000 square feet. The Halo also has dedicated clinical and non-clinical cores for vertical connectivity.

1 Mabledon Place, London WC1H 9AX

Mortimer Market

Mortimer Market rapid response laboratory (RRL) provides urgent parasitology diagnostic work in association with the travel clinic and the Hospital for Tropical Diseases.

3rd Floor Mortimer Market Centre,
Mortimer Market, London WC1E 6JB

60 Whitfield Street

60 Whitfield Street has been transformed into a specialist centre for cellular pathology and a RRL for UCLH. The RRL serves all of UCLH's urgent work, including A&E, ITU and in-patient work.

Royal Free London and North Middlesex University NHS Trust

HSL has developed two RRLs at the Royal Free London and North Middlesex University NHS Trust, which launched in the summer of 2016. The services that are operated from the RRL include haematology, biochemistry, routine coagulation and blood transfusion.

Barnet and Chase Farm Hospitals

The pathology laboratories at Barnet and Chase Farm Hospitals joined HSL in October 2017. The RRL and SRA launched in the last quarter of 2018 at the Barnet site. The services that are operated from the RRL include haematology, biochemistry, routine coagulation and blood transfusion.

Quality assurance

HSL is committed to providing doctors with pathology of the highest quality.

The quality of results is of fundamental importance, and HSL operates to stringent UK regulatory and International standards. Internal quality assurance is achieved by strict adherence to standard operating procedures for all analytical processes.

Quality management team

The QMG supports all HSL departments , to achieve and maintain the requirements of all relevant regulatory and accreditation standards. These include, but are not limited to international standards such as ISO 15189, and UK regulations such as Blood Safety and Quality Regulations, and the Health and Social Care Act 2012

The team is primarily responsible for the implementation of a quality management framework, including document control and auditing processes, along with more technical elements associated with change management processes and validation framework. Our objective is to deliver a framework, that supports our services, with, high quality, safe and patient focussed service provision at its core.

The team is primarily responsible for the implementation and management of a compliant and electronic document management programme, auditing schedule and audits, along with more technical elements associated with change management processes and validation framework.

Led by a director of governance, the team also includes quality advisors, quality managers, a quality administration team, and quality officers.

Accreditation

HSL participates in accredited National External Quality Assessment Schemes. These schemes are subscribed to by NHS and private laboratories. Results are subjected to both internal and external quality control.

Details of the laboratories that refers specialist testing to are available from HSL Referrals. These laboratories are UKAS accredited, or of equal accreditation status.

Quality assurance is administered by HSL's Quality Management Group (QMG) who also adhere to regulatory and accreditation requirements.

ADVANCED DIAGNOSTICS

UKNEQAS ICC & ISH for

Routine IHC & ISH (FFPE)
Routine IHC (Cytology)
HER2 IHC
ALK IHC
ROS1 IHC
PD-L1 22C3
PD-L1 28-8
PD-L1 SP142
Mismatch repair (MMR) IHC
p16 IHC
HER2 FISH + Interpretation
ALK FISH + Interpretation
ROS1 FISH + Interpretation

BLOOD SCIENCES

UKNEQAS, WEQAS, RIQAS, BIORAD, LABQuality, RCPAQAP for

ACE
ACTH (with PTH)
AFP/CEA & HCG
Antibiotics (Gentamicin, Vancomycin and Amikacin)
Anti-HBs Detection
Ammonia
Autoimmune (RF and TPO)
ASO
B2 Microglobulin
Borrelia IgM/IgG
Cardiac Markers
Clinical Chemistry
CMV IgG/IgM/Avidity
CRP & Ultra-Sensitive CRP
CSF
Cyclosporin and Tacrolimus
DEQAS
Diagnostic Serology
Diagnostic Serology Hepatitis
Drugs of Abuse
Ethanol
Free Beta HCG and PAPP-A
GFR
Glucose/Glucometer
Glycated Haemoglobins
Guildford Peptides
Haematinics
Healthcontrol Therapeutic Drugs Screen (TDM)
Hepatitis A (with B and C)
Hepatitis B Serology
Hepatitis C Serology
Hepatitis D serology
Hepatitis E Serology
HIV Serology
HSV 1 & 2 IgG & typing
Homocysteine
HTLV 1 & 2 serology
IGF-1
Immunity Screen
Lipase
Lipid Investigations
Measles and Mumps serology
NT-Pro BNP
Paediatric Bilirubins
Parasitology
Peptide Hormones
PSA
PTH, ACTH and hCT
Rubella IgG Serology

Salicylate and Paracetamol
SARS-CoV-2 (COVID-19) Antibodies
Specific Proteins
Steroid Hormones
Syphilis Serology
Thyroglobulin Surveys
Thyroid Hormones
Total IgE
Toxoplasma IgG/M Serology
Tumour Markers
Toxoplasma IgM Serology
Toxoplasma IgG Serology
Trace Elements
Urine Chemistry
Vitamin D (25 OH)

HAEMATOLOGY

UKNEQAS for

Automated Differential Leucocyte Count
Blood Film Morphology
Coagulation (Including PoCT Coagulation)
ESR and NRBC (nucleated Rbc)
Flow Cytometry
Leukaemia immunophenotyping
Myeloperoxidase
Iron stain
Full Blood Count
Haematology
Haematology Analysis
Malaria
Parasite Films
Reticulocyte
Sickle Screening
Thrombophilia Screening
Factor assays:
Von Willebrand (vWD) screen
Lupus anticoagulant
ADAMTS-13 activity and antigen
Anti-Xa assay
Plasma viscosities

RCPA

PFA-100 analysis

GENETICS AND MOLECULAR VIROLOGY

GENQA, ISFG, EMQN, UKNEQAS, ECAT, LABQUALITY for

Acquired array (CLL/MDS)
Acute Leukaemia FISH pilot
Acute Lymphoblastic Leukaemia (ALL) – G banding and FISH
BoBs Rapid Aneuploidy detection
Chlamydia & Gonorrhoea detection by PCR
Constitutional Clinical Cytogenetics (Rounds for Amniocentesis, CVS, Solid Tissue, Blood, Array CGH)
Cystic Fibrosis
Duchenne/Becker Muscular Dystrophy
Hereditary Haemochromotosis (C282Y+H63D) genotyping + reporting
HLA Class I (HLA-A, HLA-B, HLA-C) Tissue Typing (low resolution)
HLA Class II (HLA-DRB1, HLA-DQB1) Tissue Typing (low resolution)
HLA-B27 Genotyping
HLA-B57*01 Genotyping
HLA+ Disease Typing Cytochrome P450 2D6/2C19 genotyping
Human Papillomavirus DNA
Mature B & T cell Neoplasms – FISH for CLL and Lymphoma
Mature B & T cell Lymphoma – G-banding
Myeloid (AML/MDS/CML) – G-banding and FISH
Myeloma – sample FISH set up and analysis plus online
NGS AML gene panel
NIPT for aneuploidies
NIPT for sexing
Paternity Testing
Prader-Willi and Angelman Syndromes
QF-PCR Aneuploidy Detection
SARS-CoV-2 (COVID-19) PCR/NAAT
Sexually Transmitted Diseases (CT/NG/MGEN/TV)
Spinal Muscular Atrophy
Thrombophilia (Factor II, V, MTHFR)
Y Microdeletion PCR Assay

QCMD, INSTAND

Atypical Mycobacterium
Adenovirus DNA Viral load
Bacterial 16S
B19 virus DNA Viral load
BK virus DNA Viral load
CMV DBS (dried blood spots)
CMV DNA Plasma Viral load
CMV DNA Whole Blood Viral load
CMV Resistance
EBV DNA Plasma Viral load
EBV DNA Whole Blood Viral load
Enterovirus RNA
Gastroenteritis Virus Panel
Hepatitis B Genotyping
Hepatitis B Drug Resistance Typing
Hepatitis B Viral Load
Hepatitis C genotyping
Hepatitis C Resistance genome detection (NS5a & b)
Hepatitis C Resistance Typing (NS3 & NS5a)
Hepatitis C Viral Load
Hepatitis D Virus Viral load and Qualitative PCR
Hepatitis E Virus Viral load and Qualitative PCR
HIV-1 Drug Resistance (Pol)
HIV-1 Drug Resistance (Integrase)
HIV-1 RNA Viral load
HIV-1 RNA Qualitative PCR
HIV-1 Tropism Genome Detection
HIV-2 Viral load and Qualitative PCR
HSV 1&2 DNA
HSV Drug Resistance
Human Herpes virus 6 DNA
Human Herpes virus 8 DNA
Influenza Haemagglutinin typing
JC virus DNA
Measles and Mumps PCR
MERS Coronavirus
Parechovirus RNA
Respiratory panel I
Respiratory panel II
SARS-CoV-2 (COVID-19) PCR/NAAT

Quality assurance

Syphilis PCR
Transplantation Virus Panel
VZV DNA

MICROBIOLOGY

UKNEQAS, QCMD for

AAFB for Microscopy + Mycobacterium Culture
Antifungal Panel
Antifungal Susceptibility
Antimicrobial Susceptibility
Clostridium Difficile + MRSA Screening
Cryptococcal Antigen Detection (Pilot Scheme)
Faecal Parasitology
Faecal Haemoglobin EQA scheme
Faecal Markers for Inflammation (Calprotectin)
Fungal Biomarkers (Pilot Scheme)
General Bacteriology
Genital Pathogens
Molecular detection of Mycobacteria
Mycology
Urinary Antigen: Legionella
Urinary Antigens (Legionella and Pneumococcal antigen)
WEQAS Urinanalysis scheme

IMMUNOLOGY

UKNEQAS – Immunology, Immunochemistry and Allergy for

ELISA
ANA/DNA
Autoimmune Serology ANCA/GBM Antibodies
Allergen Component Testing
Bullous Dermatosis Antibodies
C1IN & Functional Complement
Coeliac Disease Antibodies
Diabetic markers
General Autoimmune serology
Interferon Gamma Release Assay (IGRA)
Myositis Antibodies
Cardiolipin IgG & IgM Screen
Specific Microbial Antibodies

UKNEQAS – Microbiology for

HIV Serology
Syphilis Serology
HepB surface Ag
HepC Serology
Lyme (Borelia) Serology
HepE Serology

Labquality EQAS for

Anti Streptolysin O
CMV IgG avidity
HSV 1 and 2 (IgG)
Helicobacter pylori IgG Serology

RCPAQAP (The Royal College of Pathologists of Australasia Quality Assurance Programs) for

Scleroderma Autoantibodies
Brucella Serology
Legionella Serology
Chlamydia Serology
Striated Muscle

INSTAND e.V. for

Adrenal Antibodies
Hep E IgG & IgM Serology

CSCQ for

Lyme (Borelia) serology

IFQ – Lubeck for

Liver Autoantibodies

CERVICAL SCREENING

UKNEQAS for Microbiology for

Molecular Detection of HPV

NHSCSP EQA scheme for

Gynaecological Pathology
The preparation and staining of cervical liquid based cytology samples

Hologic EQA Scheme for

ThinPrep Stain

ANDROLOGY

UKNEQAS for

Semen Analysis Scheme

Information security

Accredited by British Standards Institute
ISO/IEC 27001:2013

Links to the UKAS Schedules of Accreditation

HSL Blood Sciences (8169)
https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8169-Medical-Single.pdf

HSL Infection Sciences (8860)
https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8860-Medical-Single.pdf

HSL Molecular Pathology and Genetics (8059)
https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8059-Medical-Single.pdf

TDL Manchester (8812)
https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8812-Medical-Multiple.pdf

TDL Andrology (10199)
https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/10199-Medical-Single.pdf

HSL Cervical Screening (8511)
https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8511-Medical-Single.pdf

Data protection

It is the policy of Health Services Laboratories (HSL) supported by its board of directors, to take steps to ensure that your information is kept confidential and secure and to otherwise protect and respect your privacy. HSL will only ever collect and process the minimum amount of information required in order to provide our pathology services. As well as the steps set out in this policy, HSL is accredited to the international standard for Information Security Management Systems set out in ISO/ISE 27001, our certificate may be found at https://www.hslpathology.com/wp-content/uploads/2018/05/IS-655966.pdf

This is a high level privacy notice describing the information that HSL processes, the purpose of that processing, and how we protect it. For more detailed information including the lawful basis for processing please read the 'Detailed Privacy Notice' at https://www.hslpathology.com/wp-content/uploads/2018/10/Health-Services-Laboratories-Detailed-Privacy-Notice.pdf

The data controller

HSL is a part of The Doctors Laboratory Group, the largest independent provider of clinical laboratory diagnostic services in the UK providing pathology services to the private and public sector, information about the companies that comprise our group can be found at the respective websites:

www.tdlpathology.com

www.hslpathology.com

This policy together with your terms and conditions sets out the basis on which any information HSL collects from you, or that you provide to HSL, will be processed. The following explains our views and practices regarding your information and how we treat it.

HSL as a data controller and/or processor

In providing products and services, HSL may be acting as a data processor on behalf of third parties (such as clinicians, hospitals and/or insurers) who will themselves be the data controllers, or as a data controller (if for example you are an employee). Where acting as a data controller, HSL will comply in full with this policy. Where acting as a data processor, HSL will be required to act on the instructions of the data controller.

Information HSL may collect from or about you

Typically, the information about data subjects that is processed by HSL comes from clinicians that you visit for healthcare purposes, but it may also be collected via email, over the phone or any other means of communication. They send us personal information in addition to pathology samples (body fluids or tissues) and request tests are carried out upon those samples.

The information provided to HSL may include:

- your name, date of birth, gender, address, email address and in some cases phone number and card payment details, and medical history;
- practice details of the requesting clinician such as address, specialities and secretary information;
- information that is necessary to process invoices including patient demographics, financial, bank and credit card information, medical and insurer specific information such as insurer name and policy/ identification details.

You may also give HSL information by accessing or filling in forms on its websites at: www.tdlpathology.com, www.hslpathology.com, https://10to8.com/book/tdlandrology/, or by corresponding with HSL via its products and services, by phone, email or otherwise. This includes information you provide when you register to use HSL's sites, place an order on HSL sites, when you report a problem with HSL sites, or participate in communications or discussions on other social media platforms.

Information regarding HSL's use of cookies can be found at www.hslpathology.com/cookie-policy/

Uses of the information you provide

HSL will use this information to carry out HSL's obligations arising from any contracts entered into between your clinician and HSL and to provide them with the information, products and services request from HSL such as:

- the provision of pathology services, and associated processing of bills for payment;
- providing test requesting and results delivery management tools
- to process invoices on behalf of various parties, such as clinicians, hospitals and insurers;
- for process management and improvement;
- to notify you or your clinician about changes to HSL's products and services and to otherwise manage HSL's communications with you; and/or;
- to ensure that content from HSL's sites are presented in the most effective manner for you and for your computer.

Disclosure of your information

HSL may share your information with selected third parties including:

- any member of The Doctors Laboratory Group, which means its subsidiaries, ultimate holding company and its subsidiaries, as defined in section 1159 of the UK Companies Act 2006;
- business partners, referral laboratories, suppliers, insurers, logistics companies, debt management agencies, and sub-contractors required for the performance of any contract HSL enter into with them, you or your clinician;
- for the purpose of investigating any potential legal claims against TDL, your information may be shared with our insurers in order to obtain insurance advice and services;
- National screening or public health monitoring schemes such as Public Health England;
- Information about your interactions with our websites may be shared with organisations that assist HSL in the improvement and optimisation of websites.

When HSL shares such information, it will ensure that it is only sharing as much information as is required to fulfil the purpose for which it is sharing it.

HSL may also disclose your information to third parties if HSL are under a duty to disclose or share your information in order to comply with any legal obligation, or in order to enforce or apply HSL terms and conditions and other agreements; or to protect the rights, property, or safety of HSL, its customers, employees, or others. This includes exchanging information with other companies and organisations for the purposes of fraud protection and credit risk reduction.

Where we store your information

Unless specific consent is sought and received, or another of the conditions for transferring data outside the EEA under GDPR satisfied (such as the inclusion of EU model contractual clauses in our contract with the supplier/ third party) we will not transfer your information outside of the EEA. The policy of your Data Controller, which could be your hospital, clinician, insurer etc... may be different to this so you should check carefully the relevant privacy policies in order to fully understand their implications.

Your rights

Under the General Data Protection Regulation, you are given certain rights to control aspects of the processing of your information. You can exercise these rights at any time by contacting HSL via the methods set out in the 'contact' section below.

Contact

Questions, comments and requests regarding this privacy policy are welcomed and should be made to:

HSL Data Protection
The Halo Building
1 Mabledon Place
London
WC1H 9AX

E dataprotection@hslpathology.com

Measurement Uncertainty

Medical laboratories are responsible for ensuring that test results are fit for clinical application by defining analytical performance goals and selecting appropriate measurement procedures. All types of measurement have some inaccuracy due to bias and imprecision; therefore measurement results can only be estimates of the values of the quantities being measured.

To properly use such results, medical laboratories and their clinical users need some knowledge of the accuracy of such estimates. The complete result of a measurement is a value, a unit and an estimate of uncertainty. This estimate of uncertainty is conventionally referred to as Measurement Uncertainty (MU) and incorporates the cumulative range of factors involved in the testing procedure itself in addition to consideration of the inter-individual and intra-individual biological variation which will potentially influence the overall test result.

Evaluating measurement uncertainty is an ISO 15189:2012 accreditation requirement.

In terms of Measurement Uncertainty determined by the HSL group of laboratories, it should be noted that all assays are performed in strict accordance with the manufacturers' instructions. Measurement Uncertainty, which has been estimated for each assay during the verification procedure, is reviewed at regular intervals to ensure that Measurement Uncertainty values do not exceed the pre-defined maximum allowable uncertainty for each assay. Overall assay performance is also regularly monitored through internal quality control (IQC) and external quality assessment (EQA) schemes and incorporated in test result interpretation. Measurement Uncertainty for individual assays is available upon request.

Complaints policy

At HSL, we are committed to providing an excellent service, and to improving our services by listening and responding to the views of our users.

Whether doctor or patient, if our service levels do not meet your expectations and you would like to complain, please contact Cyril Taylor, Laboratory Service Compliance Director, on hsl@hslpathology.com. Details of the complaint will be treated as confidential, and the information you provide will link into our Quality Management Procedures for incident investigation. Corrective and preventative actions will be introduced where needed.

Internally, any complaints received will be shared and discussed at Executive Director level where appropriate.

HSL referral laboratories

For certain specialist tests, HSL works with a selected network of TDL Group and Reference Laboratories. The specialist laboratory performing the testing can be identified on the final report. The quality of these laboratories is recognised by UKAS, or similar accrediting bodies for the laboratories outside the UK.

ABS Laboratories Ltd

Addenbrooke's Hospital – BGU and Immunology

Affinity Biomarker Labs

Alder Hey Children's NHS Foundation Trust – Biochemistry Department

Alder Hey Liverpool

Anthony Nolan Lab

Bart's and Royal London Hospital

Biolab Medical Unit

Biomnis

Bioscientia

Birmingham Children's Hospital NHS Foundation Trust – Clinical Chemistry

Brucella Special Diagnostics Unit Cambridge Life Sciences Cambridge Nutritional Science Ltd Cardiff & Vale Immunology

Brigham and Women's Hospital – Department of Pathology

Cardiff Toxicology Laboratory

Central Medical Laboratory

Cerba

Charing Cross Hospital – Chemical Pathology Department, Charing Cross Hospital – Infection and Immunity

Charing Cross Hospital – Medical Oncology

Chelsea and Westminster Hospital

Cheltenham General Hospital – Cellular Pathology Department

Churchill Hospital – Immunology Department

City Hospital, Birmingham – Clinical Biochemistry Department, City Hospital, Birmingham – Toxicology Department

CNC forensic toxicology

The European Laboratory of Nutrients

Douglass Hanly Moir Pathology

Epsom and St Helier Hospital – Virology Department

Genoid Kft

Great Ormond Street Hospital – Department of Chemical Pathology

Great Ormond Street Hospital – Department of Histopathology

Great Ormond Street Hospital – Enzyme Unit, Chemical Pathology

Great Ormond Street Hospital – Immunology Department, Great Ormond Street Hospital – Neurometabolic Unit

Great Ormond Street – Virology Department

H & I Laboratory

Hammersmith Hospital – Molecular Endocrinology

HCA

Health Diagnostic Laboratory Inc

Health & Safety Laboratory

Heartlands Hospital

HFL Sport Science

Homerton University Hospital – Department of Clinical Biochemistry

Igenomix UK

Imperial College London – Department of Investigative Medicine

Independent Histopathology Services

Institute of Neurology – Department of Neuroimmunology

Institute of Neurology – Neurogenetics Unit

Institute of Neurology Pharmacology & Therapeutics Unit

Instituto Bernabeu Biotech

King's College Hospital – HMDC Laboratory for Molecular Haemato-Oncology

King's College Hospital – Liver Institute

Lab21 Ltd

Labor Augsburg MVZ GmbH

Laboratory of The Government Chemist (LGC)

Latis Scientific

Leeds General Infirmary

Liverpool Clinical Laboratories

London School of Hygiene & Tropical Medicine – Diagnostic Parasitology Lab

Manchester Royal Infirmary – Meningococcal Ref Unit Matrix Diagnostics

Manchester Royal Infirmary – Vaccine Evaluation Unit

HSL referral laboratories

Mayo Medical Laboratories

MDU Imperial College St Mary's Campus

Microbiological Solutions Ltd

Micropathology Ltd

Mycology Reference Centre
– Department of Microbiology, Leeds

National Genetics Institute (NGI)

National Blood Service
– Red Cell Immuno Haematology Department

National Mycobacterium Reference Lab

NHSBT Birmingham

NHSBT Tooting

Norfolk and Norwich Hospital –
Specialised Virology Centre

Nutritional Analytical Service
– University of Stirling Pathcare Reference Lab

Perinatal Centre

PHE Brucella reference unit

PHE Centre for Infections
– Bacterial Reference Laboratory

PHE Centre For Infections
– Enteric And Respiratory Virus Lab

PHE Centre for Infections
– Legionella Reference Laboratory

PHE Centre For Infections – Virus Reference Division

PHE Mycology Reference Laboratory – Bristol

PHE Rare and imported pathogens laboratory
– Porton Downs

Preston Microbiology Services Royal Preston Hospital

Queens University Hospital
– Institute of Clinical Science

Radboud University Nijmegen Medical Center

Randox Health

Reflab

Reproductive Immunology Associates

Rosalind Franklin University

Royal Berkshire Hospital – Clinical Biochemistry

Royal Brompton Hospital – Department of Histopathology

Royal Group of Hospitals Trust, Belfast –
Department of Pathology

Royal National Orthopaedic Hospital –
Department of Histopathology

Royal Surrey County Hospital
– SAS Peptide Hormone Section

Royal Victoria Infirmary

SAS Leeds – Steroid Hormone Centre

SAS Metabolic Bone Laboratory

SAS Trace Elements Laboratory

SCSA Diagnostics

Sheffield Children's NHS Trust – Clinical Chemistry

Sheffield Northern General Hospital
– Protein Ref Laboratory

Sheffield Protein Unit – Protein Reference Unit
& Immunology Department

Singleton Hospital – Toxoplasma Reference Lab
Southmead Hospital – Antimicrobial Ref Lab

Southmead Hospital Bristol –
Regional antimicrobial reference lab

St Barts – Antenatal Screening Service DEPM
St George's Hospital – Cell Markers

St George's Hospital Medical School –
Forensic Toxicology Service Analytical Unit

St Helier – Biochemistry Department

St Helier – Immunology Department

St Mary's Hospital – Department of Histopathology

St Mary's Hospital – Virology Department

St Thomas' Hospital – St John's Institute of
Dermatopathology

St Thomas' Hospital – Department of Histopathology

Synergy Health Laboratory Services

The Royal Marsden Hospital
– Department of Haematology / Oncology

Trace Laboratories Ltd

UCL Great Ormond Street Institute of Child Health
University of Utah School of Medicine

University Hospital of Wales – Cardiff Medical Immunology
Veterinary Labs Agency

Veterinary Laboratories Agency

Viapath – Guy's Biochemical Genetics Laboratory

Viapath – Guy's Purine Research Laboratory

Viapath – King's College Clinical Biochemistry Viapath – St
Thomas Hospital Haemophilia Centre Viapath
– St Thomas Immunohistology

West Yorkshire Analytical Services

HSL Genetics referral laboratories

Academic Medical Centre
Amplexa Genetics A/S
Asper Biotech
Bioscientia
Bristol Genetics Laboratory
Centogene AG
Connective Tissue Gene Tests
Diagenom GmbH
Douglass Hanly Moir Pathology
East Anglian Genetics Service
Fulgent Diagnostics
Great Ormond Street Hospital
Hammersmith Hospital
Health in Code
IBGRL Molecular Diagnostics
Institute of Neurology
John Radcliffe Hospital
King's College Hospital
Liverpool Women's Hospital
Medical Neurogenetics
Micropathology Ltd
Mitochondrial NGC Laboratory
Molecular Diagnostic Genetics
Molecular Vision Laboratory
Ninewells Hospital & Medical School
Northern Genetics Service
NW Thames Genetics Service
Oxford Genetics Laboratory
Polwarth Building Medical School
Prevention Genetics
Progenika
Protein Reference Unit & Immunology Department
Purine Research Laboratory
Reprogenetics
Royal Devon & Exeter NHS Trust
Royal Marsden Hospital
South East Scotland Molecular Genetics Service
Southern General Hospital
St Mary's Hospital
St. George's Hospital
SYNLAB Budapest Diag Center
The Anthony Nolan Trust
The Leeds Genetics Laboratory
UCLH Clinical Biochemistry
University Hospital of Wales
Viapath at Guy's Hospital
Wessex Genetics Laboratory
West Midlands Genetics Service

How to order a test

A completed request form (electronic or manual) must accompany each patient sample, with the details on the specimen label matching the details on the corresponding request form.

Note down the collection date and time on the request form.

Paper request forms should include the signature/initials of the person collecting the samples confirming:

- They have verified that the patient details on the label matches the patient details on the test requisition.
- The specimen has been drawn.

Electronic requesting can be made by:

- **CERNER** is the Royal Free London NHS Foundation Trust's internal electronic ordering system and result viewer. Detailed information for CERNER requesting is available on Freenet.
- **T Quest** is the electronic system (Indigo) for requesting and reporting tests in place for those GPs who have opted for this. A multipart single pathology request form is to be used when the electronic ordering system is unavailable.
- **EPIC** is the University College Hospitals (UCL) internal electronic ordering system and result viewer. Detailed information for EPIC is available from the UCL EHRS team.
- **CELLMA** is the Mortimer Market electronic system for requesting and reporting in place for the STD service.
- **MEDWAY** is the North Middlesex NHS trust's internal electronic ordering system and result viewer. Detailed information for MEDWAY requesting is available from the trust.

Requests should be completed with all relevant information including:

- NHS number (or hospital number) when appropriate.
- Patient name (Last name and First name)
- Date of birth
- Ward or clinic (if a referral from a hospital)
- Requesting doctor with contact number the signature, bleep and/or contact number of the requesting doctor must also be completed.
- Clinical details
- Tests requested
- Date and time the sample was taken
- Consultant
- Date and time for crossmatched blood to be ready
- LMP (last menstrual period) – where appropriate
- Consent (where appropriate)

ROYAL FREE LONDON

Requests made on CERNER

- Do not generate a request form except for Blood transfusion and both Cytopathology & Histopathology.
- Will generate a CERNER label which needs to be attached to the patient sample at the bedside prior to despatch to the Central Pathology Reception except for Blood Transfusion samples – where it is a requirement that the label on samples must be hand written legibly and signed by the person who bled the patient.

Manual Requests – in case of CERNER downtime

- In the event that electronic requesting is not available.
- Wards have a stock pile of paper request forms.
- Request forms can be accessed using the URL http://freenet/freenetcms/Default.aspx ?p=1795&m=2507&s=28#Downtime.
- Please complete all requests (form) legibly and ensure full identity is entered on both the top and any under copies if applicable.
- Departmental request forms can be ordered via the trust ordering system, not direct from departments. Note: Molecular Cytogenetics tests are not available on Cerner and forms are available on the TDL website: https://www.tdlpathology.com/tests/request-forms/

Virology resistance samples require paper request forms, which indicate current and past treatments and viral load. Request forms are kept in the Ian Charleson Day Centre.

UNIVERSITY COLLEGE LONDON

Requests made on EPIC

- Will generate an Epic label which needs to be attached to the patient samples at the bedside/ clinic prior to dispatch to the RRL/Specimen reception (SRA) at 60 Whitfield Street.
- Any extra labels which have been printed but where a specimen is being shared, must be put into the sample bag with the specimen and sent to the specimen reception.

Manual Requests - in case of EPIC downtime

In the event that electronic requesting is not available:

- The wards will be given access to paper/ electronic version of request forms by the trust.
- Please complete all requests (form) legibly and ensure full identity is entered on both the top and any under copies if applicable.

MORTIMER MARKET

Requests made on CELLMA

- Will generate a CELLMA request form with barcode which needs to placed in the specimen bag pouch to accompany the labelled patient sample, which is taken in the clinic. Specimen and request form then are sent to the SRA at 60 Whitfield Street.

NORTH MIDDLESEX

Requests made on MEDWAY

- Will generate a MEDWAY request form with barcode which needs to placed in the specimen bag pouch to accompany the labelled patient sample, which is taken in the clinic. Specimen and request form then are sent to the SRA at the North Middlesex RRL.

Other Users

Any other user must ensure that specimens sent to the appropriate SRA, and all specimens are accompanied by a clearly and correctly filled out request form and clearly labelled specimen.

Urgent requests

Any urgent requests which have to be processed at the core laboratory must follow the urgent pathways which have been set up for each trust site.

- All requests for Virology and Microbiology must be cleared as urgent by an appropriate specialty pathology consultant. The laboratories will be contacted to indicate that there is an urgent sample coming to the core laboratory.
- Samples which are to be processed by the urgent pathway must be taken to the appropriate SRA and the need for this pathway indicated clearly.
- SRA will then arrange urgent courier and ensure that the correct procedure is followed to allow all laboratories to identify that this sample is urgent.
- Samples for MERS coronavirus must follow the urgent pathway and ensure that the samples are packaged in a Category B specimen box, and are not transported with other specimens.

Guidance on specimen collection

A properly collected specimen is critical to quality test results. Ensure that:

- The correct specimen type is collected.
- The correct amount is collected.
- The specimen is collected in the right container with any necessary additives.
- The specimens are collected following safe working practices.
- Ensure that there is no contamination from external sources when collecting microbiology and virology samples.
- Clean surgical instruments and surgical trays must be used when collecting Histopathology samples.
- The container is securely sealed and labelled.

Specimen packaging

- Place the labelled specimen container in a plastic specimen mini-grip bag which is available on the Wards, in the Clinics and from central stores and seal.
  - Each specimen bag must only contain samples from one patient (DO NOT mix patient samples).
  - For ease of sample processing in the laboratory it is advisable to place each discipline sample in a separate sample bag for the same patient.
- Place the matching requisition in the outside pouch of the bag.
- Always send the specimen promptly to the laboratory or the collection point.

Specimen labelling

Each specimen container:

- Must be labelled at the time of collection i.e. next to the patient when the sample is taken and not prior to, or remotely from the patient after collection.

  Note: Never label the specimen bag.

  Note: The Laboratory (apart from Cellular Pathology) will discard a specimen if it is received unlabelled.
- Must be labelled with the correct bar-code label (pre-printed label with accession numbers generated by an information system) except Blood Transfusion samples which must be labelled by hand.
- Must have a label whose information matches the information on the accompanying request form.

  Note: Specimens will not be accepted if the information does not match. Cellular Pathology will liaise with the referring clinician to update details.
- Must have no more than one label placed on it.
- Must not have the request form wrapped around it as a specimen label. This is not acceptable.

A label that does not contain the required information or which has illegible information will be considered to be improperly identified and will result in delays or a decision not to process the specimen. In these instances, a repeat specimen will be requested. Cellular Pathology will liaise with the referring clinician to update details.

Note: Always label the specimen clearly with the name, hospital number, date of birth and collection date and time.

ROYAL FREE LONDON USERS: CERNER

CERNER labels can be placed on all specimens except for Blood Transfusion samples.

Blood Transfusion samples

- Collect and label samples from one patient at a time.
- Check the identity details on the patient wristband matches the identity details on the request form.
- The samples must be labelled by hand.
- Do not label the samples with CERNER generated barcode or addressograph labels.
- Label the sample at the patient's bedside using information from the patient's wristband. Write the patient's full name, date of birth, hospital number. Where the patient is able to communicate they should be asked their full name and date of birth to confirm details are correct.
- Write the date and time of collection, and signature of the person who took the blood.
- Phlebotomists covering wards need to ask a second person to check patient details written on the sample before the sample is sent to the laboratory.

Blood samples for all other disciplines

- Place the CERNER label along the length of the tube, as straight and as far up as possible without touching the cap of the tube, so that the analysers can read the label.
- It is imperative that the label quality is checked prior to labelling the specimen bottles as poor quality barcodes cause delays and introduce risk of errors in the laboratory.
- Ensure the correct label goes on the corresponding tube. Requests for Clinical Biochemistry tests must be attached to the appropriate tube
- In addition write the date and time of collection on the label. If the date and time of collection is not recorded the sample may be rejected by the laboratory.

Cellular Pathology (Histopathology and Cytopathology) specimens, urine, stool, CSF, amniotic fluid specimens and respiratory specimens (Microbiology & Virology)

- Place the CERNER barcode label along the length of the container. This is to enable bar code reading.
- It is imperative that the label quality is checked prior to labelling the specimen bottles as poor quality barcodes cause delays and introduce risk of errors in the laboratory. Please see section 3.4.2.3 below for correct attachment of labels to the specimen bottle

Note: CERNER labels must NOT cover the barcodes on the blood culture bottles as these need to be read by the analyser

OTHER USERS

The minimum information required on the specimen label is three unique identifiers that MUST match the information on the request form. These should be:

- Patient name (Surname/family name and first name)
- Hospital number (or Private Patient number) and/or date of birth
- NHS number (if available)

In addition, specimens should be hand-labelled with the date, and time if appropriate, of collection. Please note it is a mandatory requirement to label the specimen with the date and time of collection.

Specimen transport

TO THE HALO

All samples are tracked and sent to the core laboratory at the Halo building using TDL couriers. There are a scheduled number of pickups throughout the day and night.

- Samples have to be booked on the department's Winpath LIMS system.
- They are then tracked into relevant static floor boxes at the SRA.
- Just before the courier pick up times, the samples in the static boxes are tracked and transferred into an appropriate Halo level transport box and the box set as dispatched.
- TDL couriers pick up all the full transport boxes and transport to the halo.
- Once they arrive at the Halo, the couriers drop off the full boxes at the ground-floor SRA reception area, where the boxes are marked as having as arrived. The boxes are then put into labelled dumb waiter trays, and put in the dumb waiters to the correct floors.
- Once they have arrived at the correct floor, the transport boxes are receipted onto the floor, and the samples tracked out of the box into appropriate storage receptacles.

TO RRLS

All samples from within the hospital sites are either sent to the SRA within the RRLs by airchute or by porters.

Samples received from centres referring into HSL via the hospital routes arrive at the RRL SRA either by courier, post or Hays tracked specimen transport services.

TO 60 WHITFIELD ST

Samples are received into the sample receipting area on the ground floor of 60 Whitfield Street. For UCLH samples, they are delivered via the UCLH portering system and the pneumatic chute system. All other samples from users external to UCLH are delivered via the TDL courier system.

TO OTHER SITES

Samples referred to other sites are either sent by registered post or, if the receiving laboratory is within the HSL/TDL group, through the TDL couriers.

High-risk specimens for Porton Down must be packaged in Category A packaging and couriered with couriers insured to carry these pathogens (e.g City Sprint).

Transport of specimens out of normal working hours

Each trust has an urgent pathway set up for getting samples to the Halo out of hours. This includes contacting the relevant clinical consultants for sign off, and then using the urgent pathway set-up through the individual SRAs.

High-risk samples

Samples from certain patient groups or disease processes (some listed below), should have their 'high risk' status noted on the request form.

This is best done by giving full medical history in the clinical details section of the request. Please indicate this to the forefront of the clinical details.

The provision of sufficient information on Specimen Request forms to staff in Clinical Diagnostic Laboratories is essential to enable them to apply the correct safety measures to control the risk of infection.

High risk samples are defined as coming from the following groups:

- Those with known or suspected CJD
- Those with known or suspected typhoid fever
- Those with known or suspected Brucellosis
- Suspected meningococcal meningitis
- Faeces from patients with known / suspected typhoid, E coli 0157, dysentery
- Sputum or bronchial washing/lavage from suspected or known TB
- Pyrexia of unknown origin (PUO) – if patient has been abroad
- Suspected diphtheria

- Patients with suspected Histoplasma, Coccidioides or other dimorphic fungal infections.
- Patients with suspected viral haemorrhagic fever (VHF) infection.
- Patients with suspected avian influenza viruses or MERS-CoV or other newly isolated human pandemic viruses.

Please refer to the following HSE guidance for the full Approved List of Biological Agents: http://www.hse.gov.uk/pubns/misc208.pdf

Special considerations

Please note that for any patient suspected of being infected with a viral haemorrhagic fever (VHF) e.g. Ebola Virus Disease (EVD) or returning from travel to endemic areas with fever consultation should be sought from the Infectious Diseases (ID) team via switchboard on the patient assessment.

By definition, samples from these patients are considered to be extremely high risk (Hazard group 4 pathogens) and dictate a higher level of handling precautions.

Please refer to the Trust guidance for full instruction on the Management and Control of Viral Haemorrhagic Fevers http://freenet/guidelines/1035_Viral%20Haemorrhagic%20Fever%20VHF.pdf

The laboratories are unable to process CSF samples containing CJD or other prions without prior arrangement. The receiving laboratory must be informed in advance of any sample being sent to them. The sample must be clearly labelled. Each laboratory has its own protocol for dealing with specimens. It is unacceptable to send a specimen on such patient defined in Table 1 from the Infection Control Protocol – CJD and Other Transmissible Spongiform Encephalopathies without informing the laboratory in advance.

Sample rejection criteria

Sometimes tests cannot be performed in the laboratory if samples fall short of the quality, volume or other eligibility criteria. In these cases, the laboratory may need to reject the samples, and not carry out processing.

Sometimes the laboratory is able to rectify a situation – and although turnaround times may be affected, it avoids having to arrange for samples to be taken again.

Summary list for sample rejection

- Incorrect sample types received:
  - Basic incorrect blood tube/other sample.
  - Samples without the appropriate preservative (e.g. acidified urine samples).
  - Samples that are received ambient, when a frozen sample is required.
  - Samples that are received unprotected from light, when they are required to be covered at the point of venepuncture.
  - Samples in incorrect containers (e.g. cervical cytology must be a ThinPrep vial; urine cytology must be in a uricyte container).
- Insufficient sample received.
- No sample received.
- Labelling or form issues (mislabelled / unlabelled / no forms / no clinical information).
- Clotted / haemolysed / lipaemic / icteric samples.
- Sample is broken or has leaked in transit.
- Stability time has been exceeded. Stability time is test-dependent, and also refers to tests that can only be carried out on certain days of the week.
- Sample contamination (e.g. being in the same bag as a leaking sample):
- Samples are high risk or infectious.
- Samples that are received in expired tubes.

Samples deemed to be precious (e.g. CSF, fluid, tissue, bone marrow and paediatric samples) will not be discarded by the laboratory. Results will include a comment relating to the condition of the sample (e.g. sample unlabelled).

Department-specific list for sample rejection

Sample Reception will not accept samples packaged with needles of any kind.

Biochemistry cannot accept:

- previously frozen samples that have thawed in transit.
- samples that display antibody interference.
- samples that have had separation delays/un-centrifuged samples that have been stored in the fridge.
- paraprotein resulting in viscous samples.
- CSF protein that is blood-stained.

Cervical Cytology cannot accept:

- over- or under-filled samples for testing.
- samples received within three months of the previous test in order to allow epithelial cells to regenerate.

Coagulation cannot accept:

- over- or under-filled samples for testing.
- previously frozen samples that have thawed in transit.

Haematology cannot accept frozen whole blood for testing.

Microbiology cannot accept samples in non-sterile containers or in formalin.

Molecular Pathology cannot accept samples for haemophilia testing without informed consent.

Parasitology cannot accept TBQ kits that:

- Incorrect sample types: Plasma instead of serum or EDTA blood for most serology tests; blood samples other than citrate blood for Microfilarial microscopy; blood samples other than EDTA blood for malaria microscopy and PCR; peripheral blood for Leishmania microscopy and PCR.
- Samples that have been incorrectly stored/ treated: Refrigerated stool sample for stool culture; fixed sample for Leishmania culture (PCR will be performed); fixed sample for stool PCR (Microscopy will be performed).
- Insufficient sample volume (especially for Strongyloides culture, which requires around 20ml of stool)
- Samples whose delivery is delayed beyond viable processing time: 15 minutes for hot stool samples; 24 hours for Trypanosomal blood microscopy.

Referrals cannot accept:

- samples without three points of identification for DRP testing.
- samples that are not labelled by hand for blood group testing.

Urine cytology cannot accept delayed samples unless they have been refrigerated.

Virology cannot accept lithium heparin samples, or samples that are in non-sterile container or in formalin.

Sample requirements

Vacutainer	Anticoagulant	Capacity	SAMPLE TYPES
Lavender	EDTA	4ml / 10ml*	A
Gold	SST/Gel	5ml	B
Light Blue	Citrate	4.5ml	C
Red	None	6ml	F
Grey	Fluoride oxalate	2ml, 4ml	G
Green	Lithium heparin	6ml	H
Dark Blue	Sodium heparin	7ml	K

* 10ml EDTA tubes are used for specific PCR assays

Streck Cyto-chex BCT Vacutainers for lymphocyte subsets (CD3/CD4/CD8) (stable for up to 7 days). They are not suitable for other CD markers.	**Chex**
Blood culture bottle: contact laboratory	**BC**
Contact laboratory for advice on sample taking	**J**
Test by appointment	**X**
Random Faeces	**RF**
Faecal Collection	**LF**
Random Urine	**RU**
First Catch Random Urine (for DL12/Chlamydia, etc.)	**FCRU**
30ml aliquot from a 24 hour urine collection – state total volume	**CU**
30ml aliquot from a 24 hour urine collection with 10ml of 0.1N Hydrochloric Acid added – state total volume	**PU**
Early Morning Urine (1st sample of the day)	**EMU**
60ml container	**SC**
Cytyc Thin Prep Vial	**TPV**
Orange/Blue swab for culture – swab in transport medium	**STM**
Black Charcoal swab	**CS**
Green Viral swab	**VS**
PCR swab for Chlamydia/PCR Infection Screening	**PCR**
Tap/bottled water mouth wash – 20mls	**MW**
Ammotic fluid (5mls PCR – 10mls Karyotype)	**AF**
Chorionic Villus (medium provided by laboratory)	**CVS**

Cervical Screening London

HSL provide a high-quality cervical screening service to the NHS in the London Region. In December 2019, Cervical Screening London (CSL) was formed and is the single provider for cervical screening in London.

The cervical screening service operates from the Halo Building in London, and provides a single integrated service for molecular HPV testing and cytology.

Hologic ThinPrep vials are used for sample collection and primary high-risk Human Papillomavirus (HR-HPV) testing using the APTIMA mRNA assay. Reflex cytology is carried out on samples which are 'HR-HPV DETECTED'.

The department works closely with primary care, colposcopy units, and other hospital-based specialties to provide technical and clinical advice. The service is committed to the delivery of medical and scientific training as well as supporting research, development and clinical trial studies.

The department holds the IBMS pre- and post-registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas. Cervical Screening London is a UKAS Accredited Medical Laboratory No. 8511.

London Cervical Sample Taker Database (LonCSTD)

In October 2020, CSL was contracted to manage the London CSTD on behalf of NHSE (Public Health). All sample takers sending samples to CSL are required to register on the LonCSTD.

For further enquires please contact: Csl.cstd@nhs.net

To access the database please visit: https://loncstd.england.nhs.uk

Key contacts

GENERAL CONTACTS			
General Cervical Screening London Queries		csl.queries@nhs.net	Tel: 020 7460 4851
MDT Queries		csl.londonmdt@nhs.net	Tel: 020 7460 4851
Cancer Audit		csl.canceraudit@nhs.net	Tel: 020 7460 4851
Direct Referrals		csl.directreferrals@nhs.net	Tel: 020 7460 4851
Transport / Courier Queries (Sample Collection)		couriers@tdlpathology.com cc: csl.queries@nhs.net	Tel: 020 7307 7373
I.T. Department (T-Quest Queries)		helpdesk@tdlpathology.com	Tel: 020 7307 7365
Cervical Screening London Clinical Lead	**Dr Evangelia Mylona**	Evangelia.Mylona@nhs.net	Tel: 020 7460 4851
Operational Head of Cervical Screening London and Cervical Screening Provider Lead	**Margaret Morgan**	Margaret.Morgan@tdlpathology.com	Tel: 020 7460 4851 Ext 4752
Cervical Screening Operational Manager	**David Smith**	David.Smith@tdlpathology.com	Tel: 020 7460 4851 Ext 4760
Deputy Cervical Screening Operational Manager	**Bernadette Shaw**	Bernadette.Shaw@hslpathology.com	Tel: 020 7460 4851 Ext 4751
Deputy Cervical Screening Provider Lead / Consultant Biomedical Scientist	**Hasit Patel**	Hasit.patel@hslpathology.com	Tel: 020 7460 4851
Programme Administration Manager	**Rhoda Ankapong-Abankwah**	Rhoda.Ankapong-Abankwah@tdlpathology.com	Tel: 020 7460 4851 Ext 4755

Cervical Screening London

GENERAL CONTACTS		
Failsafe Team	csl.failsafeteam@nhs.net	Tel: 020 7460 4851
London Cervical Sample Taker Database (LonCSTD) Enquires	Csl.cstd@nhs.net	Tel: 020 7460 4851

CERVICAL SCREENING ADMINISTRATIVE SERVICES – CSAS		
Contact CSAS	csas.enquiries@nhs.net	https://www.csas.nhs.uk/contact-us/

Laboratory hours

The laboratory department is open between 8.00am and 6.00pm.

Out of hours service

There is no routine service for weekends and bank holidays. There is no on-call service for Consultant Pathologists.

Clinical advice

The clinical team is available to provide clinical advice as required by users.

HPV testing

High-risk subtypes of human papillomavirus (HR-HPV) are linked to the development of abnormal cells and may cause cervical cancer. In 2017, the UKNSC recommended that high-risk Human papillomavirus (HR-HPV) testing should be the first (primary screening test).

Compared to cytology, HR-HPV testing has been shown to reduce the risk of developing cervical cancer through increased sensitivity for underlying disease.

In 2019, the UK moved to primary testing for HR-HPV, reserving cytology for women who test HR-HPV positive (also called reflex cytology).

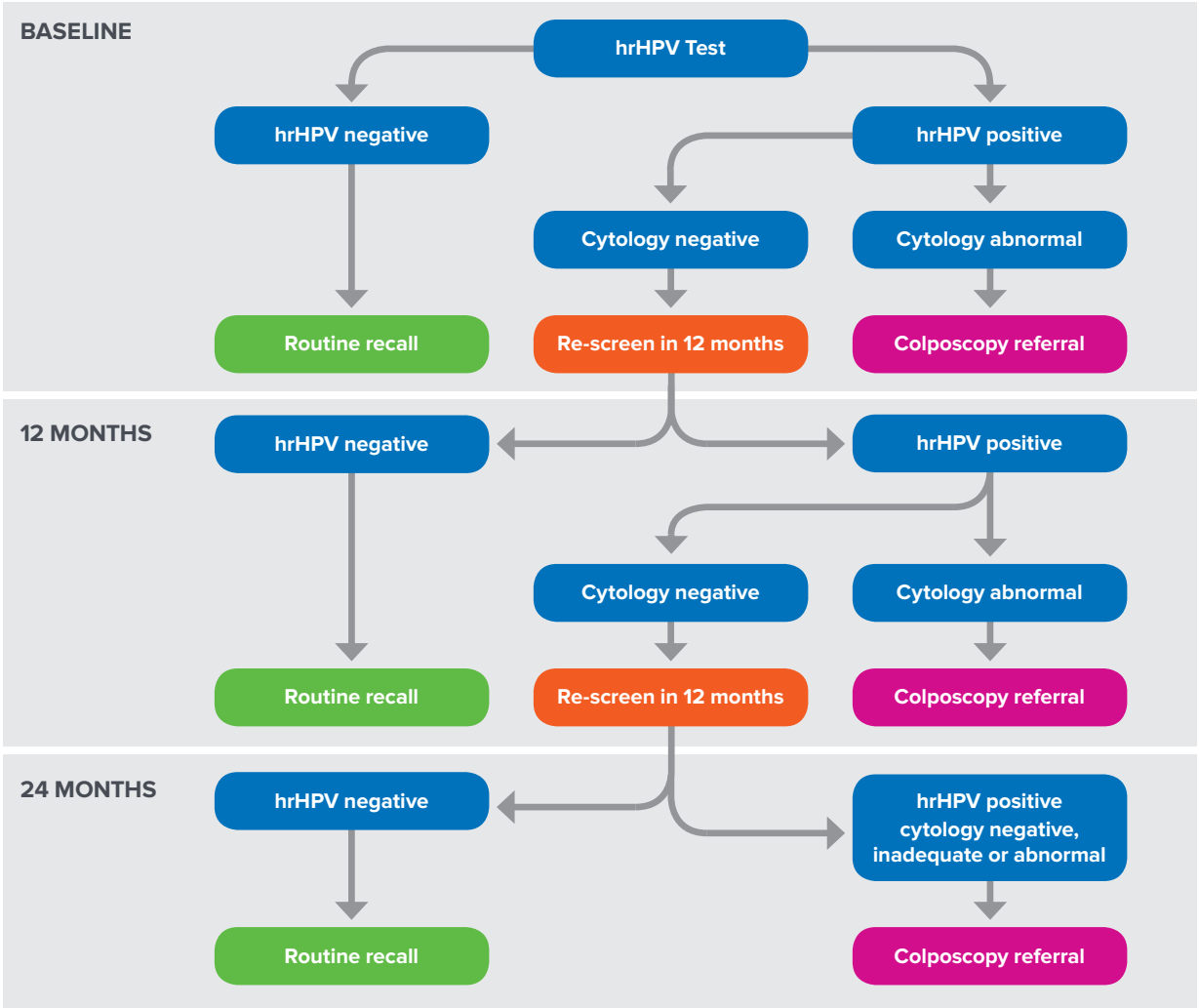
Women will be managed according to the protocol below.

- **HR-HPV NOT DETECTED**: no further testing is required – Return to Routine Recall.
- **HR-HPV DETECTED**: reflex cytology will be processed from the same ThinPrep Vial. If the cytology result from this sample is **abnormal**, the recommendation is to refer to colposcopy regardless of the cytology grade.
- **HR-HPV DETECTED/CYTOLOGY NEGATIVE** – Repeat in 12 months

  12M HR-HPV DETECTED/CYTOLOGY NEGATIVE – Repeat in 12 months

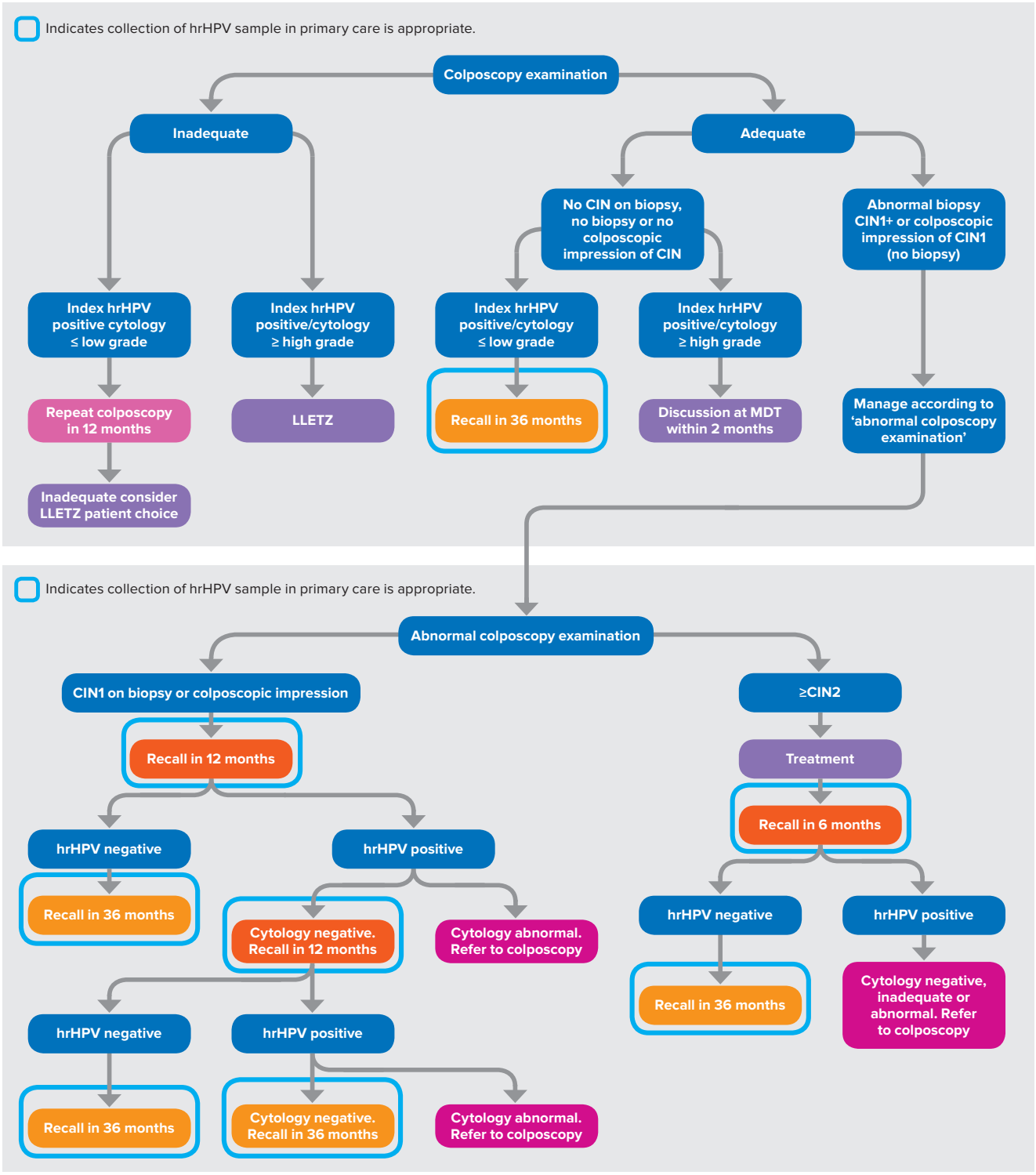
  24M HR-HPV DETECTED/CYTOLOGY NEGATIVE – Refer to colposcopy

Cervical Screening Protocol



Ref: Modified from Colposcopy and programme management: flowcharts of screening and colposcopy pathways (publishing.service.gov.uk)

Cervical screening colposcopy management recommendations



Ref: Modified from Colposcopy and programme management: flowcharts of screening and colposcopy pathways (publishing.service.gov.uk)

Cervical screening requests

Sample takers using EMIS or SystmOne are strongly recommended to use tQuest to electronically request cervical screening tests.

For help and support with tQuest please contact our IT department at helpdesk@tdlpathology.com or 020 7307 7365

Where tQuest is not available all NHS samples must be accompanied by a HMR101 form.

A pdf version of the form is available at the back of this User Guide.

Alternatively, this may be accessed using the following link

https://nww.openexeter.nhs.uk/nhsia/index.jsp

All request forms must include the following mandatory information, failure to include this information may delay the processing of the request.

- First name
- Last name
- Date of Birth
- NHS number
- Home address
- GP Details
- Sender details (if not the GP)

Cervical screening samples

Sample acceptance policy

CSL accepts samples based on the national acceptance policy. For further information regarding sample acceptance policy, including the minimum labelling
criteria, please refer to:

www.gov.uk/government/publications/cervical-screening-accepting-samples-in-laboratories

- All vials must be labeled with a minimum of three identifiers.
- This must include the individual's last name in all circumstances.
- All cervical sample takers sending samples to CSL must have a LonCSTD PIN. Contact csl.cstd@nhs.net for further information.

Failure to comply with the sample acceptance policy will result in the rejection of samples.

For request form information please see Cervical Screening Requests.

Factors known to significantly affect the performance of the examination or the interpretation of results

- Only Hologic ThinPrep vials must be used
- The head of the cervical broom MUST NOT be left in the vial
- Lubricants should not be used as these will affect the quality of the sample

Ordering Supplies

Practices and clinics can order supplies (ThinPrep vials, brooms, supply bags and bar code labels) via our easy-to-use **online order page** at:

https://pathologyforms.formstack.com/forms/hpv_surgery_supplies

Please do not try to order supplies via telephone or email.

Supplies will be delivered by ParcelForce; please allow 5 days for delivery.

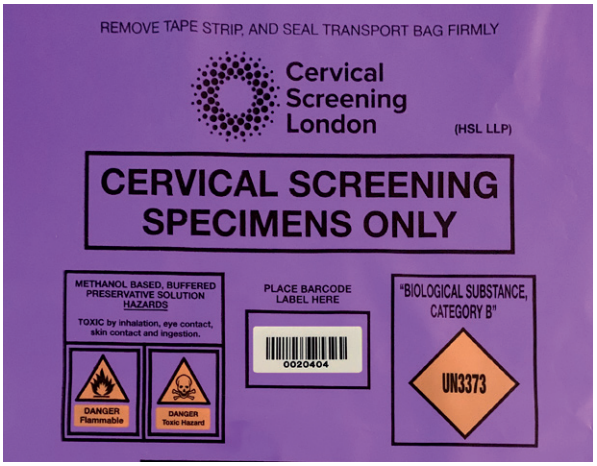
For queries about sample taker supplies, please contact: hpv.supplies@hslpathology.com or phone 020 7307 9440.

Sample packaging

Check each sample is correctly labelled with full name, DOB, NHS/Hospital number and date of collection.

Ensure the matching request has all the necessary demographic, clinical and screening history information required for testing. Current cervical screening sample rejection criteria still apply. Unlabeled or partially labelled vials and samples with discrepancies identified between the information on the vial label and form will be rejected.

Place each vial and request form (if paper request being used) in an individual small clear sample bags. The vial goes in the sealable section, and the form in the pocket at the front. The individually packaged cervical screening samples should then be placed in the large purple CSL transport bags. Seal the bag using the self-adhesive strip.



Sample transport: Courier collection

TDL Collect is the name of the specialist pathology transport division servicing HSL, TDL and CSL referrers. Your cervical screening samples will be picked up by a **TDL Collect** courier and brought to our central London laboratory.

TDL Collect couriers can be contacted at:

couriers@tdlpathology.com cc: csl.queries@nhs.net

T: 020 7307 7373

Practices collecting high volumes of cervical screening samples will have daily pick-ups.

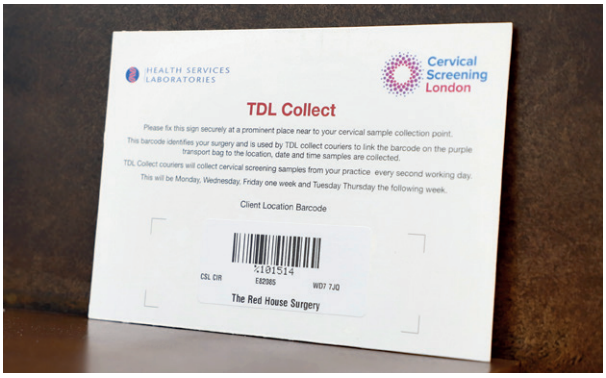
Lower volume surgeries will have a **TDL Collect** courier call every second workday – Monday, Wednesday, Friday one week, and Tuesday, Thursday the next week.

Please note:

- Cervical samples are collected directly form clinics/surgeries/practices across London.
- Sample takers and receptionists are reminded that a number of different pathology providers may collect samples from the same location.
- It is the responsibility of the sender to ensure the CSL purple bags are available at the designated collection point.
- CSL cannot accept responsibility for samples that enter the wrong sample pathway and may result in the individual requiring a repeat test and delayed management.
- Histopathological samples received in error will be repatriated to the correct location.
- All other samples should be repeated as delay caused by unnecessary transit to the CSL laboratory adversely impacts the sample stability.

Sample tracking

All practices and hospital clinics will have been provided with a card with a barcode identifying your location as shown below. This card should be firmly fixed to a bench or wall in the area where the purple sample transport bags will be placed for pick-up by the courier.



Always attach one of the barcode labels from the roll to the outside of each purple bag in the box marked 'Place Barcode Label Here' as shown below. Place the barcode-labelled purple bag near the practice identification barcode you have fixed to the bench or wall in the place designated for pick-up by the TDL Collect courier.

The courier will scan the practice identification barcode on the bench and then the barcode on the sample transport bag to log the pick-up of a cervical screening transport bag containing the samples from your location.

Important: never place other pathology samples in the CSL purple transport bags.

Cervical screening results

Turnaround times

The turnaround times for Cervical Screening results are 98% within 14 days of sample collection.

Communication of results to the sample taker

All cervical screening results, which include both a result and a management recommendation, are sent to the sample requester.

The majority of reports in primary care are sent electronically to the sample requester. A small number will continue to receive hard-copy reports. As part of the overall transition to primary HPV testing across London, the aim is to have all results sent electronically.

In secondary care, users receive reports by secure email to a dedicated mailbox.

Results to Cervical Screening Administration Service (CSAS)

Results are transmitted daily to the Cervical Screening Administration Service (CSAS), who are responsible for notifying individual women of their results in writing.

Direct referrals

All women who have a **HR-HPV DETECTED / CYTOLOGY ABNORMAL** test will be referred directly to colposcopy. The colposcopy administration team arranges appointments directly with the woman, unless a referral to another unit is requested by the woman. In this case the woman is referred back to her GP by colposcopy who will redirect the referral as per patient's choice.

Failsafe

CSL runs a failsafe system to ensure that women are not lost to follow up.

The laboratory will send notifications to sample takers at specified time frames if the failsafe team have not been notified of attendance at colposcopy, or outcome of the referral.

Table 1: Laboratory failsafe notification time frame

	Time from result being issued to failsafe letter being sent		
	1st letter	2nd letter	3rd (Final) letter
Routine failsafe	16 weeks	24 weeks	32 weeks
Urgent failsafe	4 weeks	6 weeks	8 weeks

Multidisciplinary Team Meetings (MDT)

The clinical team provides support for MDTs across London. For any queries in relation to MDTs, please email csl.londonmdt@nhs.net.

Please send MDT lists to csl.londonmdt@nhs.net one week in advance of the meeting.

Cancer Audit Review

CSL participates in Cancer Audit Review. Legacy cases reported before 2 December 2019 remain the responsibility of Trusts. CSL works closely with Cervical Screening Provider Leads (CSPLs) and the London Screening Quality Assurance Service (SQAS) to ensure local and external reviews are carried out in line with national guidance.

For any queries or requests in relation to cancer audit, please email csl.canceraudit@nhs.net

Cervical Sample Taker Training

All cervical sample takers taking samples with the NHS Cervical Screening Programme are required to comply with the training requirement specified in the National Guidance below.

https://www.gov.uk/government/publications/cervical-screening-cervical-sample-taker-training

It is highly recommended that all sample takers in primary and secondary care complete the e-learning for healthcare modules. To access e-learning for healthcare please follow the link below.

https://www.e-lfh.org.uk/

Cervical Sample Taker PIN Code

All sample takers, including those medically qualified, sending samples to CSL must be registered on the LonCSTD.

For further information on how to obtain your London PIN please contact csl.cstd@nhs.net.

Cervical Screening Professional Guidance

https://www.gov.uk/government/collections/cervical-screening-professional-guidance

Sample Taker Updates

Regular Sample Taker Updates (STU) are circulated to our users. Previous versions are available on the HSL website.

HSL Advanced Diagnostics

HSL Advanced Diagnostics (HSL-AD) is a specialist clinical and research referral laboratory for targeted cancer diagnostics. Evolving from the UCLH Department of Research Pathology, HSL-AD has been providing expert services to UCLH Hospitals since the early 1980s and to other hospitals around the UK and overseas since 1990.

Modern personalised cancer treatments depend upon an accurate characterisation of the disease, and so HSL-AD provides immunohistochemistry, *in situ* and molecular tissue diagnostics services. It has one of the largest collections of antibodies and *in situ* probes in the country for use on formalin-fixed paraffin embedded tissue sections, and is a major centre for HER2 testing using both immunohistochemistry and in situ hybridisation (ISH). In addition, a series of chromogenic *in situ* methods are used to test for infective agents, such as cytomegalovirus (CMV), Epstein-Barr virus (EBV). The laboratory also provides an HPV genotyping service for FFPE material.

2014 saw the implementation of a translational program to bring rapid, cost effective targeted next generation sequencing of cancer-specific somatic mutation targets to clinical practice. This led to the development of the Sarah Cannon Molecular Diagnostics, a specialist centre and HSL Advanced Diagnostics partner laboratory for next generation sequencing services.

Our service is available on a permanent or temporary basis to all laboratories, pathologists, and oncologists whether they require a complete immunohistochemistry, *in situ* or molecular service, or just to complement their own local testing protocols with additional, specific biomarkers. We strongly believe that rapid, accurate and cost effective diagnostic testing; enabling assignment of targeted therapeutics should be available to all cancer patients, providing pathologists, oncologists and clinicians alike with the best possible tools to aid in the diagnostic and therapeutic decision making process.

Our IHC, *in situ* and molecular tests are listed on our website (www.hsl-ad.com), which is updated frequently. If you do not see an antibody or probe or molecular target you require, please do not hesitate to contact us.

HSL-AD is a UKAS Accredited Medical Laboratory No. 9007.

Staff/Key personnel

CLINICAL STAFF			
Dr Alan Ramsay	Clinical Lead HSL Histopathology	alanramsay2@nhs.net	

LABORATORY STAFF			
Mr David Allen	Operations and Scientific Manager/HoD	david.allen@hslpathology.com	+44 (0)20 3912 0285
Mr Josep Linares	Lead BMS (IHC)/Deputy HoD	josep.linares@hslpathology.com	+44 (0)20 3912 0286
Ms Sanuri Govender	FISH Service Lead	sanuri.govender@hslpathology.com	+44 (0)20 3912 0285
Ms Elaine Power	Quality Manager/ Molecular Service Lead	elaine.power@hslpathology.com	+44 (0)20 3912 0285

INVOICING & PRICING			
Mr Simon Mackie	Finance & Office Manager	simon.mackie@hslpathology.com	+44 (0)20 3912 0287

Laboratory hours

Specimen Reception Enquiries:
Monday–Friday: 09:30–18.00

Routine Opening Hours:
Monday–Friday: 07:30–19:00

General enquiries

HSL-Advanced Diagnostics
Ground Floor
60 Whitfield Street
London
W1T 4EU

Tel: +44 (0)203 912 0280
Fax: +44 (0)20 3912 0288
Email: AD@hslpathology.com

Clinical advice

Customers are encouraged to contact the laboratory with any queries about the testing service we provide. All requests should be either telephoned directly or emailed to AD@hslpathology.com. The laboratory will liaise with our consultant colleagues where their clinical input is required.

Out-of-hours service

No weekend work or on-call services are available.

Urgent samples

If a report is required urgently, please mark the request form 'Urgent' and contact the laboratory via telephone or email. Please note only urgent cases should be marked as 'Urgent'.

Specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

Immunohistochemistry (stain and return only)

For stain and return IHC requests, we require sections cut at 3-4µm placed on positively charged IHC slides. Please provide an appropriate number of unstained sections to cover the number of requests per case plus an additional 2 sections for repeat staining that may be required.

IHC and FISH for interpretation

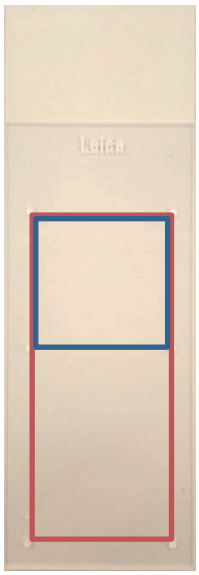
For all interpretative requests, we require an appropriate number of unstained sections plus an additional 2 unstained sections for repeat/reflex testing that may be required.

We recommend SuperFrost Plus, Leica Bond Plus or TOMO slides for all IHC staining. Please note that the use of X-tra® Slides from any manufacturer are not suitable for FISH testing.

Cutting of tissue sections to be referred to HSL-AD for IHC or FISH testing

All sections cut for IHC or FISH testing require special precautions for optimal performance and quality of staining procedures.

- Sections should be cut onto the recommended slide type.
- Section placement should not be excessively high. HSL-AD primarily uses the Leica Bond III platform for IHC staining and the staining area does not cover the entire surface area of the slide. (Please see life sized photograph of a Leica Bond PLUS slide for reference, this can be printed and laminated to use as a template in your microtomy area).
- Sections from biopsies and small pieces of tissue should be placed in the area within the blue box.



- Sections from resections and larger/ multiple pieces of tissue should be placed in the area covered by the red box.
- Placement of tissue in this way is applicable for all slide types.
- It is very important that the lesion of interest from mega blocks is placed on the test slides appropriately.
- For tests performed on the Roche/Ventana and Agilent/Dako platforms, placement is not as critical, but it is always best practice to place test sections centrally on the slide.
- Once cut, all sections for IHC and FISH should be left to dry naturally or in a slide rack above a gentle heat source in an upright position for 30 minutes to 1 hour. Ensure that there is no remaining water underneath the section before baking. The use of slides recommended in this user guide are selected to optimize the drying process, reduce the time required and significantly reduce the number of repeat tests we perform.
- All sections for IHC or FISH should be placed in a temperature controlled oven at 60°C for 1 hour or at 37°C overnight.
- Sections should not be hot-plated using direct heat on the slide, as this may cause poor tissue adherence and unreliable IHC/FISH staining quality.
- The use of X-tra® Slides from any manufacturer is not suitable for FISH testing.
- If slide identification at the referring laboratory is done through printed labels, the maximum height of these labels must not exceed 22mm. If this is not possible, slides hand written with pencil are preferable.
    - This is critical as HSL-AD primarily uses a range of staining platforms. IHC/CISH staining on these have been calibrated and validated for a specific slide surface area. Furthermore, labels extending down onto the slide staining area may exert a hydrophobic effect on the reagents applied.
- For IHC or ISH requests for bacteria or viruses, it is best practice to place a ribbon of sections on each slide referred for testing. This reduces the possibility of staining artifacts interfering with slide interpretation, reduces the need for repeat staining and will reduce overall turnaround time.

Any deviations from these instructions may lead to compromised staining quality.

Packaging and transport

All slides sent to us must be securely packaged in slide mailer boxes with lids taped down. Where possible, tape the slide boxes together to minimise movement inside the package. Blocks must be thoroughly secured in protective material before sending.

A padded envelope must be used for all specimens.

Ensure all material (forms, slides and blocks) is in the package before sealing. (Confirm that three points of identification are present). Please ensure the correct address label is on the envelope.

When we are returning slides/blocks to the requestor, all slides (slide mailer boxes) and blocks (secured in protective material) are sent out in securely padded envelope via Royal Mail or courier. As standard, all cases are returned to referring laboratories using 1st class postage through the Royal Mail. If you would like to arrange a courier, or want us to arrange one, please contact us directly.

Rejection criteria

Requesting laboratories will be notified where samples are unsuitable for testing. Changes to the request form or new tissue section may be requested and testing will commence once the issue has been corrected. The following issues will result in specimen rejection:

Request Forms

- Illegible request (all request forms are designed as editable PDF documents; we recommend that requesting laboratories complete forms electronically).
- Test(s) required not stated.
- Requesting laboratory not stated.
- Requesting laboratory/surgical slide/ block number not stated.

Slides/blocks

- Number mismatch between slide/ block and request form.
- Slide broken in transit.
- Insufficient material received to complete testing.

Clinical Trials

- Inclusive of points above, all requests for work coming through the laboratory as part of an organised clinical trial must have all information points completed and correct. All identifiable patient information must be anonymised (unless such information forms part of the trial process, e.g. date of birth). Cases with incorrect or no information will be rejected. All corrections to request forms or data should be corrected with a single line through the incorrect information, be signed and dated. Where appropriate, an explanation of the nature of the correction should be stated.

Request procedures

See page 14 for general information on request procedures.

Copies of request forms can be downloaded from:

www.hsl-ad.com/ihc/ihc_and_ish_request_forms/

Please complete the appropriate form fully. In particular, three points of patient identification are required. Ensure that the slide/block and request form information match.

Patient identification required:

1 Surname

2 Date of Birth

3 Referring hospital laboratory/surgical number

The referring hospital/laboratory accepts responsibility for errors caused due to insufficient patient identification provided for diagnostic tests.

For all interpretation requests, we use specific request forms. Please select the appropriate form and complete all details. These can be found by using the above link.

Terms and Conditions

Each individual test request is considered as an agreement between HSL-AD and the referring laboratory to perform all available tests requested.

Service level agreements are available for all referring laboratories/customers, please enquire for further information.

Results

Interpretation

Any request with interpretation will be done by the appropriate specialist Consultant Histopathologist or Biomedical Scientist team depending on the test requested.

Availability

Reports are returned by fax or email to the requesting hospitals only. A paper copy of the report is also sent out with the stained slides.

HSL use encrypted email for the secure transmission of patient results and information as required. We are in the process of transferring all report transmission to email rather than fax.

Where results are unexpected, require explanation or may require urgent intervention we will endeavor to contact the requestor.

Downtime

There are times where instrument downtime may result in delay of slides being processed and returned. Such occurrences are very rare, and all major engineering tasks required for our IHC instruments and department are carried out during weekend periods. In the event of downtime, all customers will be contacted directly and will be informed of any situation with expected turnaround times.

HSL Advanced Diagnostics tests

HSL-AD has a large repertoire of IHC and ISH tests. Full details can be found on our website. If there are any markers not currently listed, please contact the laboratory to enquire. We monitor all requests received into the laboratory and ensure that we have the broadest repertoire of antibodies and probes to supplement your diagnostics workflow. All referring laboratories will be contacted directly if any requested tests are not currently stocked by HSL-AD.

- Clinical antibodies: http://www.hsl-ad.com/ihc/clinical_antibodies
- Research antibodies: http://www.hsl-ad.com/ihc/research_antibodies
- Clinical ISH probes: http://www.hsl-ad.com/ish/clinical_probes
- Research ISH probes: http://www.hsl-ad.com/ish/research_probes

Immunohistochemistry (IHC)/ Chromogenic *in situ* hybridization (CISH)

Slide type: SuperFrost Plus, Leica Bond Plus or TOMO recommended

	NO OF SLIDES REQUIRED	SECTION THICKNESS (MICRONS)	ADDITIONAL MATERIAL REQUIRED	TURNAROUND TIME
Stain & Return IHC/ISH	No of tests requested + 1 USS per 4 IHC (max 4 USS required)	3	N/A	24 hours
Breast HER2	4	3	Any diagnostically relevant markers, such as p63, SMM or CK5	48–72 hours
ALK	3	3	N/A	48–72 hours
EGFR	2	3	N/A	48–72 hours
Mismatch Repair (MMR, HNPCC)	8	3	N/A	7 days
p16	3	3	N/A	48–72 hours
PD-L1 (22C3)	3	3	N/A	5 days
PD-L1 (28-8)	3	3	N/A	5 days
PD-L1 (SP142)	3	3	N/A	5 days
ROS1	3	3	N/A	48–72 hours

FISH

Slide type: SuperFrost Plus, Leica Bond Plus or TOMO ESSENTIAL

	NO OF SLIDES REQUIRED	SECTION THICKNESS (MICRONS)	ADDITIONAL MATERIAL REQUIRED	TURNAROUND TIME
ALK	2	5	H&E, ALK IHC (if performed)	7 days
FGFR1	2	3	H&E	7 days
FGFR2	2	3	H&E	7 days
HER2 (ERBB2)	2	3	H&E, Her-2 IHC PLUS any diagnostically relevant markers, such as p63, SMM or CK5	5 days
MET	2	3	H&E	7 days

HSL Advanced Diagnostics tests

	NO OF SLIDES REQUIRED	SECTION THICKNESS (MICRONS)	ADDITIONAL MATERIAL REQUIRED	TURNAROUND TIME
NTRK1	2	5	H&E	7 days
RET	2	5	H&E	7 days
ROS1	2	5	H&E, ROS1 IHC (if performed)	7 days
Lymphoma	No of tests requested + 2 USS	2–3	H&E PLUS any diagnostically relevant markers	7 days
Melanoma	2	3	H&E	28 days

Molecular

	NO OF SLIDES REQUIRED	SECTION THICKNESS (MICRONS)	ADDITIONAL MATERIAL REQUIRED	TURNAROUND TIME
HPV Genotyping	Block Only	N/A	TISSUE BLOCK ESSENTIAL (if not sent this will be stained as part of the patient workup and is mandatory for final reporting of this assay)	7 days
Nanostring Prosigna	Tumour Resection Block Only (Breast)	N/A	Patient should be ER Positive & HER2 Negative. Full pathology report, including original biopsy, sentinel node(s), resection and axillary clearance.	7 days

HSL Biochemistry

HSL Biochemistry provides a high-quality, safe and effective service that facilitates the clinical care of patients. The service is set up across the HSL network of laboratories based on the hub-and-spoke model. The service includes routine, high-volume biochemistry testing provided through the rapid response laboratories (RRLs) located at each associated Trust site, combined with the specialist biochemistry service delivered from the hub laboratory (The Halo building). These services are supported by fully automated and tracked instruments, comprising general chemistry and immunoassay analysers on multiple platforms.

The purpose-built laboratory at the Halo is equipped with state-of-the-art instrumentation, and has an independent pre-analytics and tracking system traversing several floors and disciplines. The service is clinically-led and staffed by medical, scientific and support personnel providing a comprehensive analytical and advisory service. In addition to general guidance, expertise is available for steroid biochemistry and cardiovascular biomarkers through the established Supra-regional Assay Services (SAS). Furthermore, considerable clinical and technical expertise is provided through our senior scientists for the urology and proteins sections, the latter operating collaboratively with the National Amyloidosis Centre (NAC) located at the Royal Free Hospital site.

The department manages an extensive point-of-care testing (PoCT) service implemented by scientific teams located at partner hospitals.

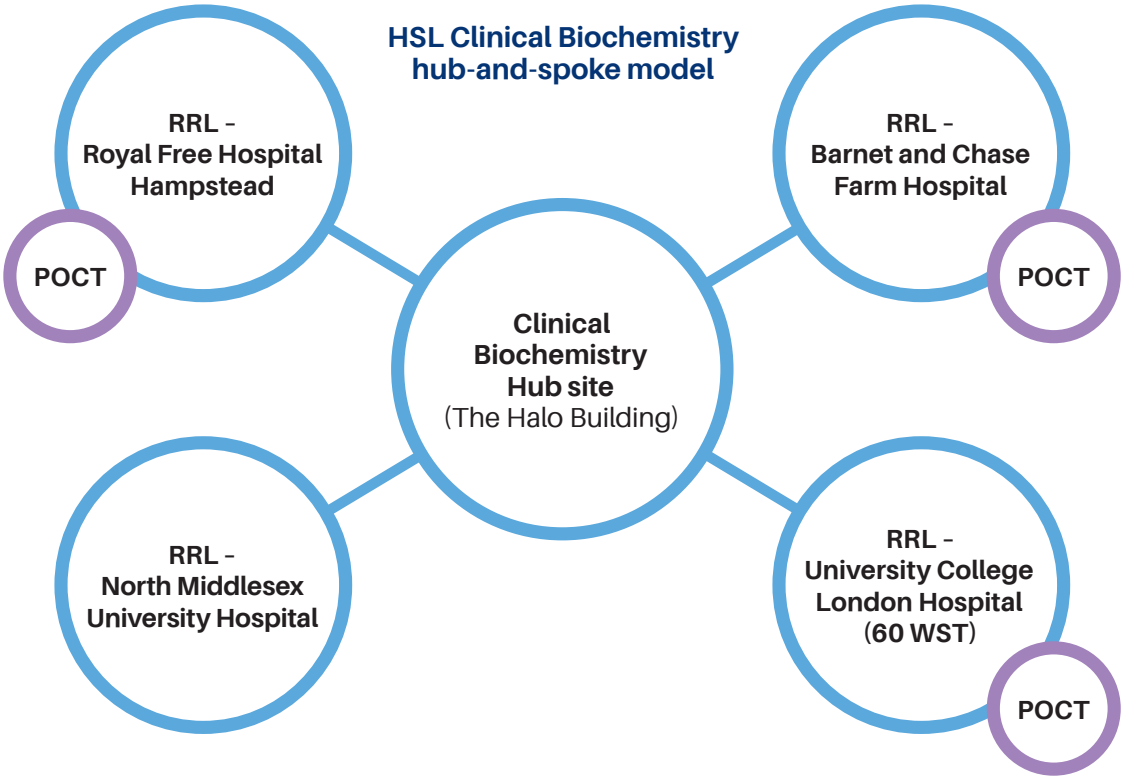
During core laboratory hours, a duty biochemist is available for clinical advice on test selection, interpretation and investigations. Additionally, on-call consultants can be contacted outside of core hours. Senior members of the department are always happy to discuss the needs of the users and to provide advice.

HSL Biochemistry is a UKAS Accredited Medical Laboratory No. 8169. Quality of the service is continuously monitored via a variety of quality assurance procedures. Clinical and laboratory audit programmes contribute to ongoing service review and improvement.

The department holds IBMS pre- and post-registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas. It also has a Health Education England (HEE) recognised training programme for the laboratory aspects of Chemical Pathology and Metabolic Medicine.

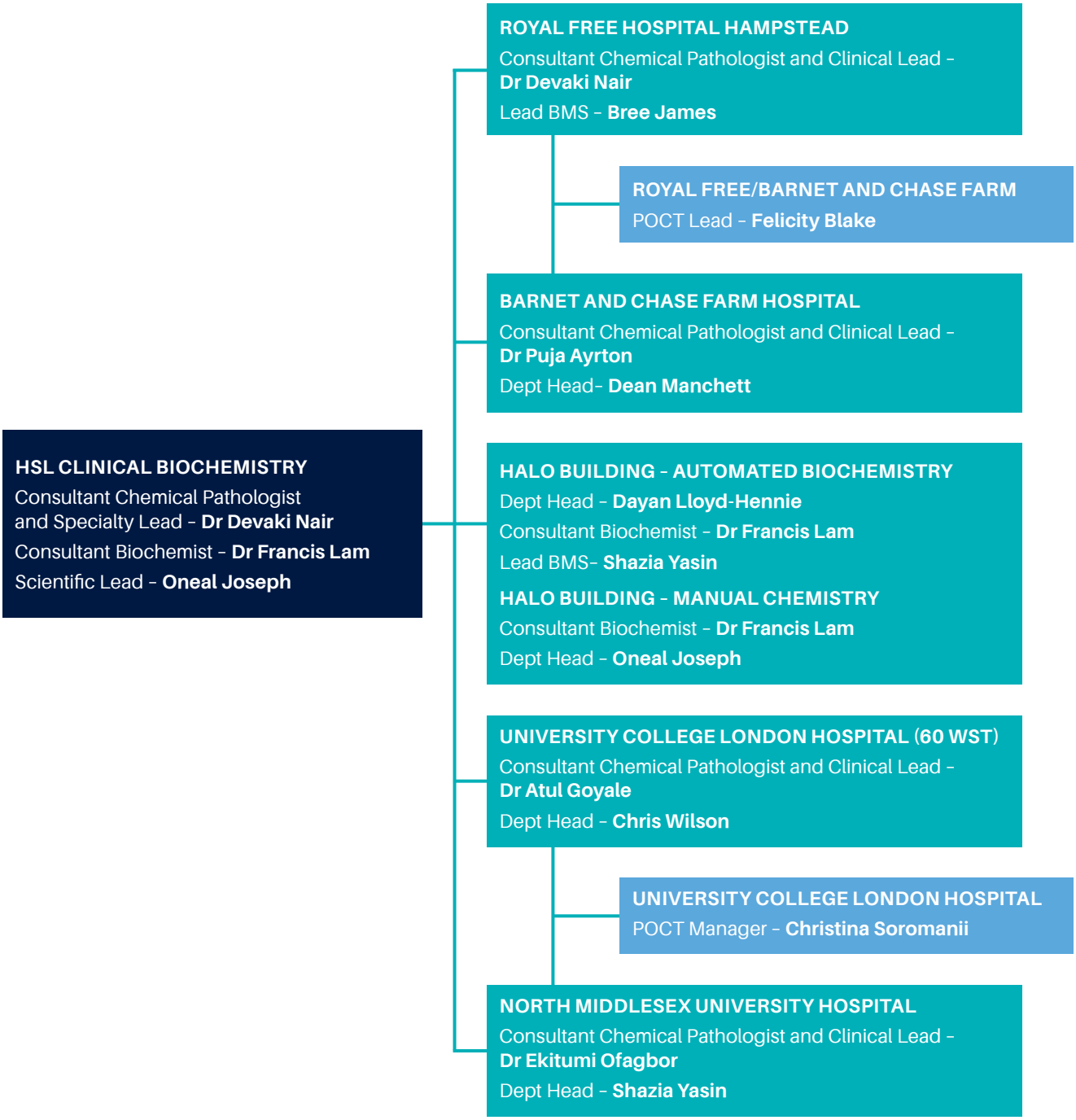
Multi-professional training through a variety of HEE recognised courses is actively encouraged and promoted in order to develop a workforce required for the profession.

See page 4 for a full list of external accreditations.



HSL Biochemistry

Staff /Key personnel



ALL SITES		
Dr Devaki Nair	Consultant Chemical Pathologist and Specialty Lead	Devaki.nair@nsh.net
Oneal Joseph	Scientific Lead	Oneal.joseph@hslpathology.com

BARNET & CHASE FARM		
Dr Puja Ayrton	Consultant Chemical Pathologist and Clinical Lead	p.ayrton@nhs.net
Dean Manchett	Department Head	dean.manchett@hslpathology.com

THE HALO BUILDING		
Dr Francis Lam	Consultant Biochemist	Francis.lam@hslpathology.com
Dayan Lloyd-Hennie	Department Head – Automated Biochemistry	Dayan.Lloyd-Hennie@tdlpathology.com
Shazia Yasin	Lead BMS	Shazia.Yasin@hslpathology.com

NORTH MIDDLESEX HOSPITAL		
Dr Ekitumi Ofagbor	Consultant Chemical Pathologist and Clinical Lead	
Shazia Yasin	Department Head	Shazia.yasin@hslpathology.com

ROYAL FREE HOSPITAL		
Bree James	Lead BMS	Bree.james@nhs.net

UCLH		
Dr Atul Goyale	Consultant Chemical Pathologist and Clinical Lead	Atul.Goyale1@nsh.net
Chris Wilson	Department Head	Chris.wilson16@nhs.net

POCT: ROYAL FREE HOSPITAL AND BARNET/CHASE FARM		
Felicity Blake	POCT Lead	Felicityblake@nhs.net

POCT: UCLH		
Christina Soromani	POCT Manager	Chrisitina.soromani@hslpathology.com

Clinical Biochemistry enquiries

ALL SITES		
Clinical Advice & support	Duty Biochemist	Duty.biochemist@hslpathology.com
BARNET & CHASE FARM		
General enquiries	Helpdesk	BarnetRRL.Helpdesk@hslpathology.com
NORTH MIDDLESEX HOSPITAL		
General enquiries	Helpdesk	nmuh.sra@hslpathology.com
ROYAL FREE HOSPITAL		
General enquiries	Helpdesk	Rf.Haemchemaddon@nhs.net
UCLH		
General enquiries	Helpdesk	UCLHRRLBiochemistry@hslpathology.com

Specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

All samples must be collected in the specified containers, as shown in the table on page 45.

Request procedures

See page 14 for general information on request procedures.

Add on tests (See pathway for the acute Trusts)

Samples are generally stored for up to 1 week after receipt. The decision to perform add-on tests will depend on analyte stability and sample availability.

Specialities

SAS steroid Biochemistry

The Biochemistry department is an established Supra-Regional Assay Service laboratory for urine steroid profiling, receiving samples from both national and international laboratories, and provides a full interpretative and advisory service. In addition, the specialist section provides serum steroid measurements and interpretative guidance. In close collaboration with the MCA laboratory, Queen Beatrix Hospital, Netherlands we operate a urine steroid profiling EQA scheme, with participants from around the world. The service uses both gas and liquid chromatography coupled with mass spectrometry for the measurement of steroids.

Assays available:

- Urine steroid profiling
- 17-hydroxyprogesterone
- Androstenedione

Contact

Francis Lam
francis.lam@hslpathology.com
020 3908 1365

SAS Centre for Cardiac Biomarkers

The network of SAS centers for cardiovascular biomarkers was set up in response to an increasing demand for tests, other than routine lipid profiles, to aid in the assessment of patients with inherited hyperlipidaemia and increased cardiovascular risk. The Department has a long-standing interest in the management of lipid disorders, with special interests in familial hypercholesterolaemia, anti-retroviral drug-induced hyperlipidaemia, and cardiovascular risk factors in South Asians. In collaboration with the Genetic Knowledge Park, the Centre participated in a project comparing DNA testing with traditional diagnostic methods for FH, funded by the Department of Health. The Centre is supported by a well-developed clinical infrastructure for lipid disorders, providing the interpretative and advisory service. There are several research and development activities including clinical trials with newer lipid lowering drugs, that the section is involved working with collaborators within the partner Trusts and external organisations, nationally and internationally.

Assays available:

- Apolipoprotein A1
- Apolipoprotein B
- Apolipoprotein E polymorphisms
- ApoE genotype
- Beta – Quantification (Ultracentrifugation)
- Floating beta test
- Lipid electrophoresis
- Homocysteine
- LDL (Calculated and Direct)
- Lipoprotein (a)

Research only

- HsCRP

Small dense LDL

- Apolipoprotein CII
- Apolipoprotein CIII
- Adipokines
- Cytokines – Metabolic and Advanced

Contact

Dr Devaki Nair, Director of SAS
Devaki.nair@nhs.net
020 7472 6694

Specialties

Proteins

The Proteins service covers a broad repertoire of investigations, including those for haematological (protein electrophoresis, immunofixation, serum free light chains, cryoglobulins and erythropoietin) and hepatic (enhanced liver fibrosis, alpha-1 antitrypsin phenotype) disorders, in addition to isoenzyme typing (alkaline phosphatase, creatine kinase). The service supports and has a close collaborative relationship with the National Amyloidosis Centre located at The Royal Free Hospital site.

Contact

Simon Salter
simon.salter@hslpathology.com
020 3908 1360

Calculi and Urology

The calculi service provides an established investigative and interpretative service for the analysis of stones and associated metabolites (citrate, oxalate, cystine/homocystine screen), including the biochemical evaluation for primary hyperoxalurias (glycolate, glycerate, 2,4-dihydroxyglutarate). The specialist techniques used include Fourier transform infrared (FTIR) spectroscopy, and liquid chromatography–tandem mass spectrometry. In addition, we provide enzyme activity and immunoreactivity assays (alanine:glyoxylate aminotransferase, glyoxylate reductase) on liver biopsies for the investigation of primary hyperoxalurias. Samples are received from both national and international sources.

Contact

Robin Pryke
Robin.Pryke@hslpathology.com
020 3908 1354

Mass Spectrometry and Chromatography

The service provides a diverse repertoire of assays, including neuroendocrine tumour markers (plasma/urine metanephrines and urine 5HIAA) and metals (copper, zinc seleneium, chromium and cobalt by ICPMS). A 7-day immunosuppressant TDM (ciclosporin A, tacrolimus, sirolimus) service is provided by the section for transplant services. In addition, the section provides analytical support for the other specialties such as steroids and urology.

Contact

Emma Woolman
emma.woolman@hslpathology.com
020 3908 1364

Biochemistry tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
17-Hydroxyprogesterone (17-OHP)	Serum	5 days	
ACE	Serum	1 day	
ACTH	EDTA plasma	5 days	Send sample to lab on ice and, if immediate analysis not possible, separate plasma and freeze.
Active B12	Serum	1 day	
Alpha Feto Protein (AFP)	Serum	1 day	
Albumin	Serum	1 day	
Alkaline Phosphatase (ALP)	Serum	1 day	
Alkaline Phosphatase Isoenzymes	Serum	10 days	
Alpha 1 Antitrypsin	Serum	1 day	
Alpha-1 Antitrypsin Phenotyping	Serum	15 days	
ALT	Serum	1 day	
Amikacin	Serum	1 day	
Ammonia	EDTA plasma	1 day	Send sample to lab on ice and, if immediate analysis not possible, separate plasma and freeze.
Amylase	Serum	1 day	
Androstenedione	Serum	5 days	
Antimullerian Hormone (AMH)	Serum	1 day	
Anti-Thyroglobulin Antibodies	Serum	1 day	
Apolipoprotein A1	Serum	5 days	
Apolipoprotein B	Serum	5 days	
AST	Serum	1 day	
B2-Microglobulin	Serum	1 day	
BHCG	Serum	1 day	
Bicarbonate	Serum	1 day	
Bile Acids	Serum	1 day	
CA 125	Serum	1 day	
CA 15-3	Serum	1 day	
CA 19-9	Serum	1 day	
Calcitonin	Serum	5 days	Freeze sample and send to lab frozen
Calcium	Serum	1 day	
Calculus Analysis	Calculus (Stones)	5 days	
Carbamazepine	Serum	1 day	
CEA	Serum	1 day	
Caeruloplasmin	Serum	1 day	
Chloride	Serum	1 day	

Biochemistry Tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Cholesterol	Serum	1 day	
Cholinesterase	Serum	1 day	
Chromium	EDTA or hip aspirate	10 day	
Chromogranin A	Plasma	10 day	Collect sample in trysolol, spin, separate immediately and freeze. Send sample to the lab frozen.
Citrate (urine)	Urine	5 days	Acidified sample preferred
CK-MB	Serum	1 day	
Cobalt	EDTA or hip aspirate	10 day	
Complement C3	Serum	1 day	
Complement C4	Serum	1 day	
Conjugated Bilirubin (Direct Bilirubin)	Serum	1 day	
Copper	Serum	5 days	Collect sample in trace metal tube
Albumin-adjusted Calcium (calculated)	Serum	1 day	
Cortisol	Serum	1 day	
Creatine Kinase (Ck)	Serum	1 day	
Creatine Kinase Isoenzymes	Serum	30 days	
Creatinine	Serum	1 day	
Creatinine clearance (Calculated)	Serum, urine	1 day	
Creatinine Enzymatic	Serum	1 day	
C Reactive Protein	Serum	1 day	
Cryoglobulins	Serum	10 days	
CSF Glucose	CSF	1 day	Fluoride oxalate specimen required
CSF Lactate	CSF	1 day	Fluoride oxalate specimen required
CSF Protein	CSF	1 day	
CSF Xanthochromia	CSF	1 day	Protect sample from light, wrap in foil or place in dark container and send to lab
Ciclosporin A	EDTA	1 day	
Dhea Sulphate	Serum	1 day	
Digoxin	Serum	1 day	
Direct LDL Cholesterol	serum	1 day	
Enhanced Liver Fibrosis (ELF) Testing	Serum	5 days	
Erythropeitin (EPO)	Serum	5 days	
Estimated GFR (eGFR) (calculated)	Serum	1 day	
Estradiol	Serum	1 day	
Ethanol	Plasma	1 day	Fluoride oxalate specimen required
Faecal Calprotectin	Stool/faeces	5 days	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Ferritin	Serum	1 day	
Floating Beta	Serum	10 days	
Folate	Serum	1 day	
Free HCG	Serum	1 day	
Free PSA	Serum	1 day	
Fructosamine	Serum	1 day	
FSH	Serum	1 day	
FT3	Serum	1 day	
FT4	Serum	1 day	
Gentamicin	Serum	1 day	
GGT	Serum	1 day	
GLDH	Serum	1 day	
Globulin (Calculated)	Serum	1 day	
Glucose	Plasma	1 day	Fluoride oxalate specimen required
Growth Hormone	Serum	5 days	
Haemoglobin A1c	EDTA whole blood	1 day	
Haptoglobin	Serum	1 day	
HDL	Serum	1 day	
High Sensitivity Crp (hsCRP)	Serum	1 day	
High Sensitivity Troponin I	Serum	1 day	
High Sensitivity Troponin T	Serum	1 day	
Homocysteine	Serum	1 day	
IgA	Serum	1 day	
IgE	Serum	1 day	
IgG	Serum	1 day	
IgG Subclasses (IgG1-4)	Serum	5 days	
IgM	Serum	1 day	
Insulin	Serum	1 day	
Insulin-like growth factor 1 (IGF-1)			
Iron	Serum	1 day	
Lactate	Plasma	1 day	Fluoride oxalate specimen required
LDH	Serum	1 day	
LDL-Cholesterol (Calculated)	Serum	1 day	
LH	Serum	1 day	
Lipase	Serum	1 day	
Lipid electrophoresis	Serum	10 days	

Biochemistry Tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Lipoprotein A	Serum	1 day	
Lithium	Serum	1 day	
Liver biopsy analysis for AGT and GRHPR activity	Liver Biopsy	15 days	
Macroprolactin	serum	3 days	
Magnesium	Serum	1 day	
Methotrexate	serum	1 day	
Myoglobin	Serum	1 day	
Non-HDL Cholesterol (Calculated)	Serum	1 day	
NT-pro BNP	Serum	1 day	
Osmolality	Serum / Urine	1 day	
Oxalate (Plasma)	EDTA Plasma	10 days	Freeze sample and send to lab frozen
Oxalate (Urine)	Urine	5 days	Acidified specimen required
PAPP A	Serum	1 day	
Primary Hyperoxaluria metabolites (glycolate, glycerate, dihydroxyglutarate)	Urine	15 day	Acidified specimen required
Phenytoin	Serum	1 day	
Phosphate	Serum	1 day	
Plasma Metanephrines (normetanephrine, metanephrine, 3-methoxytyramine)	EDTA Plasma	10 day	Send sample to lab on ice and, if immediate analysis not possible, separate plasma and freeze
Potassium	Serum	1 day	
Procalcitonin	serum	1 day	
Progesterone	Serum	1 day	
Prolactin	Serum	1 day	
Protein Electrophoresis	Serum	5 days	
Paracetamol (Acetaminophen)	Serum	1 day	
Parathyroid Hormone (PTH)	Serum	1 day	
Red Cell Folate	EDTA whole blood	2 days	
Rheumatoid Factor	Serum	1 day	
ROMA (Calculated)	Serum	1 day	
Salicylate	Serum	1 day	
Selenium	Serum	5 days	Collect sample in trace metal tube
Serum Amyloid A	Serum	5 days	
Serum Capillary Zone Electrophoresis	Serum	5 days	
Serum Free Light Chains	Serum	5 days	
Serum Immunofixation	Serum	5 days	
Sex Hormone Binding Globulin (SHBG)	Serum	1 day	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Sirolimus	EDTA	1 day	
Sodium	Serum	1 day	
Soluble Transferrin Receptor	Serum	1 day	
Sweat Chloride	Sweat	1 day	Please call laboratory to arrange in advance
Tacrolimus	EDTA	1 day	
Testosterone	Serum	1 day	
Theophylline	Serum	1 day	
Thyroglobulin	Serum	1 day	
Total Bilirubin	Serum	1 day	
Total Glycated Haemogolobin (Boronate Affinity)	EDTA whole blood	1 day	
Total Iron Binding Capacity (TIBC) (Calculated)	Serum	1 day	
Total Protein	Serum	1 day	
Total PSA	Serum	1 day	
Total T3	Serum	1 day	
Total T4	Serum	1 day	
Transferrin	Serum	1 day	
Transferrin Saturation (Calculated)	Serum	1 day	
Triglyceride	Serum	1 day	
TSH	Serum	1 day	
UIBC	Serum	1 day	
Urate	Serum	1 day	
Urea	Serum	1 day	
Urine 5-HIAA	Urine	10 day	Acidified specimen required
Urine Albumin:Creatinine Ratio (Calculated)	Urine	1 day	
Urine Albumin	Urine	1 day	
Urine Amphetamine Screen	Urine	1 day	
Urine Amylase	Urine	1 day	
Urine Barbiturate Screen	Urine	1 day	
Urine Benzodiazepine Screen	Urine	1 day	
Urine BJP Quantitation	Urine	5 days	
Urine Calcium	Urine	1 day	Acidified specimen required
Urine Cannabinoids Screen	Urine	1 day	
Urine Cocaine Screen	Urine	1 day	
Urine Copper	Urine	5 days	
Urine Cotinine	Urine	1 day	
Urine Creatinine	Urine	1 day	

Biochemistry Tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Urine Cystine and homocystine screen	Urine	1 day	
Urine Ethanol	Urine	1 day	
Urine Glucose	Urine	1 day	
Urine Immunofixation	Urine	5 days	
Urine Magnesium	Urine	1 day	
Urine metadrenaline (normetanephrine, metanephrine, 3-methoxytyramine)	Urine	5 days	Acidified specimen preferred
Urine Methadone Screen	Urine	1 day	
Urine Opiate Screen	Urine	1 day	
Urine Phosphate	Urine	1 day	
Urine Porphobilinogen	Urine	1 day	Protect sample from light, wrap in foil or place in dark container
Urine Potassium	Urine	1 day	
Urine Pregnancy Test	Urine	1 day	
Urine Protein	Urine	1 day	
Urine Protein Electrophoresis	Urine	5 days	
Urine Protein:creatinine Ratio (Calculated)	Urine	1 day	
Urine Reducing Substances Screen	Urine	1 day	
Urine Sodium	Urine	1 day	
Urine Steroid Profile	Urine	10 day	Please contact the lab for urgent samples, which can be prioritised with a shorter turnaround time
Urine Total Porphyrins	Urine	1 day	Protect sample from light, wrap in foil or place in dark container
Urine Urate	Urine	1 day	
Urine Urea	Urine	1 day	
Urine Zinc	Urine	5 days	
Valproate	Serum	1 day	
Vancomycin	Serum	1 day	
Vitamin B12	Serum	1 day	
25-Hydroxyvitamin D	Serum	1 day	
Zinc	Serum	5 days	Collect sample in trace metal tube

HSL Cellular Pathology

HSL's Cellular Pathology Department consists of Histopathology and Diagnostic Cytology. Its prime objectives are to provide hospital clinicians and general practitioners with a speedy, high quality diagnostic service.

Diagnostic Histopathology

The services provided include:

- Routine histological diagnosis, using a wide variety of techniques including special stains, immunocytochemistry and molecular techniques.
- Cellular Pathology SRA's are located at 60 Whitfield Street, Chase Farm, Barnet, NMUH and RFH.
- Consultant led large tissue sampling
- Rapid response laboratory histological service is based at the Royal Free Hospital site.
- Mohs clinic technical support.
- Frozen section service on request, pre-booking is essential except for unforeseen intraoperative circumstances.

Specialities of the Cellular Pathology department include:

- Lymphoma and haematological malignancies
- Urological pathology
- Respiratory pathology
- Oral pathology
- Head and neck pathology
- Cardiac pathology
- Gynaecological pathology
- Gastro-intestinal pathology
- Breast pathology
- Skin pathology
- Thoracic pathology
- Endocrinology
- Hepatobiliary pathology
- Liver pathology
- Renal pathology

The department also provides a laboratory support based service to the Mohs clinics at the Royal Free and Chase Farm Hospital's Dermatology departments.

Diagnostic Cytology

Diagnostic cytology is a specialist discipline that provides the examination of samples taken by non-invasive or minimally invasive procedures. This is done by examining cells from fluids, brushings or fine needle aspirates (FNAs) to give a diagnosis of disease.

All samples should reach the laboratory **as soon as possible** and preferably early in the working day to avoid deterioration of cells. Samples should be received in the department by 4.00pm.

Cases are received and booked in at Royal Free, NMUH and BCF Hospitals and transported to 60 Whitfield Street for processing and testing before being returned to Royal Free Hospital for reporting.

Department Laboratory Accreditation

The department is IBMS approved for HCPC registration portfolios, specialist portfolios, advanced practice portfolios, and the RCPath diagnostic histopathology reporting post graduate diploma and actively promotes the training and continual development of its staff to ensure we retain the highest levels of professional and academic excellence.

In addition, a service is provided to Ealing General Hospital as part of the London North West University Hospital NHS Trust (Ealing Hospital), and it is a referral centre for over 560 hospitals in the UK, Republic of Ireland and over 200 overseas hospitals.

The department also provides a Histology service to Barnet and Chase Farm Hospitals along with a laboratory support based service to the Mohs clinics at Chase Farm Hospital. Cases are received and booked in at Royal Free Hospital and transported to 60WS for processing and testing before being returned to Royal Free Hospital for reporting. UCLH is part of the North London Cancer Network,which co-ordinates cancer services in specialist pathology for the North Thames Central Sector of London.

The department is always keen to help with collaborative projects and can provide technical services for all methodologies. Please contact the 60WS Cellular Pathology Operations Manager for further details.

HSL Cellular Pathology

The department is IBMS approved for HCPC registration portfolios, specialist portfolios, advanced practice portfolios, and the RCPath diagnostic histopathology reporting post graduate diploma and actively promotes the training and continual development of its staff to ensure we retain the highest levels of professional and academic excellence. Staff have the opportunity to experience and specialise in all the technical areas of the laboratory.

We encourage the advancement of the histopathology BMS role through advanced specimen dissection and the RCPath diagnostic reporting scheme, as well as nurturing those with an eye for progression through the management route.

HSL Cellular Pathology is a UKAS Accredited Medical Laboratory No. 9706.

UCLH and Core Laboratories

Cellular Pathology Specimen Reception
Diagnostic Cytology Laboratory
Histopathology Laboratory
Cellular Pathology Reporting
Cellular Pathology Office/Archive
60 Whitfield Street
London, W1T 4EU

Mohs Service (Chase Farm only)
Mohs Laboratory, Dermatology
Zone C, Chase Farm Hospital
127 The Ridgeway
Enfield, EN2 8JL

Staff /Key personnel

Histopathology

UCLH STAFF			
Clinical Director of Pathology	**Dr Mary Falzon**	mfalzon@nhs.net	020 3456 8416
Clinical Lead for Cellular Pathology	**Professor Manuel Rodriguez-Justo**	manuel.rodriguez@nhs.net	020 3456 8424
Cellular Pathology Office Manager	**Ms Camelia Bouzid**	Camelia.Bouzid@nhs.net	020 3456 8401
Results & Enquiries	Please check on EPIC before calling		020 3456 8402
Consultant Pathologists	**Dr M Falzon**	mfalzon@nhs.net	020 3456 8416
	Dr A Freeman	alex.freeman2@nhs.net	020 3456 8425
	Dr A Gallimore	andrew.gallimore@nhs.net	020 3456 8434
	Dr S Hughes	s.hughes9@nhs.net	020 3456 8409
	Dr R Arora	rupali.arora@nhs.net	020 3456 8420
	Dr A Jay	amrita.jay@nhs.net	020 3456 8406
	Professor T Marafioti	teresa.marafioti@nhs.net	020 3456 8426
	Professor M Novelli	marco.novelli@nhs.net	020 3456 8423
	Dr A Ramsay	alanramsay2@nhs.net	020 3456 8412
	Professor M Rodriguez-Justo	manuel.rodriguez@nhs.net	020 3456 8424
	Dr R Saraswati	ruma.saraswati@nhs.net	020 3456 8422
	Dr R Ball	rhys.ball@nhs.net	020 3456 8410
	Dr A Childerhouse	a.childerhouse1@nhs.net	020 3456 8431
	Dr S Amin	sepidehamin@nhs.net	020 3456 8417
	Dr A Winstanley	alison.winstanley@nhs.net	020 3456 8427
	Dr I Proctor	ian.proctor@nhs.net	020 3456 8407
	Dr I Ben Salha	imen.ben-salha@nhs.net	020 3456 8421

UCLH STAFF			
Consultant Pathologists	**Dr E Borg**	elaine.borg@nhs.net	020 3456 8418
	Dr S Pomplun	sabine.pomplun@nhs.net	020 3456 8419
	Dr M Jansen	marnix.jansen@nhs.net	020 3456 8431
	Dr M Mitchison	miriam.mitchison@nhs.net	020 3456 8413
	Dr N Wilkinson	nafisa.wilkinson@nhs.net	020 3456 8408
	Dr M Ratynska	marzena.ratynska@nhs.net	020 3456 8411
	Dr R Agrawal	reshma.agrawal@nhs.net	020 3456 8414
	Dr P Ellery	peter.ellery@nhs.net	020 3456 8430
	Dr R Khiroya	reena.khiroya@nhs.net	020 3456 8415
	Dr D Moore	david.moore11@nhs.net	020 3456 8432
	Dr K Lawson	kay.lawson@nhs.net	020 3456 8429

RFH GROUP STAFF			
Clinical Lead for Cellular Pathology	**Dr Dhili Arul**		
Diagnostic Cytology Lead Pathologist	**Dr Miguel Perez-Machado**		
Cellular Pathology Office Manager	**Mr Eamonn Kane**	Eamonn.kane@nhs.net	Ext 34604
Consultant Pathologists	**Sarah Alexander**	sarah.alexander5@nhs.net	Ext: 36061
	Dhili Arul	dhili.arul@nhs.net	Ext: 37218
	Delia Alexe	d.alexe@nhs.net	Ext: 37216
	Lauren Heptinstall	lauren.heptinstall@nhs.net	Ext: 33544
	Lauren Carp	lauren.carp@nhs.net	Ext: 37210
	Khurram Chaudhary	khurram.chaudhary@nhs.net	Ext: 37212
	Corina Cotoi	corina.cotoi@nhs.net	Ext: 37213
	Florence Deroide	florence.deroide@nhs.net	Ext: 34780
	Soha El Sheikh	s.elsheikh@nhs.net	Ext: 33169
	Nazanin Etessami	nazani.etessami@nhs.net	Ext: 37217
	Roger Feakins	roger.feakins@nhs.net	Ext: 34603
	John Firth	johnfirth@nhs.net	Ext: 36065
	Richard Frow	richard.frow@nhs.net	Ext: 35178
	Ioannis Roxanis	ioannis.roxanis@nhs.net	Ext: 36067
	Hazem Ibrahim	hazem.ibrahim@nhs.net	Ext: 34340
	Anupam Joshi	anupam.joshi@nhs.net	Ext: 37211
	Delaram Kermani	delaram.kermani@nhs.net	Ext: 36060
	Eva Kolson Kokohaare	eva.kolsonkokohaare@nhs.net	Ext: 37223
	Jasmin Lee	jasminlee@nhs.net	Ext: 38450
	Tu Vinh Luong	tuvinh.luong@nhs.net	Ext: 37016
	George Meligonis	gmeligonis@nhs.net	Ext: 37214
	Sonali Muthukumar	sonali.muthukumar@nhs.net	Ext: 36024
	Evangelia Mylona	evangelia.mylona@nhs.net	Ext: 36066

HSL Cellular Pathology

RFH GROUP STAFF			
Consultant Pathologists	**Luka Ozretic**	luka.ozretic@nhs.net	Ext: 33279
	Miguel Perez-Machado	miguel.perez-machado@nhs.net	Ext: 33615
	Anuja Pradhan	anuja.pradhan1@nhs.net	Ext: 37221
	Alberto Quaglia	alberto.quaglia@nhs.net	Ext: 35641
	Julia Rees	juliarees@nhs.net	Ext: 36062
	Ioannis Roxanis	ioannis.roxanis@nhs.net	Ext: 36067
	Victoria Swale	victoria.swale@nhs.net	Ext: 38594
	My-Anh Tran-Dang	my-anh.tran-dang@nhs.net	Ext: 37440
	Jennifer Watkins	jennifer.watkins@nhs.net	Ext: 38898
	Martin Young	martin.young@nhs.net	Ext: 35146
	Tanya Alan	tanya.alan@nhs.net	
	Viktorija Nariunaite	viktorija.nariunaite@nhs.net	
	Thakur Gurung	thakur.gurung@nhs.net	Ext: 33278
	Preeti Kothari	preeti.kothari@nhs.net	Ext: 33544

60 WHITFIELD ST LABORATORY STAFF			
Cellular Pathology Operations Manager	**Mr Neal Byron**	Neal.byron@hslpathology.com	
60 WS Cellular Pathology Operations Manager	**Mr Gary Brown**	gary.brown1@nhs.net	020 3912 0350
Histology Laboratory Manager	**Mr S Dawodu**	s.dawodu@nhs.net	020 3912 0361
Diagnostic Cytology Lead	**Mrs Cherlehan Etman**	Cherlehan.Etman@hslpathology.com	020 3912 0345
Floor Manager Specimen Handling	**Maxwell Owusu-Ansah**	maxwell.owusu-ansah@nhs.net	020 3912 0347
Floor Manager Slide Production and QC	**Deborah Brown**	deborah.brown39@nhs.net	020 3912 0348
Histology Laboratory			020 3912 0370
Frozen Section Bookings UCLH Patients			020 3912 0370

HSL RFH LABORATORY STAFF			
Cellular Pathology Operations Manager	**Mr Neal Byron**	Neal.byron@hslpathology.com	
60 WS Cellular Pathology Operations Manager and RFH Cellular Pathology Interim Site Lead	**Mr Gary Brown**	gary.brown1@nhs.net	Ext 33514
Cellular Pathology Laboratory Manager	**Ms Reshmi Patel**	reshmi.patel@nhs.net	Ext 34601
Mohs Service Lead (RFH and Chase Farm)	**Mr Miguel Lala**	miguel.lala@nhs.net	Ext 51464
Diagnostic Cytology Lead	**Mrs Cherlehan Etman**	Cherlehan.Etman@hslpathology.com	020 3912 0345
Frozen Section and Renal Bookings RFH Patients			Ext 35180

Diagnostic Cytology

All Diagnostic Cytology laboratory tests are carried out at 60 Whitfield Street. Please contact the following for any guidance.

Diagnostic Cytopathology
Department of Cellular Pathology 2nd Floor (South)
60 Whitfield Street
London W1T 4EU

Email: Diagnostic.Cytology@hslpathology.com

General enquiries

During working hours (see below), please contact the Main Laboratory on 020 3912 0349 / 020 3912 0348.

Laboratory hours

Histopathology: Monday–Friday, 07:30–19:00.

Diagnostic Cytology: Monday–Friday, 09:00–17:30.

Urgent requests

Please contact the relevant pathologist to discuss urgent processing prior to sending the sample.

Out-of-hours service

There is no routine consultant diagnostic service for weekends and bank holidays; for urgent results special arrangements must be made in advance.

Currently, only the RFL histopathology section of Cellular Pathology offers an out-of-hours service for RFL Patients. The on-call service is a consultant led out-of-hours telephone advisory service and is available every evening and at weekends; this includes a technical service for very urgent samples. Where a sample requires out-of-hours processing the on-call consultant should be contacted first, via the switchboard.

There is no on-call or out of hours service for consultant histopathologists or cytologists for the UCLH Hospital Patients.

Clinical advice

During working hours (Monday–Friday, 09:00–17:30), please contact the relevant Consultant Pathologist.

Cellular Pathology samples

Types of samples

Histology samples

TYPE OF SAMPLE	SAMPLE REQUIREMENT
Histopathology – Routine Diagnosis	Tissue in 10% Neutral Buffered Formalin, at least 10x the volume of the specimens.
Histopathology – Frozen sections (on request)	Fresh tissue (i.e. no fixative) – delivered immediately to the laboratory.

Diagnostic cytology samples

TYPE OF SAMPLE	SAMPLE REQUIREMENT	SAMPLE REQUIREMENT
Anal brushings	Brush rinsed in Hologic ThinPrep vial.	Brush tip must not be placed in vial. Ensure ThinPrep vial is in date and stored between 15–30°C.
Bronchoalveolar lavage (BAL)	Place in an empty sterile container.	Cells deteriorate rapidly so the specimen should be brought to the lab immediately. Where a Cell differential count is required, the sample must be submitted within a couple of hours of sample being taken.
Cerebrospinal fluids (CSF)	2ml sample ideal (less OK).	Cells deteriorate rapidly so the specimen should be brought to the lab immediately. Inform lab staff that a CSF sample is being sent. These samples must be received in the lab **before 4.00pm** (Monday to Friday except bank holidays) to ensure they are dealt with that day. Ensure a separate sample has been submitted to clinical chemistry and Microbiology as well, if appropriate.
Cyst Fluid	25ml (max) of fluid.	Plain sterile container
Endoscopic Brushings (eg. Bronchial)	Placed in 15ml CytoLyt solution.	
Endoscopic Washings (eg. Bronchial)	Placed in 15ml CytoLyt solution.	
FNA slides & Needle Rinses	Fixed slides must be fixed in IMS or spray fixed. Needle rinses to be placed in a plain sterile container/ Roswell Park Memorial Institute Medium (RPMI) or CytoLyt solution. Ask laboratory if unsure.	Ensure method of fixation is clearly stated on slide(s). Number of slides submitted must be written on request form. Slides must be transported in a slide mailer.
Nipple Discharge		
Serous Fluid (eg.Pleural, Ascitic, Abdominal, Peritoneal, pericardial)	60ml (min) recommended in an empty sterile container.	If patients have been supine for any length of time, please get the patient to sit up and move a little, so that any cells that have settled are resuspended.
Sputum	Place in an empty sterile container.	This sample is of limited or no clinical value, and should rarely be received. Should only be taken where patients are unfit for Bronchoscopy. For best results obtain sputum following chest physiotherapy, with an early morning sample before the patient has eaten or brushed their teeth. Multiple samples (x3) may be needed, but they should be taken on 3 separate days. The whole of the expectorated sample should be submitted.

TYPE OF SAMPLE	SAMPLE REQUIREMENT	SAMPLE REQUIREMENT
Synovial Fluid	5ml min	
Urine	20ml (min) of fluid in sterile container. Second void of the day to be collected.	Send to lab ASAP; if a delay is anticipated, refrigerate and store at 4°C. Or... A preservative, such as Hologic PreservCyt solution, may be added to the sample in a **2:1 ratio** (2 parts urine to 1 part fixative) and this must be recorded on the sample pot with a black dot using a marker pen or written on the request form. The first sample voided in the morning is unsuitable for analysis. RED TOPPED Borate Universals are **NOT** Suitable for Cytology. The lab will not accept these samples.

Preparation of Specimens

Histopathology

All specimens must be sent in fixative, except in special circumstances where other arrangements have been made (e.g. for frozen section requests). The recommended fixative is 10% Neutral Buffered Formalin (NBF), which is a hazardous reagent and instructions for dealing with it should be followed carefully.

Please use a container large enough to accommodate the specimen without forcing it in, and sufficient volume of fixative (at least 10x the volume of the specimen).

Please note, all histology tests have been verified using 10% NBF. Due to the nature of histological samples (most samples cannot be repeated) the department will not currently reject samples received in 10% formal saline. These samples will be transferred to 10% NBF at the earliest opportunity.

For Oral Pathology samples for immunofluorescence, please contact St John's Institute of Dermatology (020 7188 6364).

Frozen Sections - UCLH cases

Requests for a frozen section must be made on 020 3912 0349. If you know in advance that you will require a frozen section, please book as promptly as possible, giving the date, time, patient's name, specimen type, infection status, consultant's name, your bleep number and the theatre number for telephoning the result.

For health and safety reasons, it is departmental policy not to carry out a frozen section on known positive patients for TB, HIV, Hep C and Covid-19 cases if the patient is still compromised or not under treatment. If you are in any doubt about this, please speak to the Consultant Histopathologist on duty, who can be contacted via 020 3456 8402. In such cases it is usually possible to arrange an urgent paraffin section which can be reported later the same day.

Specimens must be taken immediately to the Histology laboratory, Specimen Reception, 2nd Floor, 60 Whitfield Street, London W1T 4EU, in a suitable rigid container which prevents patient identifiable data from being seen by members of the public and is compliant with UN3373 regulations. These can be found on the wards and theatres. A courier service is used at Westmoreland Street.

Full instructions are posted in each theatre; if this is not the case please inform the 60WS Cellular Pathology Operations Manager on 020 3912 0350.

Frozen Sections - RFH cases

Requests for a frozen section must be made on Ext 35180. If you know in advance that you will require a frozen section, please book as promptly as possible, giving the date, time, patient's name, specimen type, infection status, consultant's name, your bleep number and the theatre number for telephoning the result.

For health and safety reasons, it is departmental policy not to carry out a frozen section on known positive patients for TB, HIV, Hep C cases if the patient is still compromised or not under treatment. If you are in any doubt about this, please speak to the Consultant Histopathologist on duty. In such cases it is usually possible to arrange an urgent formalin fixed paraffin embedded section which can be reported later the same day.

Specimens must be taken immediately to the Histology laboratory, Specimen Reception, 2nd Floor, adjacent to room 2/429, in a suitable rigid container which prevents patient identifiable data from being seen by members of the public and is compliant with UN3373 regulations.

Cellular Pathology samples

Diagnostic Cytology

All samples should reach the laboratory **as soon as possible** and preferably early in the working day to avoid deterioration of cells. Samples should be received in the department by 4.00pm.

If a delay in transportation is anticipated or samples have been taken out-of-hours, then they should **be kept refrigerated at 4°C**. **There is no out-of-hours Cytology service**.

Full instructions are posted in each theatre; if this is not the case, please inform the 60 WS Cellular Pathology Operations Manager on 020 3912 0350.

Cellular Pathology: Fine Needle Aspiration Cytology -UCLH

There are a number of FNA clinics held weekly within the Trust for a variety of specialties including breast, thyroid, head and neck and lymph nodes. The clinics are not attended by laboratory staff, and samples must be delivered directly to the department for same day reporting.

Cytology samples that do not reach the laboratory within working hours or have missed the last collection must be stored in the refrigerator at 4–8°C.

Specimen labelling

A minimum acceptance criteria for all Cellular Pathology samples of three patient identifiers must be provided for all samples.

Sample site must be provided in both request form and sample pot, if multiple pots are sent all must be clearly labelled (e.g. A, B, C).

All Cytology request forms, sample containers, glass slides and slide boxes must be labelled and completed as per the following:

Acceptance criteria

Cytology Request forms, sample containers/ slides/ slide mailer boxes must have a minimum of 3 key Patient identifiers, and these Patient identifiers must include:

- **Full name (first name & surname)**
- **A unique patient identification number, Hospital number or NHS number**
- **Date of birth**

Rejection criteria

Samples will be rejected if:

- The request form has less than 3 of the key patient identifiers
- The sample container/slide/slide mailer box has less than 2 key patient identifiers
- The patient data on the form and sample container **do not** match.

Cytology request forms and samples containers / slides / slide boxes that do not meet these standards will need verifying by a senior clinician. And in such cases the requesting clinician will be asked to visit the Diagnostic Cytology department to verify the request form and specimen or complete a **Specimen deficiency form** accepting responsibility for any clinical decisions that are made based on the results of the sample submitted.

Please ensure the correct sample containers are used.

Transport to the laboratory

Instructions for the transportation of Histopathology samples

Small biopsy pots (universals, 60ml) should be placed into a small, clear plastic bag with absorbent sheet, usually attached with the request form and sealed (please see diagram).

If the form does not have a bag attached, please use the clear bags provided at the clinic.

The request form should never be placed inside the bag with the specimens in case of leakage.

The form must be attached to the sample using tape, please do not use pins or staples as this is hazardous.

Larger specimens should be placed into the snap-top white plastic bucket supplied by theatres, clinics or our department. The bucket should then be placed inside a plastic bag and request form attached using tape. Never use yellow clinical waste bags as these can be mistaken for waste.

Instructions for the transportation of Diagnostic Cytology samples.

Sample pot lids and slide boxes must be secured properly and checked to ensure no leakage or that slides cannot fall out.

The sample container(s)/slide boxes must be placed in a clear plastic transport bag, and sealed properly, with the accompanying request placed in the side pocket. Forms should not be stapled to the bag or placed with the samples.

Collection and Deliveries

The Trust portering service is instructed not to collect pots which are damaged or leaking.

The Trust portering service will place all samples into a rigid container which prevents any patient identifiable data from being seen by members of the public and is compliant with UN3373 regulations.

There are collection points for specimens in theatres, wards and clinics. It is important that specimens are left in these designated areas. Please place specimens at collection points as soon as possible, to avoid batching and delay in reaching the laboratory.

If a specimen is received at the laboratory but is not clearly identifiable, (e.g. the pot is not labelled, or its label does not correspond to the accompanying request form), it will not be processed. Laboratory staff will contact the requesting clinician to identify the specimen and correct the detail.

Diagnostic Cytology samples that do not reach the laboratory within working hours or have missed the last collection must be stored in the refrigerator at 4°C.

Cellular Pathology samples must not be put in the Pneumatic Tube System (PTS) under any circumstances. For further information please refer to Trust Guidance.

If a specimen is received at the laboratory but is not clearly identifiable, (e.g. the pot is not labelled, or its label does not correspond to the accompanying request form), it will not be processed. Laboratory staff will contact the requesting clinician to identify the specimen and correct the detail.

Cytology samples that do not reach the laboratory within working hours or have missed the last collection must be stored in the refrigerator at 4–8°C.

At the Eastman Dental Hospital, specimens should be taken to the reception desk where they will be collected by courier.

Factors that affect performance and interpretation

Histology

Ensure all samples are placed immediately into 10% Neutral Buffered Formalin (NBF). A delay may lead to a loss of morphology through autolysis and putrefaction, affecting the interpretation.

All samples must be placed in containers that have at least 10 times the volume of 10% NBF, when compared with the size of tissue. Placing tissue into a container that is not large enough will lead to the tissue being distorted and poor fixation.

Please note, all histology tests have been verified using 10% NBF. Due to the nature of histological samples (most samples cannot be repeated) the department will not currently reject samples received in 10% formal saline. These samples will be transferred to 10% NBF at the earliest opportunity.

Diagnostic Cytology

Cytology samples not being delivered and received by the lab ASAP

- These specimens (unless they have been placed in cytospin collection fluid) do not contain any preservatives/fixatives that prevent the cells from deteriorating or prevents microbes from growing. The longer a specimen takes to reach the lab there is an increased chance that the cells will deteriorate and that the sample may become unsuitable for diagnosis.
- CSF cells deteriorate rapidly, so a delay may mean that a diagnosis may not be possible.

Delayed samples not being refrigerated (4°C)

- These specimens (unless they have been placed in cytospin collection fluid) do not contain any preservatives/fixatives that prevent the cells from deteriorating or prevents microbes from growing. Placing them in a fridge will help to slow down cell deterioration and microbial growth, especially important with urine samples.

Cellular Pathology samples

Patient not being prepared properly and therefore not obtaining the best sample possible

- If serous fluid is being sampled and the patient has been supine for a long time it is important to get them to sit up and move a little to re-suspend the cells that have settled.
- Sputum samples should be taken first thing in the morning before patient has eaten or brushed their teeth.
- Sputum samples need a very deep cough and it is recommended that this is obtained by a physiotherapist. If this is not done the sample may just be saliva.
- Early morning urine should be avoided because the cells will appear degenerate and interpretation will be difficult.

FNA technique inadequate

- Sample does not contain the cells needed to make a diagnosis and may be heavily blood stained.

FNA smears inadequate

- If sample is too thick the viewing of cells down the microscope is difficult, only a small drop of sample needed
- If sample is all over the slide, cells at the sides of the slide may be lost or uninterpretable
- Cells squashed/smashed when slide pressure applied was too great.

FNA smear incorrectly fixed

- Slow drying causes air drying artefact where the cells appear bigger and lack definition.
- If the slide is incorrectly labelled wet or dry, the wrong stain may be applied in the lab making interpretation difficult.

FNA smear on back of slide

- If the smear is placed on the back of the slide and not the front, cells or even the whole sample might be removed when being handled by lab staff

Request procedures

See page 14 for general information on request procedures.

Handwritten request forms are no longer in use. UCLH requests can only be made on the electronic health record system (EHRS), EPIC. It is essential that you ensure a printed EPIC form with an electronic request number is sent with the specimen to Cellular Pathology.

The following details must be provided as a minimum acceptance criteria:

- Patient first and surname (clearly printed labels must be present on all copies)
- Date of birth
- Patient Gender
- Hospital number/ NHS number
- Site of specimen
- Clinical Details
- Date and time of sample collection (this information is paramount to ensure timely processing of your request)

The destination of the report, the name of the requesting clinician and a contact or bleep number for the responsible clinician must be provided. This enables the laboratory to contact the clinician regarding unsuitable samples and for communication urgent results.

Please provide information on what you are looking for from the sample.

HILIS forms can be downloaded from www.hmds.info or HILIS and must be completed in full.

All forms should be marked 'HIGH RISK' if known.

Urgent Samples

Any case that is required urgently (in working hours) must be discussed with the duty consultant prior to its receipt.

To ensure the case is dealt with at the earliest opportunity, the sample should be brought to the department by a member of the ward staff or specially-arranged porter. In this situation, the sample should be transported in a suitable receptacle, which prevents members of the public seeing patient identifiable details and within UN3373 regulations. Such containers should be available on each ward.

Turnaround Times

Histology

The time taken to process and report a specimen depends on its size, and the complexity of the case. An urgent, same-day diagnosis can be arranged by telephoning the specialty lead consultant histopathologist.

Depending on the complexity of the case and additional specialist techniques required for diagnosis, the average turnaround time to diagnostic report after receipt in the laboratory is:

- Aim to Report 80% in 7 days
- Aim to Report 90% in 10 days

A typed report will not be available before this time, but an interim report may be issued by the Consultant Histopathologist. Consultants are always available to discuss cases upon request.

Diagnostic Cytology

Diagnostic cytology samples are processed on the same day they are received in the laboratory. The turnaround time may be affected by the complexity of the case and the requirement for additional tests.

We aim to report on diagnostic cytology specimens within 48 hours of receipt into the laboratory.

Urgent Diagnostic Cytology samples

In some circumstances a report may be required urgently. In these cases the request form must be marked 'URGENT' and with a contact name and telephone/bleep number. In exceptional circumstances, for some cases, it is possible to obtain results on the same day as sampling. Such requests must be discussed beforehand with one of the Consultant Histopathologists.

CSF Cytology

Urgent CSF cytology specimens are processed on the day they are received in the laboratory (before 17:00) and reported on within 24 hours.

Results

UCLH

Summary reports of histology and diagnostic cytology requests are available electronically via EPIC. Results are available as soon as the report has been authorised electronically by the duty pathologist, and therefore provides prompt information. It is helpful if you can check results on EPIC before contacting the secretaries.

Molecular results are uploaded and available on EPIC.

Clinicians are welcome at all times to visit the laboratories to discuss their cases and view the slides.

RFH

Summary reports of histology and diagnostic cytology requests are available electronically via EPR. Results are available as soon as the report has been authorised electronically by the duty pathologist, and therefore provides prompt information. It is helpful if you can check results on EPR before contacting the Reporting Secretariat.

Molecular results are uploaded and available on EPR. Regular users of the molecular service may be able to get direct access to results via the Marsden Order and View system.

Manual Haematology (Immunophenotyping and Immune Monitoring)

HSL's Immunophenotyping and Immune Monitoring laboratory is equipped with a suite of state-of-the art 10-colour 3-laser flow cytometers. We use a sophisticated automated lysing process that allows 40 markers of differentiation to be interrogated, diagnosing malignancies with a rapid turnaround time.

The Specialist Integrated Haematological Malignancy Diagnostic Service (SIHMDS) coordinates, manages and guides laboratory scientists and clinicians towards a fully comprehensive, streamlined and rapid diagnostic and monitoring service to the patient. Our repertoire includes HIV Immune (CD4:CD8) and CD19 monitoring.

The SIHMDS diagnostic algorithm, drafted and updated by haematology oncology consultants, includes the disciplines of immunophenotyping, cytogenetics, histology and molecular testing of acute leukaemia (myeloid, T-cell, B-cell), chronic leukaemia (T-CLL, B-CLL, B-PLL) and lymphoma (MCL, FL, HCL and other) on bodily fluids.

At the dedicated SIHMDS reception, staff carry out pre-analytical work such as data entry, processing slides, lymphocyte subsets and calibrating analysers.

Morphological screenings, where level of work-up is discussed, are attended by scientists and medical staff. Samples are then dispatched to the correct disciplines, and data are entered onto an integrated reporting system.

Customised panels are used, pre-prepared by the manufacturer with full QC and titre information. Panel contents are selected by scientists and clinical consultants from WHO's 'Classification: Tumours of Haematopoietic and Lymphoid Tissues'. All laboratory staff process malignancy samples, and fully trained BMSs interpret and report onto LIS; authorisation includes consultants and laboratory staff. An integrated report for all disciplines with a joint conclusion is made and reported by consultant staff.

We hold the IBMS pre- and post- registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas. HSL Manual Haematology (Immunophenotyping and Immune Monitoring) is a UKAS Accredited Medical Laboratory No. 8169.

Staff/Key personnel

CLINICAL STAFF			
Dr Rajeev Gupta	Clinical Specialty Lead for Haematology	rajeev.gupta@ucl.ac.uk	
Dr Andrew Wilson		andrew.wilson19@nhs.net	
Dr Chris McNamara		cmcnamara1@nhs.net	
Dr Wai Keong Wong		w.wong@nhs.net	
Dr Jenny O'Nions		jenny.o'nions@nhs.net	
Dr Kate Xu		ke.xu@nhs.net	
Dr Suranjith Senevirathne	HSL Clinical Lead for Immunology	suranjith.seneviratne@nhs.net	

LABORATORY STAFF			
Naina Chavda	Scientific Lead and Manager	naina.chavda@hslpathology.com	020 3908 1344

Manual Haematology (Immunophenotyping and Immune Monitoring)

General enquiries

- 020 3908 1339
- 020 3908 1340
- Flow.cytometry@hslpathology.com

Out of hours service

Acute Leukaemia Screen + MRD

An out-of-hours service in place covering Saturday and Sunday and all Bank Holidays, 9.00am–3.00pm. This is for undiagnosed new acute leukaemias which have to be treated BEFORE next working day. All call-out have to be authorised by one of the consultants named above.

Bone Marrow Aspirate (BMA)

There is no out of hours service for BM aspirate reporting unless it is part of an undiagnosed new acute leukaemia screen where a consultant has authorised on-call work to be carried out.

Manual Haematology (Immunophenotyping and Immune Monitoring) specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

- All citrate samples sent by post or with an overnight delay must be double spun and sent frozen.
- Samples must be labelled correctly with three points of ID.
- Samples must be left in correct courier pick-up point.

Please send samples to:

Health Services Laboratories
Manual Haematology
(Immunophenotyping and Immune Monitoring)
Halo Level 2
The Halo Building
1 Mabledon Place
London WC1H 9AX

Request procedures

See page 14 for general information on request procedures.

Manual Haematology (Immunophenotyping and Immune Monitoring) tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Bone Marrow Aspirate (BMA)	8 Bone Marrow slide smears (all slides to be labelled with hospital number, surname and date sample was taken).	2 days 8 hours for undiagnosed new acute leukaemia	All new acute leukaemia for flow cytometry must have BMA requested and slide sent. Date of sample MUST be on slides BM smears must be dried thoroughly before being placed in plastic holder (red cells lyse). Slides must be correctly spread. Minimum 2 slides. Samples must be < 24 old on delivery to lab. Heavily clotted samples will affect results. Haemodilute samples will affect results.
Cerebral Spinal Fluid Morphology (CSF), Pleural Fluid morphology and Ascites Fluid morphology	CSF in sterilin pot. No minimum volume.	2 days	Samples must be <48 hours old. Samples must be taken in correct pot. Heavily blood-contaminated samples will affect results.
Acute Leukaemia Screen + MRD	BM liquid in EDTA CSF, Pleural Fluid or Ascites Fluid in sterilin pots No minimum volume In cases where BM is not possible PB can be used but only if there is morphological evidence of disease.	2 days 8 hours for undiagnosed new acute leukaemia	All flow cytometry requests for new acute leukaemia must have BMA. Samples must be <24 hours old. EDTA sent without BM smears is a problem. No EDTA sent will result in incomplete processing.
Chronic Leukaemia Screen + MRD	PB in EDTA No minimum volume Where possible, recent FBC result must also be sent.	2 days	Samples must be < 24 hours old. EDTA sent without BM smears is a problem. No EDTA sent will result in incomplete processing.
Myeloperoxidase Stain	BM smears x 2 or PB in EDTA	2 days	This is not a UKAS accredited test. Samples must be < 24 hours old. Sample must be in EDTA. If BM is sent, there must be slides sent. No EDTA sent will result in incomplete results.
Esterase Stain	BM smears x 2 or PB in EDTA	2 days	This is not a UKAS accredited test. Samples must be < 24 hours old. If BM is sent, there must be slides sent. No EDTA sent will result in incomplete results.
Iron Stain (BMA)	BM smears x 2	2 days	Must receive minimum 2 BM smears.
Haemosiderin	Urine in Sterilin pot	2 days	
Myeloma Flow*	BM in EDTA	7 days	Sample must be < 12 hours old. Samples must not to be sent on Fridays.
PNH*	PB in EDTA	3 days	Sample must be <12 hours old. Samples must not to be sent on Fridays.
CD20/CD21	PB in EDTA	2 days	This test has been set up specifically for one client and is not routinely offered. We can set up a contract for other clients if required. Clotted samples will not be processed. Sample must be >48 hours old.

Manual Haematology (Immunophenotyping and Immune Monitoring) tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
CD57	PB in EDTA	2 days	This test has been set up specifically for one client and is not routinely offered. We can set up a contract for other clients if required. Clotted samples will not be processed. Sample must be > 48 hours old.
NBT*	PB in EDTA	2 days	Sample must be <12 hours old. Sample should not be sent on Friday.
Common Variable Immunodeficiency (CVID) (B-Cells)	PB in EDTA	2 days	Samples must be <24 hours old. Clotted samples will not be processed.
T-Cell Immunodeficiency (TCID) (T-Cells)	PB in EDTA	2 days	Samples must be <24 hours old. Clotted samples will not be processed.
T Cell Proliferation*	Lithium Heparin	2 days	Sample must not be requested on Friday.

* Referral test.

HSL Genetics

HSL's Genetics division has expertise in the testing, diagnosis and counselling of inherited disorders and of genetic variation that can influence susceptibility to disease or therapeutic response to drugs.

Using molecular genetic and cytogenetic methods, we analyse patients' DNA for variants and study whole chromosomes to assess for a range of inherited disorders, genetic associations and disease risk. Our oncogenomics tests use various cytogenetic analysis methods to look for acquired chromosome rearrangements.

Our pharmacogenetics tests identify variations in genes involved in drug metabolism, and can help improve drug safety and efficacy. They can provide vital data when selecting volunteers for trials.

Genetic tests are available for:

- Prenatal diagnosis and rapid trisomy screening
- Carrier screening
- Newborn chromosome analysis
- Confirmation of symptomatic individuals and pre-symptomatic testing
- Genetic variation that influences risk of disease
- Identity studies (paternity, zygosity, tissue typing)
- Fertility studies
- Studies of products of conception

Genetic tests vary in their ability to detect variants or to detect all patients who have, or will develop, a particular disease. Some tests are diagnostic for a condition, others are indicative or are associated with an altered risk for a condition. Where testing will predict the inheritance of a disease in a healthy person, counselling and consent are mandatory. For these tests, please complete the Genetic Request form (including informed consent). Our service provides result interpretation and risk assessment to patients and their family members. Genetic counselling can be arranged by TDL's Consultant Clinical Geneticist.

To meet the increasing range and complexity of genetic testing we have developed an excellent collaboration with other specialist laboratories (see page 11). Tests marked with a hash (#) in the test table are sent to these laboratories within our network.

HSL Genetics is a UKAS Accredited Medical Laboratory No. 8059.

HSL Genetics

Staff /Key personnel

GENETICS			
Consultant Clinical Geneticist	**Professor Michael Patton**	michael.patton@tdlpathology.com	020 7307 7409
Director of Genetic Services	**Dr Lisa Levett**	lisa.levett@tdlpathology.com	020 7307 7409
Genetics & Molecular Pathology Operations Manager	**Oliver George**	oliver.george@tdlpathology.com	020 3908 1282
Consultant Clinical Scientist/ NHS FASP Screening Lead for NIPT	**Elaine Holgado**	elaine.holgado@tdlpathology.com	020 7307 7409
Head of Genetics & Molecular Pathology	**Dr Stuart Liddle**	stuart.liddle@tdlpathology.com	020 7307 7409
Head of Cytogenetics	**Rebecca Watts**	rebecca.watts@hslpathology.com	020 7460 4787
Cytogenetics Operations Manager	**Emma Wilcock**	emma.wilcock@tdlpathology.com	020 7307 7409
Postnatal Lab Manager	**Allison Daffern**	allison.daffern@tdlpathology.com	020 7307 7409
Molecular Cytogenetics Manager	**Alessandra Callegari**	Alessandra.callegari@tdlpathology.com	020 7307 7409
Senior Cytogeneticist	**Kath Masters**	kath.masters@tdlpathology.com	020 7307 7409

MOLECULAR HAEMATOLOGY			
Consultant for Haemophilia and Thrombosis Genetics	**Dr Keith Gomez**	k.gomez@ucl.ac.uk	
Lead Clinical Scientist Haemophilia and Thrombosis Genetics	**Bilal Jradeh**	Bilal.Jradeh@hslpathology.com	
Consultant in Clinical Molecular Haemoglobinopathies	**Dr Mary Petrou**	mary.petrou@nhs.net	07984 391130

ONCOLOGY			
Consultant Oncologist	**Dr Rajeev Gupta**	rajeev.gupta@ucl.ac.uk	
Head of Oncogenomics	**Dr Elisabeth Nacheva**	elisabeth.nacheva@hslpathology.com	020 3908 0130
Consultant Haematologist	**Dr Derralynn Hughes**	derralynnhughes@nhs.net	
Molecular Haematology Operations Manager	**Robert Baker**	Robert.Baker@hslpathology.com	020 3908 1292

Specimen Receipt at the Halo is 24 hours a day, 7 days a week.

HSL Genetics results service is available Monday to Friday 08:30 – 17:30.

The Cytogenetics Laboratory is also open for processing of samples on Saturdays from 09.00 – 13.00.

The OncoGenomics (Molecular Cytogenetics) Laboratory is open Monday to Saturday 09:00 – 18:00.

If you do not find the test you require in this directory or need more information and advice please telephone the head of department on the contact number shown.

Genetic specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

All samples must be collected in the specified containers, as shown in the table.

Samples should be fresh and in good condition (e.g. not clotted or haemolysed if EDTA or heparinised whole blood is required); otherwise testing may be adversely affected and another sample may be required.

Specimens must not be allowed to come in contact with request forms, but should be kept separate by using dual – pocketed plastic bags. Specimens for inland postage must be packed in a rigid crush-proof container according to current Post Office guidelines. IATA guidelines should be followed for international transport (Advice is available from the laboratory).

Always provide Clinical Details and Family History with requests for Genetic Tests.

All specimens should be kept at room temperature and dispatched to the laboratory as soon as possible, by TDL/international courier, first class post, guaranteed next day delivery or a reliable alternative.

If a delay in sending the sample is unavoidable, please refrigerate overnight – do not freeze. NIPT samples should be kept at room temperature only and never stored in the fridge or freezer.

High-risk samples

Please note that it is the responsibility of the referring clinician to ensure that high-risk samples are clearly identified to reduce the risk of infection to staff and others.

Unlabelled samples

Unlabelled samples will only be processed if the individual who took the sample can confirm the sample is from the patient in question. In the absence of this assurance, the sample will be discarded and a repeat required.

DNA storage

Small DNA samples are stored routinely for one year; DNA samples can be stored for longer by special arrangement. Haemoglobinopathy DNA samples are stored for at least 30 years as they may be needed for family studies.

Request procedures

See page 14 for general information on request procedures.

To order a test, please complete a Genetics Request form and, when appropriate, a Consent Form. Both forms are available at the end of this guide and on the TDL website.

NIPT requests need to be accompanied by their own Harmony request form supplied with the sample-taking pack.

Haemoglobinopathy genetics: For UCLH requests, it is mandatory to include informed consent for DNA testing and storage, otherwise a request cannot be made. Referrers outside UCLH use the Haemoglobinopathy request forms: Prenatal Diagnosis request form or Haemoglobinopathy Genotype request form.

Haemophilia and thrombophilia genetics: Requests for Haemophilia and Thrombosis Molecular Genetics must be accompanied by a request form. For users on the Royal Free network, the form is available on Freenet (http://freenet/freenetcms/Default.aspx?&s=38&p=860&m=1778). For other users, please contact the the laboratory for a form. Genetic testing for inherited bleeding disorders requires patient consent. Please use the following consent form and information – http://www.ukhcdo.org/docs/Genetic%20testing%20consent%20form.doc

HLA B*57:01 and HLA B*27: For RFH requests, please order on Cerner. The SRA then fill out a Genetics Request form to send with the sample to the Halo.

In order to avoid unnecessary time spent in obtaining details please provide the following information:

Information for request forms:

- Surname, forename (not initials) and date of birth.
- Full name (not initials) and location of referring clinician.
- Full address of clinician to whom the result should be sent.
- Legible clinical summary, including details of any relevant family history.
- Address for billing – doctor, patient or other.
- Gestation and number of fetuses on prenatal samples.
- Hospital or reference number.
- Test required.

Essential information on sample container label:

- Patient's surname and forename (not initials).
- Date of birth.
- Hospital number or reference number.

Consent forms

Consent forms are available for genetic testing. As genetic testing may have implications for other family members and is regarded as personal data, it is recommended that written consent is obtained wherever possible. In cases with predictive testing for severe disorders, as indicated in the laboratory guide, it is essential that patients should also be offered formal genetic counselling.

It is the responsibility of the referring clinician to obtain appropriate consent from the patient.

Clinical Details

Clinical details are very important when providing genetic analysis. The more clinical information that is available (e.g. details of ultrasound information, phenotypic features or family history) the better the service we can provide. Failure to provide this information for genetic studies may result in an inaccurate analysis or interpretation.

Specialities

Cytogenetics (Constitutional cytogenetics)

Cytogenetic analysis is performed according to the Professional Guidelines for the Association of Clinical Genetic Science, and the recommendations provided are dependent on the clinical indications given for each case.

Clinical details inform the investigation at all stages:

- Prior to analysis, clinical details may indicate, for example, that procedures such as chromosome breakage or leukaemic studies are required, which must be referred to a specialist centre.
- During analysis, they may indicate that extra cells should be screened to investigate the possibility of mosaicism (in a diagnosis of suspected Turner syndrome, for example) or that particular chromosomes must be targeted for high-resolution study, (chromosome 4 in suspected Wolf-Hirschhorn syndrome, for example).
- When the analysis has been completed, they may help to provide an accurate interpretation of the findings and, in some instances, prompt further investigations, such as FISH or molecular genetic studies.

When clinical details are not available, a routine analysis will be performed and a conditional report issued.

Samples

Cytogenetic studies require living cells, so please ensure that samples reach the laboratory as soon as possible.

If a delay before dispatch is unavoidable, samples may be stored in a refrigerator (4°C) but must not be frozen.

Samples sent more than 48 hours after sampling, or kept at temperatures below 4˚C or greater than 38˚C, may have inhibited growth.

Requesting additional tests

Any further tests that not requested at the time of sample receipt must be requested within:

- 1 week for tests requiring prenatal culture or cultured cells
- 2 weeks for DNA testing
- 2 weeks for cell culture testing
- 3 months for FISH testing

Samples can be stored for longer periods if specifically requested at the time of sample receipt.

Haemato-oncology

The molecular haemato-oncology service provides a molecular diagnostic, prognostic and treatment monitoring service for malignant haematological disorders. The laboratory works closely with the UCLH SIHMDS and other specialist units within the hospitals we provide a service to.

The laboratory offers:

- A comprehensive molecular work up for new acute leukaemia diagnoses.
- A comprehensive molecular work-up for chronic myeloproliferative disorders.
- Assessment of B and T cell clonality as well as MYD88 status for lymphomas.
- Monitoring of treatment efficacy in CML and Philadelphia positive ALL (qBCR-ABL).
- Assessment of IgVH mutation status in CLL.

We are always looking to expand our test repertoire in response to clinical demand

Samples

- EDTA blood samples, which should be transported to the laboratory at ambient temperature.
- EDTA bone marrow samples, which should be transported to the laboratory at ambient temperature.
- FFPE tissue samples – please provide a minimum of five curls with a thickness of 5–10 microns each.
- Extracted DNA.
- Cerebrospinal fluid, pleural fluid, ascitic fluid and other aspirated body fluids.

Factors that significantly affect the performance of the examination or interpretation of results:

- Clotted samples
- Aged Samples (>48 hours)
- Haemolysed samples

Note that samples for qBCR-ABL must arrive at the laboratory within 72 hours of having been taken. Samples received that are more than 72 hours old cannot be processed.

Reporting times

FLT3 and urgent Q30 leukaemia multiplex results will be reported within 48 hours of arriving in the laboratory. All other tests will be reported within 14 calendar days with the exception of IgVH mutation analysis which will be reported within 28 calendar days.

Requesting additional tests

Additional tests can be requested at any time via UCLH/SIHMDS HiLIS or by emailing the lab directly via molecular.haemonc@hslpathology.com.

Haemophilia Laboratory

The Haemophilia Laboratory provides a comprehensive diagnostic service for inherited and acquired bleeding and thrombotic disorders. The service covers phenotyping for the diagnosis of congenital bleeding and thrombotic disorders, treatment monitoring and inhibitor detection and monitoring, and molecular genetics analysis. The Laboratory also acts as a reference service for other Haemophilia treatment units.

Requests

Requests must be accompanied by a request form and, where appropriate, by an informed consent form – see page 70.

Samples for platelet aggregometry testing can only be accepted on Mondays–Wednesdays. Please discuss in advance with a haemostasis consultant.

Samples

Samples for Platelet studies (aggregometry, Lumiaggregometry, and platelet nucleotides) and whole blood assays (IMPACT R, PFA-100 and ROTEM) must be hand-delivered to the RFH Special Coagulation laboratory as soon as possible after collection (within two hours of venepuncture).

Pre-examination sample suitability and integrity is important to the final test result that is reported by the laboratory and/or to the safety of laboratory staff. As a result, the laboratory will reject the specimen and not proceed with analysis of samples if it meets one or more of these criteria:

- Samples or request forms are received without the minimum essential identification criteria listed in the above table and as a result the details on the sample label cannot be matched with the details on the request form
- If the sample is unlabelled or mislabelled
- Blood samples for coagulation testing are filled above the Maximum or below the Minimum fill line etched in the sample tube. A minimum of 90% and maximum of 110% fill is required to have an appropriate ratio of blood to anticoagulant/plasma otherwise the samples are subject to unpredictable dilution and anticoagulation effects which would invalidate the test results.
- Samples are haemolysed
- Samples are clotted
- Sample tubes are used past their expiry date
- Samples are received leaking and the container is found to be damaged
- The wrong sample has been received for a given investigation or the sample has been collected in the wrong sample bottles
- Samples received after 4 hours of collection for clotting screens, APTT, FV and FVIII and after 6 hours of collection for PT/INR
- Samples received for Specialist Coagulation testing (Bleeding state work ups – Factors II, V, VII, VIII, IX, XI, XII, VWF:Ag, VWF:RCo, VWF:CB, Platelet Aggregation studies, PFA-100, Pro-thrombotic (Thrombophilia testing) – protein C (PC), protein S (PS), Antithrombin (AT), APC-R ratio, other tests plasminogen, antiplasmin, PAI-1, tPA, ROTEM, Thrombin generation, Lupus Anticoagulant, DOAC (Rivaroxabn, Apixaban, Dabigatran, Argatroban levels, LMWH, UFH, Fondaparinux, and Danaparoid levels), which fulfil the above criteria and are received more than 4 hours after collection.
- Frozen plasma aliquots that have thawed in transit due to incorrect transport conditions (delay in transit, lack of dry ice etc.)
- Samples for Platelet Studies (Platelet aggregation studies) and ROTEM testing which have been sent via the pneumatic tube. Samples for these tests should be delivered by hand or via the dumb waiter from the Haemophilia and Thrombosis centre
- Whole citrated blood samples for PAI-1 antigen analysis which are not delivered on crushed ice
- Samples for genetic testing received without indication that informed consent has been given. In such cases, the laboratory will contact the Requestor informing them that the sample will not be tested unless informed consent is given.

Factors that significantly affect the performance of the examination or interpretation of results

- Underfilled or Overfilled Citrate tubes so that the ratio of anticoagulant to blood is less or greater than 1:9
- Clotted samples
- Haemolysed samples as a result of mixing tubes too vigorously, using the wrong size tube, using the wrong size needle or when the blood is drawn too slowly
- Heparin contaminated samples (unless for monitoring heparin levels)
- Out of date citrate tubes
- Samples for coagulation tests greater than four hours old
- Samples for INR greater than six hours old
- Lipaemic samples may interfere with some of the tests carried out.
- Patients samples with low platelet counts (<80–100 x109/dL) for platelet function investigations

Requesting additional tests

Please call the department routine hours for additional tests. Please note that additional tests are dependent during upon sample integrity and suitability for the test:

- D-dimers within same day
- INR less than 6 hours
- All other coagulation tests less than 4 hours

Molecular Genetics

Clinical details can be extremely important for clinical interpretation of a molecular genetic test.

For example, the clinical comments accompanying a cystic fibrosis screening report will vary depending on whether the patient is a potential gamete donor or a person exhibiting a cystic fibrosis phenotype.

It may also be crucial, where a variant has already been shown to be segregating in a family, to be provided with information concerning the variant and a family pedigree to ensure the correct analysis is performed and reliable risk figures calculated.

Samples

- Whole blood collected in EDTA should be sent to the laboratory at ambient temperature within 48 hours, and kept between 4–28˚C.
- Long term storage should be at 2–8°C.
- Extracted DNA samples should be sent to the laboratory between 4–28˚C.
- Samples for NIPT should be kept at room temperature and never placed in the fridge or freezer.

Non-invasive prenatal testing

Non-invasive prenatal testing (NIPT) analyses cell-free DNA circulating in a pregnant mother's blood. It is used as a screen for trisomy 21, 18 and 13. Options are also available to screen for X and Y chromosome conditions, and for fetal sex.

Samples

Samples – two 10ml tubes of maternal blood – must be taken in special tubes provided by the laboratory. These samples must not be refrigerated, but stored at ambient temperature protected by the gel packs provided. The lab must receive the samples within 7 days to allow testing to proceed.

There needs to be enoughcell-free fetal DNA in the maternal blood to be able to provide a result. If there is insufficient fetal DNA in the sample (which occurs in 3% of cases), another blood sample from the mother may be required. This will be processed in the laboratory at no extra charge.

OncoGenomics (Molecular Cytogenetics)

The OncoGenomics (Molecular Cytogenetics) Laboratory provides a diagnostic service for malignant haematological disorders and carries out research in cancer genomics. The laboratory works closely with the internationally respected bone marrow transplant unit and other specialist units in the hospital.

Tests offered:

- Karyotyping by G-banding
- FISH screening (single test or disease target panels)
- Microarray CGH (chromosome microarray analysis/ molecular karyotyping)
- Next Generation Sequencing (Myeloid malignancies target panel)
- Genetic screening of CD138+ cells isolates

A record of the sample details should accompany all samples submitted for cytogenetic analysis.
See attached Cytogenomics request form.

Samples

For optimal results, samples for conventional cytogenetic tests and FISH analysis should be collected in preservative-free heparin or in sterile containers provided by the laboratory. Call on +44(0)20 7307 9400 ext 3711 (office) / 3612 (lab) to obtain 'Cytogenetic collection containers'.

Samples for DNA-based molecular karyotyping and/or next generation sequencing (NGS) analysis should consist of fresh or frozen cells (bone marrow aspirate, lymph node biopsy, trephine, needle biopsy, pleural effusion or ascites) or 5–8µg total genomic DNA.

Cytogenetic analysis requires living cells. Please ensure the sample reaches the Laboratory within 24 hours of donation. Multiple myeloma samples should arrive by 3.00pm on the day of sampling whenever possible. Samples should not be frozen, i.e.; below 1°C or exposed to excess heat, i.e. above 38°C. If there is a delay in transit please store the sample at 4°C (in a refrigerator).

Factors that significantly affect the performance of the examination or interpretation of results:

- Clotted samples
- Aged Samples (>48 hours)
- Haemolysed samples
- Under-filled or over-filled transport medium tubes.

Reporting times

Urgent FISH results such as PML-RARA may be available within 4 hours of receipt of sample. Prior agreement with the lab is required for all urgent tests. Tests for query acute leukaemia (e.g. AML, ALL, PCL, CML at presentation, transforming CML and acute phase of NHL) can be urgently processed with results available within 10 calendar days. The reporting time for the remaining samples is normally within 21 calendar days. Molecular karyotyping and NGS analyses are carried out according to current requirements of 21 calendar days.

Requesting additional tests

Additional tests can be requested at anytime via UCLH/SIHMDS HiLIS or by emailing the lab directly via oncogenomics@hslpathology.com.

Postnatal Diagnosis (Blood Culture)

Chromosome studies are requested where problems that may have a cytogenetic basis are suspected – such as in cases of babies with birth defects; children with developmental delay and physical handicaps, or adults with fertility problems. Additionally, prospective gamete donors are screened to detect carriers of balanced chromosome rearrangements.

Samples

Lithium heparin whole blood specimens are required – gently mixed to prevent clotting and must not be frozen, See sample stability section for cytogenetic samples. Sample volumes may be reduced for children (2–4ml) and neonates (1–2ml).

Turnaround time

The usual turnaround time is 2-3 weeks however the laboratory will endeavour to respond to urgent requests. Where a major trisomy is suspected, a rapid PCR screen may be performed to provide an urgent provisional result.

Notes

- Rarely, blood samples fail to culture (in less than 1% of cases);
- The culture may yield chromosomes of insufficient quality. This will be indicated on the report and a repeat study suggested;

- The laboratory should be informed if the patient has recently received a blood transfusion.
- The laboratory should be informed if the patient has EVER had a bone marrow transplant.

Prenatal testing

Chromosome studies are requested where pregnancies are identified as being at risk of a cytogenetic abnormality. Risks may include:

- advanced maternal age;
- positive maternal serum screening;
- fetal abnormalities found on ultrasound;
- where a parent is a known carrier of a chromosome anomaly,
- where a high risk trisomy has been found by NIPT.

As false positive NIPT results may arise from placental mosaicism, amniocentesis is the suggested sample type for confirmation of NIPT results.

Samples

Amniotic fluid – 10ml+ in a plain sterile, leak-proof container. Suitable containers can be provided by the laboratory. The specimen must not be frozen. See sample stability section for cytogenetic samples.

Chorionic villus – 5mg+ in sterile transport medium. Suitable containers containing medium can be provided by the laboratory. The specimen must not be frozen. See sample stability section for cytogenetic samples.

Fetal blood – 1–2ml lithium heparin whole blood, gently mixed to prevent clotting. The specimen must not be frozen. For QF-PCR or array CGH, please provide EDTA whole blood.

See sample stability section for cytogenetic samples.

Turnaround time

This is dependent on the rate of cell growth; however, the usual turnaround time is approximately 2 weeks. As invasive prenatal diagnosis becomes less common, a number of circumstances now occur more frequently that may result in delayed reporting time. These include:

- A delay in transportation in order to collect a batch of samples to reduce courier costs. Even when couriered promptly, sample growth may be slower than that seen in samples sent immediately.
- Sampling at early or late gestations, for example to confirm non-invasive tests or follow up anomaly scans.
- A tendency to take smaller quantities of sample or to take insufficient sample for multiple techniques.
- The request for karyotyping as an add-on after an initial PCR test.

Fetal blood results will usually be reported by 10 calendar days. For all other prenatal tests, please contact the laboratory prior to taking samples.

Notes

- Maternal contamination, and mosaicism may complicate the analysis and may lead to the suggestion that a second invasive test is performed.
- Rarely, cultures fail to grow (overall <1%)
- Very small chromosome abnormalities may not be detected (this is why the phrase 'No trisomies or major chromosome abnormalities detected...' is used in our reports).
- For Twin to Twin Transfusion samples or heavily bloodstained amniocentesis samples, please provide a maternal EDTA blood sample for comparison studies.

Solid Tissue

Fibroblast cultures may be used in addition to blood cultures, such as when tissue-specific mosaicism is suspected, or where blood samples cannot be obtained. Products of conception samples may be requested for early spontaneous miscarriages, stillbirths, or to confirm a prenatal diagnosis.

Samples

All specimens should be placed in a sterile container, preferably containing transport medium. This can be supplied by the laboratory. Sterile normal saline can be used if transport medium is not available. Samples must not be placed in formaldehyde or other preservative and must not be frozen. See sample stability section for cytogenetic samples.

Turnaround time

This is dependent on the rate of cell growth; however, the usual turnaround time is approximately 4 weeks.

Notes

- Material from miscarriages has a relatively high culture failure rate (around 20%). Where failure occurs, alternative molecular methods may be attempted, usually a KaryoLite Bacs-on-Beads assay that can detect whole monosomy or trisomy of any chromosome, if possible.
- If no villus or fetal parts are identified in supposedly products of conception material, and a normal female chromosome result is found, this may indicate that maternal tissue has been cultured (this will be noted on our report).
- Material from miscarriages can be returned for sensitive disposal if requested at the time of receipt. If no special request is made, fetal material will be sent for incineration separate from general clinical waste. Placental and other products of conception material will be disposed of in general clinical waste for incineration.

Fluorescence *in situ* hybridisation (FISH)

Where FISH studies for specific microdeletion syndromes are required this must be indicated on the request form.

Notes

- FISH studies for a rapid pre- or postnatal aneuploidy screen have now been superseded in our laboratory by multiplex-PCR technology.
- Subtelomeric screens are now performed by array CGH as part of developmental delay investigations.
- Common microdeletion syndrome testing is now performed by BOBs analysis.

Cell-line karyology

The cytogenetics laboratory can perform cell line karyology on live cultures or fixed cells suspensions (recommended) on a research basis. Please note: a laboratory processing charge of £100 + VAT is applicable to those cases wherein a successful analysis cannot be obtained. Please contact the laboratory for further details.

Statement regarding measurement uncertainty (MU)

See page 10.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
1p36 Deletion Syndrome – karyotype + FISH	**CVS/AF/**(A)	12-17 days	Clinical history must be provided.
21-Hydroxylase Deficiency (Congenital Adrenal Hyperplasia)[#]	Requires patient informed consent (A)[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
22q11 & 10p14 deletion (Di George Syndrome) – BOBs only	**CVS/AF/**(A)[9]	5 days	Clinical history must be provided.
22q11 & 10p14 deletion (Di George Syndrome) – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**(A)(H)[9]	5-15 days	Clinical history must be provided.
Achromatopsia NGS Panel – full gene sequencing [#]	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
Aicardi-Goutières Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
Alagille Syndrome NGS Panel – full sequencing JAG1 + NOTCH2 genes[#]	Requires patient informed consent (A)(A)[9]	8 weeks	Clinical history must be provided.
Alpha Fetoprotein on Amniotic fluid	**AF**[9]	5-10 days	Clinical history must be provided.
Alpha Thalassaemia – multiplex PCR for common large deletions[#]	Requires patient informed consent (A)[9]	4 weeks	Clinical history must be provided.
Alpha-1 Antitrypsin Genotype – PI∗M, PI∗S, PI∗Z[#]	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Alport Syndrome NGS Panel – full sequencing with deletions and duplications[#]	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
AML/ALL Molecular MRD – NPM1, PML-RARA, CBFB-MYH11, RUNX1-RUNX1T1, ETV6-RUNX1	Requires patient informed consent **Bone Marrow** / (A)	5 weeks	Contact lab for further information.
AmnioBOBs only – rapid aneuploidy diagnosis for all chromosomes + common microdeletion syndromes	**AF**[9]	5 days	Clinical history must be provided.
Amniocentesis culture (karyotype) only	**AF**[9]	10-15 days	Clinical history must be provided.
Amniocentesis – rapid BOBs aneuploidy diagnosis for all chromosomes (5 days) + culture (10-15 days)	**AF**[9]	5-15 days	Clinical history must be provided.
Amniocentesis – rapid PCR diagnosis for common aneuploidies (2 days) + culture (10-15 days)	**AF**[9]	2-15 days	Clinical history must be provided.
AmnioPCR only – rapid common aneuploidy diagnosis by QF-PCR	**AF**[9]	2 days	Clinical history must be provided.
Amylotrophic Lateral Sclerosis (Motor Neurone Disease) NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
Androgen Insensitivity – AR gene sequencing[#]	Requires patient informed consent (A)[9]	4 weeks	Clinical history must be provided.
Aneurysm/Connective Tissue Disorders/ Ehlers-Danlos Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	7 weeks	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Angelman Syndrome (Primary Screen) – methylation PCR	A[9]	10 days	Clinical history must be provided.
Angelman/Rett Syndromes NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	5 weeks	Clinical history must be provided.
Aniridia, Isolated – PAX6 gene sequencing + deletions/duplications[#]	Requires patient informed consent A[9]	5 weeks	Clinical history must be provided.
Anophthalmia/Microphthalmia/Coloboma NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Antithrombin Deficiency – SERPINC1 Gene Variant Analysis (Known Genotype)	Requires patient informed consent AA (Whole Blood)[40]	6 weeks	Informed Consent is required for these tests.
Antithrombin Deficiency – SERPINC1 Gene Variant Analysis (Unknown Genotype)	Requires patient informed consent AA (Whole Blood)[40]	12 weeks	Informed Consent is required for these tests.
Aortopathy/Marfan Syndrome and Thoracic Aortic and Dissection NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Apert Syndrome – common FGFR2 variants[#]	Requires patient informed consent A[9]	9 weeks	Clinical history must be provided.
Apolipoprotein E genotype – E2, E3, E4	A[9]	14 days	Clinical history must be provided.
Array CGH (Comparative Genomic Hybridisation)	**CVS/AF/**AH[9]	10 days	Clinical history must be provided.
Ashkenazi Breast Cancer Screen – common variants[#]	Requires patient informed consent A[9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Ashkenazi Jewish Carrier Screen	A[9]	4 weeks	Clinical history must be provided.
Ataxia NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Autoinflammation/Periodic Fever NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Azoospermia – karyotype + cystic fibrosis screen + polyT(5T) + Y deletions	AH[9]	10-15 days	Clinical history must be provided.
B cell clonality assay (IgH and IgK)	A or **FFPE**	2 weeks	
Bardet-Biedl Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Batten Disease (Neuronal Ceroid Lipofuscinosis) NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
BCR-ABL diagnostic assay	A	2 weeks	
BCR/ABL Quantitative – fusion gene sizes p190 + p210 – ***MUST arrive in the laboratory within 48 hours, before 12pm on Fridays***	AA[9]	10 days	Clinical history must be provided.
Becker/Duchenne Muscular Dystrophy – deletions/duplications	A[9]	10 days	Clinical history must be provided.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Beckwith-Wiedemann Syndrome – methylation studies on 11p15 imprinting domains KvDMR + H19#	Requires patient informed consent (A)[9]	6 weeks	Clinical history must be provided.
Behcet's Disease – HLA Tissue Typing B*51	(A)[9]	10 days	Clinical history must be provided.
Beta Thalassaemia – beta-globin gene sequencing#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Bleeding and Platelet Gene Panel (known familial variants)	Requires patient informed consent (A)(A)	6 weeks	Contact lab
Bleeding and Platelet Gene Panel (unknown familial variants)	Requires patient informed consent (A)(A)	12 weeks	Contact lab
Blood PCR for Chromosome 13, 18, 21 and sex chromosomes	(A)	5 days	
Breast Cancer Ashkenazi Screen – common variants#	Requires patient informed consent (A)[9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Breast Cancer – BRCA1 + BRCA2 only gene sequencing + deletions/duplications	Requires patient informed consent (A)	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Breast Cancer NGS Panel – full gene sequencing	Requires patient informed consent (A)(A)[9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Brugada Syndrome/Long-QT NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	4 weeks	Clinical history must be provided.
C-KIT D816V variant by PCR for Mastocytosis	Requires patient informed consent **Bone Marrow**/(A)	14 days	
CADASIL – NOTCH3 gene sequencing#	Requires patient informed consent (A)[9]	6 weeks	Clinical history must be provided.
CAKUT (Congenital Anomalies of Kidney & Urinary Tract) NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Calreticulin – CALR exon 9 variant screen	(A)[9]	2 weeks	Clinical history must be provided.
Cancer, Comprehensive NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Cardio-Facio-Cutaneous/Noonan/ LEOPARD/Costello Syndromes NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Cardiomyopathy, Dilated NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Cardiomyopathy, Hypertrophic NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Cardiovascular, Comprehensive NGS Panel – full gene sequencing + deletions/duplications	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Carrier Screen (Ashkenazi Jewish)	Requires patient informed consent (A)[9]	4 weeks	Clinical history must be provided.
Carrier Screen (Ashkenazi Jewish) – Partnered Report – Please contact the lab for special requirements before sending [#]	Requires patient informed consent (A)[9]	4 weeks	Clinical history must be provided.
Carrier Screen (Pan-Ethnic)[#]	Requires patient informed consent (A)[9]	4 weeks	Clinical history must be provided.
Carrier Screen (Pan-Ethnic) – Partnered Report – Please contact the lab for special requirements before sending [#]	Requires patient informed consent (A)[9]	4 weeks	Clinical history must be provided.
Charcot-Marie-Tooth Syndrome NGS Panel – full gene sequencing – Contact lab prior to sending. Referral from clinical neurologist or clinical geneticist required with genetic consent form. [#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Charcot-Marie-Tooth Type 1A – PMP22 duplications – Contact lab prior to sending. Referral from clinical neurologist or clinical geneticist required with genetic consent form.[#]	Requires patient informed consent (A)[9]	7 weeks	Clinical history must be provided.
CHARGE Syndrome – CHD7 gene sequencing[#]	Requires patient informed consent (A)[9]	6 weeks	Clinical history must be provided.
Chediak-Higashi Syndrome – LYST gene sequencing[#]	Requires patient informed consent (A)[9]	6 weeks	Clinical history must be provided.
Cholestasis, Intrahepatic NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Chromosome Analysis (Amniocentesis) – culture only	**AF**[9]	10-15 days	Clinical history must be provided.
Chromosome Analysis (Amniocentesis) – rapid BOBs aneuploidy diagnosis for all chromosomes (5 days) + culture (10-15 days)	**AF**[9]	5-15 days	Clinical history must be provided.
Chromosome Analysis (Amniocentesis) – rapid PCR diagnosis for common aneuploidies (2 days) + culture (10-15 days)	**AF**[9]	2-15 days	Clinical history must be provided.
Chromosome Analysis (Blood)	(H)[9]	5-15 days	Clinical history must be provided.
Chromosome Analysis (Chorionic Villus) – rapid PCR diagnosis for common aneuploidies (2 days) + culture (10-15 days)	**CVS**[1,9]	2-3 weeks	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Chromosome Analysis (Chorionic Villus) – culture only	**CVS**[1,9]	10-15 days	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Chromosome Analysis (Chorionic Villus) – rapid BOBs aneuploidy diagnosis for all chromosomes (5 days) + culture (10-15 days)	**CVS**[9]	5-15 days	Clinical history must be provided.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Chromosome Analysis (Product of Conception) – BOBs rapid aneuploidy diagnosis for all chromosomes (5 days) + culture (25 days)	**Placental Sample** [1,9]	5-25 days	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Chromosome Analysis (Products of Conception)	**Placental Sample** [1,9]	20-25 days	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Chromosome Analysis (Solid Tissue)	**Fetal tissue** [1,9]	4-5 weeks	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Chromosome Analysis (Stem Cells)	**Culture/Fixed cells**	Contact lab	
Chromosome Y Deletion – AZFa, AZFb, AZFc + SRY	(A) [9]	5 days	Clinical history must be provided.
Coeliac Disease – HLA DQ2/DQ8 genotyping	(A) [9]	10 days	Clinical history must be provided.
Colorectal Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent (A)(A) [9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Comparative Genomic Hybridisation (Array CGH)	**CVS/AF/**(A)(H) [9]	10 days	Clinical history must be provided.
Comprehensive Neuropathy NGS Panel – full gene sequencing.	Requires patient informed consent (A)(A) [9]	6 weeks	Clinical history must be provided.
Congenital Absence of Vas Deferens – karyotype + cystic fibrosis screen + polyT(5T) + Y deletions	(A)(H) [9]	10-15 days	Clinical history must be provided.
Connective Tissue Disorders/Ehlers-Danlos Syndrome/Aneurysm NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent (A)(A) [9]	6 weeks	Clinical history must be provided.
Cornelia de Lange Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A) [9]	5 weeks	Clinical history must be provided.
Costello/Noonan/LEOPARD/Cardio-Facio-Cutaneous Syndromes NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A) [9]	6 weeks	Clinical history must be provided.
Craniosynostosis NGS Panel [#]	Requires patient informed consent (A)(A) [9]	6 weeks	Clinical history must be provided.
Cri du Chat Syndrome – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**(A)(H) [9]	5-15 days	Clinical history must be provided.
Cri du Chat Syndrome – BOBs only	**CVS/AF/**(A) [9]	5 days	Clinical history must be provided.
CVS PCR for common aneuploidies (2 days) + culture (10-15 days)	**CVS** [1,9]	2-15 days	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
CVSBOBs – rapid BOBs aneuploidy diagnosis for all chromosomes (3-5 days) + culture (10-15 days)	**CVS** [9]	5-15 days	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
CVSBOBs only – rapid aneuploidy diagnosis for all chromosomes + common microdeletion syndromes	**CVS**[9]	5 days	Clinical history must be provided.
Cystic Fibrosis (139 common variants) – reflex to Poly T when CFS required	A[9]	5-7 days	Clinical history must be provided.
Deafness NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Diabetes - Obesity NGS Panel[#]	A[9]	6 weeks	Clinical history must be provided.
DiGeorge Syndrome (22q11 & 10p14 deletion) – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**AH[9]	5-15 days	Clinical history must be provided.
DiGeorge Syndrome (22q11 & 10p14) – BOBs only	**CVS/AF/**A[9]	5 days	Clinical history must be provided.
Dihydropyrimidine Dehydrogenase deficiency screening (Fluoropyrimidine Toxicity)[#]	A[9]	1-2 weeks	Clinical history must be provided.
Dilated Cardiomyopathy NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
DNA Extraction & Storage – 3 years (longer upon request)	A[9]	20 days	Clinical history must be provided.
DNA Identity Profile – 15 STR markers	A[9]	10 days	Clinical history must be provided.
Duchenne Muscular Dystrophy – deletions/duplications only	A[9]	10 days	Clinical history must be provided.
Duchenne Muscular Dystrophy – full sequencing DMD1 gene[#]	Requires patient informed consent A[9]	5 weeks	Clinical history must be provided.
DVT/Pre-travel Screen	AAB[9]	5 days	Clinical history must be provided.
Ehlers-Danlos Syndrome/Aneurysm/ Connective Tissue Disorders NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Endometrial Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Epidermolysis Bullosa NGS Panel – full sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Epilepsy, Adolescent / Adult Onset Panel – sequencing + deletions/duplications[#]	Requires patient informed consent A	6 weeks	
Epilepsy, Comprehensive NGS Panel – full sequencing + deletions/duplications[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Fabry Disease, X-linked – GLA gene sequencing	A[9]	4 weeks	Clinical history must be provided.
Facioscapulohumeral Muscular Dystropy (FSHD) – D4Z4 repeat deletion – ***Contact lab prior to sending*** – Evidence of neurology counselling and genetic consent form is required.[#]	Requires patient informed consent AAA[9]	9 weeks	Clinical history must be provided.
Factor II Prothrombin – G20210A variant	A[9]	5 days	Clinical history must be provided.
Factor V Leiden – G1691A variant	A[9]	5 days	Clinical history must be provided.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Factor VII Deficiency – F7 Gene Variant Analysis (Known Genotype)	AA (Whole Blood 10ml) [40]	6 weeks	Informed Consent is required for these tests.
Factor VII Deficiency – F7 Gene Variant Analysis (Unknown Genotype)	AA (Whole Blood 10ml) [40]	12 weeks	Informed Consent is required for these tests.
Factor X Deficiency – F10 Gene Variant Analysis (Known Genotype)	AA (Whole Blood 10ml) [40]	6 weeks	Informed Consent is required for these tests.
Factor X Deficiency – F10 Gene Variant Analysis (Unknown Genotype)	AA (Whole Blood 10ml) [40]	12 weeks	Informed Consent is required for these tests.
Factor XI Deficiency – F11 Gene Variant Analysis (Known Genotype)	AA (Whole Blood 10ml) [40]	6 weeks	Informed Consent is required for these tests.
Factor XI Deficiency – F11 Gene Variant Analysis (Unknown Genotype)	AA (Whole Blood 10ml) [40]	12 weeks	Informed Consent is required for these tests.
Familial Adenomatous Polyposis (FAP) – full gene sequencing + deletions/duplications#	Requires patient informed consent AA [9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Familial Exudative Vitreoretinopathy (FEVR) NGS Panel– full gene sequencing#	Requires patient informed consent AA [9]	8 weeks	Clinical history must be provided.
Familial Hypercholesterolaemia NGS Panel#	Requires patient informed consent AA [9]	6 weeks	Clinical history must be provided.
Familial Hypocalciuric Hypercalcaemia (FHH) Panel – full sequencing CASR + AP2S1 + GNA11 genes#	Requires patient informed consent AA [9]	9 weeks	Clinical history must be provided.
Familial Medullary Thyroid Carcinoma – hotspot sequencing RET gene#	Requires patient informed consent A [9,11]	8 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Fatty Acid Oxidation Disorders NGS Panel – full gene sequencing#	Requires patient informed consent AA [9]	6 weeks	Clinical history must be provided.
FLT3-ITD and FLT3-TKD screening assay	A	24 hours	
Fragile X Syndrome screen – FMR1 repeat analysis PCR#	Requires patient informed consent AAA [9]	3-8 weeks	Clinical history must be provided.
Friedreich Ataxia – frataxin gene repeat analysis#	Requires patient informed consent A [9]	6 weeks	Clinical history must be provided.
Gaucher disease full gene sequencing	A [40]	4 weeks	Informed Consent is required for these tests.
Genetic Reproductive Profile (Male)	AH [9]	10-15 days	Clinical history must be provided.
Gilbert Syndrome – common UGT1A1 repeat variation#	Requires patient informed consent A [9]	4 weeks	Clinical history must be provided.
Glucose-6-Phosphate Dehydrogenase (G6PD) Deficiency – full G6PD gene sequencing#	Requires patient informed consent A [9]	4 weeks	Clinical history must be provided.
Glycogen storage disease type 2 (Pompe) mutation analysis	A	4 weeks	
Haemochromatosis – HFE common variants C282Y + H63D	A [9]	3 days	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Haemophilia A CVS Variant Analysis (Known Genotype) – F8 Intron 22 Inversion, F8 Intron 1 Inversion, Sequence analysis of known variants for F8 gene	**CVS** [40]	3 days	[40] Informed Consent is required for these tests.
Haemophilia A Variant Analysis (Known Genotype) – F8 Intron 22 Inversion, F8 Intron 1 Inversion, Sequence analysis of known variants for F8 gene	AA (Whole Blood 10ml) [40]	6 weeks	[40] Informed Consent is required for these tests.
Haemophilia A Variant Analysis (Unknown Genotype) – F8 Intron 22 Inversion, F8 Intron 1 Inversion, Sequence analysis of unknown variants for F8 gene	Requires patient informed consent AA (Whole Blood 10ml) [40]	12 weeks	[40] Informed Consent is required for these tests.
Haemophilia B CVS Variant Analysis (Known Genotype) – Sequence analysis of known variants for F9	**CVS** [40]	3 days	[40] Informed Consent is required for these tests.
Haemophilia B Variant Analysis (Known Genotype) – Sequence analysis of known variants for F9	AA (Whole Blood 10ml) [40]	6 weeks	[40] Informed Consent is required for these tests.
Harmony® Prenatal Test (Non-Invasive Prenatal Testing) – common aneuploidy screening from maternal blood	**J / Special tubes** [1]	3-5 days	Contact the laboratory for special sample tubes/containers/ instructions.
Hearing Loss NGS Panel – full gene sequencing#	Requires patient informed consent AA [9]	5 weeks	Clinical history must be provided.
Hereditary Cancer NGS Panel, Comprehensive – full gene sequencing + deletions/duplications#	Requires patient informed consent AA [9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Hereditary Neuropathy with Liability to Pressure Palsy – PMP22 deletion analysis . Contact lab prior to sending. Referrals only from consultant neurologist or clinical geneticist. Genetic consent form required.#	Requires patient informed consent A [9]	4 weeks	Clinical history must be provided.
Hereditary Colon Cancer (Lynch Syndrome) NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent AA [9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Hereditary Spastic Paraplegia NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent AA [9]	5 weeks	Clinical history must be provided.
HFE gene (Haemochromatosis) – common variants C282Y + H63D	A [9]	3 days	Clinical history must be provided.
Hirschprung Disease NGS Panel – full gene sequencing with deletions and duplications#	Requires patient informed consent AA [9]	6 weeks	Clinical history must be provided.
HLA Tissue Typing A/B/C/DRB1/3/4/5/DQB1 (Class I & II)	A [9]	10 days	Clinical history must be provided.
HLA Tissue Typing A/B/DRB1/3/4/5/DQB1	A [9]	10 days	Clinical history must be provided.
HLA Tissue Typing A/B/DRB1/3/4/5	A [9]	10 days	Clinical history must be provided.
HLA Tissue Typing A+B+C (Class I)	A [9]	10 days	Clinical history must be provided.
HLA Tissue Typing A+B	A [9]	10 days	Clinical history must be provided.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
HLA Tissue Typing A	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing B*27 only	A[9]	3 days	Clinical history must be provided.
HLA Tissue Typing B*51 (Behcet's Disease)	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing B*57:01 high resolution	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing B	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing C	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing Coeliac Disease – DQ2/DQ8	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing DRB1/3/4/5/DQB1 (Class II)	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing DRB1/3/4/5	A[9]	10 days	Clinical history must be provided.
HLA Tissue Typing Narcolepsy – DQB1*06:02[#]	Requires patient informed consent A[9]	4 weeks	Clinical history must be provided.
Huntington Disease – HD gene repeat analysis PCR – Contact lab prior to sending. Referrals only from consultant neurologist or clinical geneticist. Genetic consent form required.[#]	Requires patient informed consent AA[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Hyperinsulinism NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Hyperparathyroidism – CASR sequencing[#]	Requires patient informed consent A[9]	8 weeks	Clinical history must be provided.
IDH1/2 screening assay[#]	Requires patient informed consent A	48 hours	
Identity Profile (DNA) – 15 STR markers	A[9,11]	10 days	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
IgVH variant analysis for CLL	A	4 weeks	
Intellectual Disability NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Iron Overload Profile	B[9]	3 days	Clinical history must be provided.
JAK2 – exon 12 sequencing (rare variants) – ***MUST arrive in the laboratory within 48 hours, before 12pm on Fridays***[#]	Requires patient informed consent A[9]	4 weeks	Clinical history must be provided.
JAK2 V617F genotyping assay	A	2 weeks	
Joubert/Meckel-Gruber Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent A[9]	6 weeks	Clinical history must be provided.
Kallmann Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Kennedy Disease (Spinal Bulbar Muscular Atrophy) – AR repeat expansion[#]	Requires patient informed consent A[9]	9 weeks	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Kidney/Urinary Tract Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent (A)(A)[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Krabbe Disease – GALC sequencing + 502T/del common deletion[#]	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
KRAS/NRAS screening assay [#]	Requires patient informed consent (A)	48 hours	
Lactose Intolerance Gene	(A)	2 weeks	
Langer-Giedion Syndrome – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**(A)(H)[9]	5-15 days	Clinical history must be provided.
Langer-Giedion Syndrome – BOBs only	**CVS/AF/**(A)[9]	5 days	Clinical history must be provided.
Leber's Congenital Amaurosis NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Leber's Hereditary Optic Neuropathy – m.3460G>A + m.11778G>A + m.14484T>C common variants[#]	Requires patient informed consent (A)[9]	8 weeks	Clinical history must be provided.
Leigh and Leigh Like Syndrome NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
LEOPARD/Noonan/Cardio-Facio-Cutaneous/ Costello Syndromes NGS Panel – full gene sequencing [#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Leukaemia (Rapid Acute) DNA and RNA NGS Panel	Requires patient informed consent (A)	3 days	
Leukaemia/Lymphoma RNA Sequencing (Fusion Gene and SNV/Indel) Panel	(A)	2 weeks	
Leukaemia Fusion Gene Screening Assay (Q30)	(A)	24 hours	
Li-Fraumeni Syndrome (p53-related cancer predisposition) – TP53 sequencing + MLPA[#]	(A)[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Limb-Girdle Muscular Dystrophy (LGMD) NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Lissencephaly NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Loeys-Dietz Syndrome/Marfan Syndrome/Aortic Aneurysm and Dissection NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Long-QT Syndrome / Brugada Syndrome – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	4 weeks	Clinical history must be provided.
Lowe (Oculocerebrorenal) Syndrome – OCRL sequencing[#]	Requires patient informed consent (A)[9]	6 weeks	Clinical history must be provided
Lung Disorders NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Lynch Syndrome (HNPCC) NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Lysosomal Storage Disorders NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	4-6 weeks	Clinical history must be provided.
Male Genetic Reproductive Profile	(A)(H)[9]	10-15 days	Clinical history must be provided.
Marfan Syndrome and Thoracic Aortic Aneurysm and Dissection NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Marfan Syndrome – FBN1 sequencing + deletions/duplications#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Maturity-Onset Diabetes of the Young (MODY) NGS Panel – full gene sequencing#	Requires patient informed consent (A)[9]	6 weeks	Clinical history must be provided.
Meckel-Gruber/Joubert Syndrome NGS Panel – full sequencing across 38 genes#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Medium-Chain Acyl-CoA Dehydrogenase Deficiency – ACADM sequencing#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Melanoma Comprehensive Cancer NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Microdeletion (common) Syndromes – BOBs only	**CVS/AF/**(A)[9]	5 days	Clinical history must be provided.
Microphthalmia/Anophthalmia /Coloboma NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Miller-Dieker Syndrome – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**(A)(H)[9]	5-15 days	Clinical history must be provided.
Miller-Dieker Syndrome – BOBs only	**CVS/AF/**(A)[9]	5 days	Clinical history must be provided.
Mitochondrial genome sequencing#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Mitochondrial genome – full mitochondrial DNA sequencing + deletions#	(A)[9]	6 weeks	Clinical history must be provided.
Motor Neurone Disease (Amylotrophic Lateral Sclerosis) NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
MPL exon 10 analysis	(A)	2 weeks	
MTHFR – common C677T + A1298C variants	(A)[9]	5 days	Clinical history must be provided.
Mucopolysaccharidosis NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Multiple Endocrine Neoplasia Type 1 – full MEN1 sequencing#	Requires patient informed consent (A)[9,11]	9 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Multiple Endocrine Neoplasia Type 2 – RET gene hotspot sequencing[#]	Requires patient informed consent A[9,11]	8 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Myeloid Gene Panel – This is a 75 gene targeted NGS panel for acute myeloid leukaemia, myeloproliferative neoplasms, myelodysplastic syndromes, and also contains a number of targets which are useful for lymphoid malignancies (ALL and lymphoma). It uses Anchored Multiplex PCR (AMPTM) chemistry which enables deep strand-specific amplification of molecular barcoded DNA fragments for sequencing.	Requires patient informed consent A	2 weeks	
Myeloproliferative Neoplasm NGS Screening Panel – This NGS assay allows for rapid generation of comprehensive profile of variants (both DNA and RNA) from a single NGS run. This assay can profile both DNA and RNA targets including DNA mutations and translocations detected from RNA targets and allows for simultaneous interrogation of 45 DNA target genes and 30 RNA fusion driver genes. The broad fusion panel enables sequencing of over 700 unique fusion transcripts. The panel covers relevant targets for acute myeloid leukaemia, myelodyplastic syndromes and myeoproliferative neoplasms, including CML, CMML and JMML.	Requires patient informed consent A	1 week	
Myotonic Dystrophy Type 1 – DMPK repeat PCR[#]	Requires patient informed consent A[9]	6 weeks	Clinical history must be provided.
Myotonic Dystrophy Type 2 (PROMM) – ZNF9 repeat PCR[#]	Requires patient informed consent A[9]	6 weeks	Clinical history must be provided.
Narcolepsy (HLA DQB1*06:02)[#]	Requires patient informed consent A[9]	4 weeks	Clinical history must be provided.
Nephrotic Syndrome, Steroid-Resistant NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Nervous System/Brain Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Neurofibromatosis Type 1 – NF1 + SPRED1 sequencing + deletions/duplications. Contact lab prior to sending[#]	Requires patient informed consent AA[9,11]	8 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Neurofibromatosis Type 2 (Bilateral Acoustic) – NF2 sequencing + deletions/duplications[#]	Requires patient informed consent A[9]	8 weeks	Clinical history must be provided.
Neuronal Ceroid Lipofuscinosis (Batten Disease) NGS Panel – full gene sequencing[#]	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Non-Invasive Prenatal Testing – common aneuploidy screening from maternal blood	**J/Special tubes**[1]	3-5 days	Contact the laboratory for special sample tubes/containers/ instructions.
Noonan Syndrome Prenatal Screening – PTPN11 exons 3 & 8 only[#]	Requires patient informed consent **CVS/AF**	2 weeks	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Noonan/LEOPARD/Cardio-Facio-Cutaneous/ Costello Syndromes NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
NPM1 mutascreen assay	(A)	24 hours	
Nystagmus, X-linked Infantile – FRMD7 gene sequencing#	Requires patient informed consent (A)[9]	7 weeks	Clinical history must be provided.
Oculopharyngeal Muscular Dystrophy – PABPN1 repeat analysis#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Optic Atrophy NGS Panel – full sequencing OPA1 + OPA3 genes#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Osteogenesis Imperfecta NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Ovarian Cancer NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
p53-related cancer predisposition (Li-Fraumeni Syndrome) – TP53 sequencing + MLPA#	Requires patient informed consent (A)[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Pancreatic Cancer NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Paraganglioma/Pheochromocytoma NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent (A)(A)[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Paternity Testing (postnatal and prenatal) – sample required from each person being tested (3 people)	(A)/**AF**/**CVS**[9,11,12] **Contact lab**	5 days	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide. Please provide one sample for each person being tested.
Pelizaeus-Merzbacher Disease – PLP1 sequencing + deletions/duplications#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Pendred Syndrome – SLC26A4 gene sequencing#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Periodic Fever/Autoinflammation NGS Panel – full gene sequencing#	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Peutz-Jegher Syndrome – STK11 sequencing + deletions/duplications#	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Phelan-McDermid Syndrome – karyotype + FISH	**CVS**/**AF**/(H)[9]	12-17 days	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Pheochromocytoma/Paraganglioma NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent (A)(A)[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Pigmentation/Oculocutaneous Albinism/ Hermansky-Pudlak Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	5 weeks	Clinical history must be provided.
POLG-Related Disorders – full POLG sequencing + copy number variant [#]	Requires patient informed consent (A)[9]	5 weeks	Clinical history must be provided.
Polycystic Kidney/NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Pontocerebellar Hypoplasia NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Postnatal array CGH	(A)(H)[9]	10 days	Clinical history must be provided.
Prader-Willi Syndrome (Primary Screen) – methylation PCR	(A)[9]	10 days	Clinical history must be provided.
Prenatal array CGH	**Amniotic fluid** or **CVS**[9]	10 days	Clinical history must be provided.
Prenatal Diagnosis (BOBs + Culture)	**CVS/Amniocentesis**	3-5 days, 15 days	
Pre-travel Screen (DVT)	(A)(A)(B)[9]	5 days	Clinical history must be provided.
Primary Ciliary Dyskinesia (PCD) NGS Panel – full gene sequencing[#]	Requires patient informed consent (A)(A)[9]	6 weeks	Clinical history must be provided.
Primary Hyperoxaluria Panel – full gene sequencing + CNV[#]	Requires patient informed consent (A)	6 weeks	
Product of Conception BOBs only – rapid aneuploidy diagnosis for all chromosomes	**Placental Sample or Solid Tissue**[1,9]	3-6 days	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Product of Conception – rapid BOBs aneuploidy diagnosis for all chromosomes (5 days) + culture (25 days)	**Placental Sample**[1,9]	5-25 days	Contact the laboratory for special sample tubes/containers/ instructions. Clinical history must be provided.
Prostate Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent (A)(A)[9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Protein C Deficiency – PROC Gene Variant Analysis (Known Genotype)	(A)(A) (Whole Blood 10ml)[40]	6 weeks	[40] Informed Consent is required for these tests.
Protein C Deficiency – PROC Gene Variant Analysis (Unknown Genotype)	(A)(A) (Whole Blood 10ml)[40]	12 weeks	[40] Informed Consent is required for these tests.
PTEN-related disorders (including Bannayan-Riley-Ruvalcaba, Cowden & Proteus Syndromes) – sequencing + deletions/duplications[#]	(A)(A)[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
QF-PCR rapid common aneuploidy screen	**AF**/(A)[9]	2 days	Clinical history must be provided.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Recurrent Miscarriage Profile (female)	Requires patient informed consent AABCCCH[9,18]	10-15 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking, if a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Renal Cysts and Diabetes (RCAD) – HNF-1β sequencing + deletions/duplications#	Requires patient informed consent A[9]	6 weeks	Clinical history must be provided.
Renal/Urinary Tract Cancer NGS Panel – full gene sequencing + deletions/duplications#	Requires patient informed consent AA[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Retinal Disorders NGS Panel – full gene sequencing#	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Retinoblastoma – RB1 sequencing + deletions/duplications#	Requires patient informed consent AA[9,11]	6 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Rett Syndrome (MECP2 gene only) – full sequencing + deletions/duplications#	Requires patient informed consent A[9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Rett/Angelman Syndromes NGS Panel – full gene sequencing#	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Short Stature – SHOX variant screening + deletions/duplications#	Requires patient informed consent A[9]	9 weeks	Clinical history must be provided.
Short-Chain Acyl-CoA Dehydrogenase Deficiency – ACADS sequencing#	Requires patient informed consent A[9]	5 weeks	Clinical history must be provided.
Silver-Russell Syndrome – methylation studies on 11p15 imprinting domains KvDMR + H19#	Requires patient informed consent A[9]	7 weeks	Clinical history must be provided.
Skeletal Dysplasia NGS Panel – full gene sequencing#	Requires patient informed consent AA[9]	6 weeks	Clinical history must be provided.
Smith-Lemli-Opitz Syndrome – DHCR7 sequencing#	Requires patient informed consent A[9]	5 weeks	Clinical history must be provided.
Smith-Magenis Syndrome – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**AH[9]	5-15 days	Clinical history must be provided.
Smith-Magenis Syndrome – BoBs only	**CVS/AF/**A[9]	5 days	Clinical history must be provided.
Sotos Syndrome (Cerebral Gigantism) – NSD1 sequencing + deletions/duplications#	Requires patient informed consent A[9]	5 weeks	Clinical history must be provided.
Spastic Paraplegia NGS Panel – full gene sequencing + deletions/duplications + mitochondrial DNA#	AA[9]	6 weeks	Clinical history must be provided.
Spinal Bulbar Muscular Atrophy (Kennedy Disease) – AR repeat analysis#	Requires patient informed consent A[9]	9 weeks	Clinical history must be provided.

Genetic tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Spinal Muscular Atrophy – SMN1 deletions/duplications	A [9]	10 days	Clinical history must be provided.
Spinocerebellar Ataxia – multiplex SCA1+2+3+6+7+17 common repeat expansions[#]	Requires patient informed consent A [9]	9 weeks	Clinical history must be provided.
Spinocerebellar Ataxia NGS Panel – full gene sequencing	AA [9]	6 weeks	Clinical history must be provided.
SRY (Sex-determining Region Y)	A [9]	2 days	Clinical history must be provided.
Systemic mastocystosis – C-Kit common variants (KIT D816V)[#]	Requires patient informed consent A [9]	14 days	Clinical history must be provided.
T cell clonality assay (TCR beta and TCR gamma)	A or **FFPE**	2 weeks	
Tay Sachs Screen – common variants[#]	Requires patient informed consent A [9]	5 weeks	Clinical history must be provided.
Thrombosis Gene Panel (known familial variants)	Requires patient informed consent AA	12 weeks	
Thrombosis Gene Panel (unknown familial variants)	Requires patient informed consent AA	12 weeks	
Thrombotic Risk Profile	AABCCC [18]	5 days	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking, if a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Thyroid Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA [9,11]	4 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Torsion Dystonia (DYT1) – TOR1A common variant c.904-906delGAG[#]	Requires patient informed consent A [9]	7 weeks	Clinical history must be provided.
Treacher-Collins Syndrome NGS Panel – full sequencing POLR1C + POLR1D + TCOF1[#]	Requires patient informed consent AA [9]	8 weeks	Clinical history must be provided.
Tuberous Sclerosis – full TSC1 + TSC2 gene sequencing[#]	Requires patient informed consent AA [9]	5 weeks	Clinical history must be provided.
Urinary Tract/Renal Cancer NGS Panel – full gene sequencing + deletions/duplications[#]	Requires patient informed consent AA [9,11]	5 weeks	Clinical history must be provided. Patient consent required. Consent Form can be found at the back of this guide.
Usher Syndrome NGS Panel – full gene sequencing[#]	Requires patient informed consent AA [9]	7 weeks	Clinical history must be provided.
Very Long-Chain Acyl-CoA Dehydrogenase Deficiency – ACADVL sequencing[#]	Requires patient informed consent A [9]	5 weeks	Clinical history must be provided.
Von Hippel-Lindau Syndrome – VHL sequencing + deletions/duplications[#]	Requires patient informed consent A [9]	9 weeks	Clinical history must be provided.
Von Willebrands Disease – Type 2 (Ex28) Variant Analysis (VWF) (Known Genotype)	AA (Whole Blood 10ml) [40]	6 weeks	[40] Informed Consent is required for these tests.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Von Willebrands Disease – Type 2 (Ex28) Variant Analysis (VWF) (Uknnown Genotype)	AA (Whole Blood 10ml) [40]	12 weeks	[40] Informed Consent is required for these tests.
Von Willebrands Disease – Type 2 VWD Variant Analysis (VWF) (Known Genotype)	AA (Whole Blood 10ml) [40]	6 weeks	[40] Informed Consent is required for these tests.
Von Willebrands Disease – Type 2 VWD Variant Analysis (VWF) (Uknown Genotype)	AA (Whole Blood 10ml) [40]	12 weeks	[40] Informed Consent is required for these tests.
Von Willebrands Disease – Type 2N Variant Analysis (VWF) (Known Genotype)	AA (Whole Blood 10ml) [40]	6 weeks	[40] Informed Consent is required for these tests.
Von Willebrands Disease – Type 2N Variant Analysis (VWF) (Uknown Genotype)	AA (Whole Blood 10ml) [40]	12 weeks	[40] Informed Consent is required for these tests.
Wolf-Hirschhorn Syndrome – BOBs (5 days) + karyotype (15 days)	**CVS/AF/**AH [9]	5-15 days	Clinical history must be provided.
Wolf-Hirschhorn Syndrome – BOBs only	**CVS/AF/**A [9]	5 days	Clinical history must be provided.
Y chromosome microdeletions – AZFa + AZFb + AZFc + SRY	A [9]	5 days	Clinical history must be provided.
Zellweger Syndrome/Peroxisomal Disorders NGS Panel – full gene sequencing#	Requires patient informed consent AA [9]	6 weeks	Clinical history must be provided.
Ziwig Endotest®	Endotest saliva collection kit	25 days	For information about this test and to order kits please contact endotest@tdlpathology.com. The quality of the saliva sample collection is important. Samples should be collected under supervision.
Zygosity testing – comparative DNA profile	A (From each twin and both parents) [9]	5 days	Clinical history must be provided.

Genetic tests

Haemoglobinopathies

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Alpha Thalassaemia – multiplex PCR and HBA MLPA for large deletions. Alpha globin gene sequencing for small deletions and point mutations	A [9]	3-20 working days depending on urgency	Clinical history must be provided. Complete the request form: Genotyping of Haemoglobin Disorders
Beta Thalassaemia – beta-globin gene sequencing, ARMS PCT, RE-PCR, Gap-PCR, HBB MLPA	A [9]	3-20 working days depending on urgency	Clinical history must be provided. Complete the request form: Genotyping of Haemoglobin Disorders
HPFH and δβthalassaemia – Gap PCR, HBB MLPA, beta and gamma globin gene sequencing	A [9]	3-20 working days depending on urgency	Clinical history must be provided. Complete the request form: Genotyping of Haemoglobin Disorders
Haemoglobin variants (alpha and beta globin gene variants) including sickle cell – ARMS PCR, RE-PCR, alpha and beta gene sequencing	A [9]	3-20 working days depending on urgency	Clinical history must be provided. Complete the request form: Genotyping of Haemoglobin Disorders
Xmn and gamma gene – gamma globin gene sequencing, RE PCR	A [9]	3-20 working days depending on urgency	Clinical history must be provided. Complete the request form: Genotyping of Haemoglobin Disorders
Prenatal diagnosis for haemoglobinopathies	**CVS / Amniocentesis / Fetal Blood**	3 days	Parental EDTA blood samples should also be provided. Complete Request form: Prenatal Diagnosis of Haemoglobin Disorders

Haemophilia and thrombophilia genetics

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Antithrombin Deficiency – SERPINC1 Gene Variant Analysis (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Antithrombin Deficiency – SERPINC1 Gene Variant Analysis (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Factor VII Deficiency – F7 Gene Variant Analysis (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Factor VII Deficiency – F7 Gene Variant Analysis (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Factor VIII (F8) Severe Haemophilia A – common 1/22 intron inversion#	A (Whole blood 10ml) [9]	6 weeks	Clinical history and informed consent is required for these tests.
Factor X Deficiency – F10 Gene Variant Analysis (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Factor X Deficiency – F10 Gene Variant Analysis (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Factor XI Deficiency – F11 Gene Variant Analysis (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Factor XI Deficiency – F11 Gene Variant Analysis (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Haemophilia A (Severe) – Factor VIII (F8) common 1/22 intron inversion#	AA [9]	6 weeks	Clinical history and informed consent is required for these tests.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Haemophilia A Variant Analysis (Known Genotype) – F8 Intron 22 Inversion, F8 Intron 1 Inversion, Sequence analysis of known variants for F8 gene	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Haemophilia A Variant Analysis (Unknown Genotype) – F8 Intron 22 Inversion, F8 Intron 1 Inversion, Sequence analysis of unknown variants for F8 gene	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Haemophilia A CVS Variant Analysis (Known Genotype) – F8 Intron 22 Inversion, F8 Intron 1 Inversion, Sequence analysis of known variants for F8 gene	**CVS** [40]	3 days	Clinical history and informed consent is required for these tests.
Haemophilia B Variant Analysis (Known Genotype) – Sequence analysis of known variants for F9	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Haemophilia B Variant Analysis (Unknown Genotype) – Sequence analysis of unknown variants for F9	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Haemophilia B CVS Variant Analysis (Known Genotype) – Sequence analysis of known variants for F9	**CVS** [40]	3 days	Clinical history and informed consent is required for these tests.
Protein C Deficiency – PROC Gene Variant Analysis (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Protein C Deficiency – PROC Gene Variant Analysis (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Von Willebrands Disease – Type 2 (Ex28) Variant Analysis (VWF) (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Von Willebrands Disease – Type 2 (Ex28) Variant Analysis (VWF) (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Von Willebrands Disease – Type 2 VWD Variant Analysis (VWF) (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Von Willebrands Disease – Type 2 VWD Variant Analysis (VWF) (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.
Von Willebrands Disease – Type 2N Variant Analysis (VWF) (Known Genotype)	AA (Whole blood 10ml) [40]	6 weeks	Clinical history and informed consent is required for these tests.
Von Willebrands Disease – Type 2N Variant Analysis (VWF) (Unknown Genotype)	AA (Whole blood 10ml) [40]	12 weeks	Clinical history and informed consent is required for these tests.

Genetic tests

Oncogenomics (haematological cytogenetics) tests

Performed are per requirements of the WHO Classification of Tumours of haematopoietic and Lymphoid Tissues and European recommendations , No2 (Swerdlow et al., 2017), Quality assurance for cytogenomic analysis of haematological neoplasms (Rack et al., Leukemia 2019) and following the UCLH/SIHMDS diagnostic algorithm (see https://www.uclh.nhs.uk) as described below:

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
AML Genome profile *Chromosome, target FISH and gene variant screening*	Bone marrow, peripheral blood	10 calendar days	Min of $10x10^6$ cells
ALL Genome profile *Chromosome, target FISH and gene variant screening*	Bone marrow, peripheral blood	10 calendar days	Min of 5–$10x10^6$ cells
MDS Genome profile *Whole genome scan complemented with target FISH gene rearrangements testing*	Bone marrow	21 calendar days	Min of $5x10^6$ cells
MPD Genome profile *Chromosome and gene variant screening by CMA, FISH and NGS)*	Bone marrow	21 calendar days	Min of $5x10^6$ cells
CLL Prognostification FISH screen *FISH screen for del13q, trisomy 12, ATM and TP53 gene loss*	Bone marrow, peripheral blood	21 calendar days	Min of $5x10^6$ cells
CLL Genome profile *Whole genome and FISH screen*	Bone marrow, peripheral blood	21 calendar days	Min of $5x10^6$ cells
Myeloma FISH high risk markers screen *Target screening of CD138(+) enriched BM isolates for the high risk genetic markers*	Bone marrow	21 calendar days	Min of $5x10^6$ cells
Myeloma Genome profile *Whole genome and target fusion gene assesment by FISH of CD138(+) enriched BM isolates*	Bone marrow	21 calendar days	Min of $5x10^6$ cells
Chromosome banding karyotype	Bone marrow	21 calendar days	Min of $5x10^6$ cells
Single FISH test as per request	Bone marrow, peripheral blood	10 calendar days	Min of $5x10^6$ cells
Molecular Karyotyping *Array CGH aka Chromosome Microarray Analysis*	Bone marrow, peripheral blood	21 calendar days	Min of $5x10^6$ cells
Next-generation sequencing *Target Myeloid panel (Illumina)*	Bone marrow, peripheral blood	21 calendar days	Min of 10µg cells

External accreditation

- See page 2.

HSL Haematology

HSL's routine haematology laboratories form part of the blood sciences and local rapid response laboratories. Fully automated and some manual testing of both routine and some more specialised haematological parameters are provided.

The departments use the Sysmex XN9000 system to analyse FBC and routine coagulation parameters – the XN9000 can provide both routine and more specialised parameters for FBC enumeration. The XN9000 also incorporates a digital morphology module with automated slide makers to speed up and allow electronic back up of data for blood film analysis. Automated analysis of HBA1c can also be available on this track, enabling sample workflow to be improved.

The routine coagulation section uses the Sysmex CS5100, which is both reliable and fast, and enables a high sample throughput to be managed efficiently. The CS5100 can automatically detect haemolysis and lipaemic samples, assisting the lab staff to make informed decisions about sample rejection criteria.

The Haemostasis department uses a range of highly specialized equipment to cater for platelet function testing, bleeding disorders, thrombotic disorders, monitoring anticoagulation therapy, and the diagnosis and monitoring of microangiopathy disorders.

The laboratory is also able to offer some manual testing such as sickle cell screening, glandular fever and malaria testing.

We hold the IBMS pre- and post- registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas. HSL Haematology is a UKAS Accredited Medical Laboratory No. 8169.

Staff /Key personnel

CLINICAL STAFF			
Dr Rajeev Gupta	Clinical Specialty Lead for Haematology	Rajeev.gupta@ucl.ac.uk	

LABORATORY STAFF			
Billy Janda	Scientific Lead for Haematology	Billy.janda@tdlpathology.com	020 3447 8961
Deepak Singh	Dept Lead for Haemostasis	Deepak.singh@tdlpathology.com	020 3447 9829
Karen Orfinada	Haematology Laboratory Manager		
Richard Munden	Deputy Manager for Haematology	Richard.munden@tdlpathology.com	

General enquiries

- 020 3946 8854
- Haematology.User@tdlpathology.com

Out of hours service

Routine haematology tests are performed 24/7.

Haematology specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

All citrate samples sent by post or with an overnight delay must be double spun and sent frozen.

Samples should be sent to:

Health Services Laboratories
The Halo Building
1 Mabledon Place
London WC1H 9AX

Request procedures

See page 14 for general information on request procedures.

Please note that sample stability times will affect the feasibility of running add-on tests – please phone the lab to discuss.

Haematology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Anaemia Profile	A A B	2 days	
Antenatal Profile	A A B B B G	3 days	Sample must be labelled by hand with first name, family name, gender and date of birth detailed on sample and form. Do not use labels other than the tube label.
APTT/KCCT	C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Atypical Antibody Screen (handwritten tube label)	A	2 days	Sample must be fresh. Sample must be labelled by hand with first name, family name, gender and date of birth detailed on sample and form. Do not use labels other than the tube label.
Blood Film Examination	A	1 day	
Blood Group†	A	2 days	Sample must be fresh. The tube's own label must be completed by hand. This must correspond with same name and date of birth details as given on the request form. Do not affix additional computerised or hand written labels.
Carboxyhaemoglobin	A	1 week	
Coagulation Profile 1	C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking, if a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Coagulation Profile 2	A C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
D-Dimers (Fibrinogen Degradation Products)	C	4 hours	Send to the laboratory without delay.
DVT/Pre-travel Screen	A A B	5 days	Clinical history must be provided.
ESR	A	4 hours	
Fibrinogen	C	4 hours	Send to the laboratory without delay. Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Full Blood Count	A	4 hours	
Haematology Profile	A	4 hours	
Haemoglobin	A	4 hours	
Immune Function Evaluation (Total)	A or **Chex** + B	7 days	Do not send sample to the laboratory between Friday noon and Monday morning. Contact the laboratory for special stability tubes for lymphocyte subsets – or take an EDTA sample and ensure same day delivery to the laboratory, Monday to Friday noon (do not send sample between Friday noon and Monday morning).
INR	C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as
Lymphocyte Subsets (CD3/CD4/CD8)	A / **Chex**	1 day	Contact the laboratory for special stability tubes for lymphocyte subsets – or take an EDTA sample and ensure same day delivery to the laboratory, Monday to Friday noon (do not send sample between Friday noon and Monday morning).
Malarial Parasites	A	STAT	Send to the laboratory without delay. Clinical history must be provided. Provide details of travel history. Provide full contact details of the requestor for communication of positive cases.

Haematology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Mean Cell Volume (MCV)	A	4 hours	
Microfilaria Blood Film		STAT	
Natural Killer Profile 2	A	2 days	
PAI1 4G/5G Polymorphism	A	10 days	
Paul Bunnell (Monospot)	A or B	8 hours	
Pre-Travel Screen (DVT)	A A B	5 days	Clinical history must be provided.
Prothrombin Time	C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Prothrombin Time + Dose	C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Reticulocyte Count	A	4 hours	
Thrombin Time	C	4 hours	Citrate Samples: Samples should be double spun and separated and frozen within 4-8 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Vitamin K (With PIVKA II)	B	10 days	Protect from light.

Special haemostasis

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Activated Protein C Resistance	C	3 days	Send to the laboratory without delay. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
ADAMTS - 13 Activity Assay	C	3 days	Send to the laboratory without delay. Clinical history must be provided Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Antithrombin III	C	3 days	Send to the laboratory without delay. Clinical history must be provided Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor II Assay	C	5 days	Send to the laboratory without delay. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor II Prothrombin Gene FX2	A	5 days	Clinical history must be provided.
Factor V Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Factor V Leiden	A	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor VII Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor VIII Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor VIII Inhibiting Antibody	C C	2 weeks	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor IX Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor IX Inhibiting Antibody	C C	2 weeks	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor X Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Anticoagulation monitoring • Anti-Xa LWMH • Anti-Xa Apixaban • Anti-Xa Rivaroxaban • Anti-Xa Arixtra • Anti Xa UFH (Heparin) • Dibigatran	C	5 days	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen. Select test based on what drug patient is on. Name of Anticoagulation drug, dose amount, and time of dose must be provided.
Factor XI Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor XII Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Factor XIII Assay	C	5 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Hughes Syndrome	C	2 days	Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.

Haematology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Lupus Anticoagulant and Anticardiolipin Abs	B C	2 days	Send to the laboratory without delay. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen. Note: The Lupus Anticoagulation test is not appropriate when a patient is on anticoagulation therapy. Suggest testing when the patient is cleared of anticoagulation or, selecting the **Taipan Snake Venom test** for lupus anticoagulant assessment if the patient is on **oral** anticoagulation.
Lupus Anticoagulant only	C	2 days	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen. Note: The Lupus Anticoagulation test is not appropriate when a patient is on anticoagulation therapy. Suggest testing when the patient is cleared of anticoagulation or, selecting the **Taipan Snake Venom test** for lupus anticoagulant assessment if the patient is on **oral** anticoagulation.
Miscarriage/Thrombotic Risk Profile	A A B C C C	5 days	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Plasma Viscosity	A	3 days	Send to the laboratory without delay.
Platelet Aggregation Studies	Contact laboratory for advice on sample taking	3 days	Do not send sample to the laboratory between Friday noon and Monday morning. Contact the Haemostasis Department before taking and sending sample to the laboratory. Send samples without delay. Test has only 4 hours stability post-collection. Send sample directly to: Haemostasis Department, 60 Whitfield Street, London W1T 4EU
Platelet function assay (PFA-100 assay)	C (Whole blood)	1 day	Do not send sample to the laboratory between Friday noon and Monday morning. Contact the Haemostasis Department before taking and sending sample to the laboratory. Send samples without delay. Test has only 4 hours stability post-collection. Send sample directly to: Haemostasis Department, 60 Whitfield Street, London W1T 4EU
Protein C	C	3 days	Send to the laboratory without delay. Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Protein S Free Ag	C	3 days	Send to the laboratory without delay. Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Taipan Snake Venom Time	C	1 week	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Thrombotic Risk Profile	A A B C C C	5 days	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Von Willebrand Profile	C C C	5 days	Send to the laboratory without delay. Clinical history must be provided. Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Von Willebrands Multimers	C C C	3 months	Citrate Samples: Samples should be double spun and separated and frozen within 6 hours of sample taking. If a delay is expected with transportation to the laboratory, samples must be transported as frozen.

*Referral test.

HSL Manual Haematology (Red Cells)

This laboratory mainly specialises in haemoglobinopathy investigations for diagnosis and monitoring. The service covers a range of haemolytic anaemias, including enzyme deficiencies (G6PD), pyruvate kinase (PK) and hereditary spherocytosis (HS).

Common Haemoglobinopathies are diagnosed using Capillary Electrophoresis (CE), High Performance Liquid Chromatography (HPLC) and Sickle solubility Testing. Unidentified haemoglobin variants and thalassaemias may be further characterised where required by the Haemoglobinopathy Genetics Laboratory using DNA analysis.

Other tests available include:

- The measurement of haemoglobin A1C in the presence of a haemoglobin variant by boronate affinity methodology;
- A quantitative assay for red cell enzymes by spectrometry;
- A flow cytometric method for the diagnosis of hereditary spherocytosis; and
- Erythropoietin measurement, which is useful for differentiating primary and secondary polycythaemia and assessing response to anaemia.

The laboratory provides a service to large populations of patients with major haemoglobinopathies, offering rapid results for monitoring purposes, particularly pre and post-red cell exchanges. The workload also includes screening for a large antenatal population and complies with the national sickle cell and thalassaemia screening programme guidelines.

Teaching and training are an integral part of the laboratory culture. We hold IBMS pre- and post-registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas.

HSL Manual Haematology (Red Cells) is a UKAS Accredited Medical Laboratory No. 8169.

Staff/Key personnel

CLINICAL STAFF			
Dr Rajeev Gupta	Clinical Specialty Lead for Haematology	Rajeev.gupta@ucl.ac.uk	

LABORATORY STAFF			
Naina Chavda	Scientific Lead and Manager	naina.chavda@hslpathology.com	020 3908 1344
Gareth Ellis	Head Biomedical Scientist	gareth.ellis@hslpathology.com	020 3908 1351

General enquiries

- 020 3908 1351
- Special.haematology@hslpathology.com

Out of hours service

No urgent out-of-hours service is available.

Manual Haematology (Red Cells) specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

Please send samples to:

Health Services Laboratories
Manual Haematology (Red Cells)
Halo Level 2
The Halo Building
1 Mabledon Place
London WC1H 9AX

Request procedures

See page 14 for general information on request procedures.

For requests that are for DNA analysis only, see the Genetics section of this user guide.

Manual Haematology (Red Cells) tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Coombs (Direct Antiglobulin Test)	A	2 days	
Eosin-5-Maleimide Dye Binding Assay for Hereditary Spherocytosis (EMA)	A (min 0.5ML)	2 days	Recent transfusion will affect interpretation of result. This test is performed Monday – Thursday and samples must be received by Manual Haematology (Red Cells) within 48 hours of being taken. It is advised that a 'traveling control should accompany sample if being sent by post.
Erythropoietin	B	4 days	
G6PD Assay	A (min 0.5ML)	3 days	Recent transfusion will affect interpretation of result. Reticulocytosis may falsely elevate result above steady state. Reticulocyte and FBC should be undertaken when requesting G6PD.
G6PD Screen	A (min 0.5ML)	3 days	Recent transfusion will affect interpretation of result. Reticulocytosis may falsely elevate result above steady state. Reticulocyte and FBC should be undertaken when requesting G6PD.
Haemoglobinopathy Screen	A	3 days	Recent transfusion will affect interpretation of result.
Pyruvate Kinase	A	3 days	Recent transfusion will affect interpretation of result.
Sickle Solubility (Urgent testing only)	A	3 days	
Thalassaemia Screen (Haemoglobinopathy Screen)	A	3 days	
Total Glycated Haemoglobin (Boronate Affinity)	A (min 0.5ML)	3 days	

HSL Immunology

HSL's Immunology department provides a comprehensive testing service to users in the public and private sector. It receives requests from primary and secondary care, as well as specialist test requests from across the UK and overseas.

HSL Immunology is a UKAS Accredited Medical Laboratory No. 8169. It participates in the External Quality Assessment Schemes (EQA) such as the UK National External Quality Assurance Schemes (UK NEQAS) for all analytes where schemes are available.

A full repertoire of allergy and allergen components testing is available in house – more than 200 common allergens can be tested.

The latest available ELISA platforms, immunofluorescent digital microscopy, ISAC and blot techniques are used to investigate immunological and allergic conditions.

Staff /Key personnel

CLINICAL STAFF			
Professor Suranjith Seneviratne	Quality Manager for Molecular Pathology, Genetics, Virology and IT	suranjith.seneviratne@nhs.net	020 3447 8991
Dr Scott Pereira	Consultant Immunologist	scott.pereira@doctors.org.uk	020 3447 8991

LABORATORY STAFF			
Dr Kushen Ramessur	Scientific Lead/HOD, Immunology	Kushen.ramessur@ tdlpathology.com	020 7307 7373 ext 3215
Emily Apsley	Clinical Scientist/ Deputy HOD	Emily.apsley@tdlpathology.com	020 7307 7373 ext 3221
Lisa Wallace	Quality manager	Lisa.wallace@hslpathology.com	020 7307 7373 ext 3221

Working hours

The department is open between 8am and 7pm on weekdays for receipt of specimens and telephone inquiries.

We also offer a limited service between 9am to 5:30pm on Saturdays.

Specimens

See section 2 for general information on ordering tests, and on specimen collection, packaging and transport.

All TB Quantiferon samples must reach the laboratory within 16 hours of collection.

Request procedures

See section 2.

Urgent requests

There is a provision for urgent investigations received within normal working hours. Urgent Myeloperoxidase (MPO) IgG, Proteinase 3 (PR3) IgG, Glomerular Basement Membrane (GBM) IgG and Acetyl Choline Receptor (ACRA) antibody requests must be discussed with an appropriate member of staff before sending the sample to the laboratory.

Specialities

The Immunology service is part of the Blood Sciences department at HSL, and offers both autoimmune serology and allergy testing.

Autoimmune serology

The autoimmune laboratory offers a diagnostic and monitoring service for organ specific autoimmune disease, renal and connective tissue disease and primary immunodeficiency.

Allergy

The department also offers a full repertoire of allergy and allergen components testing. We currently test over 200 common allergens, including customised allergy panels to ensure a client tailored service. Our component resolved diagnostics service uses the latest ISAC microarray and ImmunoCap sIgE technology.

Immunology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Acetylcholine Receptor Antibodies	B	Referral	
AChR Cluster	B	Referral	
Actin Antibodies	B	5 days	
ADA (Adenosine deaminase) (Nucleotide Metabolism)	A	Referral	
Adrenal Cortex Antibodies	B	2 days	
Adulimimab Antibodies	B	Referral	
Alpha 3 Ganglionic Antibodies	B	Referral	
Anti-mitochondrial Antibodies (M2) (see Myositis Immunoblot)	B	3 days	
AMPA 1 and 2 Antibodies	B	Referral	
ANCA (Anti-Neutrophil Cytoplasmic Antibodies)	B	2 days	Urgent samples must be arranged with the laboratory in advance.
Anti-Nuclear Antibodies	B	2 days	
AP50 (Alternative Pathway)	B (Frozen) [4]	4 weeks	Send to the laboratory within 2 hours of collection.
Apoptosis Assay	H + Control	Referral	
Aquaporin 4 Antibodies (Neuromyelitis Optica)	B	2 weeks	
Aspergillus Fumigatus Precipitins	B	Referral	
Autoantibody Profile I	B	2 days	Refer to TDL Lab Guide test information section www.tdlpathology.com
Autoantibody Profile II	B	2 days	Refer to TDL Lab Guide test information section www.tdlpathology.com
Avian Precipitins (11 Species)	B	5 days	
B2 Microglobulin	B	2 days	
Basal Ganglia Antibodies	B	3 weeks	
Beta 2 Glycoprotein 1 Antibodies	B	5 days	
BPO (M2-3E) Antibodies (see Liver Immunoblot)	B	7 days	
BRAF-V600E	A	Referral	
Bruton's Tyrosine Kinase (BTK)	A + Control	Referral	
Bruton's Tyrosine Kinase (BTK) Gene	A	Referral	2 x 5ml A required.
C1 Esterase Inhibitor (Functional)	B (Frozen)	Referral	Sample needs to be delivered to the laboratory immediately for separation and storage at -20°C.
C1 Esterase gene	A	Referral	
C1 Esterase Inhibitor (Antigenic)	B	5 days	
C1 Inhibitor Antibodies	B	Referral	
C1q Binding Immune Complex	B	5 days	
C2	B	Referral	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
C2 Gene	A	Referral	
C3 Complement	B	4 hours	
C3 Nephritic Factor	B	Referral	
C3/C4 Complement	B	4 hours	
C3d	A (Frozen)	Referral	Sample needs to be delivered to the laboratory immediately for separation and storage at –20°C (Monday – Friday up to 5pm).
C4 Complement	B	4 hours	
C7 Gene	A	Referral	
C8 Gene	A	Referral	
Candida Stimulation	H + Control	Referral	
Cardiolipin Antibodies (IgG+IgM)	B	2 days	
Cartilage Antibodies	B	5 days	
CASPR2 Antibodies	B	Referral	
CCP Antibodies ([RF])	B	2 days	
CD40	A + Control	Referral	
CD40 Ligand (CD154)	A + Control, H + Control	Referral	
CD40L Gene Mutation Analysis	A + Control		
CENP A Antibodies (see Scleroderma Immunoblot)	B	7 days	
CENP B Antibodies (see Extractable Nuclear Antibodies/ Scleroderma Immunoblot)	B	2 days/ 7 days	TAT – 2 days if ENA but 7 days if scleroderma immunoblot method used
Centromere Autoantibodies (see Anti Nuclear Antibodies)	B	2 days	
CGD Proteins p22, gp47, 67, gp91	A + Control	Referral	
CH100 (Classical pathway)	B (Frozen)[4]	4 weeks	Send to the laboratory within 2 hours of collection.
Chlamydia Species Specific Antibodies Screen	B	2 days	
Coeliac/Gluten Profile 2	A B	10 days	Refer to TDL Lab Guide test information section www.tdlpathology.com
Coeliac/Gluten Sensitivity Profile	B	2 days	Refer to TDL Lab Guide test information section www.tdlpathology.com
Colloid Antigen-2 Antibodies	B	2 weeks	
Common Gamma Chain	A + Control	Referral	
Crithidia Antibodies (dsDNA Abs)	B	2 days	
Cytokine Defect Investigations	B + Control, A + Control, H + Control	Referral	To reach referral laboratory within 24 hours, Monday – Thursday only.
DC Phenotype	B + Control, A + Control	Referral	To reach referral lab within 24 hours.

Immunology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Dihydrohodamine-123-Respiratory-Burst Assay (DHR)	H + Control	Referral	To reach the laboratory within 24 hours and by 2:30pm on a Friday (not processed over weekends). Store at room temperature.
DNA (Double Stranded) Antibodies	B	2 days	
DNA (Single Stranded) Antibodies	B	Referral	
Dock 8 Mutation Analysis	A + Control	Referral	
Dock 8 Protein	A + Control	Referral	
DVT/Pre-travel Screen	A A B [9]	5 days	Clinical history must be provided.
EJ Antibodies (see Myositis Immunoblot)	B	3 days	
Endomysial Antibodies (IgA)	B	2 days	
Extractable Nuclear Antibodies (nRNP, Sm, Ro, La, Jo-1, Scl-70, CENP-B)	B	2 days	
Factor B Level	B	Referral	
Factor H Antibodies	B	Referral	
Factor H Level	B	Referral	
Factor I Antibody	B	Referral	
Factor I Level	B	Referral	
Factor XII Gene	A	Referral	
Farmers Lung Precipitins	B	5 days	
FH3L	B + Control, A + Control	Referral	To reach referral lab within 24 hours.
Fibrillarin Antibodies (see Scleroderma Immunoblot)	B	7 days	
FLT3 Ligand	B + Control, A + Control	Referral	To reach referral lab within 24 hours.
Functional C1 Esterase Inhibitor	B		Sample needs to be delivered to the laboratory immediately for separation and storage at -20°C.
GABAR Antibodies	B	Referral	
Ganglionic Alpha 3 Acetylcholine Receptor Antibodies	B	1 month	
Ganglioside GM1, GD1B, GQ1B Antibodies	B	5 days	
Gastric Parietal Cell Autoantibodies (see Tissue Battery)	B	2 days	
GATA2 Sequencing	B + Control, A + Control	Referral	
Gliadin Antibodies (IgG) (deamidated)	B	2 days	
Glomerular Basement Membrane Antibodies	B	2 days	Urgent samples must be arranged with the laboratory in advance.
Glutamic Acid Decarboxylase Antibodies (GAD 65)	B	5 days	
Gluten Allergy Profile	A B B	10 days	Refer to TDL Lab Guide test information section www.tdlpathology.com

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Gluten Sensitivity Evaluation	B	2 days	
Gluten/Coeliac Profile 2	A B	10 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Glycine Receptor Antibodies	B	Referral	
GMCSF Antibodies	B (no control) + (H + control for function if required)	Referral	24 hours, sample to arrive no later than Thursday.
gp210 Antibodies (see Liver Immunoblot)	B	7 days	
Granule Release Assay	A + Control	Referral	
Granulocyte Antibodies	B	Referral	
Granulocyte Immunology	A A	2 weeks	
H. Pylori Antibodies (IgG)	B	2 days	
Haemophilus Influenzae Antibodies (HIB)	B	5 days	
Histamine	A (Frozen plasma)	5 days	
Histamine (Urine)	**RU**	5 days	
Histamine Releasing Urticaria Test	B	10-14 days	
Histone Antibodies	B	5 days	
HMG CoA Reductase Autoantibodies	B	Referral	
Human Anti-Mouse Antibodies	B (Frozen)	6 weeks	
IA2 Antibodies	B	Referral	
IFN Gamma Antibodies	B (no control) + (H + control for function if required)	Referral	24 hours, sample to arrive no later than Thursday.
IgA Antibodies	B	Referral	
IgG Subclasses (IgG1, IgG2, IgG3, IgG4)	B	2 days	
IL17 (Th17)	H + Control	Referral	
IL2R Gene Mutation Analysis	A	Referral	
IL6/Interleukin 6	B or **CSF**	Referral	
IL7R alpha and JAK3 gene Mutation Analysis	A	Referral	
Immune Function Evaluation (Total)	A or **Chex+** B [5,10]	7 days	Do not send sample to the laboratory between Friday noon and Monday morning. Contact the laboratory for special stability tubes for lymphocyte subsets – or take an A sample and ensure same day delivery to the laboratory, Monday to Friday noon (do not send sample between Friday noon and Monday morning).
Immune-Complexes	B	5 days	
Immuno Solid Phase Allergen Chip (ISAC)	B	3 days	
Immunoglobulin E – Total	B	1 day	
Immunoglobulins (IgG, IgM, IgA)	B	4 hours	

Immunology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Infliximab antibodies	B	Referral	
Infliximab levels	B	Referral	
Inner Ear Antigen (Ottoblot)	B	3 weeks	
Insulin Antibodies IgG	B	5 days	
Interferon - Alpha	B (Frozen) [9]	3 weeks	Clinical history must be provided.
Interferon - Gamma	A (Frozen)	3 weeks	
Interleukin 1 Beta	B (Frozen) [4,7]	1-2 weeks	Send to the laboratory without delay. Sample should be separated and frozen if sending overnight.
Interleukin 10	B (Frozen) [4,7]	1-2 weeks	Send to the laboratory without delay. Sample should be separated and frozen if sending overnight.
Interleukin 2	B (Frozen) [4,7]	1-2 weeks	Send to the laboratory without delay Sample should be separated and frozen if sending overnight.
Interleukin 4	B (Frozen) [4,7]	1-2 weeks	Send to the laboratory without delay. Sample should be separated and frozen if sending overnight.
Interleukin 6	B (Frozen) [4,7]	1-2 weeks	Send to the laboratory without delay. Sample should be separated and frozen if sending overnight.
Interleukin 8	B (Frozen) [4,7]	1-2 weeks	Send to the laboratory without delay. Sample should be separated and frozen if sending overnight.
Intrinsic Factor Antibodies	B	2 days	
Islet Cell Antibodies	B	2 days	
ITK mutation analysis	A	Referral	
JAK 3	A	Referral	
Jo-1 Antibodies (see Extractable Nuclear Antibodies/ Myositis Immunoblot)	B	3 days	
Ku Antibodies (see Scleroderma/Myositis Immunoblot)	B	3–7 days	
La Antibodies (see Extractable Nuclear Antibodies)	B	2 days	
LC-1 Antibodies (see Liver Immunoblot)	B	7 days	
Legionella Antibodies	B	2 days	
Leukotriene E4	**CU** (Frozen)	3 weeks	
LGI 1 Antibodies	B (plasma and CSF acceptable)	Referral	
Liver Cytosol Antibodies	B	5 days	
Liver Kidney Microsomal (IIF) (see Tissue Battery)	B	2 days	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
LKM-1 (immunoblot) (see Tissue Battery/Liver Immunoblot)	B	7 days	
Lupus Anticoagulant and Anticardiolipin Antibodies	B C [4,18]	2 days	Send to the laboratory without delay. Citrate Samples. Samples should be double spun and separated and frozen within 4–8 hours of sample taking, if a delay is expected with transportation to the laboratory, samples must be transported as frozen.
Lymphocyte Antibodies	B	Referral	
M2-3E (BPO) Antibodies (see Liver Immunoblot)	B	7 days	
Mast Cell Tryptase	B	2 days	1 sample at onset of reaction, 1 sample 3 hours post reaction, 1 sample 24 hours post reaction. Clearly mark this in Clinical details for each sample. Specimens may be kept at room temperature for shipping purposes for 2 days, store at 2–8°C if assayed within 5 days after collection. For longer periods, store samples at –20°C and –70°C.
MBL (Mannose Binding Lectin)	B (Frozen)	31 days	Sample needs to be delivered to the laboratory immediately for separation and storage at –20°C.
MDA5 Antibodies (see Myositis Immunoblot)	B	3 days	
Meningococcal Antibodies (A, C, W, Y)	B	2–4 weeks	
Meningococcal Serum Bactericidal Titre	B	Referral	
MHC Class 1	A + Control	Referral	
Mi-2α Antibodies (see Myositis Immunoblot)	B	3 days	
Mi-2β Antibodies (see Myositis Immunoblot)	B	3 days	
Mitochondrial Antibodies (see Tissue Battery)	B	2 days	
Mitochondrial Antibodies M2	B	5 days	
Mitochondrial mutation M.1555 analysis	A	Referral	
MOG [Myelin Oligodendrocyte Glycoprotein] Antibodies	B	3 weeks	
MUSK Antibodies	B	2 weeks	
Musk Cluster Antibodies	B	Referral	
Myasthenia Gravis Evaluation	B	5 days	
Myelin Associated Glycoprotein Antibodies (MAG)	B	5 days	
Myelin Basic Protein Antibodies	B	2 weeks	
Myeloperoxidase (MPO) Antibodies	B	2 days	
Myocardial Antibodies	B	1 week	
Myositis Immunoblot (Mi-2α, Mi-2β, TIF1γ, MDA5, NXP2, SAE1, Ku, PM-Scl100, PM-Scl75, Jo-1, SRP, PL-7, PL-12, EJ, OJ, Ro-52)	B	3 days	

Immunology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
NBT Test (Nitro Blue Tetrazolium)	A + Control	Referral	To be analysed within 24 hours. To reach specimen reception on day of collection before 15.30 (Monday to Thursday) and before 13:00 on Fridays. Not processed over the weekends. Store at room temperature.
Neuronal Antibodies (Hu, Ri, Yo, Cv2, Ma2)	B	10 days	
Neutrophil Antibodies	B	Referral	
Neutrophil Phenotypic Analysis (CD11a and CD18)	A + Control	Referral	
NK Killing	A + Control	Referral	To reach referral laboratory on the same day (Monday to Friday only).
NMDA Receptor Antibodies	B	3 weeks	
NOR90 Antibodies (see Scleroderma Immunoblot)	B	7 days	
nRNP Antibodies (see Extractable Nuclear Antibodies)	B	2 days	
Nucleotide Metabolism (ADA and PNP)	A	Referral	
NXP2 Antibodies (see Myositis Immunoblot)	B	3 days	
OJ Antibodies (see Myositis Immunoblot)	B	3 days	
Ovarian Autoantibodies	B	2 days	
Pancreatic Islet Cell Antibodies	B	2 days	
Parathyroid Antibodies	B	1 week	
PDGRF Antibodies (see Scleroderma Immunoblot)	B	7 days	
Pemphigus/Pemphigoid Autoantibodies	B	2 days	
Perforin	A + Control	Referral	
Phagocytosis Assay	H + Control	Referral	
Phosphatidylserine Antibodies	B	5 days	
Phospholipase A2 Receptor	B	3 weeks	
Pituitary Antibodies	B[4]	1 month	Send to the laboratory without delay.
PL-12 Antibodies (see Myositis Immunoblot)	B	3 days	
PL-7 Antibodies (see Myositis Immunoblot)	B	3 days	
Platelet Antibodies	B	Referral	Requires NHSBT Bristol request form.
PML Antibodies (see Liver Immunoblot)	B	7 days	
PM-Scl100 Antibodies (see Scleroderma Immunoblot)	B	3–7 days	
PM-Scl75 Antibodies (see Scleroderma Immunoblot)	B	3–7 days	
Pneumococcal Antibodies – Serotype Specific	B	5 weeks	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Pneumococcal Antibody (PCP)	B	2 days	
PNP (Nucleotide Metabolism)	A + Control	Referral	
PRF1 (perforin) gene and MUNC 13-4 mutation analysis	A	Referral	
Proliferation Assay	H + Control	Referral	Store at room temperature. To reach specimen reception by 13:00 on Fridays (not processed over weekends).
Proteinase 3 Antibodies	B	2 days	
Purkinje Cell Antibodies (Hu and Yo)	B	5 days	
Quantiferon Gold (see TBQ)	**Special tubes** or H [1] 4 QuantiFERON tubes: QuantiFERON Nil tube (grey cap, white ring); QuantiFERON TB1 tube (Green cap, white ring); QuantiFERON TB2 tube (yellow cap, white ring); QuantiFERON Mitogen tube (purple cap, white ring)	3 days	Fill samples to 1 ml black mark on side of tube. Overfilled/underfilled tubes not accepted. To reach laboratory within 12 hours of venepuncture.
Retinal Antibodies	B	Referral	
Rheumatoid Factor	B	1 day	
Rheumatology Profile 1 (Screen)	A B	2 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Rheumatology Profile 2 (Connective Tissue)	A A B B	3 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Rheumatology Profile 3 (Rheumatoid/Basic)	A B	2 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Rheumatology Profile 4 (Systemic Lupus)	A B B	2 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Rheumatology Profile 5 (Mono Arthritis)	A A B B	3 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Rheumatology Profile 6 (Rheumatoid Plus)	B	2 days	Refer to TDL lab Guide test information section www.tdlpathology.com
Rheumatology Profile 7 (Sjogren's Syndrome)	B	2 days	Refer to TDL lab Guide test information section www.tdlpathology.com
RNA Polymerase Antibodies	B	2 days	
Ro Antibodies (see Extractable Nuclear Antibodies)	B	2 days	
Ro-52 Antibodies (see Scleroderma/Myositis/ Liver Immunoblots)	B	3–7 days	
RP11 Antibodies (see Scleroderma Immunoblot)	B	7 days	
RP155 Antibodies (see Scleroderma Immunoblot)	B	7 days	
SAE1 Antibodies (see Myositis Immunoblot)	B	3 days	

Immunology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Salivary Gland Antibodies	B	15 days (now referral test)	
SAP	A + Control	Referral	
Scl-70 Antibodies (see Extractable Nuclear Antibodies/Scleroderma Immunoblot)	B	2–7 days	
Scleroderma Immunoblot (Scl-70, CENP A, CENP B, RP11, RP155, Fibrillarin, NOR90, Th/To, PM-Scl100, PM-Scl75, Ku, PDGFR, Ro-52)	B	5 days	
Serotype Specific Pneumococcal Antibodies	B	Referral	
Signal Recognition Particle (SRP) Antibodies (see Myositis Immunoblot)	B	3 days	
Signal Transducer and Activator of Transcription 3 Gene (STAT3)	A	Referral	
Skin (Pemphigus/Pemphigoid) Autoantibodies	B	2 days	
SLA (Soluble Liver Antigen) Antibodies	B	10 days	
SLA/LP Antibodies (see Liver Immunoblot)	B	7 days	
Sm Antibodies (see Extractable Nuclear Antibodies)	B	2 days	
Smooth Muscle Antibodies (see Tissue Battery)	B	2 days	
Soluble IL2 receptor (CD25)	B	Referral	
Sp100 Antibodies (see Liver Immunoblot)	B	7 days	
Specific IgE to Allergen	B	2 days	
Sperm Antibodies (Serum)	B	5 days	
Staphylolysin Titre Antibodies (SGOT)	B	2 days	
STAT4 Tyrosine Phosphorylation	A + Control	Referral	
STAT5 Tyrosine Phosphorylation	A + Control	Referral	
Steroid Cell Antibodies	B	2 days	
Streptolysin Titre Antibodies/ASOT	B	2 days	
Striated/Skeletal Muscle Antibodies	B	2 days	
Sulfatide Antibodies	B	5 weeks	
Synthetase Antibodies (PL7, PL12, EJ, OJ) (see Myositis Antibodies)	B	3 days	
T Cell Receptor Excision Circlet Analysis (TRECS)	A	Referral	
T Cell Spectratyping	A	Referral	
TB Quantiferon®-TB Gold*	**Special tubes** or H[1]	3 days	Contact the laboratory for special sample tubes/containers/instructions.
Testicular Autoantibodies (see Steroid Cell Antibodies)	B	2 days	
Tetanus Toxoid Antibody	B	2 days	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
TGN (TGN Antibodies)	A + Control	Referral	
Th/To Antibodies (see Scleroderma Immunoblot)	B	7 days	
Thyroglobulin Antibodies	B	Referral	
Thyroid Antibodies (incl. Thyroglobulin + Thyroid Peroxidase Antibodies)	B	1 day	
Thyroid Peroxidase Antibodies/Anti TPO	B	1 day	
TIF1γ Antibodies (see Myositis Immunoblot)	B	3 days	
Tissue Battery (AMA Anti mitochondrial antibody, SMA smooth muscle antibody, LKM1 liver kidney microsomal 1, GPCA Gastric parietal cell antibody)	B	2 days	
Tissue Transglutaminase IgA (Coeliac)	B	2 days	
Tissue Transglutaminase IgG	B	5 days	
TNFRSF6 (FAS) gene mutation analysis	A	Referral	
Total IgE	B	1 day	
Total Immune Function Evaluation	A or **Chex** + B [5, 10]	7 days	Do not send sample to the laboratory between Friday noon and Monday morning. Contact the laboratory for special stability tubes for lymphocyte subsets – or take an A sample and ensure same day delivery to the laboratory, Monday to Friday noon (do not send sample between Friday noon and Monday morning).
Total Immunoglobulin E	B	1 day	
Transmembrane Activator and CAML interactor (TACI)	A	Referral	
TSH-Receptor Antibodies	B	4 days	
U3-RNP Antibodies (Fibrillarin) (see Scleroderma Immunoblot)		7 days	
Urticaria Test (Histamine Releasing)	B	10–14 days	
V Beta Repertoire	A + Control	Referral	
Vascular Endothelial Growth Factor	B	2 months	
VDRL (RPR)	B	2 days	
Voltage Gated Calcium Channel Antibodies	B	3 weeks	
Voltage Gated Potassium Channel Antibodies	B	3 weeks	
WAS Protein	A + Control	Referral	To reach referral laboratory within 24 hours.
XIAP	A + Control	Referral	To reach referral laboratory within 2 days (and before 2pm on Fridays). (Not processed over weekends).
Zinc Transporter 8	B	Referral	

HSL Microbiology

The HSL Microbiology service (located within the Infection Sciences department) is a broad-ranging pathology service. In addition to routine microbiology diagnostics, the laboratory includes reference and developmental clinical services, with expertise in all areas of conventional and molecular microbiology. As a clinically-led department, we offer a comprehensive 24/7 service in a state-of-the-art pathology complex divided across two levels of the Halo building. HSL Microbiology is a UKAS Accredited Medical Laboratory No. 8860.

The services provided reflect the needs of our users. Specialist areas include: solid organ and stem cell transplantation, renal dialysis, hepatology, neurosurgery, ENT, ophthalmology, bone and joint infection and blood culture diagnostics. In addition, the laboratory hosts a UK regional Clinical Mycology Network facility and the UK PHE Parasitology reference service.

HSL Microbiology is also responsible for running and developing the laboratory at the high-level isolation pathology unit based within the Royal Free Hospital, where we offer a clinically-led 24/7 multidisciplinary service for patients with the diagnosis of viral hemorrhagic fever (hazard group 4 pathogens).

The department holds the IBMS pre- and post-registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas. The laboratory also holds accreditation for STP clinical scientist training. In addition, the department is a leader in training of Microbiology specialist registrars and medical undergraduates, as well as regularly hosting visiting PHE doctors and ESCMID observers. The department has an extensive research portfolio, working closely with UCL Centre for Clinical Microbiology and other collaborators on translational research projects.

Staff /Key personnel/Contacts

INFECTION SCIENCES		
Consultant Specialty Lead, Microbiology	**Dr Robin Smith**	Robinsmith1@nhs.net
Head of Department, Microbiology	**Alan Spratt**	Alan.Spratt@hslpathology.com
Quality manager	**Andrew Clarke**	andrew.clarke@hslpathology.com
Training Manager	**Ashleigh Dadson- Butt**	Ashleigh.Dadson-Butt@tdlpathology.com

INFECTION SCIENCES DEPARTMENT ENQUIRIES		
General enquiries – all sections	Microbiology.Enquiries@hslpathology.com	0203 908 1390
Training – all sections	Microbiology.Training@hslpathology.com	

INFECTION SCIENCES DEPARTMENT OUT OF HOURS (8pm–8am and weekends, bank holidays)	
All enquiries – all sections	0203 908 1390

Level 3 Infection Sciences

SECTION	SPECIMEN	EMAIL
Blood cultures	Blood culture	Blood.Cultures@hslpathology.com
Tissues/Fluids/CSF/ Moorfields	Tissues/Fluids/ Intra-ocular	Tissues.Fluids@hslpathology.com
CL3 $TB/Respiratory	Respiratory/TB	Mycobacteria@hslpathology.com
Gynaecological/*GUM	Swabs, Semen	Gynae.GUM@hslpathology.com
Wounds	Swabs	Wounds@hslpathology.com

*Genitourinary medicine. $Mycobacteria tuberculosis (incl. non-tuberculosis mycobacteria).

Level 4 Infection Sciences

SECTION	SPECIMEN	EMAIL
Enteric	Stool	HaloLevel4.EntericMicrobiology@tdlpathology.com
Mycology	Skin/Hair/Nail Fungal culture Serology	Mycology@hslpathology.com
Urines	Urine and associated specimens	Urines@hslpathology.com
***HCAI**	MRSA/VRE/CPE and resistance screening swabs	MRSA.HAI@hslpathology.com

*Health Care Associated Infection

Microbiology specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

Labelling

The specimen must be labelled with the patient details as on the request form. Please ensure that electronically created barcodes are placed down the length of the specimen container and do not obscure any pre-existing barcodes.

Unlabelled samples or samples with insufficient unique identifiers cannot be processed and will be discarded.

Clinical details

Clinical details are essential for to ensure that specimens are processed appropriately. For example:

- Include travel history if submitting an enteric specimen to ensure that specific agar plates necessary for detecting travel-related organisms such as *Vibrio* sp. are set up.
- Specify whether prosthetic material is present when submitting joint specimens to ensure that cultures have the prolonged incubation and enrichment conditions required to identify PJI-related organisms such as *Cutibacterium acnes*.

Containers

All samples must be collected in the specified sterile containers, as shown below.

Factors that significantly affect the performance of the examination or interpretation of results

General factors

- Specimens must be sent in sterile containers.
- Always use aseptic technique for collection of specimens.
- Specimens can easily be contaminated with surface and mucosal flora, so the specimen should be collected using methods to minimise contamination. For example, take mid-stream clean catch urine samples to minimize contamination from urethral flora.
- False-negative results may occur in patients taking antibiotics.
- The time that a specimen is collected can impact on the diagnostic yield e.g. early morning urine (EMU) sample for TB investigation.
- Delays in transport and/or incorrectly stored samples may lead to loss of viability of some organisms and/or overgrowth of other flora.
- Always send separate samples if requesting multiple tests from different departments. Failure to adhere to this may result in the testing being missed or delayed.
- Storage conditions of the samples prior to testing are important.

Blood cultures

- Hospital procedures for optimal blood culture technique should be followed to minimise contamination with skin flora.
- Incorrectly collected blood cultures (under/overfilled) may affect organism growth and recovery.
- Never refrigerate blood culture samples.
- Blood cultures should be delivered to the laboratory promptly to ensure rapid incubation for maximal diagnostic yield.
- The time and date of blood culture collection should be clearly stated on the blood culture bottle labels.

Urine specimens

- The optimal non-invasive urine specimen is a mid-stream clean catch urine.
- Urine for culture should be sent in a container with boric acid preservative to preserve specimen quality and minimise overgrowth of contaminating flora.
- Urine culture specimens should be stored in a fridge prior to transportation to reduce the rate of multiplication of microorganisms.

Therapeutic drug monitoring (TDM)

- Clinical details should include the name of the antimicrobial given, dose, date and time of dose, and date and time of sample.
- Avoid the use of gel tubes for TDM as they may impact analysis.

Serology testing

- Haemolysed, lipaemic and icteric blood samples are not suitable for serological investigations.

Molecular testing

- Swabs with additives (such as charcoal or gel) cannot be used for PCR tests. A specific NAAT swab or dry swab should be used.

Dermatology specimens

- Do not refrigerate Dermapak specimens (nail, skin, hair) as this will lead to loss in viability of Dermatophytes.

Sterile fluid microscopy analysis

- Sterile fluid is prone to clotting which makes accurate cell count impossible. If sending sterile fluid for the investigation of infection please send an additional aliquot of fluid in an EDTA vial for an accurate cell count.

Swabs for *Neisseria gonorrhoeae* culture

- As this organism dies rapidly, these should be transported to the laboratory as soon as possible after collection to ensure maximal yield.

Pre-inoculated culture plates

- Where possible pre-inoculated plates for *Neisseria gonorrhoeae* culture should be pre-incubated for a minimum of 18 hours in appropriate CO2 gas packs prior to referral to the laboratory.
- All other pre-inoculated plates should be transported to the laboratory urgently to prevent plate dehydration, which will reduce recovery of organisms.

Request procedures

UCLH (EPIC)

All routine specimens from the main hospital sites and Mortimer Market should be sent to the Rapid Response Laboratory (RRL) specimen reception area (SRA) located in 60 Whitfield Street.

ROYAL FREE LONDON

All routine specimens should be sent to the Central Pathology Reception Area 2 (SRA2) on the 1st floor of the main Royal Free Hospital Building or to the Barnet site Rapid Response laboratory. Where possible please order test request(s) using Cerner. If unable to use the system, send a blue microbiology request form with the test request(s) and clinical details.

NMUH

All routine specimens from the main hospital sites should be sent to the Rapid Response Laboratory (RRL) specimen reception area located on the North Middlesex Site.

ALL OTHER USERS

All other users of services must ensure that samples are sent to the hospital site with which you have pre-agreed prices and/or a service level agreement in pace. Samples must be received with clear requests with clinical details, and clearly labelled specimens.

Requesting additional tests (add on requests)

After sample receipt: this is dependent on the retention time of the sample in the laboratory. The retention time varies for different types of clinical specimens; this information is available from microbiology on request. Please discuss the additional requests with the microbiology doctors or the laboratory.

Specimen acceptance/rejection criteria

Pre-examination sample suitability and integrity will influence the final test result that is reported by the laboratory and can also impact on the safety of laboratory staff. As a result the laboratory will reject the specimen and not proceed with analysis of samples if it meets one or more of the following criteria:

- Specimens or request forms are received without the minimum essential identification criteria (see Section 2).
- Grossly leaking or broken specimen containers.
- Inappropriate specimens for the test requested (see table above for guidance on specimens).
- Tissue specimens received in formalin, formal saline or any other fixative is not suitable for investigation by microbiological culture.

Creutzfeldt-Jacob Disease

All samples received for Creutzfeldt-Jacob Disease (CJD) testing are sent to the National Creutzfeldt-Jacob Disease surveillance unit (CJDSU) in Edinburgh. The clinical team considering sending the test must discuss the case with CJDSU (Dr Alison Green or Dr Mary Andrews on 0131 537 3075) in advance. If testing is agreed, the CJDSU will organize a courier to pick up the specimen from the laboratory and they will liaise with the laboratory in advance to arrange a suitable time for collection. The sample is stored at –20°C in the CL3 laboratory until collection.

Laboratory opening hours and urgent processing

The department operates a 24/7 shift system. There are always Microbiology staff available on site at the Halo Building, including at nights, weekends and public holidays. There is a reduced number of staff working after 8pm on weekdays, and at weekends and bank holidays.

Microbiology sample reception on all sites is also open 24/7 on all days for receipt of specimens and to arrange transport of urgent specimens. Each site has regular set transport times to transport specimens to the Halo building. In addition, the SRAs will arrange urgent courier collection to expedite transfer for urgent specimens to the Halo for urgent processing.

Urgent samples

A 24-hour service is provided for urgent requests. Requests submitted for urgent analysis must be agreed with the laboratory in advance and may require discussion with the microbiology clinical doctors if the urgent request is not part of laboratory urgent repertoire.

Urgent specimens should be marked clearly and, ideally, should be hand delivered to the SRA and handed directly to a member of SRA or RRL staff. If hand-delivery is not possible, the SRA staff should be telephoned to alert them that a specimen requiring urgent attention is on its way If the SRA is not alerted to an urgent specimen, it is unlikely to be detected among the routine work arriving at the SRA.

The SRA will arrange an urgent courier to transport the specimen to the Halo building for urgent processing. The Laboratory will endeavour to report out all urgent tests within the published turnaround times.

Pre-inoculated agar plates for corneal scrapings must be transported immediately to the laboratory for incubation.

For the diagnosis of amoebic dysentery, fresh (still warm) 'hot stool' or rectal scrape is required. Any aspirated pus from abscesses for parasite investigations must also be submitted fresh and warm and treated as urgent. The specimen needs to be examined without delay; the sample collected must therefore be transported and rushed to the laboratory immediately. Please contact the laboratory or RRL in advance, to inform them that the sample is on its way.

Out of hours (8pm-8am)

A limited number of Microbiology tests are available out of hours in order to prioritize tests where a rapid result can influence the treatment of a patient:

- Cerebrospinal (CSF), peritoneal, ascitic or other sterile fluid for microscopy and culture set up
- Corneal scrapings pre-inoculated plates and slides for microscopy and incubation
- Urgent auramine stain for TB (AAFB microscopy)
- Paediatric urine microscopy
- Stool samples for *Clostridium difficile* testing in consultation with the on-call medical microbiologist
- Other specimens in consultation with the on-call medical microbiologist
- Processing within High Level Isolation Unit in the event of patient admission (via specific on-call rota)

Specialities

The Microbiology service is sub-divided into eight key areas throughout the Infection Sciences department across levels 3 and 4 of the Halo building with the aim of developing highly skilled, specialist teams that process specimens according to their pathology.

Level 3

Blood cultures

Blood cultures focuses on the investigation of bacterial and fungal blood infection. Blood cultures bottles are incubated on continuous monitoring culture systems (BacTec FX) based either on site at the local SRA or at the Halo building. Bottles which 'flag' positive are removed and processed 24/7 to minimise time to identification and susceptibility results for patient management.

Positive cultures are gram-stained and cultured. In addition, rapid identification of bacterial pathogens direct from the positive blood bottle using MALDI-TOF, within 4 hours of blood culture positivity is performed during daytime shift and positive bottles processed at night have 8-hour rapid culture MALDI-TOF identification the following morning. All positive blood cultures are communicated to the Microbiology doctors for management. Interim negative blood culture results are reported at 36-hours for paediatric patients, 48-hours for adult patients and final negative results are reported after 5-days incubation.

Mycobacterial and respiratory investigation

Housed in our state of the art containment level 3 laboratories, the CL3 service offers a comprehensive Mycobacterial diagnostics service.

Our service includes auramine smear microscopy, with a 24-hour turnaround from the time the sample arrives at the Halo, and rapid PCR testing to detect *M. tuberculosis* complex and Rifampicin resistance.

The mainstay of detection is mycobacterial culture, from specimens including blood, tissue, early morning urine (EMU; minimum 60ml) and respiratory samples. Mycobacteria isolates are first examined with MPT64 rapid antigen testing for the preliminary identification of MTB; Isolates are then referred to the Mycobacterial Reference Laboratory (MRL) for full identification and susceptibility testing.

The routine culture of specimens for Mycobacterium species is primarily carried out through MGIT liquid broth automated culture. After careful clinical review, the laboratory service has discontinued Löwenstein–Jensen (LJ) agar slope culture on all specimens.

The following lists detail the specimens which will have a LJ agar slope culture carried out in addition to the routine MGIT liquid broth automated culture:

- Supplementary LJ slope culture at 30°C, incubated for 8 weeks:
  - All skin biopsies
  - Any specimen where clinical details indicate possible *M. marinum* infection
- Supplementary LJ slope culture at 37°C, incubated for 8 weeks:
  - Any specimen which is positive on *Mycobacterium tuberculosis* PCR direct from specimen
  - Any specimen which is positive on auramine stain direct from specimen
  - All lung and pleural biopsies
  - On clinical request via laboratory communication or through clinical details provided with the specimen. For LJ slopes to be set up, the request needs to specify the clinical reasons why extended Mycobacterial culture is required.

Negative mycobacterial cultures are reported after 6-weeks incubation. Routine respiratory culture is performed for the detection of respiratory pathogens, and PCR for the investigation of atypical Pathogens (*Legionella pneumophila*, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*) is available.

If you wish to contact the laboratory to request supplementary LJ slope culture at 37°C please see details on page 121.

Swabs

Automated culture of swab specimens using twin Kiestra total laboratory systems. The automated microbiology section offers a comprehensive bacteriology service processing ENT, wound, genital, orthopaedic/ staphylococcal screen swabs and other clinical swab specimens.

The molecular service also performs PCR for the detection of the Panton Valentine Leukocidin toxin gene from *Staphylococcus aureus* isolates on clinical request.

Please note: culture for *Trichomonas vaginalis* from genital swabs has been discontinued due to unavailability of reagents. Analysis is performed by direct microscopy and is limited to swabs from non-GUM settings with appropriate clinical details including: pregnancy, STI screen or *Trichomonas vaginalis* infection.

In view of the low sensitivity of direct microscopy compared with culture or PCR a negative microscopy result should be interpreted with caution. Please consider TV PCR testing if clinically indicated, please see page 188 for TV PCR requirements.

Tissue, fluids and specialist microbiology

Investigation of sterile specimens including: tissue, bone, CSF fluids and prosthetic material. The specialist service offers semi-quantitative and quantitative microscopy' synovial fluid crystal analysis and enrichment culture for all sterile fluids using BacTec broth continuous monitoring culture. Prosthetic joint specimens will undergo prolonged enrichment culture for 14 days, but only if the clinical details alert the laboratory to the presence of prosthetic material. If these details are not provided, routine 5-day enrichment culture will be applied.

Level 4

Enterics

The service provides investigation of non-travel related diarrhoeal infections using the EntericBio multiplex PCR for Salmonella, Shigella, Campylobacter, STEC, Giardia and Cryptosporidium, with culture follow-up of positive Salmonella, Shigella and STEC specimens. Travel-related diarrhoeal pathogens are tested using culture techniques for bacteria and microscopy for ova, cysts and parasites, *Clostridium difficile* using PCR screening assay followed by toxin EIA detection on all positive PCR samples. The enterics service also includes the detection of *Helicobacter pylori* antigen.

Mycology

Our UK Clinical Mycology Network regional laboratory provides culture, serological and molecular diagnostics. The service offers PCR, microscopy and culture for the investigation of superficial fungal infection, identification and susceptibility testing of clinically significant yeasts, routine (7-day) and extended (21-day) fungal culture from clinical specimens. The serology service provides TDM for triazoles, Galactomannan antigen detection, 1-3-β-d-glucan detection, Cryptococcal antigen by LFD and the detection of Histoplasma antigen from urine. The molecular mycology service offers *Pneumocystis jirovecii* PCR, Candida PCR by T2MR and Aspergillus PCR.

Healthcare-associated infection

Processing of routine screening specimens for MRSA, carbapenemase-producing organisms (CPO) and vancomycin-resistant enterococci (VRE) as well as bespoke screening for outbreak management. The service offers rapid molecular MRSA detection for high-risk in-patients, culture screening for multi-drug resistant bacteria including: MRSA, CPO and VRE. A rapid response service is available for potential outbreak of infections via liaison with the laboratory.

Urine investigation

Routine and complex urinary pathology investigation. The service offers automated and manual microscopy, culture, identification and susceptibility testing. Urine antigen test for legionella and pneumococcal antigen is available. A specialist urine service includes the analysis of sequential urine samples and prostatic secretions in the diagnosis of prostatitis and other complex genitourinary samples including VBU specimens, and invasive urine samples such as suprapubic aspirates and ureteric urine.

Microbiology tests

Healthcare associated infections

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Carbapenemase-producing organism (CPO) screen	**STM (rectal)**	4-5 days***	*** Presumptive positive isolates will be sent to the PHE reference laboratory for confirmation.
Extended beta lactamase (ESBL) screening	**STM**	Negative result 48 hours; Positive result 96 hours	
MRSA rapid PCR (one swab per site)	**PCR swab**	24 hours	Expedite delivery to laboratory.
MRSA Culture (one swab per site)	**STM**	3 days	
VRE screen (one swab per site)	**STM**	3 days	
Acinetobacter screen (one swab per site)	**STM**	3 days	

Enteric microbiology

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
***Clostridium difficile* Toxin by PCR/EIA (positive)**	**RF**	2 days	
Stool for OCP travel associated (microscopy)	**RF**	3 days	
Stool for endemic community pathogens by PCR	**RF**	2 day	
Stool for travel-related diarrhoea by culture	**RF**	3 days	Travel history is essential to ensure appropriate detection agar plates are set-up.
***Helicobacter pylori* antigen**	**RF**		
Sellotape Test	**Send Sample****	1 day	** Use clear Sellotape only and attach to microscope slide.
Schistosoma (Urine)	**Mid-morning terminal urine following exercise**	1-2 days	Must send terminal urine.

Tissues, fluids, CSF

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
CSF for Microscopy and Culture	**UC**	1–3 days	
CSF PCR	**UC (200 µl)**	24 hours	This test must be requested clinically by contacting the tissues and fluids laboratory.
Ascitic fluid	**EDTA sample for microscopy plus sample inoculated into BacTec bottles for culture**	4 days	EDTA is optimal sample for microscopy.
CAPD fluid	**Follow local protocol**	4 days	
Sterile Fluid Culture	**UC**	7 days	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
QIAstat Bacterial Meningitis PCR	**CSF** Minimum sample volume: 200 µl	4 hours from clinical request	This test is restricted and is only performed on clinical request by microbiology clinical staff. To request this test please contact your local microbiology clinical team.
Synovial fluid	**EDTA and 20ml universal**	7 (up to 16 days for prosthetic joint specimens)	EDTA is optimal sample for microscopy sample prone to clotting). State whether prosthetic material is present to ensure prolonged enrichment culture.
Synovial Fluid (For Crystals)	**UC**	1 day	
Tissue for culture	**Tissue sample in SC or 20mL universal**	7 (up to 16 days for prosthetic joint specimens)	If sending tissue from prosthetic joint, state presence of prosthetic material in clinical details to ensure prolonged enrichment culture.
'Hardware' or device	**Send device in SC**	Up to 14 days	
Corneal scrapings	**Pre-inoculated culture plates and slides**	Up to 7 days	Collect plates and slides from the SRA. Return inoculated plates and slide to SRA immediately and request urgent transport to the laboratory.
***H. pylori* Culture**	**Send biopsy in sterile saline**	3 weeks	Laboratory will transfer to protagerm medium prior to transfer to reference laboratory.

Mycobacterial/Respiratory

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Sputum for TB microscopy (AFB) and culture	**UC3**	up to 6 weeks	
TB Culture	**UC**	up to 6 weeks	
TB Culture (Urine)	3 x **Early Morning Urine**	up to 6 weeks	
Sputum for Routine Culture	**UC**	4 days	
TB PCR	**UC**	2 days	
Atypical mycobacterial culture (tissues)	**UC**		
Atypical PCR	**UC**	5 days	

Blood cultures

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Inoculated blood culture bottles	**Set of aerobic and anaerobic bottles (adults)** **Paediatric bottle (children)**	5 days (negatives) 7–10 days (positive)	Follow local protocol to minimise contamination and maximise diagnostic yield.

Microbiology tests

Urine analysis

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Urine (Microscopy Only)	**RU**	1 day	
Urine for Microscopy and Culture	**Mid-stream clean catch urine in boric acid container**	2-4 days	Send in boric acid container to preserve quality and minimise contaminant overgrowth.
Urine for Extended Culture	**MSU**	up to 7 days	
Pneumococcal Urinary Antigen	**RU**	1 day	
Prostatitis Screening Panel	**VB1U+VB2U+EPS** or **EPSW + VB3U**	4-5 days	
Legionella Urinary Antigen	**RU**	1 day	
Semen Culture	**Semen in UC**	4 days	
Specialist urine culture	**VB1, VB2, VB3, ureteric in UC**	4 days	

Genitourinary/ENT/Wounds/Swabs

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
HVS	**STM/CS**	4 days	
IUCD for Culture	**Send device in sterile container**	11-12 days	
Swab (Ear)	**STM**	4 days (Culture)	See Mycology for fungal TAT.
Swab for Culture (Any Site)	**STM**	4 days	
Group B Streptococcus screening	**STM**	4 days	Send a combined LVS and rectal swab to maximise yield (national guideline).
Swab for Bordetella pertussis investigation	**Throat or pernasal PCR swab** **Nasopharyngeal aspirate for PCR in 20mL universal** **Pernasal swab on STM for culture**	7 days	PCR is gold-standard test and should be sent in preference to culture swab. Must be ent on PCR swab such as copan swab.
Nose screen for *Staphylococcus aureus* carriage	**STM**	4 days	
GC culture	**CS**	5 days	Swabs should be sent immediately to the laboratory for culture to maximize the chance of recovery of GC.
PVL toxin gene PCR	***S. aureus* isolates from culture**	7 days from positive culture	Please contact the laboratory to request PVL PCR on *S. aureus* isolates if required

Mycology

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
1-3-Beta D Glucan	F	72 hours	(4ml minimum volume)
Galactomanan (Aspergillus Antigen)	F	72 hours	(4ml minimum volume)
Fungal investigations (superficial/ dermatophyte PCR test)	**Skin, Hair, Nails**	3-7 days	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Antifungal TDM	F	72 hours	(4ml minimum volume)
Cryptococcal antigen	F or **CSF**	48 hours	(4ml minimum volume)
Histoplasma antigen (Urine)	**UC**	72 hours	Sample stability is reliant on freezing to preserve the antigen therefore please inform the laboratory when sending requests
Routine fungal culture (Ear, other)	**STM**	8 days	
Extended fungal culture	**UC**	22 days	
Dimorphic fungal culture	**UC**	42 days	
Dermatophyte investigation (PCR)	**Dermapak**	8 days*	*If the specimen is insufficient for PCR cultures will be extended to 15 days to optimize fungal recovery
***P. jirovecii* PCR (BAL, Sputum)**	**UC**	72 hours	
T2MR Candida PCR	A	72 hours	(4ml minimum volume)
Antifungal susceptibility testing		72 hours	
Aspergillus PCR (Sputum/BAL)	**UC**	7 days	

Referral serology tests (sent to UK reference laboratories for processing)

TEST NAME	SAMPLE REQUIREMENT	TAT	REFERENCE UNIT
***Borrelia burgdorferi* antibodies**	F	14 days	RIPL Porton down
Teicoplanin level	F	14 days	Southmead Bristol
TB: Isoniazid level	A (minimum 2 mL)	14 days	Cardiff Toxicology
TB: Rifampicin level	F	14 days	Southmead Bristol
Other antibiotic assays	F	14 days	Determined by antimicrobial
Bordetella antibodies	F	14 days	RVPBRU Colindale
Coxiella antibodies	F	14 days	RIPL Porton Down
***Mycoplasma pneumoniae* PCR**	F	14 days	Colindale PHE
Histoplasma antibodies	F	14 days	Bristol PHE Mycology
Meningococcal PCR	A or **CSF**	24 hours	Meningococcus reference unit
Rickettsial antibodies	F	14 days	RIPL Porton Down
Leptospira antibodies	F	14 days	RIPL Porton Down
Toxoplasma B1 PCR	F	14 days	Swansea ref lab
Coccidioides antibodies	F	14 days	Bristol Mycology PHE
***Tropheryma whippellii* PCR**	F	14 days	GOSH
Campylobacter serology	F	14 days	LSHTM
Yersinia antibodies	F	14 days	GBRU Collindale PHE
Leptospira DNA detection	F or **Urine**	14 days	RIPL Porton down
***H. pylori* culture (biopsy)**	**UC (in saline)**	21 days	

Other referrals are available on request.

HSL Parasitology

HSL's Department of Clinical Parasitology serves as a National Parasitology Reference Laboratory. It services requests from general practitioners, the UK Health Security Agency (UKHSA) and medical laboratories in the NHS and private sector. The department has an international reputation, and provides a parasitology service to clinicians and laboratories worldwide.

We offer a wide range of investigations including diagnosis and identification of parasites in clinical material, diagnosis of human parasitic disease by immunological methods in addition to culture of parasitic organisms and detection of parasitic genomic material from clinical samples. The Department processes over 36,000 requests per annum.

A 24-hour service for microscopic diagnosis of malaria, trypanosomiasis and gastrointestinal amoebiasis (via hot stools) is available.

We also offer guidance regarding the appropriateness and timing of tests as well as a clinical advice service covering result interpretation and patient management.

The department is situated in two purpose built laboratories. Sample reception and urgent blood films for malaria and African trypanosomiasis diagnosis, as well as hot stool examination for intestinal amoebiasis are performed in the Mortimer Market Building. All other diagnostic services are carried out in the Halo Building at 1 Mabledon Place.

Routine access to the laboratories is restricted to the laboratory staff, with controlled entry for visitors.

HSL Parasitology is a UKAS Accredited Medical Laboratory No. 9702.

Our remit is:

- To provide a comprehensive diagnostic, identification and advisory service for clinical and laboratory staff on human parasites and the diseases they cause.
- To develop, evaluate and advise on new parasite diagnostic techniques.
- To produce epidemiological data for UKHSA.
- To liaise with other diagnostic and research parasitology laboratories in the UK and overseas, so that best practice is shared globally.

Our services:

- **Diagnosis and identification of parasites in clinical material**. Examples of this service include:
  - Identification or confirmation of identity of ova, cysts, larvae and worms in faeces, tissues, urine and other samples. The department aims to provide a 24 hour turnaround time within the working week for such specimens. If histology is required the sample will be dealt with in conjunction with a histopathologist.
  - Identification of malaria parasites in thick and thin blood films. The department aims to provide a 2 hour turnaround time within the working week, for these specimens. Communication with the laboratory before the specimen is dispatched is recommended for urgent samples.
- **Diagnosis of human parasitic diseases by immunological methods**: Immunological diagnosis of the following infectious diseases is available upon request: amoebiasis, babesiosis, cysticercosis, fascioliasis, filariasis, echinococcosis (hydatid disease), leishmaniasis (visceral only), malaria, schistosomiasis, strongyloidiasis, toxoplasmosis, trichinosis, trypanosomiasis (South American and African).
- **Culture of *Leishmania* from clinical material by prior arrangement**: Culture of *Leishmania* from clinical material can take up to 3 weeks. Prior arrangement is advised to obtain the most efficient service.
- **PCR assays**: PCR assays for *Leishmania*, Babesia, Microsporidia, the triple assay for *Entamoeba histolytica, Giardia* and *Cryptosporidium*, free-living amoebae and detection of subpatent (repeatedly slide negative) malarial infections are available on request.
- **Advisory service**: We provide an advisory service on the investigation of patients for parasitic disease, the appropriateness of tests, their timing and interpretation together with advice on treatment (see above). Information regarding this service can normally be provided by telephone, fax or email.

Staff /Key personnel

CLINICAL STAFF		
Dr Laura Nabarro	Consultant Parasitologist and Clinical Lead for Parasitology	laura.nabarro@nhs.net
Dr Gauri Godbole	Consultant Microbiologist and Parasitologist	
	Specialist Registrar (on rotation) in Parasitology	

LABORATORY STAFF		
Dr Spencer Polley	Scientific Lead for Parasitology	Spencer.Polley@hslpathology.com
Ms P Lowe	Serology Section Head (BMS 8a)	
Mrs Rashmita Bodhani	Microscopy & PCR Section Head (BMS 8a)	

Laboratory hours

Information and advice is available from staff in the Department of Clinical Parasitology within normal working hours (0900–1700 Monday to Friday).

General enquiries

Phone +44 (0)20 7307 9400 (switchboard) and, when connected, ask for one of:

- Parasitology microscopy
- Parasitology serology
- Dr Spencer Polley (Scientific Lead)
- Parasitology medical staff

For healthcare professionals seeking advice regarding services offered by the Department of Clinical Parasitology or the suitability and transport of specimens, as well as test results please contact the Scientific Lead or appropriate laboratory section.

For clinical enquiries including appropriate test section, interpretation of results, or patient management please contact the Consultant Parasitologist or Parasitology Registrar (your call will be transferred to the laboratory team if they are unavailable).

Regrettably, the Department of Clinical Parasitology is unable to offer clinical advice directly to members of the public. Patients are advised to contact their GP in the first instance or follow the advice available on the Hospital for Tropical Diseases website if unwell following travel.

http://www.thehtd.org/emergencies.aspx

Please note: the Department will only release test results to recognised health care providers. It is unable to release results to members of the general public, patients or their friends and family.

We are always happy to receive feedback on the quality or scope of service offered. Please send to spencer.polley@hslpathology.com.

Urgent requests during normal hours

If a result is likely to have a direct and immediate impact on patient care, we will endeavour to process the test as quickly as possible. Please contact the laboratory to advise them of any such urgent sample using the following number:

Phone 020 7307 9400 (switchboard)

When connected, ask for one of:

- Parasitology microscopy
- Parasitology serology

A responsible person (and deputy) capable of accepting and transmitting the result(s) in the submitting organisation must be identified at this time, along with a suitable contact number. The results of urgent tests will be telephoned by a senior member of staff to the identified person (or deputy) in the submitting organisation as soon as the result is verified.

Out of hours service

For out-of-hours urgent malaria/hot stool/African trypanosomiasis diagnosis only, please call +44 (0)845 155 5000 or +44 (0)20 3456 7890 and ask for the on-call Parasitologist.

For urgent out-of-hours advice on clinical matters, please phone switchboard (020 3456 7890) and ask to be transferred to the duty tropical medicine SPR.

Emergency On-call Service

A 24-hour, 7-day service is provided for urgent diagnosis of malaria, trypanosomiasis and intestinal amoebiasis (via hot stools). See above.

Parasitology specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

Types of specimens

Diagnosis of parasitic infection may be made by direct examination of a clinical specimen to identify the presence of a parasite. Indirect methods for parasite detection (such as serology) are also available for many parasitic infections.

Faeces, blood and sera constitute the majority of samples received for analysis. Other samples include adhesive tape smears, urine, semen, skin snips, tissue biopsies, liver aspirates, CSF, vitreous humour and corneal scrapes. Additionally, organisms suspected of causing parasitic infection, such as whole worms or arthropods can be examined.

Please send separated serum rather than whole blood for routine serology requests (to prevent lysis of sample if delayed in post). Plasma may be processed in a limited number of assays if not other sample type is available (please contact the Department of Clinical Parasitology for further information).

If you are uncertain of the type(s) of specimen(s) you should submit for analysis, telephone prior to sending the sample, in order that you can discuss the appropriateness of the specimen with a senior member of staff from the Department of Clinical Parasitology.

Labelling and packaging

Label all samples clearly with hospital number, name, and date of collection.

Location, consultant code/name, doctor's name, bleep/extension and test(s) required in addition to the patient details above should be put on the request form.

Specimens MUST be packaged according to Packing Instructions P650 and UN3373 requirements. Refer to the most up to date information on the HSE website (http://www.hse.gov.uk).

The outside must be marked conspicuously with:

'BIOLOGICAL SUBSTANCE, CATEGORY B' or **'BIOLOGICAL SUBSTANCE, CATEGORY A'** as appropriate.

It is essential that such substances are properly packed and labelled and appropriate instruction and protection provided to the carrier(s).

The sender is responsible for ensuring the health and safety of any employee or taxi driver that is used to transport samples to the Parasitology laboratory.

Safety

Current local and national guidelines must be followed to avoid needle stick injuries or accidental exposure to blood and blood-contaminated body fluids of those persons taking, transporting and processing the samples.

Any accident should be reported at once to your immediate superior as urgent action may be required; please refer to your local Safety Policy/Infection Control guidelines.

Ensure that the sample is correctly packed and that neither the request form nor the outside of the container should be contaminated with the sample (see below).

Ensure that the container is correctly sealed. All specimens from human sources must be regarded as potentially infectious.

High risk samples should be appropriately labelled (see below).

Hazardous specimens

Any specimens from known or suspected cases of hepatitis, tuberculosis, Viral Hemorraghic Fever (VHF – see below) or HIV must be clearly identified as a 'RISK OF INFECTION'. Refer to the most up to date information on the HSE website for guidance (http://www.hse.gov.uk) for list of ACDP categorised pathogens.

Spillage of body fluids/leaking containers may necessitate the rejection of the specimen. If this occurs, a member of the Department of Clinical Parasitology staff will inform a responsible person in the submitting organisation by telephone and advise that a request for a repeat sample be made.

The sample will be booked, cancelled and then reported to provide evidence of this activity.

Parasitology specimens

Transport to the Laboratory

Specimens are received (by a number of routes, including: Royal Mail post, DX, hospital van, taxi, or by courier) at the Mortimer Market laboratory. A regular van delivery and pickup of specimens between local centres is maintained by the TDL and UCLH Transport departments.

If specimens are to be brought to the Mortimer Market laboratory personally by medical or nursing staff, they must be carried in an approved container for transport.

The Department of Clinical Parasitology is unable to receive samples sent by members of the public that are not accompanied by a request form from an approved laboratory, medical practitioner or health care provider.

See also Request Procedures below.

Postal address

Send your specimens, together with an official request form or signed letter containing as much clinical information as is deemed necessary and requesting the service(s) required to:

The Department of Clinical Parasitology
The Hospital for Tropical Diseases
3rd Floor Mortimer Market Centre
Mortimer Market
London WC1E 6JB

Dx Number: DX 6640701
Exchange: TOTTENHAM CT RD 91 WC

We would ask that your request form has an address, a contact phone number, sample time and date added to the patient identifiable information and travel history.

Bespoke request forms can be obtained from spencer.polley@hslpathology.com, these will ensure the correct booking of your request and resulting in a timely manner. See below

Please note: specimens sent for diagnosis or further investigation to a clinical laboratory must comply with the conditions set down in the Post Office Regulations governing the transport of pathological specimens. For insurance purposes, the value of a routine specimen is not likely to exceed £1 sterling.

Specimens which are known or suspected to contain Hazard Group 4 pathogens should not be sent by post (see www.hse.gov.uk/pubns/misc208.pdf for a list of group 4 pathogens)

Sample rejection criteria

Sample rejection criteria would include the following (although testing of specific samples may be done upon consultation with the Clinical Lead):

- Wrong sample type
  - Plasma instead of serum or EDTA blood for most serology tests (unless discussed beforehand with the Parasitology Clinical Lead).
  - Blood samples other than Citrate blood for Microfilarial microscopy
  - Blood samples other than EDTA blood for malaria microscopy and PCR
  - Peripheral blood for Leishmania microscopy and PCR (except where specifically agreed with the Clinical Lead)
- Sample incorrectly stored/treated
  - Refrigerated stool sample for stool culture
  - Fixed sample for Leishmania culture (PCR will be performed)
  - Fixed sample for stool PCR (Microscopy will be performed)
- Contaminated or broken container/slide
  - Container contaminated due to leaking sample.
  - Container/slide poses safety risk due to breakage.
- Insufficient sample volume (especially for Stronygloides Culture which requires around 20ml of stool)
- Heavily lipemic or hemolyzed serum sample.
- Sample delivery delayed beyond viable processing time.
  - 15 minutes for Hot Stool sample
  - 24 hours for Trypanosomal blood microscopy
- Sample unaccompanied by request form or accompanied by an incorrect or incorrectly filled out request form. Such errors would include lack of specific tests requested. Please ensure that suitable travel history is completed as specified by individual tests (such as African and South American Trypanosomiasis).

Retention of Samples

Please note that we do not keep all samples once tested, so if extra tests are required please phone the laboratory at the earliest opportunity to request the additions. Please see below for approximate sample retention times:

Standard retention times for samples

Serum and CSF supernatant for serology tests: 2 months unless specifically requested to be saved (or found to be positive), although CSFs are normally kept as long as space allows.

Citrated blood for filarial microscopy: Discarded after filtration.

EDTA Blood for microscopy: 7 days.

Body fluids inc semen, Aspirates, Duodenal and jejunal aspirates, Cyst fluids, Stool: Excess sample stored 14 days after final report produced by Parasitology Laboratory.

Bronchoalveolar Lavage, Sputum, Urine, Perianal swab: Processed sample stored 14 days after final report produced by Parasitology Laboratory (although sample may be altered by processing).

Skin scrapes, Skin snips, Swabs, Rectal scrapes, Rectal snips, Sellotape slide: Discarded after processing and testing.

Biopsies, Bone marrow, Slit skin smears: 6 months (unless all sample used in testing).

Ectoparasites, Adult worms: 1 year.

Tapeworm Segments: 48 hours after final report produced by Parasitology Laboratory.

Send away sample (including Ticks): Not kept (sent to ref lab for further ID).

Transplant Donor Samples: If clearly labelled, these are stored for 10 years.

Pre-transplant Recipient Samples: If clearly labelled, these are stored for 30 years.

Request procedures

See page 14 for general information on request procedures.

Where possible, use a Parasitology request form personalised to your location. A personalised request form will have the code assigned to your laboratory or practice; this ensures expeditious processing of the specimen and ensures the report is returned to the requesting address.

If a laboratory would like a copy of the new Parasitology request form please email the Scientific Lead providing the laboratory address, responsible person to whom results are to be sent (where appropriate), telephone and fax number using the following email address:

spencer.polley@hslpathology.com

Request forms can be dispatched to you by prior arrangement. Use a separate form for each specimen type. Personalised request forms will ensure your tests are booked in correctly and you receive the results in a timely manner. Complete all sections of the form using a ball-point pen or ink. Mark clearly the name of the responsible person (and deputy where appropriate) to whom results are to be sent.

Please give complete patient identification and relevant clinical details, including risk category and travel history. This information is needed to help determine which special precautions are required and which tests are to be performed. If you use your own form, please include your address and a contact telephone number that we can use in case of a clinically urgent result.

The test requestor must be an authorised person, not a member of the public.

The recipient of the results must be a recognised laboratory, medical practitioner or health care provider.

Processing times for different specimens vary according to clinical priority, as does the frequency of individual tests.

Clinically urgent requests will be given priority and the results telephoned to you by a senior member of staff at the earliest opportunity.

Reporting times

The reporting time is defined as the period from the receipt and booking in of a specimen to the time the report is issued to the individual requesting the test.

Clinically important requests will be given priority and the results telephoned to you at the earliest opportunity.

A table listing the range of tests for parasitic diseases that are undertaken in the Department of Clinical Parasitology is available as a separate turnaround times document.

Microscopy turnaround times

Within the working week, we aim to provide a 24-hour turnaround time for the majority of microscopy tests, although some tests have an official turn-around-time which is longer than this period. The majority of microscopy tests can be performed and reported by telephone within 24 hours of receiving an urgent specimen if prior notice is given.

PCR turnaround times

It is most economical to carry out molecular tests in batches and, in general, molecular tests are not necessarily performed as soon as a specimen is received (except for the diagnosis of Free Living Amoebae). Most tests are batched weekly, thus when tests are carried out at the Department of Clinical Parasitology, written reports may not be available for eight to 21 days after the specimen has reached the laboratory depending upon the assay type. The extended period is to allow for required reflex testing such as species identification where this would be of clinical importance.

Serology turnaround times

It is most economical to carry out serological tests in batches and, in general, serological tests are not necessarily performed as soon as a specimen is received. Most tests are batched weekly, thus when tests are carried out at the Department of Clinical Parasitology, written reports may not be available for 8 days after the specimen has reached the laboratory. The exception to this is Amoebiasis, which is tested for on a daily basis.

When several tests are to be carried out on the same specimen, urgent tests such as Amoebiasis will be booked on a separate number to facilitate rapid reporting.

If urgent results are required or if you want to know when a particular result will be available, please contact the relevant department via Switchboard.

Samples sent to external reference laboratories

The following tests may be referred to external laboratories for primary or confirmatory testing:

- Angiostrongylus, Anisaksis, Paragonimus, Gnathostoma serology
- Insects (for further identification) and malaria PCR
- Ancathamoeba kerrititis samples.

We would hope for a 28-day turnaround from sending of a sample to another reference laboratory to receiving a result and reporting it on our computer system.

Results

Normal reporting practice

Reports are currently issued in either paper format (via postal system) or Encrypted PDF reports via email and GP link for local GPs.

Where possible the Department would prefer to issue reports as encrypted PDFs via email system to ensure the speed and security of data delivery (including compliance with GDPR).

Encrypted PDFs as sent as soon as the results are ready, and ensure the fastest routine reporting system available.

If you would like to set up email reporting you will need an email address that is regularly monitored. Please email Spencer.Polley@hslpathology.com

Telephoned results

Results are telephoned under the following circumstances:

- If it is thought that a result might lead to an immediate change in patient management (including positive Malaria films, Positive Leishmania results, Positive African Trypanosomiasis results (HAT), Positive Neuroschitosomiasis).
- If further information is required to decide whether the submitted sample should be processed further.
- If a telephoned result has been requested.
- All on-call results.
- Results will usually be telephoned by the Specialist Registrar or by the individual who has performed the test, but if clinical advice is likely to be needed the call may be made by the Consultant Parasitologist or Deputy. If a telephone number, telephone extension or bleep number has been indicated on the report, the call will be made to that number.

Although written and email reports are issued as soon as they are available, the laboratory is happy to make results available by telephone when these would be of clinical assistance. Users are asked to use this service only when necessary as it does delay the routine work of the laboratory.

The use of encrypted PDF reports via email offers a significant improvement in the speed of returning results to our users and has been found to largely negate the requirement for telephoning the department.

Storage of results

All records are currently maintained in the department for a minimum period of ten years.

Information Governance Policy

Please note we are unable to fax results.

Advisory service

If advice is needed on the clinical interpretation of results by Clinical or Laboratory staff, the Consultant Parasitologist or the Specialist Registrar can be reached via the switchboard (see above). If the advice relates to a particular result, it is helpful if the clinical details and laboratory reference number are available.

For urgent out of hours advice on clinical matters please phone switchboard (020 3456 7890) and ask to be transferred to the duty tropical medicine specialist registrar.

Laboratory staff will not give out clinical advice.

Patients looking to book a clinical appointment or requiring clinical advice are advised to contact their GP initially or if acutely unwell following recent travel, please refer to the Hospital for Tropical Diseases Website: http://www.thehtd.org/emergencies.aspx

For further advice on the types of samples and containers appropriate for different tests please contact the relevant section – see above.

If you are unsure which of the above numbers is appropriate, please telephone either section and the Department of Clinical Parasitology staff will put you in touch with the appropriate section/ people.

Please note: Laboratory staff can only give out results to a recognised laboratory or medical practitioner and not members of the general public.

Tests for parasitic diseases and specimen requirements

Amoebiasis (*Entamoeba histolytica*)

Amoebiasis is caused by infection with *Entamoeba histolytica* which is transmitted primarily through the faecal-oral route. Symtoms may include: abdominal cramps, bloody diarrhoea or diarrhoea with mucus, nausea and vomiting, loss of weight and intermittent fever. Extra-intestinal amoebiasis can occur if the amoebae spreads to other organs, most commonly the liver where it causes amoebic liver abscess. Amoebic liver abscess often present with fever and right upper quadrant abdominal pain.

In patients with a travel or exposure history compatible with intestinal amoebiasis, it is advised that the following investigations are performed prior to starting immunosuppression or surgery for suspected inflammatory bowel disease: hot stool examination for trophozoites, PCR of stool for *E. histolytica*, amoebic serology and rectal scrapings/biopsies. Positive results should be discussed with a member of the Parasitology clinical team.

Detection of *Entamoeba histolytica/Entamoeba dispar* cysts and trophozoites by microscopy

- Sample type: **Standard stool sample** – cysts may be identified in stool samples, but *Entamoeba histolytica* and *Entamoeba dispar* cysts are indistinguishable by microscopy.
- Sample type: **Hot stool sample** – Examination for trophozoites requires that the stool is examined within 15 to 20 minutes of voiding. Stool samples for examination can be sent by conventional means so long as they arrive within this time frame. Please phone the laboratory to inform them of expected sample arrival in advance of submission.
- Sample type: **Rectal scrapings** – Microscopy for these samples must be arranged with the laboratory in advance.

Detection of *Entamoeba histolytica, Cryptosporidium* species and *Giardia intestinalis* by PCR

- Sample type: **Standard stool sample** must **NOT** be in any fixative as this may cause false negatives
- Sample type: **Liver aspirates** for the molecular test must **NOT** be in any fixative as this may cause false negatives (please note this test has not been validated for this sample type but will still be performed upon request).
- Sample type: **Duodenal biopsy or fluid** for the molecular test must **NOT** be in any fixative as this may cause false negatives (please note this test has not been validated for this sample type but will still be performed upon request).

This test offers several advantages over standard microscopy based diagnostics. The assay is significantly more sensitive (greater than ten fold improvement in the limit of detection for some species) than light microscopy. In addition, the assay is semi-quantitative and can therefore reveal detailed information on the response of a patient's parasite load to subsequent drug therapy.

For *Entamoeba histolytica*, the assay also has the advantage of being specific for this pathogen, and does not pick up morphologically related but non pathogenic cysts such as those of *Entamoeba dispar*.

Finally, the assay can be run on a much wider range of samples, such as biopsies and liver aspirates, as it does not rely on the presence of morphologically intact parasites, although the assay is not currently validated for anything other than stool samples.

Detection of antibodies to *E. histolytica* by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required (can be transported at room temperature).

The *Entamoeba histolytica* ELISA is an essential test in cases of suspected amoebic liver abscess (ALA). The reported sensitivity of this ELISA is 100% in patients suffering from an amoebic abscess. The specificity of this test is reported as: 96% in uninfected Swiss blood donors; 89% in patients suspected to have amoebiasis where the disease has been ruled out; and 80% in patients with other parasitic infections. Cross-reactivity mainly occurs in patients with leishmaniasis, malaria, filariasis and strongyloidiasis.

Amoebic serology may be negative in amoebic dysentery, especially in the early stage. If clinical suspicion remains, please send a further serum sample 2 weeks after the first sample. In addition, for all suspected cases of intestinal amoebiasis, faecal microscopy and PCR for *Entamoeba histolytica* should be performed.

Diagnosis of amoebic liver abscess is based on imaging plus serology. Amoebic serology can take up to 2 weeks to become positive in amoebic liver abscess. Therefore, a further serum sample should be sent if the first one is negative, if clinical suspicion remains. In the interim, empirical treatment with metronidazole or tinidazole should be considered. In cases of diagnostic uncertainty where liver abscess aspiration has been performed, please send an aliquot of the aspirate for *Entamoeba histolytica* PCR. Light microscopy alone is not adequate to confirm or exclude the presence of amoebae in liver abscess pus.

Babesiosis

Babesiosis is a tick borne parasitic infection caused by *Babesia microti* (commonly North America) and *Babesia divergens* (commonly Europe).

Many people who are infected with *Babesia microti* are asymptomatic. Patients may experience nonspecific flu-like symptoms such as fever, chills, sweats, headache, body aches, loss of appetite, nausea and/or fatigue. In severe cases it may result in hemolytic anemia, blood clots, organ failure, unstable blood pressure, and in very rare cases death may occur.

Detection of *Babesia* spp. by microscopy

- Sample type: Please send a **minimum** of 2ml of **EDTA anti-coagulated blood**. Diagnosis is via microscopic examination of thick and thin blood films.

Detection of *Babesia* spp. by PCR

- Sample type: Please send a **minimum** of 0.5ml of EDTA **anti-coagulated blood**. PCR may be performed on the same sample that is sent for microscopic examination of thick and thin blood films if required

Detection of antibodies to *Babesia microti* by serology

Please note that detection of antibodies to *Babesia microti* is no longer available.

Cryptosporidium spp

Cryptosporidiosis is an intestinal infection resulting from ingestion of oocysts of the coccidian parasite *Cryptosporidium* spp. (including *Cryptosporidium parvum, canis, hominis* and *felis*). It is the second most commonly diagnosed intestinal parasite in the UK and its oocysts are resistant to chlorine. It may be associated with swimming or drinking infected water as well as contact with infected lambs and calves when visiting farms. Symptoms commonly include severe watery diarrhea. It is most common in children between one and five years of age, and in people who are immunocompromised, where symptoms may be more severe.

Detection of *Cryptosporidium spp.* oocysts by microscopy

- Sample type: **Standard stool sample** – Oocysts may be identified in stool samples, by modified Zn staining

Detection of *Cryptosporidium spp.* by PCR

- See section on Detection of Entamoeba histolytica, Cryptosporidium species and Giardia intestinalis by PCR above.

Detection of *Cryptosporidium spp.* by serology

- Serology is not available for the detection of this parasite.

Cyclosporiasis

Cyclosporiasis is an intestinal illness resulting on average 7 days after the ingestion of sporulated (requiring temperatures between 22 to 32 degrees) *Cyclospora cayetanensis* oocysts via contaminated food or water. Direct fecal-oral transmission can not occur. Symptoms generally involve watery diarrhea, and sometimes non-specific systemic symptoms (such as headache, low-grade fever, malaise). Malabsorption is a relatively common finding in patients with *Cyclospora cayetanensis*.

Detection of *Cyclospora cayetanensis* oocysts by microscopy:

- Sample type: **Standard stool sample** – Oocysts may be identified in stool samples, by modified Zn staining. Up to three samples may be necessary due to the intermittent excretion of this parasite.

Detection of *Cyclospora cayetanensis* oocysts by PCR:

- Sample type: **Standard stool sample** – The STAT-DX system may be used to determine the presence of *Cyclospora cayetanensis* DNA in fecal samples where appropriate. Please contact the Deparment of Clinical Parasitology for further information if you feel this is required. Please do NOT send samples in fixative for this assay.

Detection of *Cyclospora cayetanensis* oocysts by serology:

- Serology is not available for the detection of this parasite.

Cystoisosporiasis

Cystoisosporiasis is an intestinal infection caused by the coccidian parasite *Cystoisospora belli* (formerly *Isospora*). Infection is transmitted faeco-orally and symptoms are typically of profuse watery diarrhoea with or without systemic upset. Acalculous cholecystitis is also associated with infection.

Detection of *Cystoisospora belli* oocysts by microscopy:

- Sample type: **Standard stool sample** – Oocysts may be identified in stool samples, by modified Zn staining. Up to three samples may be necessary due to the intermittent excretion of this parasite.

Detection of *Cystoisospora belli* oocysts by PCR:

- PCR is not available for the detection of this parasite.

Detection of *Cystoisospora belli* oocysts by serology:

- Serology is not available for the detection of this parasite.

Cysticercosis (larval *Taenia solium* infection) and Taeniasis (Adult *Taenia* Spp. Infection)

Cysticercosis is a disease caused by the larval stage of the pork tapeworm (*Taenia solium*). Infection is contracted when humans accidentally consume food contaminated with embryonated eggs of *Taenia solium*. Ingested larvae then disseminate throughout the body and form cysts within tissue (mostly commonly subcutaneous tissue, the central nervous system and ocular tissue). Disease is a result of the presence of these cysts and the associated inflammation in tissue. Neurocysticercosis is the most severe form of the disease and may present with unexplained seizures, confusion or focal neurological deficit.

Taeniaisis, caused by the presence of the adult stage of either the beef tapeworm (*Taenia saginata*) or the pork tapeworm (*Taenia solium*) within the human gastrointestinal tract. Disease is contracted via ingestion of meat (beef or pork respectively) containing cysticerci. These larvae then mature in the human gut. Infection is often asymptomatic, but patients may experience non-specific gastrointestinal upset and may also visualise segments (proglottids) of the adult worm in their stool.

Detection of *Taenia* spp. ova and segments by microscopy

- Sample type: **Standard stool sample/tapeworm segment(s)** must **NOT** be in any fixative. If sending segments for identification (see also HUMAN HELMINTHIASIS for identification of worms) **HIGH RISK** stickers must be used if *Taenia solium* is suspected.

Microscopy of stools for ova is recommended in these cases but cannot differentiate to species level.

Detection of antibodies to *Taenia solium* by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required, CSF testing is also available (please inform laboratory before hand and provide as much CSF as you are able to spare). Samples can be transported at room temperature.

A serological service (EITB Immunoblotting) is provided.

Intestinal infections with *Taenia solium* or *saginata* (taeniasis) do not usually result in positive *Taenia* serology.

Detection of *Taenia solium* antigen

- Sample type: A **minimum** of 0.5ml of **serum** is required, CSF testing is also available, please provide as much CSF as you are able to spare (minimum volume for the test is 0.2ml).

For individuals with a high suspicion/confirmed infection with Taenia solium, detection of circulating cysticercal antigens is also available. This test detects the presence of antigens secreted by live cysticerci within the patient.

Ectoparasites

Ectoparasites are those parasites which remain external to, or in the surface layers of skin of the human body. They may cause pathology due to reaction against the parasite by the host immune system, destruction of tissue, or the introduction of another pathogenic agent by their feeding.

Ectoparasites include: insects such as *Pediculus humanus capitis* (head lice) and insect larvae such as *Dermatobia hominis* (human botfly); arachnids such as mites including *Sarcoptes scabiei* (causative agent of scabies) and ticks such as those from the family *Ixodidae*. Please note this is not an exhaustive list.

Diagnosis of Ectoparasites by microscopy

Sample types may include:

- The putative parasite itself in a small sealed container. This may be embedded in host tissue where the parasite has been surgically removed, such as occurs with *Tunga penetrans* (Jigger flea)
- Eggs attached to hair (eg. head lice) in a small sealed container
- Scrapings of skin from the location of a putative parasitic infection (eg. scabies). For skin scraping, ideally the sample should be scraped onto a black dermapak before transport

Samples may be referred on to the London School of Hygiene and Tropical Medicine for further analysis.

Enterobiasis

Enterobiasis is caused by intestinal infection with the helminth *Enterobius vermicularis*, also known as threadworm or pinworm. Infection occurs following the ingestion of eggs. The females will migrate to perianal area to lay eggs and may cause perianal pruritus (itching) such that auto-innoculation can occur following scratching of the perianal area. Vulvovaginitis may also occur in females. Enterobiasis is a common infection particularly in children under 10 years of age and may be asymptomatic.

Detection of *Enterobius vermicularis* by microscopy

- Sample type: **Adhesive tape smear** (Sellotape, Scotch tape (i.e. clear transparent adhesive tape)) taken first thing in the morning from the perianal skin and attached sticky side down to a microscope slide, is the appropriate specimen for detecting *Enterobius vermicularis* ova.
- Sample type: **Standard stool sample** – adult worms and/or ova may be present in stool samples, a negative stool result for worms and ova does not exclude the diagnosis because the ova are laid on the perianal skin.

Detection of *Enterobius vermicularis* by PCR

- PCR is not available for the detection of this parasite within the department.

Detection of *Enterobius vermicularis* by serology

- Serology is not available for the detection of this parasite.

Fascioliasis

Fascioliasis is caused by *Fasciola hepatica* and *Fasciola gigantica*. Ruminants are the natural hosts of these liver flukes. Human infection occurs following consumption of freshwater plants contaminated with the encysted metacercariae (commonly watercress and khat). Disease is typified by fever and abdominal pain with a marked eosinophilia during the acute phase. Occasional sporadic outbreaks of *Fasciola hepatica* have occurred in the UK, although the majority of cases are imported.

Fasciolopsiasis is a similar disease caused by the fluke *Fasciolopsis buski*.

Detection of *Fasciola hepatica*, *Fasciola gigantica* and *Fasciolopsis buski* by microscopy

- Sample type: **Standard stool sample** – ova may be present in stool sample but are often scanty and may not be found in up to 30% of cases.
- Sample type: **Whole worm** – Please send fresh and do **NOT** add any fixative.

Detection of *Fasciola hepatica* by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required (can be transported at room temperature).

Serology can be helpful and an IFAT test for antibody is available. The IFAT (screening titre 1/32) has given reliable results. It is species specific. In proven *Fasciola hepatica* infections the titre is in the order of 1/128. Serology is the best method of diagnosis in the early stage of the infection.

Patients with upper abdominal pain, thought to be hepatic, eosinophilia and fever, should be investigated.

Filariasis

Lymphatic filariasis, onchocerciasis and loiasis are the three common forms of filariasis in humans.

The majority of lymphatic filariasis is caused by two species of filarial nematode (roundworm), *Wuchereria bancrofti* and *Brugia malayi*. Infection is transmitted via the bite of an infected mosquito (*Culex* spp). Adult worms settle in the lymphatics where they cause mechanical obstruction and scarring. Chronic infection results in the characteristic lymphoedema with lichenification of the overlying skin. The microfilarae (juvenile form) are detectable in the peripheral blood at night time.

Onchocerciasis is an infection caused by the filiarial nematode *Onchocerca volvulus*. The worm is transmitted via the bite of *Simulum* spp (blackflies) which are found near fast flowing bodies of freshwater. Adult worms settle in subcutaneous tissue causing nodular swellings as well as other skin rashes. Microfilarae migrate around the body, including to the eye where they cause inflammation, which can lead to blindness. Onchocerciasis is the second most common infectious cause of blindness worldwide and is also termed River Blindness. Microfilarae are not detectable in peripheral blood but can be visualised in skin snips.

Loiasis is an infection caused by the filarial nematode *Loa loa*. The worm is transmitted via the bite of an infected deer fly (*Chrysops* spp). Often infection is asymptomatic, however loiasis may manifest with soft tissue swellings (Calabar swellings) and occasionally with the presence of a visible adult worm migrating across the subconjunctiva. Microfilarae are detectable in peripheral blood during the middle of the day.

The syndromes produced by the various species of filarial worms are usually associated with eosinophilia. A patient with an eosinophilia who has lived in, or visited, a filaria-endemic area might reasonably be tested for filariasis.

Detection of Filariasis (except *Onchocerca volvulus*) by microscopy:

- Sample type: 20 millilitres of **anti-coagulated blood (citrate tube)** are required so that the microfilariae can be detected by filtration. Day blood (for *Loa loa*) should be taken between 12pm (noon) and 2pm local time and night blood (for *Wuchereria bancrofti* or *Brugia malayi*) at 12am (midnight). Samples should be kept at room temperature until processed.

Correct blood collection times for diagnosis of human filariasis

	Periodicity	Collection Time (Hr/Local)
Wuchereria bancrofti	Nocturnal (except in Pacific Islands)	2400–0200
Brugia malayi	Nocturnal	2400–0200
Loa loa	Diurnal	1200–1400
Mansonella perstans	No periodicity	Anytime
Mansonella ozzardi	No periodicity	Anytime

With the exception of *Onchocerca volvulus*, a definitive diagnosis of filariasis is usually made by the demonstration of microfilariae in the peripheral blood.

Detection of *Onchocerca volvulus* by microscopy

- Sample type: *Onchocerca volvulus* is diagnosed by demonstration of microfilariae in **skin snips**. Please contact the department before sample is taken for information about sample transport and to let the laboratory know the sample when the sample will be arriving.

Detection of filariasis by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required (can be transported at room temperature).

A filaria ELISA, using *Brugia pahangi* as antigen is used as a 'generic' screening test. A negative result does not exclude the diagnosis and this is especially so with onchocerciasis.

The filaria ELISA is a non-specific screening test that is positive in many types of filariasis and cross reacts in cases of strongyloidiasis. It is most useful in the diagnosis of TPE (Tropical Pulmonary Eosinophilia) where high antifilarial antibody levels are required to make the diagnosis. Positive results are reported at Levels 1 to 9. Levels 1 and 2 are regarded as weak positives; Levels 5 and over are strong positives.

Reactive symptomatic cases with moderate eosinophilia tend to give high level positives. Non-reactive cases, which may be asymptomatic though microfilariae are present, give low levels of positivity and may be negative. Known causes of false positive results are *Strongyloides*, Hookworm (about 50% of cases) and occasionally *Ascaris* infection. We are unable to determine the species of Filaria infections using our ELISA test. This may be done if microfilariae are seen in a blood film, or by staining the microfilariae obtained by filtration.

Free-living Amoebae

This section on free living amoebae refers to human infection with any of the following amoebae: *Naegleria fowleri, Acanthamoeba* spp. and *Balamuthia mandrallis*.

Naegleria fowleri is a free living amoeba found in warm, fresh water. Infection is contracted via inhalation of infected water, often during recreational activities. It causes primary amoebic meningoencephalitis which is a rapidly progressive, haemorrhagic meningocephalitis. Symptoms resemble bacterial meningoencephalitis with fever, headache, altered mental state, seizure and coma. The disease follows a fulminant course with an exceptionally high associated mortality. Trophozoites can be visualised in the CSF.

Acanthamoeba spp and *Balamuthia mandrallis* cause granulomatous amoebic encephalitis. Infection is more common in immunocompromised hosts and aquisition of the amoeba is via inhalation of the cysts from the environment. The syndrome follows a sub-acute course with a headache, low grade fever, focal neurological deficit and behavioural change, typically evolving over a period of weeks and months. Examination of CSF or brain tissue is usually required for diagnosis.

If infection with free living amoebae is suspected, please discuss the case with the Parasitology consultant or registrar.

Diagnosis of primary amoebic meningoencephalitis or granulomatous amoebic encephalitis by Microscopy

- Sample type: **CSF** – please send a fresh sample (as much as you are able to spare) without fixative for microscopy. CSF microscopy may detect *Naegleria fowleri*, but is much less sensitive for the detection of *Acanthamoeba* or *Balamuthia mandrillaris*.

Diagnosis of primary amoebic meningoencephalitis or granulomatous amoebic encephalitis by Culture

- Sample type: **CSF** or **brain tissue** without fixative and received in the laboratory as soon as possible.

Culture is available for *Naegleria fowleri* and *Balamuthia mandrillaris* on discussion with the Consultant Parasitologist or Parasitology registrar.

Diagnosis of of primary amoebic meningoencephalitis or granulomatous amoebic encephalitis by PCR

- Sample type: **CSF** or **brain tissue** without fixative and received in the laboratory as soon as possible.

A PCR is available upon discussion with the Consultant Parasitologist or registrar for the diagnosis of *Naegleria fowleri, Balamuthia mandrillaris* and *Acanthamoeba* spp.

Molecular detection of free living amoebae is not currently validated as a clinical test or covered under our accreditation by UKAS. Please phone the Consultant Parasitologist or registrar to discuss its relevance to patient management.

Diagnosis of amoebic keratitis by culture and PCR for *Acanthamoeba* spp.

Samples should be referred directly to:

Diagnostic Parasitology Laboratory
The London School of Hygiene and Tropical Medicine.
Keppel Street, London WC1E 7HT

DX address: HPA Malaria Reference Lab
DX 6641200
Tottenham Crt RD92WC

Tel: +44 (0)207 927 2427
Fax: +44(0)207 637 0248

This is best diagnosed by sending **corneal scrapings** suspended in a small volume (0.2ml) sterile saline or sterile distilled water.

They can also perform culture from **contact lenses or fluids**; isolation from these specimens, whilst suggestive, does not necessarily implicate the amoeba as causing the patient's symptoms.

Request forms can be found at:
http://www.parasite-referencelab.co.uk/

Giardiasis (See also intestinal protozoa)

Giardiasis is caused by the single celled parasite *Giardia intestinalis*. Infection occurs following the ingestion of cysts in contaminated water, food or via direct person to person contact. Infection may be asymptomatic or present with abdominal pain, bloating, nausea, flatulence, diarrhea and steatorrhoea. Giardiasis may also lead to temporary lactose intolerance. It is the most commonly diagnosed intestinal parasite in the UK.

Drug-resistant *Giardia intestinalis* is increasingly recognised as a cause of treatment refractory disease. If treatment failure due to drug resistance is suspected, please discuss investigation and management with the Parasitology consultant or registrar.

Detection of *Giardia* by microscopy

- Sample type: **Standard stool sample** (for cyst examination) – this does not need to be fresh as cysts are robust. *Giardia* trophozoites are only detectable when stools are examined within **4 hours of voiding**. *Giardia* cysts are frequently excreted intermittently so that a minimum of **six stools** may be required for microscopic exclusion.
- Sample type: **Duodenal or jejunal aspirate** – *Giardia* trophozoites may be demonstrated in aspirated duodenal or jejunal fluid if examined within 4 hours (cysts will last longer but may not be present).

Detection of *Giardia* by PCR

- Sample type: **Standard stool sample** – molecular diagnosis via the multiplex stool parasite PCR (including *Cryptosporidium* species, *Giardia intestinalis* and *Entamoeba histolytica*) offers several advantages over standard microscopy based diagnostics. The assay is significantly more sensitive (greater than ten fold improvement in the limit of detection for some species) than light microscopy.

  Stool samples for the molecular test must **NOT** be in any fixative as this may cause false negatives.
- Sample type: **Biopsies, duodenal or jejunal aspirate fluid and other sample types (following discussion with staff)** – divergent sample types may be analysed for the presence of *Giaridia* DNA where microscopy would be inappropriate. Please contact Clinical Parasitology staff for further information. Please note that we have not validated this test for sample types other than stool.

  These samples must **NOT** be in any fixative as this may cause false negatives.

Detection of *Giardia* by serology

- Giardia serology is no longer available, please send an unfixed stool sample for microscopy and PCR.

Hydatid disease (Echinococcosis)

Hydatid disease or echinococcosis is caused by infection with the cestodes (tapeworms) *Echinococcus granulosus* (cystic enchinococcosis) and less commonly *Echinococcus multilocularis* (alveolar enchinococcosis). Humans are infected via ingestion of embryonated eggs passed by the definitive host (dog or related carnivores). Oncospheres (invasive form) hatch in the gastrointestinal tract and migrate to tissue where large cysts form (most commonly affected organs are the liver or lungs). Infection is often asymptomatic and may be unrecognised for many years. Symptoms relate to direct mechanical pressure from the cysts or if the cyst leaks or ruptures, causing an anaphylactic reaction.

Echinococcosis should be considered in patients with a compatible exposure history and evidence of one or more cystic lesions with an organ (particularly the liver). Suspected cases should be discussed with the Parasitology consultant or registrar. Diagnosis requires a combination of serology, radiology and sampling of lesions.

Detection of hydatid disease by microscopy (*Echinococcus granulosus*)

- Sample type: **Aspriated cyst fluid, whole liver section, excised cyst or other fluids following putative cyst rupture (eg pleural fluid).**

Aspiration of a cyst should be considered only after taking expert advice and, if felt to be indicated, should be conducted in a centre experienced in the management of hydatid disease. If viability testing is required the aspirate should be kept at room temperature and reach us with 24 hours.

Echinococcus multilocularis usually presents as suspected malignancy is diagnosed by a combination of imaging, serology and biopsy.

Detection of hydatid disease by serology (*Echinococcus granulosus* and *multilocularis*)

- Sample type: A **minimum** of 0.5ml of **serum** is required (CSF testing is available, please provide as much CSF as possible, along with a paired serum sample).

Serology is performed in two steps. An initial ELISA for *Echinococcus* spp. is performed. Serological cross-reactions, giving rise to false positives, can occur with sera from patients with other parasitic infections, notably larval cestodes and filarial worms, and with some neoplasms. False negatives may occur and are more common in the case of non-hepatic hydatid cysts.

A Western blot may also be performed to confirm the ELISA and to differentiate cystic from alveolar hydatid (if not possible based on radiological findings).

For watchful waiting of confirmed cases of *Echinococcus granulosus* or to determine patient response to surgical intervention and/or drug treatment an IgG2 subclass ELISA is available. Please contact medical staff for advice on this service.

Human Helminthiasis (worm identification)

Human heminthiasis includes infections with **Nematodes** (e.g. Ascaris lumbricoides, *Gnathostoma* spp., Hookworm, *Angiostrongylus cantonensis, Anisakis* spp., *Enterobius vermicularis, Trichinella* spp., microfilaria and *Toxocara* spp.), **Trematodes** (e.g. *Paragonimus* spp., *Fasciola hepatica, Clonorchis sinensis*) and **cestodes** (e.g. *Taenia* spp., *Dipylidium caninum, Diphyllobothrium latum* and Hydatid disease) – please note this is NOT an exhaustive list.

For specific information on individual helminth infections please refer to the relevant section(s) of this manual where relevant.

Detection/identification of human helminths of medical importance by microscopy

- Sample type: **Tapeworm segments for identification** (see also section on Cysticercosis) – please send in saline. **DO NOT** send in formalin or other fixative agent as this prevents identification beyond genus level.

HIGH RISK stickers must be used if *Taenia solium* is suspected.

- Sample type: **Other worms, part or whole** – please send as they are or in saline, **DO NOT** send in formalin or other fixative agent.
- Sample type: **Standard Stool samples** – please forwarded with minimum delay. (A minimum of two separate samples should be examined before a diagnosis is excluded.)

Detection/identification of human helminths of medical importance by Serology

- Serology in-house is available for Cysticercosis, Fascioliasis, Filariasis, Schistosomiasis, Strongyloidiasis, Toxocariasis, Trichinosis and Hydatid. Paragonimiasis, Angiostrongyliasis, Anasikiasis and Gnathostomiasis are referral tests and not conducted at the HTD. Please see individual sections of this user manual for information on these.

We are unable to provide serological diagnosis for other helminth infections.

Intestinal Protozoa
(See also Amoebiasis, Cryptosporidiasis, cyclosporiasis, Giardiasis and Microsporidia)

For the major parasitic causes of human gastroenteritis, please see individual sections on Amoebiasis, Cryptosporidiasis, Cyclosporiasis Giardiasis and Microsporidia. In addition, non-pathogenic protozoa such as: *Entamoeba coli, Entamoeba hartmani, Entamoeba dispar* (indistinguishable from *Entamoeba histolytica* as cysts by morphology), *Iodamoeba buetschlii, Endolimax nana, Chilomastix mesnili* and *Blastocystis hominis* will also be reported if viewed by microscopy.

Diagnosis of intestinal protozoa by microscopy

- Sample type: **Stool samples** for the demonstration of trophozoites, cysts and oocysts should be forwarded with the minimum of delay (other sample types may also be analysed).

For further information on the diagnosis of intestinal protozoa by microscopy please refer to the relevant section(s) of this manual.

Diagnosis of intestinal protozoa by PCR

- Sample type: **Stool samples** for the demonstration of trophozoites, cysts and oocysts should be forwarded **without fixatives** (other sample types may also be analysed).

PCR is currently available only for Giardiasis, Cryptosporidiasis, Amoebiasis and Cyclosporiasis. For further information on the diagnosis of these protozoa by PCR please refer to the relevant section(s) of this manual.

Diagnosis of intestinal protozoa by serology

For *Entamoeba histolytica* infection, serology gives very good results in cases of amoeboma. In amoebic colitis the test is positive, often at low titre, in about 75% of cases. In cyst passers it is often negative and in other cases it may be positive because of past infection. The test is therefore not suitable for the investigation of vague abdominal symptoms or as a routine check. For further information on the diagnosis of amoebiasis please refer to the relevant section of this manual.

For Giardiasis and other intestinal protozoal pathogens we are unable to offer serological investigation. Please send a stool sample for PCR and Microscopy – please refer to the relevant section(s) of this manual.

Leishmaniasis

Leishmaniasis is an obligate intracellular protozoal infection. Human leishmaniasis can be caused by multiple species of *Leishmania*, classically divided into Old World (Eastern Hemisphere) and New World (Western Hemisphere). It is transmitted by the bite of a sandfly and may be classified as Cutaneous, Mucosal (previously known as Mucocutaneous) and Visceral according to travel history and clinical presentation.

Cutaneous leishmaniasis is the most common form, resulting in skin nodules and often subsequent ulceration. Visceral leishmaniasis usually affects the spleen, liver, and bone marrow, and can be fatal if left untreated. Patients usually present with fever, weight loss, splenomegaly, hepatomegaly and pancytopenia. Mucosal leishmaniasis can be a sequela of cutaneous leishmaniasis acquired in Latin America (most commonly, but not restricted to, the sub-genus *L. Viannia*).

The different species are morphologically indistinguishable, but can be differentiated by other diagnostic techniques detailed below.

Please do not send unfixed samples over the weekend (it is better to store samples in the fridge over the weekend before sending to reduce bacterial/ fungal growth).

Please send a travel history with all specimens (this is essential for species determination).

Diagnosis of Cutaneous and Mucosal Leishmaniasis by microscopy

- Sample type: **Punch Biopsy** – Take from the edge of the lesion. Ideally placed in a small volume of sterile saline in a suitable sterile container (DO NOT FREEZE AND WHERE POSSIBLE AVOID FIXING SINCE THIS WILL AFFECT CULTURE AND PCR – see below).

If histology is required, please take a second biopsy, or cut original biopsy in half vertically through the epidermis and tissue. Put half in sterile saline for Parasitology and half in formal saline for histology.

- Sample type: **Slit skin smears**; Take from the edge of the lesion, onto a slide. Air dry and then fix with methanol.

Diagnosis of Visceral Leishmaniasis by microscopy

- Sample type: **Bone marrow or Splenic aspirate** – please provide two methanol fixed slides and a **small** amount (less than 1ml) of sample in a sterile EDTA tube (e.g. Vacutainer purple top).
- Sample type: e.g. **Biopsies** – Microscopy based diagnosis of Leishmaniasis may be performed on sample types other than bone marrow or splenic aspirate under consultation with the Department of Clinical Parasitology. Please phone for advice if considering such an investigation.

In cases of suspected visceral Leishmaniasis, an attempt should always be made to find Leishmania from aspirated/ trephine material (bone marrow or spleen) – contact laboratory for advice.

- Sample type: **Histology Sections** – if histology is required, please contact the Department of Clinical Parasitology so this may be actioned as a referral test.

Diagnosis of Cutaneous, Mucosal and Visceral Leishmaniasis by PCR

PCR can be used to detect (with very high sensitivity) and identify the species of *Leishmania* when an accurate travel history is provided. Contact microscopy section of laboratory for advice.

- Sample type: **Unfixed tissue** – see above for information on **Biopsies, Bone marrow or Splenic aspirate and Slit skin smears**. In addition Leishmania PCR may also be performed on additional unfixed samles such as **Vitreous fluid** and **BAL** under consultation with the Department of Clinical Parasitology. Please phone for advice if considering such an investigation.
- Sample type: **Fixed tissue** – please send at least 6 normal thickness sections in a small screw capped or Eppendorf (snap lip) tube.

The Fixation of tissue containing DNA is known to significantly decrease the sensitivity of PCR based diagnostics and therefore we request unfixed tissue where possible.

Diagnosis of Visceral and Mucosal Leishmaniasis by serology

- Sample type: a **minimum** or 0.5ml of **serum** is required.

Note: negative serology does NOT exclude the diagnosis of visceral leishmaniasis in heavily immunosuppressed patients.

Serology is **NOT** helpful in the diagnosis of cutaneous infections.

Serology is usually positive in mucosal leishmaniasis, except in early cases.

A Direct Agglutination Test (DAT) for Leishmaniasis using formalinised promastigotes of *Leishmania donovani* stained with Coomassie blue is the standard serology test and a rapid test (rK39) antibody detection assay is also provided. The DAT is considered positive when the titre exceeds 1600 and in visceral leishmaniasis titres may rise to 51,000 or above. The rK39 antibody test is reported as positive or negative, with no titre available.

Microsporidiosis

Microsporidiosis is an opportunistic disease typically affecting immunocompromised patients. Microsporidia have now been re-classified as fungi and consist of several species. *Enterocytozoon bieneusi* and *Encephalitozoon intestinalis* are most commonly found in the small intestine, whereas *Encephalitozoon cuniculi* may be systemic in location. *Encephalitozoon hellem* may present as cause of ocular lesions or keratitis. Although rare, *Trachipleistophora hominis* may be detected in muscle biopsies by PCR and microscopy, and *Vittaforma corneae* in ocular samples (including corneal scrapes) for investigation of keratitis.

Diagnosis of Microsporidiosis by microscopy

Microscopy is rarely used in the diagnosis of microsporidiosis due to molecular techniques showing significantly improved sensitivity and the ability to identify the infecting species. Microscopy may be attempted on individual high value, small volume samples such as corneal scrapes, where the entire sample may be analysed for a small number of spores, although PCR is preferable.

Sample type: please consult the Department of Clinical Parasitology for advice if considering such an investigation.

Diagnosis of Microsporidiosis by PCR

- Sample type: **Unfixed stool, tissue and urine samples**.

Stool samples for the molecular test must NOT be in any fixative as this may cause false negatives.

Please note: requests for microsporidiosis should be clearly marked.

The molecular test for microsporidial species offers several advantages over standard microscopy. The assay is significantly more sensitive (greater than one hundred fold improvement in the limit of detection) than light microscopy. In addition, the assay is semiquantitative and can therefore reveal detailed information on the response of a patient's parasitic load to subsequent drug therapy. Finally, the assay can differentiate between morphologically identical microsporidia, a feat only possible previously with electron microscopy.

Please note this test has not been validated on tissues and urines but will still be performed upon request.

Diagnosis of Microsporidiosis by serology

Serology is NOT available for these parasites.

Malaria

Malaria remains endemic in many countries and can be fatal if left undiagnosed. There should not be a delay in testing if the clinical history and epidemiology suggests a possible diagnosis of malaria.

Diagnosis of Malaria by Microscopy (essential for a suspected medical emergency)

All suspected acute malarial infections MUST be urgently diagnosed by slide microscopy.

- Sample type: A **minimum of 2ml of EDTA anti-coagulated blood** sent without delay.

Diagnosis will be made by thick and thin film microscopy, ideally using fresh blood. Delay in receipt of an EDTA specimen can adversely affect the integrity of the sample and consequently make accurate diagnosis difficult.

For users other than University College London Hospitals NHS Trust, please make 2 thin and 2 thick films for examination and send together with any original slides from the blood sample in addition to the original blood sample.

Samples are also screened with a Rapid Diagnostic Malaria Antigen Test (RDT). This utilises lactate dehydrogenase (LDH) for pan-malarial species detection and Histidine-rich protein (HRP-2) for *Plasmodium falciparum* specific identification. Please note, due to rare gene deletions in *Plasmodium falciparum* species, this test can result in false negatives and we recommend its use in conjunction with microscopy.

Malaria serology is **NOT** suitable for diagnosing acute infection.

Diagnosis of Malaria by PCR

This is useful for suspected slide negative, sub patent, on going malaria infections and species identification where morphology is inconclusive.

- Sample type: A **minimum of 0.5ml of EDTA anti-coagulated blood**.

For suspected malaria infections that are repeatedly negative by slide microscopy, highly sensitive diagnosis may be made by the use of species specific PCR. Alternatively, where the morphology is inconclusive, species identification may be performed on old microscopy positive bloods to identify *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi*.

Diagnosis of Malaria by Serology

This is useful for suspected past infection and blood, tissue and organ donor screening.

- Sample type: A **minimum** of 0.5ml of **serum** or EDTA **plasma** is required.

Serology for malaria may be requested for the following reasons:

- If for some reason it is important to attempt a retrospective diagnosis.
- For the investigation of splenomegaly or nephrotic syndrome in a patient who might have been exposed to malaria.
- For donor screening where the donor has potentially been exposed to malarial infection.

It is NOT recommended for the investigation of acute fever, as urgent blood film examination is the method of choice. An ELISA assay is performed using *Plasmodium falciparum* and *vivax* antigens. Positive results will be reported as an optical density and a cut-off point will be stated.

Sera/plasma from suspected Tropical Splenomegaly Syndrome patients will be tested by IFAT if the ELISA is positive.

The malaria ELISA used cannot be used to identify the species in malaria infections.

Schistosomiasis

Schistosomiasis is a helminth infection contracted when infective cercariae penetrate the skin of the human host during exposure to infected water (e.g. swimming and bathing). Fertilised females lay eggs which are shed via the lumen of the intestine (*S. mansoni* and *S. japonicum*) and of the bladder and ureters (*S. haematobium*), to spread via faeces or urine. Symptoms may include fever, cough, abdominal pain, hepatosplenomegaly, eosinophilia and bloody diarrhoea for *S. mansoni* and *S. japonicum* or hematuria for *S. haematobium*.

Diagnosis of Schistosomiasis by microscopy

- Sample type: **terminal urine, stool samples and unfixed biopsy**.

Definitive diagnosis is by demonstration of the characteristic ova in clinical material. Deposition of ova commences at about six weeks after exposure to the infection but their first appearance (e.g. in urine) may be delayed for several (typically three) months. Confirmation of *Schistosomiasis* by finding ova should be sought where possible.

For *S. haematobium*, **a terminal urine sample (the last 10 to 20ml of urine passed)** is required.

For *S. mansoni* (and *S. japonicum*) **standard stool samples** are the ideal specimens.

Given that *S. mansoni* and *S. haematobium* overlap in geographical distribution and can affect both genitourinary and alimentary systems both terminal urine and stool samples should be sent from all patients being investigated for schistosomiasis when serology is positive.

Biopsy material (unfixed) from rectum, sigmoid or bladder is valuable for the detection of ova by crush preparation and permits assessment of their viability. If biopsies are taken, fixed material should also be sent for histology. Rectal/sigmoid scrapings are also useful samples for the diagnosis of schistosomiasis. Such samples must be sent to the laboratory by prior arrangement only.

Diagnosis of Schistosomiasis by PCR

- PCR is NOT available for these parasites within the Department of Clinical Parasitology.

Diagnosis of Schistosomiasis by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required.

The test should be requested on patients known to have been exposed to fresh water in endemic areas. It starts to become positive approximately six weeks after exposure. In asymptomatic individuals though to have acquired schistosomiasis, serological testing should be delayed until three months post exposure.

The ELISA is reported to detect about 96% of *Schistosoma mansoni* and 92% of *Schistosoma haematobium* infections. The test does not distinguish active from treated infections. The actual time taken to become seronegative post treatment varies, but in some patients the test may remain positive for over two years after treatment.

Positive results are reported at Levels 1 to 9. Levels 1 and 2 are regarded as weak positives; Levels 5 and over are strong positives.

It is known that patients may become seropositive through contact with cercaria from animal species of schistosome and probably when harbouring unisexual infection with human species.

The schistosomal egg antigen used in the ELISA may cross-react with the sera of trichinosis cases or with those of hepatitis cases in some instances.

Currently it is not possible to identify the infecting species using our Schistosomal ELISA test.

It is not recommended to retest patients post treatment for at least 18 months after the completion of treatment.

Strongyloidiasis

Strongyloidiasis is a disease caused by a soil-transmitted nematode. It is the result of free living filariform larvae penetrating the human host skin to initiate infection and migrating to the small intestine where they lay their eggs. Larvae are passed in the stool and can cause autoinfection, contributing to lifelong carriage. It is commonly acquired in tropical and subtropical areas, but cases also occur in temperate areas.

It is often asymptomatic but can be associated with mild abdominal symptoms including bloating, pain, diarrhoea and constipation. In mild disease, it can also cause a dry cough and skin rashes. Strongyloidiasis is an occasional cause of Loeffler's syndrome and, in fulminating cases, may cause secondary bacterial septicaemia or meningitis. Rarely, hyperinfection syndrome can occur, which is life-threatening. Patients on immunosuppressive agents, transplant recipients, or those co-infected with HTLV-1 are at greater risk of this.

Testing for Strongyloides is indicated for the investigation of eosinophilia or if there is a good clinical history to suggest strongyloidiasis.

Diagnosis of Strongyloides by microscopy

- Sample type: **Standard stool sample.**

Faecal specimens should NOT be refrigerated before sending if Strongyloides culture is required.

Direct observation of *Strongyloides* larvae is achieved by faecal microscopy and stool culture. The larvae may not be present in every specimen.

- Sample type: **duodenal/jejunal aspirates, BAL (bronchoalveolar lavage) and Sputum**

Strongyloides larvae (and adults) can also be demonstrated in the above samples. Sputum may be useful in cases of hyperinfestation. None of these samples will be analysed by culture.

Diagnosis of Strongyloides by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required.

There is known to be cross reaction between filaria and strongyloides antibody in ELISA tests.

Strongyloides serology may be negative in cases of strongyloides hyperinfestation.

After treatment, we do not recommend follow up serology until at least a year after treatment.

Toxocariasis

Toxocariasis occurs following the ingestion of embryonated eggs in infected dog (*Toxocara canis*) or cat (*Toxocara cati*) faeces. Occasionally infection may occur from ingestion of encysted larvae in paratenic hosts. Infections are often asymptomatic except for eosinophilia but occassionaly result in Visceral Larva Migrans with concurrent symptoms (fever, anorexia, weight loss, cough, wheezing, rashes, hepatosplenomegaly) and Ocular Larva Migrans to produce various ophthalmologic lesions.

Diagnosis of Toxocariasis by microscopy

- Sample type: **Standard stool samples**.

Stool samples may be examined for putative intestinal infections.

Diagnosis of Toxocariasis by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required.

Serology is the method of choice for the diagnosis of toxocariasis. The ELISA is usually performed on serum, but can be undertaken on aqueous humour, vitreous humour or CSF under the guidance of the Consultant Parasitologist. Please contact the serology section if you intend to send any non-serum samples.

The Toxocara IgG antibody ELISA test against larval excretory/secretory antigen is the most appropriate method for diagnosis. Sensitivity is 91% and specificity is 86% (with cross reactivity possible with strongyloidiasis, trichinosis, amoebiasis and fascioliasis). Results are expressed as an optical density value.

Positive ELISA tests will be confirmed using a Western blot. Sera that are high negative by ELISA will also have a Western blot performed. All CSFs requiring analysis for Toxocara antibody will have a Western blot performed, as the ELISA is not validated for this sample type.

Negative Toxocara serology on serum does **NOT** exclude ocular toxocariasis. Vitreous sampling may be necessary to confirm or exclude ocular toxocariasis. Please contact the Consultant Parasitologist for queries about ocular toxocariasis.

Toxoplasmosis

Toxoplamosis diagnosis is NOT routinely performed by the Department of Clinical Parasitology.

Please refer samples and enquires about this infection to the Toxoplasma Reference Laboratory (TRL) at Singleton Hospital, Swansea (General enquiries: 01792 285058).

The use of microscopy to detect the presence of Toxoplasmosis in samples may be undertaken in specific cases following consultation with the Department of Clinical Parasitology.

Trichinosis

Trichinosis (also know as Trichinellosis) is caused by the ingestion of encysted larvae of *Trichinella* spp. within undercooked meat. Larvae are released, mature and mate in the small intestine to produce more larvae which migrate and encyst, most commonly in striated muscle. Initial symptoms are predominantly abdominal including nausea and vomiting, abdominal discomfort, diarrhoea and can include fever and fatigue. As the larvae encyst, they can result in further fevers, facial swelling, muscle pains, pruritus and diarrhoea/constipation.

Diagnosis of Trichinosis by microscopy

- Sample type: **muscle biopsy**.

Crush/digested preparations of muscle biopsy specimens may reveal larvae.

Biopsies should also be fixed and sent for histology.

Diagnosis of Trichinosis by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required.

Serology is the mainstay for diagnosing this condition.

Except in the rare event of an outbreak in the UK, serology is usually requested for symptoms suggestive of the stage of muscle encystment: myalgia, eosinophilia, and, in the early stages, fever. The IFAT (screening titre 1/32) has proved reliable and specific with positive titres of about 1/128.

Trypanosomiasis (Overview)

(Human) African trypanosomiasis (HAT) is caused by *Trypanosoma brucei rhodesiense* or *gambiense* following the bite of an infected Tetse fly. This disease is restricted to Africa. The Department of Clinical Parasitology should be IMMEDIATELY notified about any suspected cases of African trypanosomiasis sent for diagnosis to ensure that the samples arrive correctly and are rapidly progressed as disease progression to Stage 2 (CNS involvement) can be rapid.

American trypanosomiasis (Chagas disease) is caused by *Trypanosoma cruzi*. Once confined entirely to the Americas, it has now spread to other continents. Testing is most generally performed following suitable travel or clinical history or to screen potential organ donations.

Please include relevant travel and clinical history with all requests for Trypanosomiasis so that the correct testing may be performed.

African Trypanosomiasis

Diagnosis of (Human) African Trypanosomiasis by microscopy

- Sample type: A **minimum** of 2ml of **EDTA anti-coagulated blood** and/ or as much CSF as you can spare.

Trypanosomes quickly disintegrate upon removal from the body, therefore, it is vital that specimens for microscopy are examined rapidly. EDTA whole blood must be examined within 24 hours and CSF within 20 minutes of taking the sample.

If there is the possibility of a delay in the receipt of EDTA whole blood for microscopy, films should be made locally for examination.

Diagnosis is made by examining stained blood films or CSF in cases with neurological involvement.

Diagnosis of (Human) African Trypanosomiasis by serology

- Sample type: A **minimum** of 0.5ml of **serum** or as much CSF as you are able to spare where neurological involvement is suspected.

Sera are screened by IFAT for *Trypanosoma brucei*.

Please give the relevant travel history so that the appropriate species can be tested for *Trypanosoma brucei rhodesiense* and *gambiense*, which have different geographical locations in Africa and are tested by different IFAT slides.

American Trypanosomiasis (chagas disease)

Diagnosis of Chagas disease by microscopy

- Sample type: A **minimum** of 2ml of **EDTA anti-coagulated blood**

Microscopy on blood films can be performed for diagnosis of *T. cruzi* following consultation with the Clinical Parasitologist. Bloods should be taken for examination within two months of the acute phase of infection or reactivation in cases of immunosuppression.

Diagnosis of Chagas disease by PCR

- Sample type: Two tubes of 5ml of **EDTA anti-coagulated blood**

This test is referred to the London School of Hygiene and Tropical Medicine. Please contact the Clinical Lead for Parasitology before requesting this test.

Diagnosis of Chagas disease by serology

- Sample type: A **minimum** of 0.5ml of **serum** is required for serological analysis.

Screening and serodiagnosis of *T. cruzi* is performed by ELISA plus IFAT.

Visceral Larva Migrans

Visceral larva migrans (VLM) is a condition in humans caused by the migratory larvae of certain nematode species Serology offers almost the only prospect of specific diagnosis. Please contact the Department of Clinical Parasitology where further information is required regarding testing for filariasis, strongyloidiasis, toxocariasis and other helminths where appropriate. Please see specific sections for the diagnosis of helminth infections in this manual.

HSL Rapid Response Laboratories

The HSL Pathology Service comprises core laboratories, which are the centralised services based in the Halo Building, Central London, and four Rapid Response Laboratories based locally, serving University College London Hospitals, Royal Free London Hospital, Barnet and Chase Farm Hospitals, and the North Middlesex University Hospital.

UCLH Rapid Response Laboratory (RRL)

60 Whitfield Street, London W1T 4EU

HSL UCLH RRL is a UKAS Accredited Medical Laboratory No. 10204.

Royal Free London Rapid Response Laboratory (RRL)

Pond Street, London NW3 2QG

HSL RFH RRL is a UKAS Accredited Medical Laboratory No. 8793.

North Middlesex University Hospital Rapid Response Laboratory (RRL)

Level T0, Main Building, North Middlesex Hospital
Sterling Way, Edmonton, London, N18 1QX

HSL NMUH RRL is a UKAS Accredited Medical Laboratory No. 9354.

Barnet General Hospital Rapid Response Laboratory (RRL)

(also serves Chase Farm Hospital)
Level 3, Wellhouse Lane, Barnet
Hertfordshire EN5 3DJ

HSL BCF RRL is a UKAS Accredited Medical Laboratory No. 8359.

Clinical services

Blood Transfusion

Clinical services offered are:

- Blood grouping
- Antibody screening and Identification
- Estimation of foetal maternal haemorrhage
- Red cell phenotyping
- DAT
- Issue of blood components

HSL blood transfusion laboratories adhere to a strict zero-tolerance policy for sample labelling and acceptance criteria, in line with national guidance.

Routine Haematology

Clinical services offered are:

- Full blood counts
- Reticulocytes
- ESR
- Blood and Bone Marrow Morphology
- Malarial Parasite
- Infectious mononucleosis diagnosis
- Routine coagulation tests

Clinical Biochemistry

The RRLs carry out routine biochemistry testing.
Other tests are analysed at the Halo Building, including:

- Tumour markers
- Specialised Proteins
- Drugs of abuse

Immunology

Immunology tests are analysed at the Halo Building.

HSL Rapid Response Laboratories

Point of Care Testing at UCLH RRL

Services provided near patients (satellite laboratories)

- 1st Trimester combined screening service (UCLH)
- HbA1c monitoring – Adult Diabetes Outpatient clinic (UCLH)
- Intra-operative parathyroid hormone measurements (Parathyroidectomies at UCLH, RF, BCF)
- Support with POCT devices used in the Trusts

Haemostasis (Specialist Coagulation) Services

Diagnosis, treatment and monitoring of inherited and acquired coagulopathy disorders including:

- Thrombotic disorders.
- Haemophilia and acquired bleeding disorders.
- Thrombotic Thrombocytopenia Purpura (TTP), Atypical Haemolytic Uraemic Syndrome (aHUS) and Thrombotic Microangiopathies (TMAs).
- Molecular Genetics services in inherited bleeding disorders and thrombophilia

Staff /Key personnel

Royal Free Hampstead - Main Switchboard: 020 7794 0500

GENERAL			
HSL Helpdesk	**Monday-Friday 09:00-17:00**	Call 020 3758 2070, internal number 38858	

CLINICAL STAFF			
Consultant Haematologist responsible for Blood Transfusion Department Clinical Lead/ Laboratory Lead	**Dr Mallika Sekhar**	mallika.sekhar@nhs.net	Ext 34936 or Bleep 71-2639
Consultant Haematologist	**Dr Momin Ahmed**	momin.ahmed@nhs.net	020 7794 0500 Ext 35173
Consultant Chemical Pathologist and Clinical Lead	**Dr M. Ewang**	mfon.ewang@nhs.net	Ext 33489 Direct Line: 020 7472 6694
Consultant Haematologist and Co-Centre Director and Clinical lead for Coagulation for Royal Free and HSL	**Dr Pratima Chowdary**	pratima.chowdary@nhs.net	Ext 35921
Haematology SpR. Rotational SpR cover for blood transfusion			Bleep 71-1811
Transfusion Practitioner, RFH Hampstead site	**Anna Li**	Anna.li@nhs.net	Ext 35875 Bleep 71-2033
Specialist Registrars Clinical Biochemistry			Ext 5195
Consultant on call, Clinical Biochemistry through air call (24h)			Available via switchboard

LABORATORY STAFF			
RRL Manager	**Saida Solkar**	saida.solkar@nhs.net	Ext 33266 020 7820 2082
Lead BMS Blood Transfusion, HSL Scientific Lead for Blood Transfusion	**Rita Atugonza**	rita.atugonza@nhs.net	Ext 33392 020 7830 2150
Lead BMS Routine Haematology	**Yan Kit Man**	yankit.man@nhs.net	Ext 33662 020 7794 0500
Lead BMS Clinical Biochemistry	**Oghenemega Okotete**	oghenemega.okotete@nhs.net	Ext 38857 Bleep 2797
Specimen Reception Manager	**Jill Price**	jill.price2@nhs.net	Ext 32943
Blood Sciences Quality Manager	**Paulo Leite**	paulo.leite@hslpathology.com	Ext 36567
Biochemistry Quality Manager	**Stan Hoeck**	stan.hoeck@hslpathology.com	07971 474928
Duty Biochemist Scientist, Clinical Biochemistry		duty.biochemist@hslpathology.com	020 3908 1362
Point of Care Testing Area Manager (RFL and BCF)	**Felicity Blake**	felicity.blake@hslpathology.com	Ext 38464/38742 Bleep 2459

Barnet General Hospital - Main Switchboard: 020 8216 4600 (also serving Chase Farm Hospital)

GENERAL			
HSL Helpdesk	**Monday-Friday 09:00-18:00**		Ext 64885

CLINICAL STAFF			
Consultant Chemical Pathologist and Clinical Lead	**Dr Puja Ayrton**	p.ayrton@nhs.net	Ext 64930
Consultant Haematologist responsible for Blood Transfusion	**Dr Nishil Patel**	nishil.patel@nhs.net	020 8216 4383
Consultant Haematologist	**Dr Maxine Lissack**	m.lissack@nhs.net	
Consultant Haematologist	**Dr Poornima Kumar**	poornimakumar@nhs.net	
Consultant Haematologist	**Dr Andreas Virchis**	avirchis@nhs.net	
Haematology SpR Rotational SpR cover for blood transfusion			Bleep 71-1811
Transfusion Practitioner	**Jipsa Jacobs**		020 8216 4547
Clinical Queries/Duty Biochemist (routine hours) Clinical Biochemistry		duty.biochemist@hslpathology.com	020 3908 1362
Consultant on-call (outside of routine hours) Clinical Biochemistry			Available via switchboard

HSL Rapid Response Laboratories

LABORATORY STAFF			
RRL Manager	**Angus Wyatt**	angus.wyatt@hslpathology.com	Ext 64635
Lead BMS Blood Transfusion	**Ishmael Carboo**	ishmael.carboo@hslpathology.com	Ext 64391
Lead BMS Haematology	**Jayesh Mankani**	jayesh.mankani@hslpathology.com	Ext 64413
Clinical Biochemistry Department Head	**Dean Manchett**	dean.manchett@hslpathology.com	020 8216 4232
Specimen Reception Manager	**Tina Marechera**	tina.marechera@hslpathology.com	Ext 64737
Quality Manager	**Abigail Galea**	abigail.galea@hslpathology.com	020 8216 4391
Point of Care Testing (POCT) Team		RF-TR.Pointof-caretesting@nhs.net	Barnet Ext: 64049/64934 Chase Farm Ext: 51534/51013
Andrology Clinic		Barnet.Andrology@hslpathology.com	020 3912 0366

University College London Hospitals - Main Hospital Switchboard: 020 3456 7890

GENERAL			
HSL Lab Helpdesk			020 3447 9405

CLINICAL STAFF			
Consultant Blood Transfusion and HSL Clinical Lead for Blood Transfusion	**Dr Sam Aliman**	s.alimam@nhs.net	Via switchboard - 020 3456 7890
Consultant Haematologist Department Clinical Lead and HSL Clinical Lead for Haematology	**Dr Rajeev Gupta**	rajeev.gupta1@nhs.net	Via switchboard - 020 3456 7890
Haemostasis SpR Rotational SpR cover for coagulation			Bleep 7044
Haematology SpR Rotational SpR cover for blood transfusion			Bleep 7050
Transfusion Practitioner	**Zeynab Jeewa**	zeynab.jeewa@nhs.net	020 3447 5457
Consultant Chemical Pathologist and Clinical Lead	**Dr Atul Goyale**	Atul.goyale1@nhs.net	Via switchboard - 020 3456 7890

LABORATORY STAFF			
RRL Manager	**Julie Dilling**	julie.dilling@hslpathology.com	07703 609 034
HOD Blood Transfusion	**Reshma Patel**	reshma.patel@hslpathology.com	020 3447 8521 07970 230651
HOD Haematology and HSL Scientific Lead Haematology	**Billy Janda**	billy.janda@tdlpathology.com	020 3447 8961
HOD Clinical Biochemistry	**Chris Wilson**	chris.wilson16@nhs.net	020 3447 9405

LABORATORY STAFF			
Specimen Reception Manager	**Ujiro Ojeanelo**	ujiro.ojeanelo@hslpathology.com	020 3912 0297
Blood Sciences Quality Manager	**Ragini Khurana**	Ragini.Khurana@tdlpathology.com	07890 513 027
Blood Transfusion Quality Manager	**Sofhia Akhtar**	Sofhia.Akhtar@hslpathology.com	020 3447 8521
Point of Care Testing (POCT) Team		uclh.poct@nhs.net	Helpline: 020 344 72950 (x72950)
HOD Haemostasis	**Deepak Singh**	Deepak.Singh@tdlpathology.com	020 3912 0298

North Middlesex University Hospital - Main Switchboard : 020 8887 2000

GENERAL			
Specimen Reception Area	Hours of Operation: 24/7	nmuh.sra@hslpathology.com	020 8887 2263
Results/Enquiries	Hours of Operation: 09:00–18:00		020 8887 2484
Andrology	Hours of Operation: 08:30–16:00	Nmuhandrology@hslpathology.com	020 8887 2925 Same number to make appointments for semen analysis
Biochemistry		nmuhrrl@hslpathology.com	0208 8887 2670 Bleep 147 for emergencies
Haematology		Haematology.nmuh@hslpathology.com	0208 887 2436 or bleep 124 for out of hours
Blood Transfusion			020 8887 2276 020 8887 2679 Bleep 124 for major haemorrhages and out-of-hours
Medirest	GP sample pick up queries		020 8887 2220

CLINICAL STAFF			
Clinical Lead Biochemistry	**Dr Devaki Nair** Dr Nair (or deputy) is based at the Royal Free Hospital	devaki.nair@nhs.net	Mon to Friday: 09:00 – 17:00 Royal Free switch 020 7794 0500 ext. 35083 or 35082 Out of hours (OOH) 07976 111253 or air call via Royal Free switchboard

HSL Rapid Response Laboratories

LABORATORY STAFF			
RRL Manager	**Jacqueline Parvu**	jacqueline.parvu@hslpathology.com	020 8887 2896
Lead BMS Andrology	**Sandra Davis**		020 8887 2925
Head of Biochemistry	**Shazia Yasin**	shazia.yasin@hslpathology.com	020 8887 2670
Duty Biochemist	Mon to Friday: 09:00–17:00	duty.biochemist@hslpathology.com	020 3908 1362
Head of Haematology	**Mohammed Rahman**	mohammed.rahman@hslpathology.com	020 8887 2436
Lead BMS Blood Transfusion	(**Vacant**)		020 8887 2679

Opening times

All RRLs operate a 24/7 service for Specimen Reception, Chemistry, Haematology and Blood Transfusion.

Normal working hours are considered to be 09:00 – 20:00 Monday – Friday.

Out of hours are considered to be 20:00 – 09:00 Monday – Friday and weekends/public holidays. During these periods, a reduced staff complement is present in all sections. Priority is given to urgent and emergency cases.

Contacting the laboratories out of hours:

Royal Free
020 7794 0500 bleep 71-1595

Barnet Chase Farm
020 8216 4600 extension 65037

North Middlesex
020 8887 2263 / 2670

University College London Hospitals
020 3447 9405

Specimens

Specimen reception

Royal Free Hospital

The Pathology Specimen Reception is located on the First floor on the south side of the main RFH building.

Specimen Reception Manager

Jill Price
Jill.price2@nhs.net

University College London Hospital

The RRL and Cellular Pathology joint Specimen Receipt is located on the Ground Floor at 60 Whitfield Street, London. The RRL Specimen Reception is on Floor 1; the Cellular Pathology Specimen Reception is on Floor 2.

Specimen Reception Manager:

Ujiro Ojeanelo
Ujiro.ojeanelo@hslpathology.com

North Middlesex University Hospital

The Pathology Specimen Reception is located on level T0 of the Main Building.

Specimen Reception Manager

Ryhan Anwar
020 8887 2263
Ryhan.anwar@hslpathology.com

Barnet General Hospital

The Specimen Reception is located on Level 3 of the Main Hospital.

Specimen Reception Manager

Tina Marechera
020 8216 4394
Tina.marechera@hslpathology.com

There is a small Specimen Reception room on Lower Ground Floor of Chase Farm Hospital; this is a satellite of the Barnet Specimen Reception.

Factors that significantly affect the performance of the examination or interpretation of results

- Haemolysis, Icterus and Lipaemia significantly affect the results to varying degrees depending on the tests that have been requested
- For serum samples, contamination from EDTA, Fluoride Oxalate and Sodium Citrate as well as samples taken from a drip arm will affect the results to varying degrees and some or all results will not be reported.
- Routine Coagulation samples **must not be underfilled** as this affects the test results.

Specimen acceptance/rejection criteria

Pre-examination sample suitability and integrity is important to the final test result that is reported by the laboratory and/or to the safety of laboratory staff. As a result, the laboratory will **reject** the specimen and not proceed with analysis of samples if the following criteria listed below are not present.

Sample

Essential labelling requirements

- NHS, CHI or Health and Care Number, Hospital number
- Patient's full name or unique coded identifier
- Date of birth and/or hospital number

Desirable labelling requirements

- Date and time of collection (essential)
- Identification of person taking the sample (essential for BT)
- Nature of sample, including qualifying details, e.g. left, distal etc. especially if more than one sample per request is submitted
- For time study samples, such as PD fluids, time of collection of each sample is essential.

Specimens

Request Form (either paper or electronic)

Essential labelling requirements

- NHS, CHI or Health and Care Number*, Hospital number
- Patient's full name or unique coded identifier
- Date of birth and/or hospital number
- Gender
- Patient's location and destination for report
- Patient's consultant, GP or name of requesting practitioner
- Investigation(s) required
- Clinical information including relevant medication
- Date and time sample collected
- Practitioner's contact number (bleep or extension)

Desirable labelling requirements

- Patient's address including postcode

*Use of the NHS number, on paper and electronic patient records, is now a mandatory requirement included within the NHS Operating Framework 2008/9. Patient data should be used to identify the sample up to the point where an NHS or CHI Number is allocated, whereupon this becomes the primary identifier.

Rejection criteria

- Any unlabelled/ partially labelled samples will not be accepted for processing.
- Any samples received labelled with pre-used requests will not be accepted for processing. Repeat samples will be needed.
- Samples delayed for receipt > 24h in the laboratory are not suitable for analysis and therefore will be discarded
- Samples from multiple patients should not be sent in one bag and if in such cases there is evidence of spillage they will be discarded and the requester informed.
- Samples received with needles attached to tubes will be discarded.
- All sample conditions such as specific temperature requirement should be followed i.e. if temperature of the samples need to be maintained at 4°C or body temperature for e.g. cryoglobulins these instructions should be followed. Please refer to pathology test finder for sample requirements.

Specimen transport

All RRLs have regular scheduled transport runs provided by TDL Collect (the company courier service) to carry samples for the centralised departments (special chemistry, Immunology, Virology, Microbiology and Molecular Pathology) to the Halo.

Each RRL receives its specimens by means of services provided by the Trusts, apart from some GP services which are serviced by TDL Collect.

All Trusts operate a pneumatic tube system (PTS) or air chute which connects the wards/clinics and emergency departments to the laboratory. There is usually a separate tube between the emergency department and the laboratory to enable fast receipt and processing of samples. There are local policies in place for the use of the PTS or air chute.

Royal Free Hospital

Samples can be delivered using the pneumatic air chute system or in person (including hospital porters).

Some specimens MUST NOT be sent via the air chute because this will affect the test result.

Routine Haematology, Blood Transfusion and Immunology

All samples can be sent via the air chute.

Cytopathology or Histopathology

No samples must be sent via the air chute.

Clinical Biochemistry

The following samples must NOT be sent via the air chute

- Samples for Ammonia or Blood Gas
- CSF and Urine (universal or sterile pot)
- Samples on ice or heat
- Samples shielded from light

Virology & Microbiology

None of the following samples (in universals or pots) must be sent via air chute

- Biopsies
- CSF
- Bone marrow or Fluid samples

Haemophilia (Specialist coagulation)

The below specialist coagulation samples must not be sent via the air chute when the following tests have been requested.

Note: Samples for Platelet studies (aggregometry, Lumiaggregometry, and platelet nucleotides) and whole blood assays – IMPACT R, PFA-100 and ROTEM must be hand-delivered to the laboratory as soon as possible after collection (within two hours of venepuncture).

SAMPLE	CERNER TEST CODE ON LABEL (WINPATH TEST CODE)
2.7mL Citrate Blood sample (Light Blue top)	CADP, CADR (PFA-100)
2.7mL Citrate Blood sample (Light Blue top) or 10mL Sarstedt Monovette (Green Lid)	PAGG (PAGG)
2.7mL Citrate Blood sample (Light Blue top) or 10mL Sarstedt Monovette (Green Lid)	CHRN (CHRN)
2.7mL Citrate Blood sample (Light Blue top)	IMPR (IMPR – Impact R)
2.7mL Citrate Blood sample (Light Blue top) or 10mL Sarstedt Monovette (Green Lid)	NUCS (NUCS)

Where samples can be sent ensure you:

- Place the specimen bag into a pod. Note: Specimens that are not sent in a pod will break and leak
- Close the pod securely and place in the station
- Enter the destination code (see table)
- Send

DESTINATION CODE	DEPARTMENT	OUT OF HOURS CODE
591	Haemostasis (Haemophilia)	885
885, 595	Rapid Response Laboratory Biochemistry, Haematology & Routine Coagulation	885
596	Blood Transfusion	885
885, 595,	Microbiology	885
885, 595	Immunology	885
885, 595	Virology	885

In the event of a spillage or breakage in the air tube system, contact the site Estates Department and log this as an incident on DATIX.

If there are problems with the pneumatic air chute during working hours Monday to Friday 9:00am to 4:30pm, please call the Estates Department on extension 33254 and log the incident as urgent. For out of hours (4:30pm-8am), contact the shift technicians on extension 34106 or bleep 71-1111.

Delivery in person (includes Hospital porters)

Place the specimen in a leak-proof, sealed plastic biohazard bag designed for specimen transport and deliver as soon as possible to Central Specimen Reception.

COLLECTION TIME	FROM	TIME DELIVERED TO CENTRAL RECEPTION
9.15	Concourse	9.45 – 10:00
10.30	Concourse/Clinics	11:00 – 11:15
11.30	Concourse/Clinics	12.00 – 12:15
14.00	Concourse/Clinics	14.45 – 15:00

There is point-to-point Chute from phlebotomy to SRA for the delivery of routine samples. Any samples that require special transport conditions are delivered from the phlebotomy room at the point the sample is taken.

Transport of specimens out of normal working hours

Samples that are collected by phlebotomists will be delivered to the RRL on weekends and bank holidays from 09:00–12:00. Outside of these times, specimens should be sent via the air chute, delivered in person or arranged through the general portering services.

University College London Hospital

Pneumatic (vacuum) tube system (PTS)

- There is a dedicated chute from A/E to the RRL and a second chute linked to several wards and locations.
- Designated carriers (PODs) must be used at all times.
- Tissue and biopsy samples should not be delivered by PTS.
- The Trust Estates departments (Interserve/ CBRE) are responsible for the pneumatic tube system. All faults or incidents are reported via hospital switchboard: 020 3456 7890 .
- Instructions for use and destination station codes are displayed by each station.

UCH at Westmoreland Street is not on the PTS and hourly scheduled courier runs transport samples to the RRL.

Samples from GP practices must be sent via UCLH Trust transport on the next available collection during the working day.

If a significant delay in sample transportation to the laboratory is anticipated, please discuss with laboratory staff, as sample deterioration may limit the viability of results.

Barnet General Hospital

Hospital porters

Hospital porters will collect samples from wards or outpatient phlebotomy and take them to the RRL.

Pneumatic (vacuum) tube system (PTS)

- There is a dedicated chute from A/E to the RRL and a second chute linked to several wards and locations.
- Designated carriers should be used at all times.
- Tissue and biopsy samples should not be delivered by PTS.
- The Trust Estates department (Bouygues) is responsible for the pneumatic tube system. All faults or incidents should be reported to Bouygues on ext. 64123 or via hospital switchboard out of hours.
- Instructions for use and destination station codes are displayed by each station.

Hand delivery

- Specimens can be delivered directly to the laboratory. If these are urgent, they must be handed directly to staff and signed in the log.
- Patients can drop off their own samples at the laboratory.

GP specimen transport

GP patients are either bled at the Barnet phlebotomy department or out in the community at their own, or nearby, surgeries. TDL Collect, the company courier service, is responsible for collecting these specimens and delivering them to the laboratory in a timely manner.

Transport-related queries should be directed to the Courier department on 020 7307 7373.

Chase Farm Hospital

The RRL at Barnet General Hospital provides Pathology services to Chase Farm Hospital, however there is a small laboratory on the lower ground floor which has a Blood Transfusion fridge and a small sample reception. There is a PTS from some wards/clinics, or samples are brought by porters. An hourly shuttle service between the laboratory at Chase Farm Hospital and the RRL at Barnet General Hospital is provided Mondays to Fridays from 08:00 to 20:00 by TDL Collect. Weekend couriers, if required, are organised by ward/departmental staff via third party providers.

North Middlesex University Hospital

Hospital porters

Hospital porters will collect samples from wards or outpatient phlebotomy.

Pneumatic (vacuum) tube system (PTS)

- There is a dedicated chute from A/E to the RRL and a second chute linked to several wards and locations.
- Designated carriers should be used at all times.
- Tissue and biopsy samples should not be delivered by PTS.
- The Trust Estates department (Bouygues) is responsible for the pneumatic tube system. All faults or incidents should be reported to Bouygues on ext. 2596 or via hospital switchboard out of hours.
- Instructions for use and destination station codes are displayed by each station.

Hand delivery

- Specimens can be delivered directly to the laboratory. If these are urgent, they must be handed directly to staff and signed in the log.
- Patients can drop off their own samples at the laboratory.

GP specimen transport

GP patients are bled at local phlebotomy hubs. The Hospital Estates department (sub-contracted to Medirest) is responsible for collecting these specimens and delivering them to the laboratory in a timely manner. Transport-related queries should be directed to Medirest (0208 887 2220).

Supplies

HSL Facilities Management provide support for consumables and reagents to laboratories and wards, departments and GPs – the extent of this service depends on the individual contracts between HSL and the Trusts.

Barnet/Chase Farm

bcf.pathologystores@hslpathology.com – GPs can use this address to order externally.

North Middlesex Hospital

GPs order supplies by use of formstack (https://pathologyforms.formstack.com/forms/nmuh_pathology_supplies_order_ form)

Royal Free Hospital

The only supplies currently being provided by HSL are Blood Culture kits to the wards and QFit Test kits for GP's.

UCL Hospitals

Orders are sent to suppliesgroup@tdlpathology.com Blood cultures via TDL Collect couriers directly from the Halo; UCLH and CNWL practices only. Formstack order at https://pathologyforms.formstack.com/forms/uch_pathology_supplies_order_form is completed internally by FM (Lab Support).

Drivers delivering specimens from GP surgeries will collect the supplies and deliver to the practices. Within the hospital, Supplies may be delivered to the wards, or pre-ordered goods may be collected from the FM stores in the Pathology department (NMUH and Barnet only).

Request procedures

HSL is contracted to provide results on an urgent and routine basis. There are contractually-defined lists of urgent tests and their target turnaround times (TATs) for each RRL, and these are monitored on a daily basis by laboratory staff and reported on formally at the HSL Board, at Laboratory Operations Committees, Clinical Pathology Advisory Committees and Operational Management Group meetings every month.

Urgent requests

The laboratory defines urgent samples as those where the results are required for immediate patient management. For each individual contract there is a defined list of locations from which samples are always treated as urgent; procedures for requesting urgent testing from other locations differ slightly depending on the Trust.

Barnet / Chase Farm

- A&E / AAU
- CC North and South
- Mulberry Ward
- Victoria Ward
- Maternity Delivery Room
- Starlight Ward (Paediatric and Transitional Care)
- Paediatrics Special Care Unit
- OPAU
- Pre-chemo samples

North Middlesex Hospital

- A&E
- Critical Care
- Ambulatory Care
- Neonatal ICU
- Labour Ward

Royal Free Hospital

- A&E / 2NA / Urgent Care
- MAAU
- IRCU
- Lyndhurst Rooms
- ICU
- Clinic 6 (Haematology only)
- 11 South (Haematology only
- Oncology (only if patient awaiting chemotherapy)
- Pre-chemo samples in a bag labelled 'pre-chemo priority'
- SCBU/NNU (BUT not routine paediatric samples)

UCL Hospitals

- A&E
- AAU
- ITU
- Haematology Wards
- Oncology (only if patient awaiting chemotherapy)
- Pre-chemo samples
- SCBU/NNU (BUT not routine paediatric samples)

Royal Free London

Other urgent samples:

- Samples phoned to extension 38851 help desk option 2 (Hampstead) and requested as urgent prior to sending sample to the laboratory.
- Samples delivered by clinicians directly to laboratory staff and identified to laboratory staff as urgent
- Any requests for blood gases, ammonia, lactate, CSF protein, CSF glucose.

Barnet/Chase Farm

- Samples phoned to 65037 (Barnet), 51786 (Chase Farm) and requested as urgent prior to sending sample to the laboratory

Please note: Samples requested as urgent on Cerner or on the specimen bag (unless specifically requested to do so by the laboratory) will not be treated as such.

Urgent results are usually communicated by telephone, therefore in order to effectively communicate abnormal urgent results the bleep number/telephone number of the clinician requesting the test is required.

If a clinician is offsite outpatient/ward/GP setting and require urgent Contact RFH switchboard and ask them to contact extension 38851 help desk option 2 (Hampstead) or phone 65037 (Barnet).

Provide the laboratory with the details of the patient whose sample you wish to be processed urgently and what tests you would like to request.

Make the request in the usual way ensuring that you have provided a telephone number or bleep number by which the lab can contact you should the results be abnormal. Please note results will be available within 1 hour of the samples receipt by the laboratory.

Package the sample which requires urgent processing separately and make it clear on the packaging that the sample is urgent. Arrange transport of the sample to the laboratory.

North Middlesex University Hospital

Samples from certain locations, such as A/E, will be automatically processed urgently.

For other locations, order comms requests should only be marked as urgent where they are required for the immediate management of the patient. Urgent samples from other locations must be sent in red bags.

It is essential to telephone a Microbiology Consultant before sending an urgent Microbiology request. To prevent delay, it is good practice to telephone Blood Transfusion for all urgent requests.

Requesting additional tests ('add-on' requests)

Under certain circumstances, it is possible to add tests on to samples that are already in the laboratory, but this will depend on sample stability, tube type and, for some tests, there will be timing restrictions. There may not be sufficient specimen to perform the additional tests. Investigations are best performed on fresh primary specimens and where possible, any non-urgent investigations should be deferred until a further phlebotomy episode is being performed.

The availability of a sample for further analysis cannot be guaranteed owing to limits imposed by refrigerated storage space, even if the analyte required is stable for weeks at a time.

It will not always be possible to add on a test if the analyte requested is sufficiently unstable that any result provided would be inaccurate (eg Troponin 24h), or if the quality of the sample is such (haemolysed, lipaemic, icteric) that the result would be inaccurate.

Please note that standard sample retention time will differ according to the nature of the original request. The laboratory will be able to advise if a sample is still in storage and appropriate to the test required to be added retrospectively. Where the laboratory receives a request for an add-on that cannot be fulfilled the user will be advised through the standard laboratory report.

Blood Transfusion accepts additional test and blood component requests over the telephone depending on the sample validity of 72 hours (7-day sample validity is also applicable at UCLH). Blood component requests made by telephone must be made by medical staff, qualified midwives or trained and authorised practitioners.

All requests for urgent add-on tests [only tests that will change management immediately and in our urgent test repertoire] should be requested by contacting the Laboratory. All requests should include the following information; Name of Patient, DOB, Hospital Number, Name of test to be added, Date and time of sample, Contact number/bleep of requestor.

Add on tests requested urgently should be available within 2 hours (if appropriate) of the time the telephone request is received. For non-urgent add on tests requested during working hours, results should be available within 24 hours of the time the email request is received. Requests for add on tests that must be sent to a referral laboratory, or be processed by our specialist sections may take longer.

Chemistry/Haematology samples are not suitable for use when requesting additional testing for virology/serology due to the potential for cross-contamination of samples during the original analysis.

At Royal Free there is an add-on email address for routine requests. This will be monitored Monday to Friday 09:00 – 17:00. rf.biochemhaemaddon@nhs.net

At North Middlesex there is an add-on email address for routine requests. This will be monitored 24/7. nmhpathology.addonrequests@nhs.net

At Barnet there is an add-on email address for routine requests. This will be monitored Monday to Friday 09:00 – 17:00. rf-tr.barnetlab.helpdesk@nhs.net

At UCLH, there is an email for routine add-on requests, monitored Monday – Friday 09:00-17:00. uclh.enquiry.biochemhelpdesk@nhs.net

Results

All results are recorded on the HSL LIMS (Laboratory Information Management System) Winpath. This is interfaced with the electronic patient record of the local Trust:

Barnet/Chase Farm

EPR-RFG

Royal Free

EPR-RFG

North Middlesex

Careflow

UCL Hospitals

EPIC

As soon as results are authorised on Winpath they are transmitted to the Trust systems and are available for viewing by clinical staff.

GPs in all catchment areas can be set up to use the electronic requesting and resulting system T-Quest. Please contact the IT helpdesk on helpdesk@tdlpathology.com.

Providing the GP surgery has been set up to request and receive results via T Quest, results will be electronically downloaded. Requests for missing GP results or requests for copies can be made to the email addresses shown below. These will be re-transmitted electronically or emailed as appropriate.

Each RRL operates a helpdesk for results enquiries:

Royal Free London

Helpdesk: 020 3758 2070

GP results: Rf.pathologyenquiries@nhs.net

UCL Hospitals

Hospital patients: 020 3447 9405
uclh.enquiry.biochemhelpdesk@nhs.net (24/7)

GP and General Enquiries: 020 3447 9953
uclh.pathology@nhs.net
NB: Service is Mon-Fri 09:00-17:00

Barnet/Chase Farm

Helpdesk: 020 8216 4885
rf-tr.barnetlab.helpdesk@nhs.net

North Middlesex

Enquiries: 020 8887 2484
northmid.pathology@nhs.net

A harmonised service for duty biochemist advice is provided from the Halo Building for all clinical users of the RRLs. Clinical Scientists, Chemical Pathologists and Chemical Pathology Registrars from all sites participate in one rota. The involvement of a larger pool of specialists with a wider expertise, both scientific and medical, provides comprehensive clinical support for Biochemistry.

The contact details for this service are:

Telephone: 020 3908 1362
Email: duty.biochemist@hslpathology.com

Please use the email for non-urgent enquiries; it is monitored and responded to at a frequency of not more than 90 minutes between the hours of 09:00 and 17:00 Monday-Friday. For more urgent issues please use the telephone contact.

Critical/Abnormal results

Results falling outside of predefined limits (set by the Royal College of Pathologists) will be phoned to the requesting clinician, GP surgery or patient location as appropriate. See below.

Outside of normal working hours, GP results will be phoned to the relevant deputising service; hospital results will be phoned to a member of the hospital's medical team.

Critically abnormal results will be communicated to the requesting clinician at all times where contactable.

Where not contactable, or out of hours:

- Inpatients – the ward will be contacted
- Outpatients – will be bleeped to the Medical Registrar
- GP results will be telephoned to the NHS emergency service 111.

If contact cannot be made, the local on-call Chemical Pathologist will be alerted (via switchboard).

RRL Haematology Phoning Limits

TEST	LOWER LIMIT	UPPER LIMIT
Haemoglobin (g/L)	<80	>180
WBC	<1.0	>30.0
Malarial Parasites	Positive Ag Screen, Parasitaemia % for P. falciparum	
Platelets	≤50	>600
INR	>4.5,	
APTT Ratio		>6.0
Fibrinogen	<1.0	
Blood Film shows evidence of Blast Cells or diagnosis suggesting of AML/CML/ALL/DIC		

North Middlesex University Hospital

HAEMATOLOGY TEST	RESULT
Wbc	> 50 x 10^9/L
Neutrophils	< 0.5 x 10^9/L
Hb.	< 60 g/L
Hb. (Males)	> 200 g/L
Hb. (Females)	>180 g/L
Platelets	>1000 x 10^9/L
Platelets	< 20 x 10^9/L
Malaria	All Positive results
Any suspected Acute Leukaemia (irrespective of WBC)	All new cases reported to Haem clinical team
Special Haematology	New major Haemoglobinopathy reported to Haem clinical team
Coagulation (non-warfarin patients	PT >40 APTT >50
Coagulation (patients on anti-coagulants)	PT >120s / INR > 5. APTT >80s / APTTR > 6
D-Dimer	>550ug / L FEU

Clinical Biochemistry: Critically abnormal results that will be communicated to the requesting clinician at all times where contactable

ANALYTE (SERUM/PLASMA)		ACTION LIMITS		COMMENTS
		LOWER LIMIT	UPPER LIMIT	
Sodium	mmol/L	120	155	≤ 130 if < 16yrs
Potassium	mmol/L	2.5	6.5 7.1 (pre-haemodialysis sample)	Exclude renal patients. Exclude haemolysis, old samples and EDTA contamination.
Urea	mmol/L		30	≥ 10 if < 16yrs
Creatinine	mmol/L		350	≥ 120 in < 14 years and ≥ 200 in older children (≥ 14 and < 16)
Acute Kidney Injury (Royal Free/Barnet/Chase Farm only) **AKI-1** Only if K > 6.0 mmol/L. Primary Care: If out of hours (OOHs) GP OOHs service or communication next day to GP **AKI-3** All new occurrences **AKI-2** All new occurrences (AKI) – For patients with previous results AKI-2 triggers to be followed.				
Glucose	mmol/L	2.5	25	≥ 15 if < 16yrs
Adjusted Calcium	mmol/L	1.8	3.0	
Magnesium	mmol/L	0.4	2.5	
Phosphate	mmol/L	0.3		
AST	U/L		15 x upper limit of normal (ULN)	10 x ULN if < 16yrs
ALT	U/L		15 x ULN	10 x ULN if < 16yrs
Total CK	U/L		5000	≥ 2000 if < 16yrs
Amylase	U/L		500	
Triglyceride	mmol/L		20	
Carbamazepine	mg/L		25	
Digoxin	ug/L		2.5	Check timing > 6hrs after dose. If Potassium < 3.0mmol/L, this should be phoned with high digoxin result.
Lithium	mmol/L		1.5	
Phenobarbitone	mg/L		70	
Phenytoin	mg/L		25	
Theophylline	mg/L		25	
CRP	mg/L		300	≥ 100 if < 16yrs
Ammonia	umol/L		100	
Conjugated Bilirubin	umol/L		25	Neonates only
Bicarbonate	mmol/L	10		

ANALYTE (SERUM/PLASMA)		ACTION LIMITS		COMMENTS
		LOWER LIMIT	UPPER LIMIT	
Cortisol	nmol/L	50	If 9am Cortisol	Unless part of dexamethasone suppression test
Ethanol	mg/L	100	4000	
FT4	pmol/L		40	
TSH	mU/L		50	
Cyclosporin	ug/L		500 (Renal) 600 (BMT)	
Tacrolimus	ug/L		25 (Inpatients) 20 (Outpatients)	
Bile Acids	umol/L		20	Ante-natal indications only
Urate	umol/L		340	Ante-natal indications only

* Croal B, The Communication of critical and unexpected pathology results. Royal College of Pathologists. Document No. G158. Published: October 2017.

Specialist Services

Lipid Clinics (at Royal Free London only)

The department has a long-standing interest in the management of lipid disorders including familial hypercholesterolaemia. The department hosts a nationally recognised specialist clinical and laboratory service for the management of inherited lipoprotein disorders as well as complex lipoprotein abnormalities and their investigation. It is renowned for providing an integrated service for the management of familial hypercholesterolaemia, with cascade testing supported by clinical nurse specialists. There is also a paediatric service.

Supra Regional Assay Service (SAS) for Cardiovascular Biomarkers (at Royal Free London only)

The SAS service for cardiovascular biomarkers supports the investigation of complex lipoprotein abnormalities. Senior clinicians for the SAS centre can be contacted for advice on appropriate investigations. The centre also supports research and development through a research laboratory. We work with several collaborators both nationally and internationally on projects related to cardiac biomarkers and lipoprotein metabolism.

Any R and D enquiries should be directed to HSL R&D department contact Siddra Noureen at siddra.noureen@tdlpathology.com. Senior staff are always happy to discuss and advise on the appropriate choice of tests as well as providing clinical advice.

Andrology (At North Middlesex and Barnet Hospitals only)

The department operates an appointment only policy for the acceptance of semen samples for analysis. Patients who wish to use the service may book appointments on the following numbers:

North Middlesex University Hospital
020 8887 2925

Barnet General Hospital
020 3912 0366

Appointments can be made hourly from 08:30 to 12 noon Monday to Friday. **Samples can only be accepted if booked as it is a requirement of the Human Embryology and Fertilisation Authority that only one specimen is dealt with at a time**.

Semen analysis is performed on a specimen of semen produced after a minimum of two days' and a maximum of 5 days' abstinence from sexual intercourse. A pre-produced specimen must be brought to Pathology Specimen Reception at the appointed time. It must be collected directly into a pre-weighed specimen container (provided from Specimen Reception) and maintained at body temperature (keep in trouser pocket). **The specimen must be delivered to the laboratory within 1 hour of collection**.

There are no facilities at North Middlesex Hospital for specimen collection. There are no facilities at Barnet.

Results are available:

- Post vasectomy: after 1 day
- Infertility: after 4 days

HSL Virology

HSL Virology provides a modern, rapid and fully comprehensive clinically-led diagnostic and reference service. Clinical services include transplantation, HIV medicine, genito-urinary medicine, infectious diseases, stem cell and solid organ transplant, haematology and oncology, renal dialysis, hepatology, obstetrics and gynaecology, paediatrics, neurology and occupational health.

The service is highly automated, and has an extensive repertoire of serological- and molecular-based tests. It can identify a wide range of viral infections, and monitor viral load levels in patients undergoing antiviral treatments for infections such as HIV 1 and 2, hepatitis B, hepatitis C and cytomegalovirus. We provide a multiplex viral respiratory molecular assay, and a multiplex viral gastroenterology molecular assay to assist in the management and control of infection in the clinical setting.

We also provide an antiviral drug resistance service for patients undergoing treatment for HIV, hepatitis B, hepatitis C and cytomegalovirus, serve as a national reference centre for the diagnosis of congenital cytomegalovirus infection – testing neonatal blood from Guthrie cards – and carry out DNA testing for bacteria associated with sexual health.

This department is a leading site for the training of biomedical scientists, clinical scientists and medical doctors including FY2 trainees and specialty registrars. The department also holds the IBMS pre- and post-registration training approval for completion of the IBMS Registration Portfolio and Specialist Diplomas. HSL Virology is a UKAS Accredited Medical Laboratory No. 8169.

Staff /Key personnel

CLINICAL STAFF			
Clinical Specialty Lead for Virology	**Gee Yen Shin**	geeyen.shin@nhs.net	020 3447 8991

LABORATORY STAFF			
Quality Manager for Molecular Pathology, Genetics, Virology and IT	**Shelley Chaytor**	shelley.chaytor@hslpathology.com or shelley.chaytor@nhs.net	020 7307 7373 Ext: 3508
Molecular Virology Operations Manager	**Melanie Turner**	melanie.turner@hslpathology.com	020 7307 7373 Ext: 3508
Molecular Virology Scientific Lead	**Dr Paul Grant**	Paul.Grant@hslpathology.com	020 7307 7373 Ext: 3508
Senior BMS in Serology	**Quincy Kusi-Appouh**	Quincy.Kusi-Appouh@hslpathology.com	020 7307 7373 Ext 3140
Virology Service Manager	**Wendy Chatterton**	wendy.chatterton@hslpathology.com	020 7307 7373 Ext:3241

Molecular microbiology (Sexual health)

CLINICAL STAFF			
Clinical Specialty Lead for Microbiology	**Robin Smith**	Robin.smith@nhs.net	020 7794 0500

LABORATORY STAFF			
Quality Rep for STI NAAT service	**Simon Stevenson**	Simon.stevenson@hslpatholgy.com	020 7307 7373 Ext: 3516

HSL Virology

General enquiries

Phone: 020 7307 9400

Email

Antiviral Resistance
Molecular.sequencingEnquiries@hslpathology.com

Molecular Pathology (non HIV,HCV, HBV)
Molecular.Virology@hslpathology.com

Blood Borne Viruses PCR (HIV, HCV, HBV)
BBVLab@hslpathology.com

Automated Serology
Automated.Serology@tdlpathology.com

Manual Serology
Viral.Serology@hslpathology.com

Out of hours service

For Molecular Virology, out of hours laboratory testing service is not available on after 5.30pm Mon-Fri, and after 5pm on Saturdays, Sundays and Bank Holidays.

For urgent serology, out of hours testing or for clinical advice, please contact the on-call relevant site Virology Consultant via the switchboard:

Barnet & Chase Farm: 020 8216 4600

North Middlesex: 020 8887 2000

Royal Free: 020 7794 0500

UCLH: 020 3456 7890

For services relating to the molecular STI and urgent out of hours bacterial serology services please use above numbers but ask for the Microbiologist consultant on-call.

Virology specimens

See page 14 for general information on ordering tests, and specimen collection, packaging and transport.

Labelling

The specimen must be labelled with the patient details as on the request form.

Please ensure that electronically created barcodes are placed down the length of the specimen container, not wrapped round it.

Please note that unlabelled samples, or samples with insufficient unique identifiers cannot be processed and will be discarded. Sex cannot be used as a unique identifier.

Containers

Blood should be taken either without anticoagulant (for general serology) or with the appropriate anticoagulant (for most molecular testing; see below). Please contact the laboratory if you are uncertain about the appropriate blood container.

Swabs for virological investigations should be placed immediately in viral transport medium (VTM). Do not use charcoal or microbiology swabs. Please use the VTM provided in the NPS (3ml) and universal viral swab packs (2ml).

Other specimens are collected in generic sterile containers available in wards and clinics or from central stores.

Transport to the Laboratory

Biological Substances; Category A infectious substances must be assigned to UN 2814 or UN 2900, as appropriate, Category B, Clinical Specimens, Diagnostic Specimens, UN 3373

All specimens should be in individual bags to protect them from external contamination.

Key Factors affecting the performance of the test/interpretation of the results.

- Haemolysed, lipaemic and out of date sample containers may give inaccurate test results. EDTA Bloods for HIV Viral Load should be received in the lab within 6 hours of blood collection.
- Heavy blood contaminated CSF may produce results that do not reflect the content of the CSF, but rather what is present in the blood.
- Insufficient sample volume in the STI Aptima tube.

Request procedures

ROYAL FREE LONDON NHS TRUST (ALL SITES)

All routine specimens should be sent to the Central Pathology Reception (SRA) on the 1st floor of the main Royal Free Hospital Building or the Barnet site Rapid Response laboratory, or blood specimens and dry swabs can be sent through the pod system direct to SRA. Respiratory swabs and Faeces must be walked down to the SRA or left for the porters to collect.

For all urgent requests during the laboratory opening hours (Mon-Fri 8am to 5.30pm) the Consultant Virologist, Specialty Registrar, or Section managers should be contacted to discuss the availability of tests. The specimens should be brought directly to the SRA and not left for the porters to deliver.

For requests on Saturdays, Sundays and Bank Holidays (testing available 9am-5pm molecular, 24/7 serology) contact the Medical Virologist on-call via switchboard. All tests will have to be urgently couriered to the core laboratory from the SRA after booking and there has to be sufficient time to process the test within the opening hours.

Where possible please order test request(s) using Cerner or TQuest.

If unable to use the system, send a purple or orange Virology request form with the test request(s) and clinical details.

The following request forms will still be required:

- Multipart single pathology request form: For GPs
- Specialised requests forms: For HIV, HCV, HBV, CMV and Influenza resistance drug resistance testing, CMV Guthrie Card testing.

There must be at least 3 unique patient identifiers on both the requests and the specimens.

For patients suspected with unusual viruses like Dengue, Hanta, West Nile and Chikungunya, please give travel history, dates and clear clinical details. This is required by the referral laboratory where the samples are sent and analysed.

Additional Requests

Please call the laboratory during routine working hours for additional tests. Additional tests can be added onto the original sample for Molecular Virology/Blood Borne Virus PCR within one week of sample receipt, Serology specimens are available for 7 days, unless they are an antenatal sample, transplant or needlestick.

UCLH

All routine specimens from the main hospital sites and Mortimer Market should be sent to the Rapid Response Laboratory (RRL) specimen reception area (SRA) which is located in 60 Whitfield Street.

For all urgent requests during the laboratory opening hours (Mon-Fri 8am to 5.30pm), the Consultant Virologist, Specialty Registrar, or Section leads should be contacted to discuss the availability of tests. The urgent specimens should be brought/sent directly to the SRA and marked clearly.

For urgent requests on Saturdays, Sundays and Bank Holidays (testing available 9am-5pm molecular, 24/7 serology) contact the Medical Virologist on-call via switchboard. All tests will have to be urgently couriered to the core laboratory after booking at the SRA and there has to be sufficient time to process the test within the opening hours.

All tests for virology should be ordered through the EPIC system; Please ensure that there are sufficient clinical details available on the requests either electronic or paper to allow the team to be able to identify the requirements, for testing this is especially important if the samples are to be sent to referral laboratories for specialist testing. Ensure that all the questions asked within the Epic request system are answered.

HTLV viral load testing on either blood or CSF must reach the referral hospital within 24 hours of being drawn. Therefore this test cannot be added onto stored samples.

For HIV, HCV or HBV resistance specimens, it is important to include any information on the patients' treatment regime or if they are treatment-naive.

NORTH MIDDLESEX

All routine specimens from the main hospital sites should be sent to the Rapid Response Laboratory (RRL) specimen reception area located on the North Middlesex Site.

For all urgent requests during the laboratory opening hours (Mon-Fri 8am to 5.30pm) the Consultant Microbiologist, Specialty Registrar, or Section leads should be contacted to discuss the availability of tests. The urgent specimens should be brought/sent directly to the SRA and marked clearly.

For urgent requests on Saturdays, Sundays and Bank Holidays (testing available 9am-5pm molecular, 24/7 serology) contact the Medical Microbiologist on-call via switchboard. All tests will have to be urgently couriered to the core laboratory after booking from the SRA and there has to be sufficient time to process the test within the opening hours.

All tests for virology should be ordered through the Medway system; Please ensure that there are sufficient clinical details available on the requests either electronic or paper to allow the team to be able to identify the requirements, for testing this is especially important if the samples are to be sent to referral laboratories for specialist testing. Ensure that all the questions asked within the Medway request system are answered.

OTHER USERS

All other users of services must ensure that samples are sent to the hospital sites that you have agreed prices/have SLAs with.

Samples must be received with clear requests with clinical details, and clearly labelled specimens.

ALL USERS

Any additional requests for tests to be added to samples which have been stored must be requested by email (see contact emails above), with sufficient information to positively identify the sample/patient to which these tests are to be added.

Specialities

Within the Virology Department, there are four main diagnostic sections; Virus Detection, Virus Serology, Molecular HIV and Hepatitis, and Anti-viral Drug Resistance.

Molecular Virology (Floor 5)

This section uses Real-time PCR techniques for the detection of viral nucleic acid in clinical samples. PCRs routinely performed in the Virology Department are for the detection of:

- Adenovirus (Qualitative & Quantitative)
- Herpesviruses (HSV 1 & 2, VZV, (Qualitative), CMV, EBV (Qualitative & Quantitative), HHV6 (Quantitative), HHV8 (Qualitative & Quantitative)
- Enterovirus
- Parvovirus B19
- Respiratory viruses (RSV, Influenza A/B, Parainfluenza 1/2/3/4, Rhinovirus, Human Metapnuemovirus, Enterovirus, Adenovirus, and Coronavirus, parechovirus)
- Influenza A typing
- MERS-CoV
- COVID-19 PCR (SARS-CoV-2)
- Gastroenteritis (Sapovirus, Norovirus type I and II, Rotavirus, Astrovirus, Adenovirus and Adenovirus Group F)
- BK PCR Quantitative
- Qualitative JC PCR
- HIV-1 Proviral DNA
- HIV-2 genome detection and viral load
- Hepatitis E RNA Quantification
- Hepatitis D RNA Quantification
- Viral CSF panel (available viruses: CMV, HHV6, Enterovirus, Parechovirus, VZV PCR, HSV 1 & 2 PCR)
- 16 & 18S sequencing
- Genital Ulcer PCR (Syphilis, HSV 1 & 2)

Viral Serology (Floors 1 and 2)

This section detects viral antibodies (IgG and IgM) and antigens in patient serum using manual and automated assays and are split over two floors depending on whether it is a manual or automated process:

Floor 1 Automated

- COVID-19 Total Antibodies (SARS-CoV-2)
- HIV 1 & 2 Ag /Ab screening, HIV 1&2 Ag/Ab confirmation
- HBsAg screening, HBsAg confirmation and HBsAg quantification
- HB 'e' markers Ag and Ab
- HB core Total and IgM
- HBsAb
- HCV Ab screening, HCV Ab confirmation
- HCV Ag screening
- Hepatitis D total antibody
- Hepatitis A Total and IgM
- CMV IgM, IgG and Avidity
- Rubella IgM and IgG
- Human T-lymphotropic virus (HTLV) 1 & 2 IgG
- VZV IgG
- HSV 1 & 2 IgG
- Epstein Barr Virus (EBV) VCA IgG, IgM and EBNA IgG
- Parvovirus IgM and IgG
- Measles IgM and IgG
- Mumps IgM and IgG

Floor 2 Manual

- HSV type specific IgG
- Hepatitis E IgM and IgG

Blood-borne Virus Laboratory, floor 2

This section detects either RNA or DNA in patient samples allowing the quantification of virus levels.

- Hepatitis B viral load
- Hepatitis C viral load
- Hepatitis C Genotyping (performed on floor 5)
- HIV-1 viral load in Plasma and CSF
- HIV-1 qualitative PCR

Anti-viral Drug Resistance, floor 5

This section looks for mutations that confer resistance to specific types of drugs in the viruses present in patient samples.

- HIV drug resistance (NRTIs, NNRTIs, PIs, Fusion inhibitors, Integrase inhibitors)
- HIV genotypic tropism assay
- Hepatitis B genotyping and drug resistance
- Hepatitis C genotyping and drug resistance, including NS3, NS5a and NS5b
- CMV Ganciclovir resistance. UL97 and UL54

Molecular microbiology (Sexual health)

The department tests for DNA from:

- *Chlamydia trachomatis*
- *Chlamydia trachomatis* serovars L1, L2 & L3 (lymphogranuloma venereum)
- *Mycoplasma genitalium*
- *Neisseria gonorrhoea*
- *Trichomonas vaginalis*

And mRNA from:

- Human Papillomavirus

For *Ureaplasma urealyticum/parvum* and *Gardnerella vaginalis*, see the TDL Lab Guide.

For Herpes Simplex Virus 1 and 2, and syphilis, see above.

Samples

Testing cannot be performed on swabs which have charcoal or gel additives in the tubes or Roche PCR swabs, as these are inhibitory to the PCR processes.

Acceptable samples types are swabs (preferably in Aptima tubes) from appropriate body sites, 1st catch urines in sterile containers and Thinprep.

Chlamydia trachomatis

Allow 6 weeks before re-testing to avoid picking up the DNA from a previous infection.

Lymphogranuloma venereum (LGV)

Investigation for possible LGV symptoms is by PCR swab taken from the rectum and penis. If LGV infection is suspected in female patients, cervical and vaginal PCR swabs should be taken. Samples are first tested for chlamydia. If chlamydia is detected, LGV is suspected and if requested, the same swab samples can be tested for LGV as an additional test. Sexual contact partners should also be checked.

Mycoplasma genitalium

M. genitalium cannot be cultured for diagnostic testing. Partner testing is advised for current partners only. Rectal infections are common, and appear to be an important reservoir for resistance. BASHH guidance is that all patients must return for test of cure at 3–5 weeks. BASHH also recommends treatment with Resistance Guided Therapy – testing for *M. genitalium* with macrolide resistance determination.

Neisseria gonorrhoea

Individual PCR swabs from each site should be taken to screen for gonorrhoea. Partners should be treated at the same time with retesting after two weeks to confirm clearance – test of cure is recommended following treatment for gonococcal infections.

Trichomonas vaginalis

Infected women who are sexually active have a high rate of reinfection, thus re-screening at 3 month post treatment could be considered.

Human papillomavirus

The Human papillomavirus test helps healthcare providers detect the presence of abnormal cervical cells, and the HPV assays identify high-risk HPV mRNA that is indicative of the HPV infections most likely to lead to cervical disease. ThinPrep samples are the only samples which can be processed for HPV.

Virology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
16s bacterial sequencing	**Cultures/Isolates/Fluids/ Biopsies**	7 days	All isolates and category 3 pathogens must be heat inactivated prior sending to the laboratory.
18s fungal sequencing	**Cultures/Isolates/Fluids/ Biopsies**	7 days	All isolates and category 3 pathogens must be heat inactivated prior sending to the laboratory.
Adenovirus by PCR	**(A) / PCR swab / Green Viral swab / 60ml container**	7 days	
Adenovirus DNA Quantitation by PCR	**6ml EDTA**	48 hours	
Alphavirus Investigations[#]	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.
Arbovirus Antibodies/Abs[#]	**6ml Clotted blood / 6ml EDTA**	21 days	Clinical history must be provided. Provide details of travel history.
BK Polyoma Virus by PCR (quantitative)	**6ml EDTA blood / Random Urine**	5 days	
Bone marrow donor screen	3 x **6ml EDTA**	72 hours	
Chagas Disease Serology (S.American Trypanosomiasis) T. Cruzi[#]	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.
Chikungunya Virus Abs[#]	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.
CMV DNA Quantitation (by PCR)	**6ml EDTA blood** or **4.8ml Citrated blood**	48 hours	
CMV DNA by PCR (Urine)	**Random Urine**	48 hours	
CMV DNA by PCR (other)	**Biopsy, saliva, ETA**	48 hours	
CMV DNA by PCR (Guthrie/Dried blood spots)	**Guthrie card / dried blood spot**	7 days	
CMV Resistance	2 x **6ml EDTA whole blood**	10 days	
Coronavirus - COVID-19 IgG Antibody (SARS-CoV-2)	**SST / Serum (B)**	24 hours	Contact the laboratory for patient self-collection sample kits.
Coronavirus - COVID-19 PCR (SARS-CoV-2)	**PCR Swab** (nasal/pharyngeal)	36 hours	Contact the laboratory.
CSF Screen by PCR (CMV, EBV, HSV, VZV, Enterovirus, Parechovirus)	**CSF**	48 hours	
Cytomegalovirus (CMV-DNA) Amnio	**Ammotic fluid**	48 hours	
Cytomegalovirus (IgG/IgM) Antibodies	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Cytomegalovirus IgG Avidity	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Dengue Fever PCR[#]	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.
Epstein-Barr Virus (EBV) Antibodies VCA IgG/IgM and EBNA IgG	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
EBV DNA quantitative PCR	**6ml EDTA / 4.8ml Citrated blood**	48 hours	
Gastro-Intestinal PCR (Adenovirus, Astrovirus, Rotavirus, Norovirus, Sapovirus.)	**Stool / Faecal**	48 hours	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Genital Ulcer PCR (HSV, Syphilis)	**6ml Clotted blood / 6ml EDTA blood**	21 days	
Travel Fever Viral Screen	**3ml Copan UTM swab**	48 hours	
Hantavirus Serology/PCR#	**6ml Clotted blood / 6ml EDTA blood**	10 days	Clinical history must be provided. Provide details of travel history.
Hepatitis (Acute) Screen	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis A (IgM)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis A Immunity (Total)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis A RNA by PCR#	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.
Hepatitis B 'e' Antigen and Antibody	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B (PCR) Genotype	**6ml Clotted blood / 6ml EDTA blood**	10 days	
Hepatitis B Core Antibody - IgM	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B Core Antibody - Total	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B DNA (Viral load)	**6ml Clotted blood / 6ml EDTA blood**	60 hours	
Hepatitis B Immunity	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B Profile	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B Resistant Mutation	**6ml Clotted blood / 6ml EDTA blood**	10 days	
Hepatitis B Surface Antibody	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B Surface Antigen	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis B Surface Antigen Quantitification	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis C Antibodies	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis C Antigen (Early detection)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Hepatitis C Genotype	**6ml Clotted blood / 6ml EDTA blood**	10 days	
Hepatitis C NS3 Resistance	2 x **6ml EDTA whole blood**	10 days	
Hepatitis C NS5a Resistance	2 x **6ml EDTA whole blood**	10 days	
Hepatitis C NS5b Resistance	2 x **6ml EDTA whole blood**	10 days	
Hepatitis C RNA (Viral Load)	**6 ml EDTA whole blood / Clotted blood**	60 hours	
Hepatitis Delta total Antibody	**6ml Clotted blood / 6ml EDTA blood**	3 days	
Hepatitis Delta RNA (Viral load)	**6ml EDTA whole blood**	5 days	
Hepatitis E RNA (Quantitative PCR)	**6ml EDTA whole blood**	72 hours	
Hepatitis E IgG/IgM	**6ml Clotted blood / 6ml EDTA blood**	5 days	
Herpes Simplex I/II Antibody Profile (IgG)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Herpes Simplex 1 and 2 IgG Typing	**6ml Clotted blood**	7 days	
Herpes Simplex I/II by PCR (Swab)	**3ml Copan UTM swab / EDTA blood**	48 hours	

Virology tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
HIV 1 Proviral DNA	**6ml EDTA whole blood from adults or at least 1ml EDTA whole blood from neonatal patients**	7 days	
HIV Screening: HIV1& 2 Abs/p24 Ag (4th Gen)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
HIV-1 Avidity (RITA/STARHS)#	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided.
HIV-1 Genotypic Resistance (Integrase)	2 x **6ml EDTA tubes**	10 days	Information Drug regimens required
HIV-1 Genotypic Resistance (RT & Protease)	2 x **6ml EDTA tubes**	10 days	Information Drug regimens required
HIV-1 PCR Qualitative	**6ml Clotted blood**	60 hours	
HIV-1 RNA Viral Load by PCR	**6ml EDTA tube**	60 hours	
HIV-1 Tropism	2 x **6ml EDTA tubes**	10 days	Information Drug regimens required
HIV-2 Proviral DNA	**6ml EDTA whole blood from adults or at least 1ml EDTA whole blood from neonatal patients**	21 days	
HIV-2 RNA (Quantitative or Qualitative) by PCR	**6ml EDTA whole blood**	21 days	
HIV-2 drug resistance#	2 x **6ml EDTA**	21 days	
HTLV 1& 2 Abs. (Human T Lymphotropic Virus Type I-II)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
HTLV by PCR#	**6ml EDTA whole blood**	21 days	
Human Herpes Virus 6 by quantitative PCR	**6ml EDTA whole blood**	5 days	
Human Herpes Virus 8 (HHV8) by qualitative/quantitative PCR	**6ml EDTA whole blood**	5 days	
Human Parvovirus B19 - Quantitative DNA PCR#	**6ml EDTA whole blood**	2 weeks	
JC Polyoma Virus by PCR	**6ml EDTA whole blood / CSF**	5 days	
Measles Antibodies (IgG) Immunity	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Measles Antibodies (IgM)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	Clinical history must be provided.
Measles PCR	**Buccal swab**	48 hours	
Measles, Mumps, Rubella (MMR)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Monkey Pox PCR	**3ml Copan UTM swab**	48 hours	
Mumps Antibodies (IgG)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Mumps Antibodies (IgM)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Mumps PCR#	**Swab**	21 days	
Needle Stick Injury Profile	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Neurological Viral PCR	**CSF**	48 hours	
Neurological Viral Screen	**6ml Clotted blood / 6ml EDTA blood**	48 hours	

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Parvovirus Antibodies (IgM)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Parvovirus Quantitative DNA by PCR	**6ml EDTA whole blood**	5 days	
Parvovirus IgG Antibodies	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Polio Virus 1, 2, 3 Antibodies#	**6ml Clotted blood / 6ml EDTA blood**	15 days	Clinical history must be provided.
Rabies Antibody#	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical and travel history must be provided.
Respiratory PCR (RSV, Influenza A, Influenza B, Parainfluenza 1-4, Coronavirus, Rhinovirus, Human Metapnemovirus, Enterovirus, Adenovirus, Parechovirus)	**PCR swab / NPA / BAL / NPS / ETA**	48 hours	
Rubella Antibody (IgG)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Rubella Antibody (IgM)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Rubella Avidity#	**6ml Clotted blood / 6ml EDTA blood**	21 days	
Rubella PCR#	**EDTA whole blood / Amniotic Fluid**	21 days	
Torch Screen	**6ml Clotted blood / 6ml EDTA blood**	48 hours	
Transplant screen donor antibody screen	**6ml Clotted**	24 hours	
Varicella Zoster - DNA	**6ml EDTA whole blood / 3ml Copan UTM Swab**	72 hours	
Varicella zoster Antibodies (IgG)	**6ml Clotted blood / 6ml EDTA blood**	24 hours	
Viral Eye by PCR (HSV/VZV/ADENO)	**3ml Copan UTM swab or dry PCR swab**	72 hours	
Vesicular Rash by PCR	**PCR swab / 6ml EDTA tube**	48 hours	
West Nile Virus Abs#	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.
West Nile Virus PCR#	**6ml Clotted blood / 6ml EDTA blood**		Clinical history must be provided. Provide details of travel history.
Zika Abs IgM and IgG - Antibody detection from 15 days#	**6ml Clotted blood / 6ml EDTA blood**	5 days	Clinical history must be provided. Provide details of travel history.
Zika RNA by PCR#	**6ml Clotted blood / 6ml EDTA blood**	21 days	Clinical history must be provided. Provide details of travel history.

Virology tests

Molecular microbiology (Sexual health) tests

TEST NAME	SAMPLE REQUIREMENT	TAT	SPECIAL INSTRUCTIONS
Chlamydia (PCR swab)	**PCR**	2 days	
Chlamydia (Thin Prep)	**TPV**	2 days	
Chlamydia (Urine)	**FCRU**	2 days	
Chlamydia/Gonorrhoea (PCR Swab)	**PCR**	2 days	
Chlamydia/Gonorrhoea (Rectal)	**PCR**	2 days	
Chlamydia/Gonorrhoea (Thin Prep)	**TPV**	5 days	
Chlamydia/Gonorrhoea (Throat)	**PCR**	2 days	
Chlamydia/Gonorrhoea (Urine)	**FCRU**	2 days	
Chlamydia/Gonorrhoea/Trichomonas by PCR	**FCRU/PCR/TPV**	2 days	
Gonorrhoea (PCR swab)	**PCR**	2 days	
Gonorrhoea (Thin Prep)	**TPV**	2 days	
Gonorrhoea (Urine)	**FCRU**	2 days	
Haemophilus ducreyi by PCR	**PCR**	7 days	
HPV (mRNA HR-HPV) (ThinPrep)	**TPV**	2-3 days	
Lymphogranuloma Venerium (LGV)	**PCR***	1-2 weeks	LGV can be added to a positive chlamydia sample using the same swab if requested within 4 days of receipt of result.
Macrolide Resistance Test (Mgen)	**FCRU/ PCR**	1-2 weeks	
Mycoplasma genitalium by PCR	**FCRU/PCR/TPV**	2 days	
N. Gonorrhoea	**TPV**	2 days	
Trichomonas vaginalis by PCR	**FCRU/PCR/TPV**	2 days	

Request Forms

- TDL Genetics Request Form
- TDL Genetics Consent Form
- HSL Oncogenomics Request Form
- HSL Haemophilia and Thrombosis Request for Genetic Status Form
- TDL Genetic Request Form
- TDL Request Form

TDL GENETICS LTD
The Halo Building
1 Mabledon Place
London WC1H 9AX
Tel: 020 7307 7409
Fax: 020 7307 7350
Email: tdlgenetics@tdlpathology.com

CLINICIAN

Doctor

Address

Tel Email

Additional copy of results to:

TAP1929C/02-12-21/V16

SURNAME				DOB or AGE	Patient Ref. No.	Gestation
FORENAME		TITLE				

Clinical Details – include reason for test request and family history
(Please complete this box – details are crucial for analysis and interpretation)

Identified gender	☐ M ☐ F
Biological sex (if different)	☐ M ☐ F

PRENATAL NT: Risk: Abnormal U/S Findings:

No of fetuses:

PRENATAL ASSAYS

- ☐ **Amnio PCR**
- ☐ **Amnio Karyotype**
- ☐ **Amnio PCR & Karyotype**
- ☐ **∝FP**
- ☐ **CVS PCR**
- ☐ **CVS Karyotype**
- ☐ **CVS PCR & Karyotype**
- ☐ **Microdeletions BOBs**
- ☐ **Prenatal Microarray (Array CGH)**
- ☐ **UPD** specify chromosome _____

Please *ensure* options* below are completed.

***Fetal sex to be reported**

Yes ☐ **No** ☐

***p.F508del Cystic Fibrosis**
Only available as part of Amnio/CVS PCR:

Yes ☐ **No** ☐

***Fee for these options is included in test price.**

POSTNATAL ASSAYS

- ☐ **Blood PCR (T13, T18, T21, X and Y)**
- ☐ **Chromosome Analysis Karyotype – blood**
- ☐ **Chromosome Analysis Karyotype from G banded slide**
- ☐ **Postnatal Microarray (Array CGH)**
- ☐ **Chromosome Analysis Karyotype of Solid Tissue/Products of Conception****
  Reflex to aneuploidy BOBs in the event of culture failure

BACs on Beads (BOBs)

- ☐ **Microdeletion/Duplication Syndromes All** (or select individual tests below)
  - ☐ **Di George/VCFS**
  - ☐ **Miller-Dieker**
  - ☐ **Cri du Chat**
  - ☐ **Williams**
  - ☐ **Wolf-Hirschhorn**
  - ☐ **Smith-Magenis**
- ☐ **Products of Conception Aneuploidy BOBs****

** Material from miscarriage samples can be returned upon request at the time of referral. Please instruct if required. Full details of sensitive disposal can be found in the lab guide.

DNA ASSAYS

- ☐ **CF (139 Mutations)**
- ☐ **Haemochromatosis mutations – C282Y,H63D**
- ☐ **Y Chromosome Microdeletion**
- ☐ **Paternity Testing**
- ☐ **DNA Identity Profile**
- ☐ **Uniparental Disomy**
- ☐ **Factor II Prothrombin**
- ☐ **Factor V Leiden**
- ☐ **MTHFR – C677T, A1298C**
- ☐ **Duchenne Muscular Dystrophy**
- ☐ **Spinal Muscular Atrophy**
- ☐ **Prader Willi/Angelman methylation**

- ☐ **Zygosity Testing**
- ☐ **Apo E Genotype**
- ☐ **HLA Tissue Typing**
  (A,B,Cw,DR,DQ Coeliac/Narcolepsy)

Please specify

_____

- ☐ **HLA B27**
- ☐ **DNA extraction and storage**

For 3 years unless otherwise stated

_____

PROFILES

Male Genetic Reproductive Profile ☐
Y Chromosome Microdeletion DNA Studies / Cystic Fibrosis Carrier Screen / Chromosome analysis (Karyotype)

Iron Overload Profile ☐
Iron / Total Iron Binding Capacity / Ferritin / Haemochromatosis mutation

Ashkenazi Jewish Carrier Screen (see lab guide for details) ☐

Pan Ethnic Carrier Screen (see lab guide for details) ☐

Other tests:

Fee to be paid by: ☐ Dr ☐ Patient

Patients address and telephone number (essential information if patient to pay)

Address

Town/City Postcode

Contact telephone number

Tick if a Letter of Guarantee is required ☐

Laboratory notes:

For Practice Use Only:

EDTA	LH	AMNIO	CVS	POC	OTHERS

Sample Date | Sample Time

For TDL Genetics Use Only:

EDTA	LH	AMNIO	CVS	POC	OTHERS

Analysis

Date/Time received:

For further test information or sample requirements please refer to Laboratory Guide or contact Dr Lisa Levett on 020 7307 7409.

Patient Consent: Patient consent is inferred upon the receipt of a completed request form and appropriate sample, unless otherwise stated in the laboratory guide. It is the responsibility of the referring clinicians to ensure appropriate consent has been obtained.

TDL GENETICS

Consent Form

TDL GENETICS

The Halo Building, 1 Mabledon Place, London WC1H 9AX
Tel: 020 7307 7409 Fax: 020 7307 7350
Email: tdlgenetics@tdlpathology.com

PATIENT OR GUARDIAN

Please cross-out where applicable.

I consent / do not consent to be tested for the genetic test/tests which have been explained to me.

I consent / do not consent for the results of this test to be available to assist in testing other family members.

I consent / do not consent for DNA from this sample to be stored.

I consent / do not consent for DNA to be used anonymously for relevant research.

Signed _____

Date ____/____/____

DOCTOR

I have explained the purpose of obtaining a blood or tissue sample for genetic testing.

Signed _____

Date ____/____/____

This consent form is for use with diagnostic testing. It is important to think through the implications of genetic testing for other family members. Certain family studies may reveal information regarding paternity. We strongly recommend genetic counselling for predictive testing in disorders such as Huntington's Disease or inherited cancers. Please contact our Consultant if you have queries about consent or counselling issues.

OncoGenomics Request Form

HEALTH SERVICES LABORATORIES

Please deliver sample and form to:

HSL Analytics LLP, OncoGenomics, Level 6, 1 Mabledon Place, Flaxman Terrace, London WC1H 9AJ

Contact details: Dr Elisabeth Nacheva, The Halo Building, Level 7, 1 Mabledon Place, London WC1H 9AX
Email: oncogenomics@hslpathology.com | e.nacheva@ucl.ac.uk | elisabeth.nacheva@nhs.net
Phone: 020 3908 1314 (office) | 020 3908 2308 (lab) Mobile: 07714 721579

CLINICIAN

Hospital: _____ Consultant: _____

Doctor for enquiry: _____ Department: _____

Contact/Bleep no.: _____

PATIENT

Hospital number: _____ Ward: _____

Surname: _____ Department: _____

Forename: _____ Gender: ☐ Male ☐ Female

Date of birth: _____ Patient status: ☐ In/Out ☐ NHS/Private

SAMPLE

Sample date: _____ Time: _____

Sample type: ☐ **Bone Marrow** ☐ **Blood** ☐ **Other** (please specify) _____

DISEASE

Diagnosis: _____ FAB classification: _____

Disease status: ☐ **Presentation** ☐ **Remission** ☐ **Relapse** ☐ **Persistent** ☐ **Post treatment**

Post transplant Date of transplant: _____

Type and **sex of donor**: _____

Other (please specify): _____

FOR CYTOGENETIC USE ONLY

Lab no.: _____ Date and time of receipt: _____

Cell count: _____ x10^6 per ml Volume of sample : _____ ml

Cultures: _____

☐ **ON** ☐ **ONC** ☐ **SYN** ☐ **Direct culture** ☐ **3D** ☐ **3D+PHA** ☐ **3D+TPA** ☐ **IL2DS30**

☐ **MACs** ☐ **Lympho prep (FISH only)** ☐ **Other** _____

UKAS MEDICAL

All tests are accredited under UKAS standard ISO 15189:2012.
For the full scope of accreditation please refer to the
UKAS website http://www.ukas.com

Haemophilia and Thrombosis Request for Genetic Status

HEALTH SERVICES LABORATORIES

Haemophilia and Thrombosis Laboratory, Royal Free Hospital, Pond Street NW3 2QG

Email: Bilal Jradeh - bilal.jradeh@nhs.net; Tel. No.: 020 7830 2274 or 020 3908 1291

Patient information

Name:		Family no.:	Lab no.:
Hospital no.:	Gender:	Family name (surname of first family member diagnosed)	
DOB:	Ethnic origin:		
Sample taken (date and time):		Sample type:	
Requested by:		Email (nhs.net address preferred):	
Consultant:	Hospital/Clinic:	Contact no.:	

Please sign this box to confirm documentation of consent: Signature: _____	**SAMPLES WILL NOT BE PROCESSED IF THIS IS LEFT BLANK**

Factor levels and clinical synopsis

Family tree (Please refer to the symbols overleaf and try to include 3 generations)

If these results are required urgently please discuss with the laboratory on the number above.
Samples from family members may be sent together but details must be recorded overleaf.

Haemophilia and Thrombosis Request for Genetic Status

HEALTH SERVICES LABORATORIES

If samples on other family members are included please record their details here

Name:		Relationship to Proband/Pedigree Position:
Hospital No.:		Factor Levels and Clinical Synopsis:
DOB:	Gender:	

Name:		Relationship to Proband/Pedigree Position:
Hospital No.:		Factor Levels and Clinical Synopsis:
DOB:	Gender:	

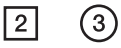
Further information

Pedigree symbols (Ref: AM JHum Genet 1995; 56:745-52)

Male/Female/Unknown Sex

Clinically affected

Multiple siblings
(If number not known, put ***n***)



Deceased (with age died)

Proband
(index, propositus, proposita)

Consultand

Carrier of recessive condition
(usually clinically asymptomatic,
e.g. Haemophilia)

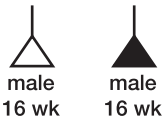
Heterozygous for partially
penetrant condition
(e.g. FXI deficiency)

Twins
(MZ, DZ and uncertain)

Ongoing pregnancy

Miscarriage
(unaffected, affected)

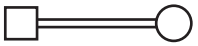
(sex, gestation)



Termination
(unaffected, affected)

Stillbirth
(with gestation)

Consanguinity



Partners now separated

FOR LABORATORY USE ONLY

Date and time received: _____ Sample type: _____

Comment:

Genetic Request

THE DOCTORS LABORATORY

In order to provide an efficient service for Genetic Requests, please complete the following:

PATIENT DETAILS

Surname: _____

First Name: _____

Date of Birth: _____ Gender: ☐ M ☐ F

Patient Number: _____

Ethnic Origin: _____

Gestation (if applicable): _____ weeks

REFERRING DOCTOR

Name: _____

Address: _____

_____

_____

Tel: _____

Email: _____

TEST REQUEST

Disease Name: _____

Gene(s) to be Analysed: _____

Test for: ☐ Diagnosis ☐ Carrier Screening ☐ Known Family Mutation

Clinical Symptoms: _____

Family History: _____

Please state any Family Gene Mutation(s) if known: _____

Please also provide copies of any relevant genetic or pathology (ie. haematology) reports.

INFORMED CONSENT

PATIENT OR GUARDIAN

Please cross-out where applicable:

I consent / do not consent to be tested for the genetic test(s), which have been explained to me

I consent / do not consent for the results of this test to be available to assist in testing other family members

I consent / do not consent for DNA from this sample to be stored

I consent / do not consent for DNA to be used anonymously for relevant research

Signed: _____ Date: ____/____/____

DOCTOR / GENETIC COUNSELLOR

I have explained the purpose of obtaining a blood or tissue sample for genetic testing.

Signed: _____ Date: ____/____/____

This consent form is for use with diagnostic testing. It is important to think through the implications of genetic testing for other family members. We strongly recommend genetic counselling for predictive testing in disorders such as Huntington's Disease or inherited cancers. Please contact our Consultant if you have queries about consent or counselling issues.

☐ Fee to be paid by Patient/Other. **PLEASE PROVIDE ADDRESS DETAILS**

Insurance Co. _____ Membership No. _____

Patient address _____

_____

_____ Postcode _____ Contact telephone number _____

☐ Fee to be paid by Doctor/Clinic as above

PATIENT RECEPTION AT:
THE DOCTORS LABORATORY
76 Wimpole Street, London W1G 9RT
Monday to Friday 7.00am–7.00pm
Saturday 7.00am–1.00pm
Main Tel: 020 7307 7373
Out of hours samples may be dropped at 76 Wimpole St

CLINICIAN

SOURCE

Doctor

Address

Tel

Email

Additional copy of results to:

SURNAME																DOB	/ /
FORENAME											TITLE					M/F	

When completing this form please provide at least three unique identifiers for your patient.

	Please Tick	
(Biochemistry)	DL1	☐
(Biochemistry/HDL)	DL1L	☐
(Haem/Bio)	DL2	☐
(Haem/Bio/HDL)	DL2L	☐
(Haematology)	DL3	☐
(Haem/Bio (short))	DL4	☐
(Haem/Bio/HDL)	DL4L	☐
(Postal Haem/Bio)	DL5	☐
(Postal Haem/Bio/HDL)	DL5L	☐
Well Person Screen (DL2/T4/TSH/Ferritin)	DL6	☐
Well Person Screen (DL2L/T4/TSH/Ferritin)	DL6L	☐
Well Man Screen (DL6/PSA/Ferritin)	DL7	☐
Well Man Screen (DL6L/PSA/Ferritin)	DL7L	☐
Well Person Screen (DL6/VITD/Ferritin)	DL8	☐
Well Person Screen (DL6/HDL/VITD/Ferritin)	DL8L	☐
Senior Male Profile 60+	DL9M	☐
Senior Female Profile 60+	DL9F	☐
Cardiovascular Risk Evaluation Profile	DL10	☐
Cardiovascular Risk Plus Profile	DL11	☐
Sexual Health 7 STI screen by PCR	DL12	☐

Home Visit ☐

PATIENT DETAILS

LMP: / /

Last smear: / (MONTH / YEAR)

Routine screen ☐

Colposcopy ☐

Previous HPV -ve ☐ +ve ☐

Previous abnormal history (please specify):

TESTS (PLEASE SPECIFY)

☐ **PAPT**
A HR-HPV test will always be carried out if PAPT is requested as a single test. HPV will be charged.

☐ **HPV HR-HPV mRNA**
If HPV is requested as a single test and is Positive/Detected, cervical cytology (PAPT) will be carried out from the same vial without charge.

☐ **HP20 28 LR+HR HPV DNA subtypes**
If HP20 is requested as a single test and is Positive/Detected for HR subtypes, PAPT will be carried out without charge.

☐ **HPVT HP20 plus mRNA E6/E7 oncoproteins**
If HPVT is requested as a single test and is Positive/Detected, PAPT will be carried out without charge.

☐ **TPCR** Thin Prep Chlamydia ☐ **TGON** Thin Prep Gonorrhoea

☐ **TCG** Thin Prep CT/GC

☐ **CCGT** CT/GC/Trichomonas ☐ **CGTM** CT/GC/Trichomonas/Mgen

☐ **7 STI (DL12)**

Patient Ref/ID No.

PROFILES AND TESTS
Please specify

TAP3643D/14-11-21/V9

Clinical Details

☐ Fasting (tick if yes)

☐ Ethnic Origin (details, if relevant) _____

☐ Drug Therapy (Please specify) _____

☐ Fee to be paid by Patient/Other. **PLEASE PROVIDE ADDRESS DETAILS**

Insurance Co. _____ Membership No. _____

Patient address _____

_____ Postcode _____ Contact telephone number _____

☐ Fee to be paid by Doctor/Clinic as above

Signature _____

Date sample taken _____

Time sample taken _____

For Practice Use Only:

EDTA	SST	GREY	MSU	OTHERS	INITIALS

For Laboratory Use Only:

EDTA	SST	GREY	MSU	OTHERS	INITIALS

For Patient Service's Use Only:

TIME IN	TIME IN	TIME OUT	TAKEN BY
R	Ph	Ph	INITIALS

THE DOCTORS LABORATORY

NHS

WRITE CLEARLY WITH BALLPOINT PEN

ENTER DETAILS IN BOXES OR RING APPROPRIATE NUMBERS

01 **Woman's hospital registration number**

02 **Laboratory**

11 **Code number of laboratory**

Fold

12 **Slide serial number**

03 **Woman's surname**

Previous surname

First names

Full postal address

Phone no.

post code

04 **Date of birth**

05 **NHS number**

CLINICAL REPORT

13 Test date ...../...../.....

14 LMP (1st day) ...../...../.....

15 Last test

16 If no previous test please put X

17 **Reason for test**

routine call ____ 1
routine recall ____ 2
previous abnormal test ____ 4
previous inadequate test ____ 5
opportunistic ____ 6
follow-up after treatment ____ 7
other ____ 3

Fold for B

06 If hospital state consultant, clinic or ward, and hospital

A
Name and address of sender if not GP

post code

07

B
Name and address of GP

19 **Condition (if applicable)**

pregnant ____ 1
post-natal (under 12 weeks) ____ 2
I.U.C.D fitted ____ 3
taking hormones (specify in 20) ____ 4

20 **Clinical data**

(including signs and symptoms, previous history of cervical neoplasia and treatment)

Specimen type	**Test Date**	**Cytology & HPV Result**	**Action**
cervical scrape ____ 1			
other (specify) ____ 2			

Fold for A

Sample taker signature ____

Date ____ **Sample taker code** ____

08 **Health Authority** **Practice code**
GP's local code **GP's national code**
NHAIS district code

09 **Source of sample**

GP ____ 1
NHS community clinic ____ 2
GUM clinic ____ 3
NHS hospital ____ 4
NHS colposcopy ____ 7
Private ____ 5
Other ____ 6

10

	1	4
LOCAL	2	5
CODES	3	6

21 **CYTOLOGY REPORT**

Signature..... **date**

FORM HMR 101/5
(2009) Single copy

801850508983

Health Services Laboratories
The Halo Building
1 Mabledon Place
London
WC1H 9AX

T +44 (0)20 7307 9400
E hsl@hslpathology.com
www.hslpathology.com

TAP5231/27-03-23/V7