

Histopathology User Manual



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1. Introduction

The Paediatric Histopathology Department at Alder Hey Children's NHS Foundation Trust provides a specialist surgical histopathology service and perinatal autopsy and placental service to the Perinatal Network of obstetric centres across Merseyside, Cheshire and Isle of Man, additionally with referrals from North Wales, Belfast and further afield.

The department is UKAS accredited (9091) in accordance with the recognised International Standard ISO 15189:2012 Medical Laboratories – Requirements for quality and competence.

https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/9091-Medical-Single-1.pdf

We are committed to providing a high quality and timely regional histopathology service and to contribute to the HM Coroner's service and Children's Cancer and Leukaemia Group (CCLG) tumour bank.

We provide the following diagnostic services:

Histopathology

Broncho-alveolar lavage, sputum & CSF non-gynae cytology

Neuropathology

The service is led by specialist Consultant Paediatric and Perinatal Pathologists experienced in the diagnosis of disease in children which is crucial to the management of further investigations and treatment.

The Histopathology laboratory and mortuary provide a professional and efficient patient and family-centered service led by experienced Biomedical Scientists and Anatomical Pathology Technologists.

Continuing Professional Development, training and education is supported by membership of professional bodies including the Royal College of Pathologists and the Institute of Biomedical Science. All qualified laboratory staff are registered with the Health Care Professions Council.

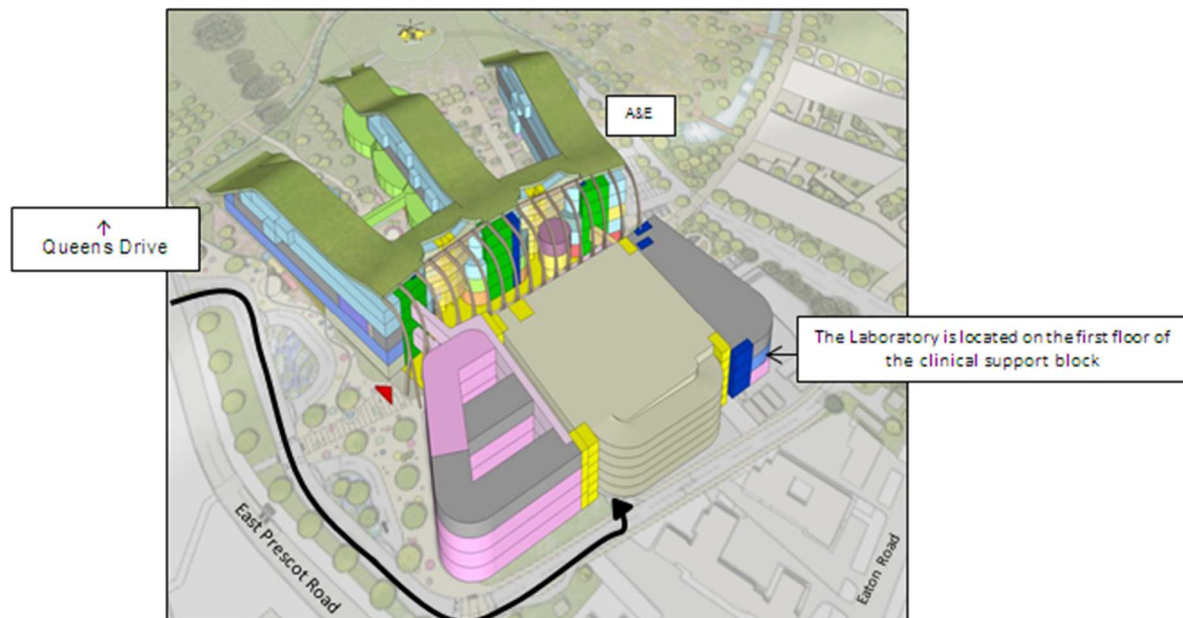
The department provides education and support to students including workplace, undergraduate, postgraduate, medical students and specialist registrars.

2. Contact details

Address: Histopathology Department
Alder Hey Children's NHS Foundation Trust
Eaton Road
West Derby
L12 2AP
(Use L14 5AB on sat-navs for East Prescott Road car park)

Location

Histopathology forms part of Laboratory Medicine (Pathology) which is located on the first floor, Zone 5 of the Children's Health Park opposite the Institute in the Park. The mortuary and bereavement suites are co-located with Laboratory Medicine on the ground floor.



There is a multi-storey car park accessed via East Prescott Road. Exit tokens can be purchased in the hospital atrium.

Telephone: 0151 228 4811 then request the extension from the key contacts listed below

Opening hours

Monday to Friday

Laboratory - 09.00 to 17.30

The consultants provide a 24/7 clinical advice service and can be contacted via switchboard out-of-hours.

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The Consultant Neuropathologists are available on site Tuesdays and Thursdays only.

Mortuary - 08.30 to 17.00

The mortuary provide a 24/7 service. Contact out-of-hours is via switchboard.

Key contacts

Personnel	Title	Extension
Clinical Advice		
Dr. Daniel Hurrell	Consultant Histopathologist (Head of Department)	3656
Dr. Rajeev Shukla	Consultant Histopathologist (DI HTA Post Mortem license)	3658
Dr. Jo McPartland	Consultant Histopathologist	2704
Dr. William Simmons	Consultant Histopathologist	3653
Dr Srinivas Annavarapu	Consultant Histopathologist	2275
Neuropathology Clinical Advice		
Dr. Daniel du Plessis	Consultant Neuropathologist	3653
Dr. Federico Roncaroli	Consultant Neuropathologist	3653
Technical Advice		
Mrs. Pamela Ashton	Histopathology Laboratory Manager & Quality Manager for Pathology	3615
Mrs. Sarah Eykelenboom	Senior Biomedical Scientist	3505
Mrs. Helen Clarry	Senior Biomedical Scientist	3505
Mortuary Advice		
Mrs. Kate Cannon	Anatomical Pathology Technologist	2219
Miss Andrea Rice	Anatomical Pathology Technologist	2219
Mrs. Amanda Kelly	Anatomical Pathology Technologist	2219
Mr. James G Ashton	Trainee Anatomical Pathology Technologist	2219
Administrative Advice		
Mrs. Patricia Flaherty	Histopathology Administrative Team Leader	3656/2081

Confidential patient information for the attention of the administrative team should be sent via NHS.net. Please email:

Histopathology.Alderhey@nhs.net

3. Histopathology Service

Please contact the laboratory regarding sending samples that are not covered in the repertoire below. In order to obtain timely results the quality of data provided with the specimen should be appropriate to allow for accurate diagnosis.

3.1 Sample Requirements

At least three identifiers are required together with the specimen site on both the pot and request form including:

- NHS number
- Patient's full name or unique coded identifier
- Date of birth and/or hospital number
- Date and time, nature of sample, including qualifying details, e.g. left, distal etc. (especially if more than one sample per request is submitted) are also required on the sample container

Samples will not be processed until errors or omissions have been resolved. To avoid **sample mix up**, specimen containers should not be labelled in advance of a procedure.

3.2 Requesting requirements

The request form should contain:

- 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
- Patient's address including postcode
- Practitioner's contact number (bleep or extension)

Further information:

Read [further guidance from the Institute of Biomedical Science](#).

- Histopathology and cytology samples must be brought in a specimen transport container directly to Pathology specimen reception (not via the pod system).
- All fresh samples must be pre-booked and arrive at the laboratory before 4pm. See repertoire for more information on relevant samples.
- All internal requests must be generated via Meditech. There are Meditech user guides for staff available on the intranet. Problems with placing orders should be directed to the IT department. Training for all clinicians ordering tests is available from the meditech/IT team.

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- Samples will not be accepted unless an order has been generated and the minimum identification criteria are placed on the container and request form. The specimens must be labelled correctly otherwise they will be returned.
- Advice on completing or printing a request form can be obtained from the IT department.
- Urgent samples should be clearly marked and in the case of fresh tissue brought immediately to the Histopathology Department.

Repertoire:

	Test	Sample & Container	Further information
3.3	Routine surgical specimens	Sample should be placed in an appropriate sized container immersed in at least 10 times the volume of 10% neutral buffered formalin soon after excision. Biopsy samples should be placed in sealed bags. All pots should be transported in a specialist transport box containing absorption pads. Pre-filled pots should be discarded if formalin expiry dates are exceeded. For consistent quality, the preferred supplier of formalin is Genta Medical UK Ltd.	Formalin hazard labels must be placed on the container. All suspected " High Risk " samples must be double bagged and clearly labelled as a biohazard. High risk samples will require prolonged fixation, therefore, a delay in reporting may occur.
3.4	Fresh specimens for frozen section	Samples should be placed in a universal or appropriately sized container and transferred immediately to the laboratory. *The laboratory are unable to accept fresh samples, including muscle biopsies, or undertake cryotomy on tissue designated or suspected as being "High Risk" (HIV, hepatitis, CJD etc.). Any such requests should be referred to the Consultant Histopathologist or	All frozen section requests must be pre-booked with the laboratory (Ext. 3505) and discussed with the Pathologists prior to sending to the laboratory. Service provision cannot be guaranteed for unbooked samples or those that arrive post 4.30 pm. A contact number must be written on the request form to enable the pathologist to issue a verbal report.

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		Neuropathologist.	
3.5	Fresh tumour samples	As for frozen section samples.	As for frozen section samples.
3.6	Rectal biopsy for initial assessment of Hirschsprung's Disease	Fresh biopsies should be placed on an isotonic saline dampened filter disc in a clean container clearly identifying the site e.g. 2cm, 3cm Ideally two deep biopsies should be taken at each site.	All biopsies for assessment of Hirschsprung's disease should be pre-booked with the laboratory (Ext 3505) in advance and arrive no later than 4pm and be transferred immediately to the laboratory.
	Pull-through biopsies on confirmed cases of Hirschsprung's Disease	As for frozen section samples.	As for frozen section samples.
3.7	Renal biopsies	Fresh cores of tissue.	All renal biopsies must be pre-booked (Ext 3505) with the laboratory in advance. Laboratory staff are available to attend the biopsy session to assess the adequacy of sample. 10-15 minutes notice is required prior to collection of the first biopsy. The cut off time for requesting staff to be in attendance at a renal biopsy is 4pm . A printed request form must be received prior to the procedure.
3.8	Muscle biopsies **Please see specialist protocols below for muscle samples**	A fresh sample wrapped in isotonic saline dampened gauze and placed in a sterile, air tight container to prevent drying should be immediately transferred to the laboratory. The sample should measure at least 10 x 10 x 5mm Differential diagnosis should be provided as this will affect how the sample is	All muscle biopsies must be pre-booked with the laboratory and a Neuropathologist notified in advance and arriving no later than 4pm . Do not place in formalin or allow the sample to dry out.

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		treated.	
3.9	Neurosurgical samples	Fresh tissue placed in a universal or appropriately sized container and transferred immediately to the laboratory.	All neurosurgical samples should be booked with the laboratory in advance. Fresh tissue should arrive Mon-Fri 9.00-4.30pm. Outside of core hours the sample should be placed in 10% neutral buffered formalin.
3.10	Skin sample for fibroblast culture only (cytogenetics)	Place sample in cytogenetics solid tissue media as soon as the sample is taken. The media is available for collection from the laboratory.	The sample must arrive at the laboratory before 3pm LWH advise that the sample is only viable in the media for 72 hours , therefore, if received after 3pm (especially on a Friday or bank holiday) it will not be sent until the next working day and viability of the sample and subsequent results cannot be guaranteed.
3.11	Skin samples for Immunofluorescence	Fresh sample wrapped in isotonic saline dampened gauze and placed in a sterile container should be transferred immediately to the laboratory	The sample should arrive no later than 4pm
3.12	Fluid samples for cytological analysis	Fluid samples should be placed in a sterile container and transferred immediately to the laboratory. A sample collection time is required.	All samples should arrive at the laboratory by 3pm if they are to be processed or transferred the same day. Delays in sample transfer may affect the viability of the sample and subsequent results. Samples should be placed in the fridge if minimal delays are expected.
3.13	Transmission Electron Microscopy	All requests for transmission EM must be discussed with a Pathologist in advance who	

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		will advise on specimen collection.	
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3.14 ** Muscle Biopsy Protocols**

The muscle biopsy samples are routinely divided thus:

- Orientated frozen sample for enzyme histochemistry
- Samples for electron microscopy
- Aliquot of tissue for snap freezing and storage

There are a number of specialist referral centres to which muscle samples may be sent via the histopathology department.

The specialist referral centres are listed below and their referral forms and further information can be accessed by following the links.

- **Mitochondrial Diagnostic Service:**

[Wellcome Trust Centre Framlington Place Newcastle upon Tyne](#)

- **Congenital Muscular Dystrophies:**

[Dubowitz Neuromuscular Centre Queen Square London](#)

- **Limb Girdle Muscular Dystrophy:**

[Referral Centre for LGMD Newcastle upon Tyne](#)

Each centre has a specific referral form. This must be completed and sent to the histopathology department prior to samples being dispatched for referral.

3.15 Specimen Transport

To ensure the safety of staff and preservation of samples, all containers should be tightly sealed, placed in sealed plastic bags where appropriate and transported in specialist carriers for the containment of spillages. Request forms should remain separate from the sample container allowing all patient information to remain confidential throughout sample transfer.

Samples will be transported from theatres and clinics to Pathology specimen reception by appropriately trained staff. Samples will be acknowledged on receipt.

3.16 Spillage procedures

Requestors should have local policies and procedures in place covering their own areas. Spillages should be dealt with as soon as possible protecting the safety of staff and

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preserving the sample. Spillage kits should be used to contain the spill; staff should have the appropriate PPE available. Contained waste should be placed in a clinical waste bag and sent for incineration. In the event of a large spillage which is uncontainable, the Fire service and Trust Health & Safety representatives should be informed. Any spillage may require ventilation of the area and appropriate signage to prevent entry.

Formaldehyde Hazards – Carcinogen and severe respiratory tract, eye and skin irritant and sensitiser.

3.17 Requests for additional investigations

Tissue taken is either routinely blocked in paraffin wax or frozen which will enable additional investigations to take place beyond the release of a report. Surgical tissue that is not blocked is discarded 1 month following the release of an authorised report.

4 Mortuary Service

The department is a centre for fetal and perinatal necropsy and holds contracts with other trusts within the region to perform post mortems. The department is licensed by the Human Tissue Authority to undertake post mortem examinations and store the deceased.

The new bespoke mortuary at Alder Hey is solely for fetal, perinatal and paediatric autopsies, allowing for care of deceased patients in a calm and dignified environment. Mortuary staff work closely with the Bereavement Care Service, assisting in the facilitation of sensitive viewings.

Post mortems are undertaken by Consultant Histopathologists. Our Anatomical Pathology Technologists are highly trained and experienced in the unique protocols of fetal and perinatal autopsies.

Post mortem examinations

Post mortems fall into 3 categories:

4.1 Hospital (consented) post mortems

Post mortem consent documentation and a request form must be completed and received with the deceased. Electronic copies are distributed by Alder Hey to referring organisations periodically and following revision. These can be obtained on request from the Histopathology Office (0151 293 3656 or 0151 252 5081).

It is important that all documentation is completed accurately to minimise further distress to the family.

A placental sample should arrive with the deceased, if being sent, and placed flat in an appropriate sized container immersed in 10% neutral buffered formalin.

The purpose of hospital post mortems is:

1. To confirm the cause of death
2. To assess the extent and severity of disease
3. To assess the effects of treatment

4.2 Coroner's post mortems

A Coroner's post mortem is required when the cause of death is unknown or unnatural and is undertaken at the request of the Coroner. This includes cases where:

- Children have died by the time they reach hospital
- Deaths are due to accidents or other injuries
- Deaths occur during or shortly after surgery

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- Deaths are unexpected or unexplained.

Reporting a death to the Coroner does not automatically mean that a post mortem will be performed, if in doubt it is best to speak to the Coroner or his officer. A Consultant Pathologist is also available to offer advice.

Coroner's post mortem reports are dispatched directly to the Coroner who must provide consent for the release of the report to other sources.

Home Office Post mortems

Home Office post mortems are also known as forensic post mortems. Home office post mortems are carried out at the instruction of the police.

5 Histopathology reports and results:

5.1 Results/Enquiries (Monday to Friday 09.00 to 17.30)

Contact the administrative team on 0151 293 3656 for enquiries relating to reports/results. Results will not be provided directly to or discussed with patients or families.

5.2 Histopathology Reports

Finalised reports are posted onto the Meditech patient index under Anatomical Pathology Reports. Authorised consultants and healthcare professionals can access the reports from any linked terminal within the Trust.

Results are validated through internal and external quality control.

5.3 Measurement Uncertainty in Cellular Pathology

All types of measurement have some inaccuracy due to bias, imprecision and operator variation, and therefore measurement results can be only estimates of the values of the quantities being measured. In histopathology reports, usually qualitative data are of greater significance, however in certain situations quantitative measurements become critical of diagnosis and prognosis.

Measurements can be made with either:-

- A ruler, for example, macroscopic measurements of tissues, tumours and excision margins.
- Microscopic measurements (for example, measuring microscopic distances in tissue sections) are made using NIS elements software on digital images. This system has been calibrated by a qualified/approved engineer using UKAS certified micrometre.

There will be a degree of variation in all such measurements and it is this uncertainty that should be considered when interpreting the final histology report. Where tumour sizes and excision margins have been measured there is a level of uncertainty in the measurement step. For macroscopic tumour measurements we have calculated this to be +/- 2.3mm. In order to minimise such uncertainty we have a number of steps and assurances in places:-

- Ensuring tumours are only measured in the largest dimension.
- For tumours of a size close to the limits of different tumour staging we are aware that inaccuracies could upstage the tumour.
- Understanding that it is not possible to measure more accurately than to the nearest millimetre.
- Measuring to the nearest millimetre with a UKAS calibrated ruler.

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- Discussion at MDT is actively encouraged regarding measurements close to staging limits.
- Final assessment of staging is a clinical decision based on multiple information sources.

If you require further information on measurement uncertainty, please contact a Consultant Pathologist or Histopathology Laboratory Manager.

5.4 Clinical advice and interpretation

Clinical interpretation of reports can be sought from the consultant pathologists. An in hours and out-of-hours Consultant Histopathologist advice service is available; contact can be made via switchboard.

The Consultant Neuropathologists can be contacted at Alder Hey on Tuesday & Thursdays during core hours. Out of hours they are contactable via switchboard.

When off site they can be contacted for advice at Salford Royal NHS Foundation Trust:

daniel.duplessis@srft.nhs.uk
federico.roncaroli@srft.nhs.uk

6 Quality

The department is accredited by United Kingdom Accreditation Service (UKAS) in accordance with the recognised International Standard ISO 15189:2012 Medical Laboratories and licensed by the Human Tissue Authority.

https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/9091-Medical-Single-1.pdf

A full Quality Assurance system is in operation, managed by staff trained in quality and governance processes. The service is regulated through Clinical Governance and Performance Management Groups and runs a well-established and maintained Quality Management System allowing achievement of the departmental Quality Policy and objectives. The quality of results is controlled by internal quality control procedures and monitored by external quality assessment.

6.1 External Quality Assurance

The Histopathology department participates in UKNEQAS external quality assurance schemes including:

- Cellular Pathology Technique (General Pathology)
- Cellular Pathology Technique (Renal Pathology)
- Cellular Pathology Technique (Muscle Histochemistry)
- Cellular Pathology Technique (Non-gynae Cytology)
- Cellular Pathology Technique (Immunofluorescence)
- Cellular Pathology Technique (Bone Marrow Trepine)
- Immunocytochemistry (General Pathology)
- Immunocytochemistry (Lymphoma)

The Pathologists also participate in interpretive EQA schemes.

6.2 Suggestions, Problems or Complaints

The laboratory operates a Quality Management System to ensure that the needs and requirements of our users are met. In order to improve the service you receive from the laboratory, it is helpful to us if you keep us informed of any laboratory-related problems which have been detrimental to good clinical practice.

As the user of the service, you may be able to offer suggestions about our procedures, requirements for new services or changes in practice which may be helpful to you. Please direct comments to the Histopathology Consultant Head of Department, Histopathology Manager or Quality Manager. Regular User Group meetings are held to ensure that the requirements of users of our service are met by obtaining feedback and recommendations on quality improvements.

We aim to provide the very best service, but unfortunately we may not always get it right and sometimes things go wrong. It is important that we are informed about problems with our service as soon as possible. Please contact the Head of Department or Histopathology Manager preferably by direct visit or telephone as soon as an issue is identified. In their absence refer the matter to the Pathology Manager or the Quality Manager. Alternatively, you can write to the Clinical Director for Pathology, Medical Director, or to the Chief Executive of the Trust.

Wherever possible the matter will be dealt with the same day but not all issues can be resolved immediately, and some may be more serious or require a longer period of investigation and assessment within the department. Details of all complaints are recorded and reviewed by our Leadership Team Quality & Governance Committee. If a written complaint is received, a written reply will be given.

7 Turnaround Times (TAT)

TAT's are monitored as one of the departmental quality/performance indicators which are aligned to RCPATH Key Performance Indicators (KPI). Although RCPATH KPI is to report 80% of diagnostic cases within 7 days we generally achieve 90% reported within 5 days.

The target for report of hospital post-mortem cases is within 56 days. The placental TAT is within 42 days.

Complex cases may require additional time to report due to referral to external centres or more involved laboratory work. Larger samples will require increased fixation. All these factors should be taken into consideration when arranging follow up appointments or inclusion of cases at MDT meetings.

Performance is continually monitored, included in corporate reports and able to be provided to referring Trusts in accordance with Service Level Agreements.

A provisional report on urgent cases is made available within 24 hours if the specimen is received in the laboratory before 3pm. Please discuss the case with a pathologist before requesting urgent results. Contact details of the person to whom the report is to be communicated are required.

8 Referred Tests

Histopathology may refer samples for expert opinion. All referred samples are sent to a UKAS approved centre:

Investigation	Address
Electron microscopy (renal)	Central Manchester Foundation Trust Department of Histopathology 1st Floor Clinical Sciences Building Manchester Royal Infirmary Oxford Road Manchester M13 9WL
Electron microscopy (muscle) & Immunohistochemistry (muscle)	Salford Royal Hospital NHS Foundation Trust Department of Cellular Pathology (Neuropathology) Stott Lane Salford M6 8HD
Cytogenetics Molecular Genetics	Cheshire & Merseyside Regional Molecular Genetics & Cytogenetics Service Liverpool Women's NHS Foundation Trust Crown street Liverpool L8 7SS
Paediatric specialty second opinions	Great Ormond Street Hospital for Children NHS Foundation Trust Great Ormond Street London WC1N 3JH
Mitochondrial myopathies	Newcastle Mitochondrial NCG Diagnostic Laboratory School of Neurology 4 th Floor Cookson Building Medical school University of Newcastle Framlington Place Newcastle upon Tyne NE2 4HH
Limb Girdle Muscular Dystrophies	NCG Limb-Girdle MD Referral Centre Muscle Immunoanalysis Unit Dental Hospital Lower Ground Floor Room 2.026 Richard Road Newcastle upon Tyne NE2 4AZ

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Congenital Muscular Dystrophy	NSCAG Referral Centre for Congenital Muscular Dystrophy Dubowitz Neuromuscular Centre 1st Floor, Department of Neuropathology Institute of Neurology Queen Square House Queen Square London WC1N 3BG UK
Forensic Toxicology	Eurofins Forensic Services Ltd Darwin House Building 414 Faraday Street Birchwood Park Risley Cheshire WA3 6FW
HODS Lymphoreticular malignancy	Royal Liverpool and Broadgreen University Hospitals NHS Trust Department of Clinical Laboratory Medicine Prescot Street Liverpool L7 8XP
CNS Tumour DNA Testing	Genomic Diagnostics Laboratory Manchester Centre for Genomic Medicine 6 th Floor St Mary's Hospital Oxford Road Manchester M13 9WL
Immunohistochemistry for Antibodies not stocked	HSL Advanced Diagnostics Laboratory Ground Floor 60 Whitfield Street London W1T 4EU
Synovial Fluid	Manchester Cytology Centre Clinical Sciences Building 2 Manchester Royal Infirmary Oxford Road Manchester M13 9WL