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**An Introduction to you local Transfusion Laboratory; the practical guide for the Essential Transfusion Medicine Course**

**Part 1 – Introduction - purpose of the practical workbook**

* User guide and advice

**Part 2 - Transfusion laboratory Overview**

* Role of the laboratory
* Opening hours/shifts/tests performed out of hours
* Key Personnel and responsibilities

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* Types of components
* Storage requirements and temperature control
* Issue of blood components and products
* Stock management and expiry

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* Neonatal and Paediatric transfusions

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**Part 1 - Introduction- purpose of the practical workbook**

**Name**Click or tap here to enter text.

**Hospital Trust**Click or tap here to enter text.

**Date**Click or tap to enter a date.

The transfusion medicine curriculum emphasises the importance of understanding laboratory practice in addition to fostering strong professional relationships with colleagues working within the hospital laboratory. To support this, dedicated time has been allocated within the Essential Transfusion Medicine programme on Thursday afternoon for you to visit your hospital's transfusion laboratory.

During this visit, we encourage you to gain insight into the various professional roles working within a blood transfusion department. This includes understanding the responsibilities of biomedical scientists, laboratory managers, quality managers, and transfusion practitioners, as well as the critical decisions they make to ensure the safe provision of blood for patients. Observing key laboratory processes and techniques will enhance your theoretical learning and help solidify your knowledge through practical experience and completion of this practical workbook will provide evidence of your learning.

The aim of this workbook however is not to provide all the answers! Some of the questions are deliberately broad, designed to stimulate discussion with the transfusion team and help you familiarise yourself with the laboratory, the staff, and the processes. Hopefully it will highlight what you know, what you don’t know and what you need to know going forward.

You may need to visit the laboratory more than once in order to complete the workbook, and some the tasks will need to be carried out independently, as consolidation (e.g. looking at guidelines, attending meetings) following time spent with the laboratory team. Responses may show variation between hospital trusts.

Along with this practical handbook is the accompanying **ST3** **laboratory visit checklist** created for laboratory managers and includes who and whatwill be required for certain parts of the visit, giving the laboratory time to prepare in advance.

If there are words or instructions you don’t understand, please use the resources you have (including haematology consultants, transfusion practitioners and biomedical scientists) to find out more.

Please also refer to the Blood transfusion training guidance document [Blood Transfusion Training Guidance 2022.pdf (thefederation.uk)](https://www.thefederation.uk/sites/default/files/2024-03/Blood%20Transfusion%20Training%20Guidance%202022.pdf)

Quick Users Guide:

Before you start:

* Have a read through the practical handbook and ST3 laboratory visit checklist in advance.
* Not every section requires you to be in the laboratory with a dedicated member of staff.
* Please note the guidance to the sections - for some tasks there may be more than one option.

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| --- | --- |
| Key | Task description |
| 🥼 | **Practical / laboratory based task.** You will need to be in the laboratory to complete this task with a Biomedical scientist (BMS). |
| 🧬 | **Observing laboratory manager or quality manager**. This will require time in the laboratory/office, or you may be able to set up a virtual call. |
| 🩸 | **Transfusion Practitioner (TP)**. This will require time spent together, or you may be able to set up a virtual call. |
| 🗓 | **Transfusion meetings**. Ask the laboratory manager or transfusion practitioner to organise invites to transfusion meetings. These may be face-to-face or virtual depending on your trust. |
| 📚 | **Supplementary reading.** This can be performed away from the laboratory and will solidify your knowledge of a chosen topic. |
| ✍ | **Reflection.** Writing/reflecting what you have learned while working through the workbook and how it may have an impact on your practice. |

Contact your transfusion laboratory **at least 6 weeks in advance**. Introduce yourself and make them aware that you would like to visit the laboratory, perform some basic laboratory tests, gain an awareness of stock control, traceability, quality management systems, incident reporting and ask if you could attend hospital transfusion team meetings. We recommend that you contact your Transfusion consultant (if you have one), laboratory manager, laboratory training officer and transfusion practitioner. The contact details will be on your local intranet site.

* When you contact them send them a copy of the **ST3 laboratory visit checklist** - this will allow the laboratory staff to prepare for your visit
* Prepare to be flexible. It may be that Thursday’s are not the best day for you to visit the laboratory and you may have to visit the laboratory more than once to complete the workbook
* You can take pictures and upload them as evidence…..
* Once you have completed the workbook upload to your **e-portfolio**

**Part 2 - Transfusion laboratory Overview**

* Role of the laboratory
* Opening hours/shifts/tests performed out of hours
* Key Personnel and responsibilities

**Role of the laboratory**

🥼🧬 What are the main roles and responsibilities of your transfusion laboratory and its staff?

**Opening hours/shifts/tests performed out of hours**

🥼🧬 What hours do the laboratory staff work, and do they perform routine tests during out of hours?

**Key Personnel and responsibilities**

✍As you meet different colleagues, note down their names and a brief description of their role. You can type in the table and add more rows if required.

|  |  |  |
| --- | --- | --- |
| Name | Role | Brief Description of Role |
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**Part 3 - Blood Component Inventory and Storage**

* Types of components
* Storage requirements and temperature control
* Issue of blood components and products
* Stock management and expiry

**Types of Components**

📚🥼What is the difference between a blood component and a blood product?

🥼Which blood products are handled by your transfusion laboratory, and which are held by pharmacy?

📚🥼What are the different types of blood components available for patients?

**Storage requirements and temperature control**

📚🥼What are the different optimum storage conditions for blood components and blood products in your laboratory? You can type in the table and add more rows if required.

|  |  |  |
| --- | --- | --- |
| Blood Component/Blood Product | Optimum Storage Temperature | Storage Location |
|  |  |  |
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|  |  |  |
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📚🥼Why is it essential that blood components and blood products are stored appropriately?

**Issue of blood components and products**

🥼How long does it take for a clinical area to receive a unit of fresh frozen plasma (FFP) or cryoprecipitate once requested? What thawing methods do your laboratory use? What is good or bad about these?

🥼📚How long do you have to transfuse thawed FFP, or cryoprecipitate once thawed, what guidance is there to support this?

🥼What is the process in your hospital laboratory for requesting and ordering blood components and blood products?

**Stock Management and Expiry**

🥼What stock is routinely held in your blood bank? Your laboratory may have a list available. You can upload a picture of this or complete the table below. You can type in the table and add more rows if required.

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| --- | --- | --- |
| Blood Component (adult unit/paediatric units) | Blood Group | Daily stock level |
|  |  |  |
|  |  |  |
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🥼 Discuss stock management with the BMS and write down what the laboratory staff do to ensure effective blood stock management.

🥼Where is your regional blood centre?

🥼How many deliveries of blood components does your laboratory receive each day?

🥼Have a look at the most recent delivery. How did the laboratory know that these units had been kept at the correct temperature?

🥼Observe a BMS completing an OBOS order. What was requested and how urgent was the request?

🥼🧬📚When might a clinician be consulted prior to ordering certain components? Does the laboratory have a process to follow?

🥼🧬How much does an ad hoc request cost and how long does it take? How are these requests delivered? What other methods are used to deliver blood to the department?

🥼What was the most recent ad hoc request for and why was it needed? Do you agree it was clinically required?

🥼Does your trust have any satellite fridges? What is kept in them?

🥼What is remote issue?

**Part 4 - Booking in samples and sample reception**

* Ordering process and documentation
* Emergency and routine requests
* Pre-transfusion tests -booking in

**Ordering process and Documentation**

🥼📚What is your laboratory’s sample and form acceptance criteria?

🥼 📚 How are sample or form rejections dealt with?

a) For sample integrity

b) For labelling errors?

🥼📚Why is there a zero-tolerance policy for sample labelling in transfusion?

**Emergency and Routine Samples**

🥼Ask the BMS what the difference in process is when handling emergency and routine transfusion samples?

**Pre-transfusion tests - booking in**

🥼📚Why is a sample centrifuged prior to testing - and at what speed?

🥼Observe a sample being booked into the Laboratory Information Management System (LIMS). Ask the BMS if the sample selected also has a request for blood.

Take notes-

🥼What tests does the BMS book the sample in for?

🥼📚Does it make a difference to what tests are required if the patient has a blood group already in the LIMS?

🥼📚What is the purpose of a confirmatory sample for blood grouping and what are the risks of only testing one sample?

🥼What is the laboratory procedure for providing blood urgently where no confirmatory sample has been received?

🥼When the BMS was booking in the sample were there any patient flags or special requirements to be considered?

**Part 5 - Special Transfusion Requirements**

* Irradiated, CMV Negative, HLA Matched, antigen negative
* Neonatal and Paediatric transfusions

**Irradiated, CMV Negative, HLA Matched**

🥼Discuss with the BMS what different special requirements for blood components there are, and how they can differ depending on patient age, demographics and conditions.

🥼How are ‘special requirements’ recorded in the laboratory to ensure the patient receives the correct component?

🥼If blood components with special requirements are routinely kept in your transfusion laboratory and what considerations will be required prior to the component being ordered? You can type notes below or complete the table. You can add extra rows if required.

|  |  |  |  |
| --- | --- | --- | --- |
| Special Requirement | Patient Group | Is this routinely kept in your laboratory? | Considerations |
| Cytomegalovirus negative (CMV Neg) |  |  |  |
| Irradiated |  |  |  |
| HbS negative |  |  |  |
| K negative |  |  |  |
| High Titre negative (HT Neg) |  |  |  |

**Neonatal and Paediatric Transfusions**

🥼Discuss with the BMS the differences between adult blood components and those that are suitable for neonatal and paediatric patients. Consider the age of the patient, conditions and if the laboratory routinely stocks these components.

**Part 6 - Laboratory Testing and Procedures**

**What is covered?**

* Blood groups (ABO/D)
* Red cell phenotypes (Rh/K)
* Antibody identification
* Samples referred to Red Cell Immunohaematology (RCI)
* Direct Antiglobulin Test (DAT)
* Compatibility testing (crossmatch techniques)
* Allocation of blood
* Traceability
* Antenatal/post-natal tests

**Blood groups (ABO/D)**

🥼What technology is used routinely for forward and reverse grouping? What other techniques are available in the laboratory?

🥼When is each type used and what are the pros and cons of each technique?

🥼How does a BMS know the results from the analyser are correct?

🥼📚What steps does the BMS take where there is a discrepancy between the forward and reverse group? What might be the cause of an anomalous result?

🥼Look at the results generated from the analyser for a group and screen sample, can you work out the blood group?

You can upload a picture of the results.

🥼Along with the BMS perform 2 manual blood groups for 2 different patient samples, interpret the results and then compare to your results to the automated result. Were they the same?

You can upload a picture of results- please ensure that any patient details are removed

What other tests (including any manual tests) are carried out in your transfusion laboratory?

**Red cell phenotypes (Rh/K)**

🥼📚Give 2 examples of when a Rh/K red cell phenotype is required.

🥼Observe or with a BMS, perform Rh/K red cell phenotyping using a gel card if this is done in your laboratory. What was the Rh/K phenotype of the patient?

You can upload a picture of results.

**Antibody Identification**

🥼Observe or perform an antibody screen?

You can upload a picture of results.

🥼Discuss with the BMS what happens when there is a positive antibody screen for

a) a new patient with no previous transfusion history in your lab

b) a patient with a history of transfusion and antibodies on file?

**Samples Referred to Red Cell Immunohaematology (RCI)**

🥼📚Find the most recent sample that was referred to RCI. Why was it referred? Were extra samples required?

🥼📚Where can you find the RCI results? How did the results impact the patient?

🥼📚How are patients with atypical red cell antibodies identified in the laboratory and to clinicians?

**Direct Antiglobulin Test (DAT)**

🥼Watch or perform a (Direct Antiglobulin Test) DAT being performed and record the result here.

🥼📚What might be the cause of a positive DAT?

🥼📚What is the difference between a monospecific and polyspecific DAT?

**Crossmatch Techniques**

🥼Observe or perform a serological crossmatch.

You can upload a picture of results.

🥼📚What is the difference between an electronic and serological crossmatch?

🥼📚List the eligibility criteria to allow electronic issue (EI) of blood to a patient.

**Allocation of blood**

🥼Observe a unit of blood being issued to a patient on the LIMS. To which clinical area is it going? Where does it go to next (e.g., another fridge or clinical area)? How is it transported to the clinical area?

**Traceability**

🥼🧬📚Why is traceability of blood components mandatory?

🥼🧬📚During a transfusion event who is responsible for ensuring traceability is recorded

a) in the clinical area

b) in the laboratory

🥼🧬📚Where are the traceability figures reported to?

**Antenatal/Post natal tests**

🥼📚What is the principle of a Kleihauer (KLH) test?

🥼Does your laboratory perform the Kleihauer test? If not, where do they go?

🥼📚How is a dose of anti-D calculated following the bleed result?

🥼📚When is flow cytometry required and where is this done?

**Part 7 - Emergency Protocols and Contingency Planning**

* Massive Haemorrhage Protocol(s)
* Cold chain failures
* Emergency Blood Management Planning

**Massive Haemorrhage Protocol(s)**

📚Read and familiarise yourself with your hospitals major haemorrhage protocol (MHP).

📚✍Does your hospital have more than one MHP? If so, what are the differences between the protocols?

📚🥼For patients experiencing a major haemorrhage, is there any difference in how their group and screen or crossmatch sample is analysed?

📚🥼What is the laboratory procedure for providing blood urgently where no confirmatory sample has been received?

📚🥼How is the MHP activated in your hospital?

**Cold Chain Failures**

📚🥼🧬What is in place to make sure that there is an accurate cold chain record for blood components?

📚🥼🧬What does your laboratory have in place to respond to cold chain failures?

**Emergency Blood Component**

🥼📚What blood components and blood products does your hospital transfusion laboratory keep in stock for emergency situations? What blood group are they? Where are they stored? Are frozen components pre-thawed? Do they have any special requirements and if so, why? Either write below or use the table.

|  |  |  |  |
| --- | --- | --- | --- |
| Blood Component/Blood Product | Blood Group | Special Requirements | Location  and condition (pre-thawed etc) |
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🥼🩸Locate information regarding a recent major haemorrhage case. Depending on the information available to you either look at the clinical notes or speak to the biomedical scientist involved to determine what components were issued, what the clinical indication was and what was the patient outcome (if your BMS is not aware ask your TP). Was the protocol followed and were there any improvements that could be made?

📚🩸✍Read the local Emergency Blood Management plan. What is the role of the haematology SpR in the event of blood component shortages?

📚✍🩸🧬Talk to the TPs and lab managers to find out what actions your hospitals introduced in response to the recent Amber Alerts? How were these actions communicated and escalated? Did they make a difference and are they now part of routine actions?

**Part 8 - Transfusion Reaction and Incident Management**

* Laboratory investigations of transfusion reactions
* Incident reporting and corrective actions

🩸🧬✍Arrange time to speak to your TP(s) and Quality Manager (this can be done at different times). Ask to see examples of the incident reporting criteria, quality system processes, and preventative actions required for the following incident types:

a) Clinical Incidents- Transfusion Reactions

b) Clinical Incidents- Wrong Blood in Tube

c) Clinical/Laboratory Incidents- (eg special requirements not met, Right Blood, Right Patient)

d) Clinical Incidents- Handling and Storage Errors

e) Laboratory Incidents- Handling and Storage Error

🩸🧬✍SHOT and MHRA- what are their roles and why is it important that incidents that meet the criteria are reported externally?

**Part 9 - Quality Assurance, Compliance and Meetings**

* Required standards
* Internal and external audits
* Quality control tests

🧬📚Look at your laboratory’s most recent NEQAS report. What was tested? What results did your laboratory get? How did this compare to other labs?

🧬📚If possible, find a report from when your laboratory scored points. What were these points for? How long do they ‘last’? What actions are taken as a result of the exercise?

🧬📚How is external quality assurance different to internal quality control?

🧬🗓✍🩸Attend a Hospital Transfusion Committee (HTC) meeting. Who attended, what were their job roles. What other meetings does the Transfusion laboratory manager and Transfusion Practitioner attend?

✍Were the following items discussed – make a couple of notes about each?

✍Adverse events

✍Blood wastage

✍Traceability

**Part 10 – Reflection**

✍Write down 1 thing that was new to you.

✍Write down 1 thing that you would like to know more about.

✍Write down 1 thing that you found beneficial to your learning.

✍Any further comments/feedback