

Division of Laboratory Medicine

Directorate of Cellular Pathology

PAEDIATRIC HISTOPATHOLOGY USER GUIDE

Contents

1 Introduction	3
2 Contact Us	4
2.1 Opening Hours	4
2.2 Location	4
2.3 Contact Information	5
3 Quality.....	6
3.1 External Quality Assurance (EQA)	6
3.2 Data Protection	7
3.3 Uncertainty of Measurement	7
3.4 Patient Consent.....	7
3.5 Retention and Storage of Pathological Records and Specimens	8
4 Requesting of Investigations	8
4.1 Specimen Acceptance Policy	9
4.1.1 Rejection Policy	9
4.2 Request Forms.....	11
4.3 HIVE Requests.....	11
4.4 Storage of Specimens	11
4.5 Transport of Specimens	12
4.6 Specimen Tracking.....	12
4.7 Requesting Formalin Pots	12
4.8 Handling Formalin	12
4.9 Formalin Spillages.....	13
4.9.1 Dealing with minor spills	14
4.9.2 Dealing with large spills	14
4.9.3 Dealing with major spills	14
4.9.4 Dealing with Biological spills	14
5 Specimen Requirements	14
5.1 Factors Affecting Performance	15
5.2 Specimen Fixation.....	15
5.3 High Risk Specimens	16
5.4 Frozen Sections	16
5.5 Urgent Specimens.....	17
5.6 Special Specimens.....	17
5.7 Renal Biopsy	18
5.8 Rectal Biopsies for Hirschsprungs Disease	19
5.9 Muscle Biopsies	19
5.10 Intra-operative frozen sections of Pancreas for Congenital hyperinsulinism (CHI) ...	20
5.11 Skin Biopsies Immunofluorescence	20
5.12 Metabolic Bone	21
5.13 Placentas	21
5.14 Molecular Diagnostics / FISH	22
5.15 Immunohistochemistry	22
5.16 Research and Biobanking	22
5.17 Electron Microscopy	23
5.18 Samples Taken at Wythenshawe	23
5.19 Referrals	23
6 Communication of Results	24
6.1 Reports	25
6.2 Turnaround Times.....	25
6.3 Clinical Advice	26

Speciality.....	26
Weekly.....	26
GI Meeting	26
Specialty	26
Monthly	26
Specialty	27
Other.....	27
7 Enquiries and Complaints	27

1 Introduction

This user guide details information for the requesting of investigations, specimen requirements and communication of results for the department of Paediatric Histopathology.

Paediatric Histopathology is situated in 4th Floor, Royal Manchester Children's Hospital.

Information regarding autopsy service can be found in the Paediatric Mortuary user guide.

Our department deals with approximately 5000 surgical cases and around 400 autopsies annually. Our department comprises approximately over 27 medical, scientific and ancillary staff. We have IBMS training status and support local universities in the training of Biomedical Science students.

We are committed to providing a high quality and timely regional histopathology service and contribute to the HM Coroner's service.

Services Offered

The laboratory offers a full range of histopathology techniques for children. These include:

- Routine diagnostic histopathology: Renal biopsies (native and transplant), Gastrointestinal biopsies and resections, skin biopsies and excisions, Bone Marrow trephines, Placentas.
- Tumour biopsies and resections
- Rapid frozen section service for rectal suction biopsies in cases of suspected Hirschsprung's disease
- Intraoperative diagnosis for a range of clinical scenarios: Hirschsprung's disease and Congenital hyperinsulism
- Enzyme histochemistry, including muscle histochemistry on both Paediatric and Adult patients.
- Immunohistochemistry
- Fluorescent In Situ Hybridisation (FISH) for soft tissue tumours and neuroblastomas (turnaround time of 3-4 days)
- Immunofluorescence for Renal Biopsies
- Immunofluorescence for Skin Biopsies

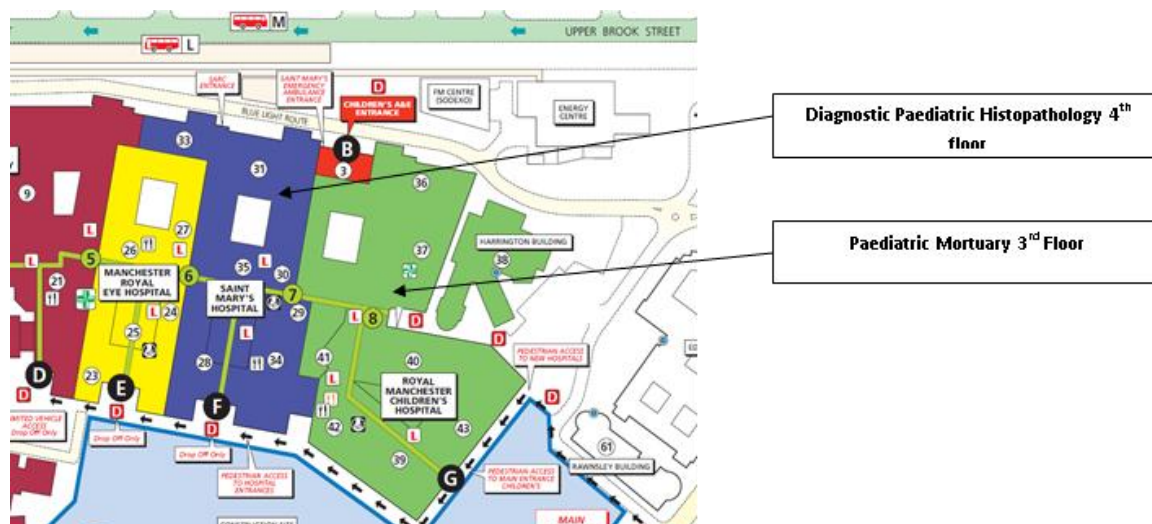
- Electron microscopy via the electron microscopy suite in Clinical Sciences Building
- Molecular diagnostics are referred to the Northwest Genomic Laboratory hub. Turnaround times are test dependent and are in line with current NW GLH and NHS England Genomic test reporting time guidelines. Users should refer to the current NW GLH service profile for specific test turnaround times
- Non-gynae cytology- we perform a limited range of tests: to detect the presence of malignant cells, eosinophils, lipid or haemosiderin laden macrophages within fluid samples from paediatric patients. **Please note we do not perform cell counts.**

2 Contact Us

2.1 Opening Hours

The laboratory is open between 08:30 and 17:30 Monday to Friday excluding Bank Holidays. There is no regular on-call service for histopathology laboratory staff, though we do try to accommodate requests for out of hours urgent work wherever possible.

2.2 Location



The department is located on levels 3, 4 and 5. The Consultants, main laboratory and secretarial office are situated on the 4th floor of Royal Manchester Children's Hospital, lift core 7, next to pharmacy.

The Giving for Living laboratory is situated above on the 5th Floor

The Paediatric Mortuary is on the 3rd floor Royal Manchester Children's Hospital, lift core 8. Please see the separate User Guide.

Address

Diagnostic Paediatric Histopathology Service
4th Floor
Royal Manchester Children's Hospital

Oxford Road
Manchester M13 9WL
0161 701 2240

2.3 Contact Information

Histology Reports

Email	paed.hist@mft.nhs.uk
-------	--

Histology reports can be accessed on HIVE. Queries should be directed to the departmental e-mail account paed.hist@mft.nhs.uk.

Laboratory Enquiries

All enquiries regarding frozen sections, specimen requesting, labelling, transport and requirements should be directed to the main histology laboratory.

Telephone	0161 701 2240
-----------	---------------

Key Contact Details

CONSULTANTS AND MEDICAL STAFF

Professor. A.M. Kelsey	Consultant Paediatric Histopathologist PA: Gemma Jawando ext 11272 anna.kelsey@mft.nhs.uk
Dr. E. Cheesman	Clinical Lead, Consultant Paediatric Histopathologist. PA: Gemma Jawando ext 11272 edmund.cheesman@mft.nhs.uk
Dr. C. Sethuraman	Clinical Director – Cellular Pathology, Consultant Paediatric, Placental and Perinatal Histopathologist, PA: Sarah Taylor ext.12375 chitra.sethuraman@mft.nhs.uk
Dr. G. Batra	Consultant Paediatric, Placental and Perinatal Histopathologist (Clinical Lead for Paediatric Mortuary) S PA: Gemma Jawando ext 11272 gauri.batra@mft.nhs.uk
Dr. M.J. Newbould	Consultant Paediatric, Placental and Perinatal Histopathologist Ext 12258, Secretary ext 12375 melanie.newbould@mft.nhs.uk
Dr. G. Petts	Consultant Paediatric, Placental and Perinatal Histopathologist Ext 11267, Secretary ext 12358 gemma.petts@mft.nhs.uk

Specialist Registrars	Ext 12935
------------------------------	-----------

LABORATORY AND OFFICE STAFF

Laboratory (Telephone Ext 12240)		
Emma Jacobs	Laboratory Manager	emma.jacobs@mft.nhs.uk
Yee Ming Chiu	Advanced Biomedical Scientist	yee.chiu@mft.nhs.uk
Meikee Cheung	Advanced Biomedical Scientist	meikee.cheung@mft.nhs.uk
Peter Collins	Research	peter.collins@mft.nhs.uk

Office(Telephone Ext 12247, 12375, 12358) paed.hist@mft.nhs.uk		
---	--	--

3 Quality

Paediatric Histopathology is fully accredited by the ISO15189:2022 accreditation standards. Our UKAS Medical Laboratory Reference Number is 8648. The department participates in regular exhaustive assessments to maintain its accreditation status. The department is licensed by the Human Tissue Authority (HTA).

The department is committed to deliver a quality service to our users and continual improvement. A quality management system is utilised to ensure all documents, processes, quality records and clinical material are controlled to DLM (Division of Laboratory Medicine) policy. Processes and systems are regularly audited to identify non-conformities and quality improvements.

3.1 External Quality Assurance (EQA)

The department participates in the following external quality assurance schemes:

UK NEQAS for Cellular Pathology Technique

- General Cellular Pathology
- Specialist Technique – Tissue Diagnostic
- Renal Pathology Methods
- Direct Immunofluorescence (DIF)
- Muscle histochemistry

- Frozen sections
- Mega blocks
- Bone Marrow Trepine

UKNEQAS for Immunocytochemistry and In Situ Hybridisation

- General pathology
- Lymphoid pathology

UKNEQAS for Cytogenomics (GenQA)

3.2 Data Protection

The department complies with trust, DLM and departmental policies relating to the handling, use and protection of personal information (IMT-POL-15 Management of Data and Information).

- We only ask for information that we need to allow interpretation of results
- We protect the information and ensure only those staff who need to see the information can access it
- We share the information only when we need to for patient care, for example sending the information to another laboratory for testing
- We don't store information for any longer than is absolutely necessary

For more information please visit:

<http://mft.nhs.uk/laboratorymedicine>

3.3 Uncertainty of Measurement

In clinical laboratory testing there are potential uncertainties that can affect test results, such as poor specimen collection or transport, patient related factors or other interfering factors. The laboratory examination process itself is subject to some degree of variability and our department regularly monitors this by the use of internal quality control and participation in external quality assurance schemes.

In accordance with the RCPATH guidance, an assessment of the uncertainty of measurement will be carried out for any measurement that is included in the diagnostic report if it is deemed to have actual or potential "direct clinical impact."

Where weights and measurements are part of an overall description and do not impart prognostic or predictive value, an assessment will not be carried out.

3.4 Patient Consent

It is the responsibility of the requesting clinician to ensure that any objections or restrictions expressed by a patient to the use of their tissue are clearly recorded on the request card.

For samples submitted from external locations, it is the responsibility of the referring Trust to ensure consent for testing is in place, please be aware that evidence of consent may be required prior to sample testing.

It is the responsibility of the requesting clinician to ensure that any objections or restrictions expressed by a patient to the use of their samples are clearly recorded on the request card.

3.5 Retention and Storage of Pathological Records and Specimens

The department retains pathological records, specimens, blocks, slides and associated material in accordance with current Royal College of Pathologists (RCPATH) and Institute of Biomedical Science (IBMS) best practice recommendations on the retention and storage of pathological records and specimens, and in line with Trust/DLM policy.

Retention, retrieval and disposal of material are managed to maintain traceability, integrity and confidentiality of clinical material and records, supporting ongoing patient care, repeat or additional testing where appropriate, audit, quality management and ISO 15189:2022 requirements.

Specific retention periods are defined in local departmental procedures and may vary depending on the type of material, clinical need, legal/HTA requirements and any agreed research or biobanking arrangements.

4 Requesting of Investigations.

The Division of Laboratory Medicine (DLM) guidelines for specimen acceptance must be followed to ensure that all samples are correctly and unambiguously identified. The policy provides an overarching process to specimen rejection to help balance the requirement to process against the risk to patient safety. Clinical governance issues may arise from errors in specimen identification and/or insufficient clinical information being given with a specimen. To ensure that specimens are linked to the correct patient, adequate identifiers are essential.

Labelling multiple samples from the same patient

If there are multiple samples from the same patient from different sample sites or multiple samples from the same site:

1. Ensure each sample is collected in the appropriate sample collection pot (see section 4.4)
2. Ensure each pot is fully labelled with all the appropriate patient demographic information (see section 4.1)– for HIVE orders each pot should have a unique sample label generated
3. Ensure each pot is labelled with the specific sample source location i.e. skin lesion left arm
4. If there is more than 1 sample / pot for a specific sample source location label each pot numerically, in the order they were taken.

All urgent and specimens on a cancer tracking pathway (HSC205) should be clearly labelled as such. The date and time the specimen was taken is important information that should be included on all requests to determine the length of fixation of the tissue specimen.

4.1 Specimen Acceptance Policy

All samples sent to Paediatric Histopathology must comply with our specimen acceptance requirements.

- All test requests ordered on the HIVE Electronic Patient Record (EPR) system must have a request form print out submitted with the sample.
- For non- HIVE requests or paper requests raised during HIVE down time see acceptance criteria below.

The following mandatory information must be provided for us to accept the specimen:

Essential Patient Identifiers:

- **Surname**
- **Forename (not required in neonates if unknown)**
- **Unique identification number** – MRN number, NHS and external hospital number for external cases
- **Date of birth**
- **Address**
- **Gender**

Essential Clinical Details:

- **High risk status** – to ensure health and safety of all staff
- **Specimen site** – must match on specimen pot and request card
- **Relevant clinical information** – to ensure all necessary investigations are performed
- **Date/time taken** – essential to ensure proper fixation of high risk specimens

Essential Sender Details:

- **Ward/department** – required for return of reports
- **Consultant or GP** – required for return of reports and contact in case of any errors/discrepancies
- **Contact number/bleep** – for frozen sections
- **Name of person making request.**

4.1.1 Rejection Policy

Samples may be rejected, or processing may be delayed, where mandatory patient identifiers or sender details are missing, incomplete or discrepant; the specimen site does not match between the request and container; the container is unlabelled or incorrectly labelled; the request form is absent or incomplete; the sample is received in an incorrect fixative or transport medium for the requested investigation; the container is leaking or unsafe to handle; or the sample falls outside the laboratory acceptance/referral criteria.

Where possible, the laboratory will contact the sender to resolve the issue and determine whether processing can proceed safely without compromising patient identification, specimen integrity or result quality. The sender may be required to attend the laboratory to complete missing information or correct any mistakes. The person correcting patient or specimen details should be of appropriate seniority and

able to take responsibility for the labelling of the specimen. This will result in a delay to specimen processing and reporting.

Rejected specimens, acceptance failures and agreed exceptions will be managed and recorded in accordance with DLM policy and local quality management requirements. For urgent, HSC205, fresh tissue or irreplaceable samples, acceptance and processing may proceed only following review and/or authorisation by an appropriate pathologist, with any limitations documented as required.

Consent for histological examination is not documented on the request forms but forms an integral part of the clinical process, for consent for the procedure.

Internal Paediatric Histology and placental requests are ordered on HIVE as **'Paediatric Histology'**.

External Paediatric Histology request forms are available on request.

All Placental Histology requests must fulfil specific acceptance criteria and ranges / measurements specified where requested. New referral criteria was applied on 01.02.2023 as follows:

We will only accept the following placentas:

- Stillbirth (antepartum or intrapartum)
- Miscarriage (14+0–23+6 completed weeks' gestation)
- Severe fetal distress defined as: pH <7.05 or base excess $\geq$ -12 or scalp lactate > 4.8mmol/l
- Preterm birth (less than 32+0 weeks' gestation)
- Fetal growth restriction defined as: birthweight below 3rd centile or drop in fetal growth velocity of >2 quartiles or >50 percentiles
- Abnormal umbilical artery Dopplers (absent or reversed end diastolic flow)
- Fetal hydrops
- Early-onset (<32 weeks) Severe pre-eclampsia requiring iatrogenic delivery
- Severe maternal sepsis requiring adult intensive care admission and/or fetal sepsis requiring ventilation or level 3 NICU admission
- Massive placental abruption with retroplacental clot.
- Baby for Post Mortem at RMCH

If the referral does not meet the criteria this will be discussed with the referring team and returned.

In exceptional or special circumstances, placentas that do not meet the above criteria may be accepted following discussion with one of the placenta pathologists. The agreed reason for acceptance should be documented on the request form and/or within the laboratory records. The Pathologists name, date and time should also be recorded on the form.

It is essential that gestation is specified and clinical details provided – without this we will be unable to accept the placenta.

4.2 Request Forms

In accordance with the departmental and **DLM Specimen Acceptance Policy**, a minimum of four matching patient identifiers are required on the request form and the specimen pot before we can accept a sample. See **4.1 specimen acceptance policy**

All external paper request forms should be completed in full (see above) and all information provided should be clearly legible. Any missing information or errors will result in a delay to specimen processing and reporting.

External Paediatric Histology request forms are available on request. External Request Form for Histological Examination of Placenta at RMCH: HIEXT2

Correct patient and specimen information is vital for us to provide a quality service to our users. Any specimens deemed to be high risk or potentially high risk should be clearly labelled as such to protect the health and safety of all staff.

If a patient is part of a research project, this should be clearly labelled on the request form to ensure that the specimen undergoes the correct agreed procedures.

4.3 HIVE Requests

Specimen acceptance criteria for HIVE samples are identical to those for samples requested in the conventional manner. HIVE generates histology labels for both the requisition form and each sample pot each pot. Please ensure the correct label is attached to the correct container. HIVE labels must be attached to the specimen container and not to the lid of the container.

Unlike some of the other pathology disciplines, Paediatric Histopathology still require a request form for all specimens requested on HIVE.

ALL SAMPLES FOR PAEDIATRIC HISTOLOGY MUST BE ORDERED ON HIVE USING PAEDIATRIC HISTOLOGY SELECTION AND NOT HISTOLOGY OR CYTOLOGY.

4.4 Storage of Specimens

Prior to transport to the laboratory, it may be necessary to temporarily store specimens. All specimens that are placed into formalin should be kept at room temperature until transported to the laboratory. Specimens in formalin should not be placed in the fridge as this will have a negative impact on fixation and therefore preservation of the tissue.

Specimen	Storage
Formalin	Room temperature
Dry unfixed	Fridge
Zeus Fixative	Room Temperature / Fridge

All dry specimens and specimens in Zeus Fixative ideally should be

transported to the laboratory immediately. Where this is not possible, these specimens should be stored in the fridge temporarily and transport should be arranged as soon as possible.

4.5 Transport of Specimens

All specimens should be transported in the relevant fixative as indicated below in section 5. All specimen pots should be tightly sealed and transported using specimen bags, where appropriate. The request card should be placed in the pocket of the specimen bag, and the pot inside the sealed bag to ensure the safety of all staff. Specimens from theatres are delivered to our specimen reception throughout the day. These specimens should be recorded when delivered to maintain the necessary records.

Fixed samples arriving Outside of Laboratory working hours should be placed in the tray at specimen reception.

Fresh samples arriving outside of Laboratory working hours can be placed in the specimen reception fridge.

All specimens sent via Royal Mail / Courier, should be packaged according to the guidance available on the Royal Mail website. It is the responsibility of the sender to ensure that specimens are appropriately labelled and packaged.

NEVER USE THE PNEUMATIC TUBING SYSTEM

4.6 Specimen Tracking

Many of our service users have systems in place to track specimens. If specimen acceptance criteria are applied at the time of tracked receipt, the specimen can be returned to the sender quickly should any discrepancy be identified.

Appropriate action in the event of a specimen acceptance failure involving fresh tissue (e.g. frozen section, gel sample) or an Urgent / HSC 205 sample is decided at the discretion of the reporting pathologist. The decision to accept and process pending confirmation may be taken by the reporting pathologist. It is the responsibility of the Pathologist to communicate this within the report.

4.7 Requesting Formalin Pots

Requests for Formalin pots will be dealt with as soon as is practicable, however if you require the pots urgently please inform the laboratory by telephone on **12240**. Sufficient notice should be given.

4.8 Handling Formalin

The department uses 10% neutral buffered Formalin (4% formaldehyde) and this should be handled with care at all times. We obtain our formalin from CellSolv, a reputable supplier and they have issued the following safety information:

10% Formalin

Acute Toxicity Category 4 - Harmful if inhaled

Skin Sensitizer	Category 1 - May cause an allergic reaction
Carcinogen	Category - 1B May cause cancer
Mutagen	Category 2 - Suspected of causing genetic defects

All solutions containing formalin are suspected carcinogens, mutagens and sensitisers. The solutions should be handled with care, minimising skin contact. Safety equipment including gloves should be worn and any spill on the skin should be washed as soon as possible. Contaminated clothing should be removed immediately and washed before re-use as the chemical can soak through clothing to stay in contact with the skin for a long period of time. Handle with care and avoid any situations which could potentially result in formalin spillage.

Formaldehyde vapours in the air are also harmful. The safety limit for formaldehyde in air is 2 part per million (2ppm). This means workers should not be exposed to formaldehyde vapour above this level (averaged over the period) for more than 15 minutes at a time. Testing machines are available to monitor the level of formaldehyde vapour in air but as a rough guide, 2ppm of formaldehyde will have a strong, unpleasant smell and will start to sting the nose and eyes on first entering the room. This check is only valid on first entering the room as the senses quickly acclimatise and will be less sensitive. In most hospitals with proper bench extraction it is unlikely that the limit will be reached in normal use but may be in the event of a spill.

Information from: Formalin Usage Guide for Hospitals – CellSolv Version 2 (Jan 2019)
(external safety data sheet, contact laboratory if required)

Formalin may be disposed of down a sink suitable for clinical waste with copious amounts of running water in a well-ventilated room depending on local environmental rules. However, please check your local rules.

4.9 Formalin Spillages

Formalin should be handled with care and sent in appropriately sized containers with secure lids to minimise the risk of a spillage. Specimen pots should be secured in a sealable plastic specimen bag.

Each sender who handles formalin should have their own policy or procedure and equipment for handling formalin and dealing with a spill, and should have sourced from a reputable supplier. Spillages should be dealt with as soon as it safe to do so. Salvage of any specimen should be of the highest importance as it is likely to not be repeatable. Specimens must not be discarded.

The sender must inform the laboratory of any spillage where the specimen may have been lost, partially lost or its integrity compromised. This should be reported as an incident and the sending clinician should be informed as soon as possible.

In the event of a spillage please follow local spillage protocols. The Histology laboratory can be contacted for advice Mon-Fri 09:00-17:30 on 0161 701 2240

Our formalin supplier, CellSolv, has issued the following guidance on spillages.
Spillage volumes:

- Minor spillages (up to 200ml) – usually can be dealt with by 1 or 2 staff using simple procedures
- Large spillages (200ml - 5 litres) – require the use of a formaldehyde spillage kit
- Major Spillages (over 5 litres) – should be dealt with by Fire Service

4.9.1 Dealing with minor spills

In a hospital environment formalin is mostly handled in very small containers with less than 100ml of 10% formalin solution. A spill of this size is unlikely to contaminate the air to dangerous levels if dealt with promptly. The spill can be wiped up with absorbent material by staff members wearing suitable impervious gloves such as nitrile gloves. The contaminated material should be sealed in plastic bags for disposal and removed from the room as soon as possible. It is important not to simply dispose of the contaminated material in an open bin as the formaldehyde will continue to contaminate the air.

4.9.2 Dealing with large spills

Some hospitals use formalin solutions in larger quantities, for example large specimen containers/buckets for whole organ fixing. A spill in this case can be up to ten litres and can cause more serious air contamination. Such a spill should only be tackled by trained personnel with appropriate personal protective equipment. This should include protective gloves, over-suit, boots and respiratory protective equipment (R.P.E.) with forced air feed or formaldehyde selective filters. The spill should be contained by absorbent booms and prevented from entering drains. The spill should then be absorbed into an appropriate absorbent medium, sealed in an airtight container and kept as special waste for professional disposal.

- Evacuate all staff from immediate area and nearby areas of spillage
- Wearing the appropriate personal protective equipment and full face mask, use a formaldehyde spill kit to contain the spillage
- Ensure all materials used to tackle the spillage are appropriately contained and disposed of

4.9.3 Dealing with major spills

- Evacuate the area
- Break nearest fire alarm point
- Phone emergency number for your department (e.g. 2222)
- Inform of nature and site of spillage

4.9.4 Dealing with Biological spills

- The Histology laboratory can be contacted for advice Mon-Fri 09:00-17:30 on 0161 701 2240

5 Specimen Requirements

All specimens should be sent to the laboratory in an appropriately labelled specimen pot that is large enough to easily accommodate the specimen. It is unsafe practice to label specimen pots in advance of a procedure.

5.1 Factors Affecting Performance

The following is a list of factors known to significantly affect the performance of examination and interpretation of results:

- Failure to follow the specimen acceptance policy will result in a delay to specimen processing and reporting.
- Failure to supply adequate clinical information may result in a delay to requesting of specimen investigations and reporting.
- Failure to label requests as urgent or HSC205 will result in a delay to specimen processing and reporting.
- Failure to fix specimens appropriately and in a timely manner will adversely affect specimen integrity and subsequent histological examination.
- Failure to follow instructions for the specific specimen requirements will prevent necessary examinations from being performed.
- Failure to disclose high risk status of the specimen will put staff at unnecessary risk of infection.
- Specimens for frozen section placed in 10% neutral buffered Formalin will result in a frozen section not being performed and therefore a rapid report would not be possible.
- Failure to contact consultant/laboratory in advance for a frozen section may result in a delay or even a scenario where it cannot be performed, due to a lack of availability of technical staff and/or Consultant staff.
- Specimens for immunofluorescence placed in 10% neutral buffered Formalin will prevent necessary immunofluorescence examinations.
- Muscle biopsies for enzyme histochemistry must be transported immediately to maintain enzyme and protein membrane integrity, failure to do so will result in poor/low diagnostic yield.
- Muscle biopsies placed in 10% neutral buffered formalin will prevent any necessary enzyme histochemistry testing.
- Rectal biopsies placed in 10% neutral buffered formalin will prevent any necessary enzyme histochemistry testing.
- De-calcification in formic acid will cause damage to DNA, therefore, subsequent FISH testing will be very unlikely to work. De-calcification in EDTA is recommended
- For IHC testing, recently cut sections are recommended wherever possible. Older unstained slides may lose antigenicity, which can reduce staining quality and may affect interpretation.
- Where downstream testing such as IHC, FISH or molecular diagnostics may be required, this should be clearly indicated on the request so that fixation, decalcification, tissue handling and sectioning are appropriate for the intended investigation.
- Where unstained slides are submitted for additional testing, the date the sections were cut should be provided where known, as section age and storage conditions may affect test performance.

5.2 Specimen Fixation

Specimens for routine histology are required to be placed into 10% neutral buffered formalin, which is available on request from the laboratory. Formalin is used to fix the specimen and preserve the tissue in as life-like state as possible. If there is a delay

between the removal of the tissue and fixation in formalin, this can adversely impact the specimen integrity and therefore report.

To ensure proper specimen fixation, the following guidelines should be adhered to:

- Specimen container – should be appropriately sized and large enough to easily accommodate the specimen
- Formalin – ensure adequate volumes of formalin are used
 - 1:5 tissue to formalin ratio for very large specimens
 - 1:10 tissue to formalin ratio for small specimens where possible
 - Ensure the details on the specimen pot and request card match, are legible and a formalin hazard label is attached
- Ensure the lid of the specimen container is securely fastened
- Use a plastic biohazard sealable specimen bag (where possible) for the specimen pot and place the request card in the pocket

All specimens in formalin should be stored at room temperature and not in the fridge prior to transport to the laboratory.

5.3 High Risk Specimens

Specimens that potentially contain category 3 pathogens (for example, SARS-coV-2, mycobacterium, HIV, hepatitis B or hepatitis C) must be clearly labelled as HIGH RISK on both the request card and on the specimen pot to ensure the health and safety of all staff. Please refer to the Advisory Committee on Dangerous Pathogens (ACDP) website for a comprehensive list of Category 3 human pathogens.

The date and time that the specimen is taken should be recorded on the request card for all high risk specimens to enable the laboratory to calculate the fixation time on receipt. This information will minimise the infection risk to staff and prevent undue delay to processing. All high risk specimens are to be fully fixed before being processed by the laboratory.

Frozen sections, muscle biopsies and immunofluorescence investigations will not be performed on any high risk or potentially high risk specimen.

5.4 Frozen Sections

All intra-operative frozen sections should be booked with the laboratory by contacting the laboratory on **0161 701 2240** to ensure the availability of the appropriate scientific and consultant staff. Every attempt will be made to provide frozen sections during the laboratory opening hours, providing appropriate clinical and technical staff are available.

Fresh samples for frozen section must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

Frozen sections should be booked **24 hours in advance** after discussion with a Consultant Pathologist. If this is not possible, for example in an emergency, a Consultant Pathologist should be contacted as soon as possible. When booking a frozen section, please provide the following information;

- Patient information

- High risk status
- Clinical information
- Clinician name
- Theatre number
- Contact number

The specimen for frozen section should be transported to the laboratory in an appropriately labelled **dry** specimen container and must arrive by 5.00pm. Formalin must not be added. Specimens should be handed directly to the technical staff at histopathology specimen reception as a matter of urgency to ensure a timely report is issued.

Frozen sections will not be performed on any high risk or potentially high risk specimen.

When the specimen is ready to be sent to the laboratory, or if there is a delay in theatre, please contact the laboratory. If a frozen section is no longer required, please contact the laboratory immediately to cancel.

5.5 Urgent Specimens

If a specimen requires an urgent report, the laboratory should be contacted on 0161 701 2240 to request this. However, it is important to state that specimens for histological analysis do need at least 24 hours fixation and a further 24 hours preparation time. It is sometimes unwise to shorten this time, as it puts the quality of the specimen at risk. Please liaise with us and we can advise you on the optimum way to deal with the sample, bearing in mind both the need for a rapid result and the requirement for good histology to make an accurate diagnosis.

5.6 Special Specimens

In order to gain the maximum amount of information we need to treat certain specimens in a specific way. In order to do this you need to liaise with us before you take the specimen, to discuss appropriate fixation, if any and transport.

Fresh samples must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

The following specimens should be sent FRESH immediately following surgical removal and should be discussed with us in advance by telephoning the laboratory on 0161 701 2240 (fresh specimens should be refrigerated whilst awaiting porter/transport to the laboratory):

- Tumours
- Lymph node specimens suspicious of tumour
- Skin biopsies for electron microscopy.
- Skin biopsies for fibroblast culture are not for histopathology, and should be sent to either the Willink Laboratory or Cytogenetics.
- Lung biopsies

- Liver biopsies for metabolic disease (usually glycogen storage disease)
- Cytology specimens
- Renal Biopsies (see section 5.7)
- Rectal Biopsies (see Section 5.8)
- Muscle Biopsies (see section 5.9)
- Fresh Pancreatic Lesions – Congenital hyperinsulinism (see section 5.10)
- Skin Biopsies for immunofluorescence (see section 5.11)
- Bone biopsies for metabolic investigations (see section 5.12)

If you are unsure about anything, including whether a specimen should be sent fresh or fixed in formalin, please discuss this with us by ringing either a consultant histopathologist or a senior member of the technical staff (techniques requiring fresh specimens will not be available once the specimen is fixed)

Any other specimens should be fixed in formalin as soon as possible before transport to the laboratory. Formalin fixed specimens should be kept at room temperature.

Turnaround of specimens is at least 2-3 days for routine formalin fixed specimens. If extra specialist work is required the turnaround time will be increased. Specimens containing bone or teeth require decalcification and this can take days to weeks depending on the size of bone.

Factors that can significantly affect the interpretation of the sample results include poor fixation, drying artefact of unfixed specimens and cauterisation that occur from sampling artefact.

5.7 Renal Biopsy

All renal biopsies should be booked in advance with the laboratory, by telephoning the laboratory on 0161 701 2240. This is to ensure the availability of the appropriate scientific staff to handle the specimen. Any urgent renal biopsies that require a report on the same day must arrive to laboratory before 11.00am of that day.

5.7.1 Native Renal Biopsies

Where possible, two cores of native renal tissue should be obtained to enable investigation into native renal disease. A good quality core of renal tissue is required for routine histology investigations and should be placed in an appropriately labelled container of 10% Formalin. The second core should be kept fresh or if taken outside of laboratory hours, placed in Zeus Tissue Fixative and is appropriately labelled for immunofluorescence accompanied with a request card.

Fresh samples must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

Cores requiring Immunofluorescence that are fresh should be delivered immediately to Paediatric Histology. If it is not possible to transport these samples immediately they should be placed into Zeus Fixative. These specimens should not be placed into formalin as this technique cannot be performed on fixed tissue. Zeus Fixative is available on request from our laboratory. Immunofluorescence will not be performed

on high risk or potentially high risk specimens due to the health and safety risk it poses to staff.

5.7.2 Transplant Renal Biopsies

Two cores of renal tissue if possible and placed in an appropriately labelled container of 10% Formalin accompanied with a request card.

5.8 Rectal Biopsies for Hirschsprungs Disease

All rectal biopsies should be booked with the laboratory in advance before the procedure, by telephoning the laboratory on 0161 701 2240. This is to ensure the availability of the appropriate scientific staff to handle the fresh specimen.

Fresh samples must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

All rectal biopsies should be transported to the laboratory in an appropriately labelled **dry** specimen container accompanied with a request card. Small biopsies should be wrapped in gauze/foil to prevent the specimen from drying out. These specimens need to be transported to the laboratory **immediately**.

An Acetylcholinesterase histochemistry stain is needed to be performed on all rectal biopsies to aid diagnosis and this technique cannot be performed if specimens are placed into formalin.

Any high risk or potentially high risk specimens can be placed into formalin immediately.

5.9 Muscle Biopsies

Paediatric Histology provides a service for both Paediatric and Adult Muscle biopsies.

All Muscle biopsies should be booked with the laboratory in advance before the procedure, by telephoning the laboratory on 0161 701 2240. This is to ensure the availability of the appropriate scientific staff to handle the specimen.

Fresh samples must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

All muscle biopsies should be transported to the laboratory in an appropriately labelled **dry** specimen container accompanied with a request card. Muscle biopsies should be wrapped in foil to prevent the specimen from drying out. These specimens need to be transported to the laboratory **immediately**.

If the muscle biopsy requires mitochondrial analysis, a portion of the muscle is given to the Willink Laboratory. It is the responsibility of the requesting consultant to inform the laboratory if mitochondrial analysis is needed and to fill out all the necessary forms.

Enzyme histochemistry staining is essential for all muscle biopsies for diagnosis and this technique cannot be performed if specimens are placed into formalin.

Muscle Biopsies taken at Wythenshawe

All Muscle biopsies should be booked with the laboratory in advance before the procedure, by telephoning the laboratory on 0161 701 2240.

Once the muscle biopsy has been sampled and collected by the courier, it is essential to contact Paediatric Histology Ext 12240/12931 to inform them the sample has been collected and is on the way.

Instruction must be given to the Courier that upon their arrival at Paediatric Histology to call Ext 12240 and to hand the sample directly to a member of staff.

Muscle biopsies will not be performed on any high risk or potentially high risk specimen.

Reporting of muscle biopsies

Paediatric muscle biopsies are reported by the consultants within the Paediatric histology team.

All Adult muscle biopsies are handled and stained within the Paediatric histology team. Reporting of adult muscle biopsies is provided by Northern Care Alliance at Salford Royal NHS Foundation Trust.

5.10 Intra-operative frozen sections of Pancreas for Congenital hyperinsulinism (CHI)

Frozen sections of pancreatic tissue for congenital hyperinsulinism (CHI) should be discussed in advance by the Clinicians, Surgeons and Pathologists. Where consent for enrolment in the CHIPS study is taken, discussions should also include the University of Manchester.

The specimen for frozen section should be transported immediately to the laboratory in an appropriately labelled **dry** specimen container. Formalin must not be added. Specimens should be handed directly to the technical staff at Paediatric Histopathology as a matter of urgency.

Fresh samples must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

5.11 Skin Biopsies Immunofluorescence

Two pieces of skin should be sent immediately to Paediatric Histopathology, one skin should be sent fresh and the other in formalin. These should be handed directly to the technical staff.

If a skin biopsy for Immunofluorescence requires to be taken outside of laboratory hours, the fresh sample should be placed in Zeus Tissue fixative and stored in a fridge. Please arrange collection of fixative from Paediatric Histology prior to biopsy, during laboratory opening hours.

Please note the fixative only allows samples to be stored for up to 5 days.

Fresh samples must arrive at the Paediatric Histology department between 9am and 4.30pm Mon – Fri.

5.12 Metabolic Bone

Bone biopsies for metabolic investigations should be discussed in advance by Clinicians, Pathologists and technical Laboratory staff. These samples require **70% alcohol fixative**. Please contact the laboratory (**X 12240**) to inform of this type of biopsy and to obtain fixative.

Once received in Paediatric Histology a courier will be arranged to send the sample to the Cambridge University Hospitals Histology Department for metabolic bone and histomorphometry pathway analysis.

It is important to communicate with the laboratory when a sample is being taken.

Do not fix these samples in formalin, a full analysis will not be possible in these circumstances.

5.13 Placentas

Paediatric histopathology primarily receives placentas but does not receive pregnancy remains below 13 weeks 6 days gestation.

Paediatric histopathology follow the Royal College of Pathologists tissue pathway for histological examination of placenta. Please see section 4.1 above for the accepted referral criteria.

Placentas falling outside the stated referral criteria may be accepted in special circumstances following prior discussion and agreement with one of the placenta pathologists.

INTERNAL PLACENTA REQUESTS

For MFT referral, ensure that the order is made for **Paediatric Histology** and that the smart text for 'Placenta' is used, please do not use free text.

EXTERNAL PLACENTA REQUESTS

Always complete a 'Request Form for Histological Examination of Placenta'. These can be obtained from Paediatric Histology or via this link

<https://mft.nhs.uk/app/uploads/2023/05/HIEXT2.pdf>

Please note, all samples MUST be delivered directly to Paediatric Histopathology not to a transport drop off point and double check you have correctly labelled the sample with the patient's details and included a request form.

It is best practise to fix the placenta including all the length of cord that is not taken for genetics examination* and membranes in 10% formalin as soon as possible to prevent autolysis. The pot should be sufficiently large enough to allow fixation and optimum histological examination, about 10 to 12 inches in diameter and larger than the diameter of the placenta.

5.14 Molecular Diagnostics / FISH

Molecular Diagnostics is situated over two floors, 4th Floor Paediatric Histology and 5th Floor Research. This service offers Fluorescent in -Situ Hybridisation (FISH) for soft tissue tumours and neuroblastomas (turnaround time of 3-4 days) involving approximately 30 probes. The department utilises a Leica DM2500 Fluorescent Microscope and image capture system and is enrolled in UKNEQAS for Cytogenomics (GenQA) quality assurance scheme. Any clinician wishing to request FISH should discuss this with the reporting Pathologist. It is not appropriate to contact the laboratory directly to request FISH.

Sample requirement for FISH - 1 H&E (marked with area of interest) plus 2 unstained sections per probe requested. Sections should be 3-4um thick and mounted on adhesive slides. Slides must be labelled as directed by specimen acceptance policy".

Unstained sections should not be cut more than 4 weeks prior to dispatch, as older sections may compromise the quality of FISH staining. It is the sender's responsibility to ensure that slides meet this requirement before submission.

De-calcification in formic acid will cause damage to DNA, therefore, subsequent FISH testing will be very unlikely to work. De-calcification in EDTA is recommended

5.15 Immunohistochemistry

The Paediatric Immunohistochemistry Laboratory is situated within Paediatric Histopathology on the 4th floor of the Children's' Hospital and provides IHC testing for our ISO 15189 accredited histology service. We currently house an automated Ventana Ultra BenchMark Plus staining machine which we use to carry out our routine clinical work. We are enrolled in the UKNEQAS ICC quality assurance scheme. For external IHC requests, unstained sections should be freshly cut where possible and submitted promptly. Older unstained slides may show loss of antigenicity, which can reduce or prevent staining and may affect interpretation. Where older sections are submitted, the age of the sections should be provided where known and this may be recorded as a limitation.

IHC request form:

<https://mft.nhs.uk/app/uploads/2023/05/HICCFRM10-Paediatric-IHC-External-Request-form.doc>

IHC external users instructions:

<https://mft.nhs.uk/app/uploads/2023/05/HIICCFRM29-Paediatric-External-Users-instructions.doc>

5.16 Research and Biobanking

The department supports research both internally to this Trust and externally, for all research enquires please contact **Peter Collins 0161 701 2263**.

Paediatric Histology provides a biobanking service for the Children's Cancer and Leukaemia Group. The department also performs biobanking for molecular diagnostic analysis and molecular based pathways such as Whole Genome Sequencing.

5.17 Electron Microscopy

We offer electron microscopy via the electron microscopy suite in Clinical Sciences Building.

Electron microscopy will be undertaken at the specific request of the reporting Consultant Histopathologist. If the user would specifically like to request electron microscopy on a specimen, an appropriate Consultant Histopathologist must be contacted prior to biopsy.

5.18 Samples Taken at Wythenshawe

Any samples for Paediatric Histology taken at Wythenshawe theatres must be transported to CSR at Wythenshawe. All samples must be clearly labelled **FAO PAEDIATRIC HISTOLOGY, 4th Floor, RMCH, Oxford Road**. These samples are taken by transport and delivered to Oxford Road Campus Adult Histology ORC. Please ensure an email is sent to the department to inform sample is on the way.

For urgent fresh Paediatric samples, please liaise directly with the laboratory X12240 and send the samples via taxi.

5.19 Referrals

External Primary Diagnostic Reporting

Paediatric Histopathology provides primary diagnostic reporting for selected paediatric histopathology specimens referred from Birmingham and Bristol under agreed referral arrangements.

Referring Trusts are responsible for arranging the safe transport, tracking, delivery and return of referred material, including blocks and slides, in accordance with their local procedures and agreed arrangements with Paediatric Histopathology. All referred material must be packaged appropriately and must meet the specimen acceptance criteria outlined in this User Guide.

Where wet tissue specimens are received as part of these agreed referral pathways, residual wet tissue will be retained for 4 weeks following authorisation of the final report and then disposed of in accordance with departmental procedure, unless prior alternative arrangements have been agreed with the department.

Cases outside agreed referral arrangements, urgent cases, or cases requiring specialist handling should be discussed with the laboratory or relevant consultant pathologist before dispatch.

The department also regularly receives requests for expert/second opinion from other hospitals within and outside the UK.

Referrals to Hospitals / Departments outside of Paediatric Histopathology

Similarly, the department also refers cases to other services for expert opinion, diagnostic services and in response to service pressures. The following are the most commonly used.

Type	Address
Reporting/Vacancy cover	LDPath NHS Department, 6 St Johns Place, London EC1M 4NP
Genetics, CNS tumour DNA, Cytogenetics	Genomic Diagnostics Laboratory Manchester Centre for Genomic Medicine 6 th Floor, St Mary's Hospital, Oxford Road, Manchester M13 9WL
Mitochondrial Studies Muscle	Wellcome Trust Centre for Mitochondrial Research Newcastle Mitochondrial NSCAG Diagnostic Laboratory University of Newcastle
Limb Girdle Muscular Dystrophies	NCG Limb-Girdle MD Referral Centre Muscle Immunoanalysis Unit Dental Hospital Lower Ground Floor Richardson Road Newcastle upon Tyne NE2 4AZ
Lymphomas – HODS	Christie Hospital
Second Opinion	Christie Hospital
Metabolic Bone	Cambridge University Hospitals Histopathology Department Old LMB Building (Opposite Outpatients) Addenbrookes Hospital Hills Road Cambridge CB2 0QQ
Adult Muscle biopsies	Norther Care Alliance Histopathology Department Salford Royal Stott Lane Salford M6 8HD
Primary Reporting of Renal Biopsies (Native and Transplant)	Adult histology CSB1 Manchester University NHS Foundation Trust Oxford Road Manchester M13 9WL

6 Communication of Results

6.1 Reports

Reports are available when all necessary tests have been completed, reviewed and authorised by a Consultant Pathologist. Verbal reports or clinical discussions can only be provided to qualified medical staff by Consultant Pathologists.

All report enquiries should be directed to the secretarial office in the first instance. The clerical and scientific staff in the laboratory cannot give out any information regarding results/reports.

Authorised Reports requested on HIVE are available HIVE EPR.

External reports are sent securely electronically.

In order to support timely release of results, third party agencies may be used to produce the report issued – this will be specifically referenced on the report issued if applicable.

Histology Reports

Email	paed.hist@mft.nhs.uk
-------	----------------------

Users are requested to check if final reports are available in hospital notes, clinics or wards before making enquiries. Please note that clerical staff will not give report details over the telephone, but on request, authorised reports can be faxed to dedicated hospital fax numbers and General Practitioners.

6.2 Turnaround Times

Urgent Frozen Section specimen arrival	Report within 20 minutes of biopsy in the laboratory
Tumour Specimens	Initial verbal report within 1- 10 days depending whether biopsy or resection
Renal Transplant Biopsies	Initial verbal demonstration and discussion within 24hrs
Rectal Biopsies	Initial verbal report within 24hrs
Non-urgent/Routine Specimens	Departmental rules: 70% of cases within 14 days, however, clinicians are encouraged to contact the pathologists to discuss complex cases. Specimens containing bone or teeth may take longer to report. RCPATH Key Performance Indicators (KPI) target is to report 80% of all specimens within 10 days (except those requiring decalcification)

N.B. If the specimen arrives on a Friday the laboratory needs to be notified if an urgent report is required to ensure a member of staff is available at the weekend to process the biopsy.

6.3 Clinical Advice

The pathologists and technical staff are available by phone, e-mail or in person in the laboratory to give clinical or technical advice such as sampling requirements for specific samples. In addition there are regular clinical meetings.

Advice may be sought in the department during normal laboratory hours (08:30 – 17:30).

CLINICOPATHOLOGICAL MEETINGS

Speciality	Date / Time	Location
<i>Weekly</i>		
Oncology MDT	Thursday 8.45 – 9:45h	MS Teams / Oncology Seminar Room
GI Meeting	Monday 11:00 - 12:00h	Oncology Seminar Room
Leukaemia MDT	Tuesday 14:00- 15:00h	MS Teams

Specialty	Date / Time	Location
<i>Monthly</i>		
Muscle Biopsy	3 rd Tuesday of the month 16:00 – 17:00h	Oncology Seminar Room / Teams
Renal	1 st Wednesday of the month 14:00 – 14:30h	MS Teams
Perinatal Mortality Review Tool	Adhoc meetings each month	MS Teams
Fetal MDT	2 nd Friday of month 14:00-15:00	NICU Seminar Room / Teams

Specialty	Date / Time	Location
Other		
Urology	4 th Thursday every 2 months 14:30-15:30h	MS Teams
Mitochondrial	Quarterly/ Half yearly	Oncology Seminar Room / Teams
Surgical Teaching Session	Quarterly Monday 10-11am	Oncology Seminar Room / Teams
Genetics Pathology/ Radiology	Bimonthly 3 rd Thursday 14:00-15:00	Genetics 6 th Floor Seminar room 1 / Teams
DSD Clinical Meeting	Quarterly	MS Teams

7 Enquiries and Complaints

To enable us to deal with enquiries efficiently, please ensure you use the correct contact information, as detailed in section 2 (Contact us). The department is committed to fully investigating all complaints regarding the standard and quality of services that we offer. Please contact our laboratory manager on the contact information below.

Lead Healthcare Scientist/ Laboratory Manager		
Katherine Congdon	0161 706 6138	Katherine.congdon@mft.nhs.uk
Emma Jacobs	0161 701 0603	Emma.jacobs@mft.nhs.uk

Complaints are managed through the PALs (Patient Advice and Liaison Service) and Trust Risk Management Service Ulysses. Any complaints made direct to the Department are passed to PALs for investigation.