1.0 INTRODUCTION

The purpose of having this user manual is to serve as a part of Transfusion Practice Guidelines for clinicians, paramedic as well as laboratory personnel to improve the safety and quality of blood transfusion practice in this hospital.

It is important for all clinicians to be judicious in ordering blood and blood components for transfusion. Blood transfusion can be dangerous as transfusion of blood or blood components carries a potential risk of:

i. Transfusion transmitted disease e.g. HIV, Hepatitis B, Hepatitis C, CMV etc.

ii. Immunization and development of antibodies to red blood cells (RBC), white blood cells (WBC) and platelets.

iii. Blood transfusion reaction e.g. immune haemolytic transfusion reaction, urticaria, anaphylactic reaction etc - which can be potentially fatal.

The Cross matching Laboratory provides a 24 hours service for request of blood and blood components. However, only emergency requests will be entertained after normal working hours (8.00 am to 5.00 pm).

2.0 REQUEST FOR BLOOD

2.1 Request Forms

2.1.1 All requests for tests such as Group, Screen and Hold (GSH), and requests for blood (Group Crossmatching) or blood component must be made using the PER-SS-BT 105 Form (in duplicate) – Refer Appendix.

2.1.2 The clinician shall ensure that each request form is completed accordingly. It is essential to provide the patients full name and full New NRIC number. For foreigners, passport number is acceptable. If new NRIC number or passport number is not available, hospital registration number unique to the particular patient should be use. The PER-SS-BT 105 Form must be handwritten.

Other information such as gender patient's location (ward, hospital etc), patient's diagnosis, reason for transfusion, date and time sample taken, blood group (if known) and previous transfusion reaction should also be filled up especially for

maternity cases where ABO grouping, Rh typing & Hb investigating have already been done during antenatal check-up. The clinician shall sign and clearly stamp his/her name on the form.

2.1.3 Request for other test (e.g Coomb's test, antibody identification, red blood cell phenotyping etc) must be made using the PER PAT 301 form that is completely filled up.) – Refer Appendix

2.1.4 For adverse transfusion reaction investigations, the form Reporting Form For Transfusion –Related Adverse Event (BTS/HV/3/2016) should be filled up. This form is available in Transfusion Medicine Laboratory.) – Refer Appendix

2.1.5 Forms that are inadequately filled up will be rejected.

2.2 Blood Sample

The process of taking and labelling of blood samples is critical to ensure that the right blood sample is collected from the right patient. This process shall be carried out as one process by one person at the bedside, one patient at one time.

2.2.1 Patient identification and blood sampling

The patient should be correctly identified by positive identification by asking the patient to state his/her full name and full IC number. The information must be checked against the patient's identification wristband and case notes. For unconscious patients, paediatric patients or in cases of emergencies, the patient can be identified by asking the relative or carer to name the patient and then check the answer given against the information stated on the patient's identification wristband and case notes.

2.2.2 Labelling of sample.

(a) The person who takes the blood sample and the person who labels the blood sample must be the same person.

(b) The sample must be labelled clearly and accurately at patient's bedside immediately after blood taking. Use only hand written label. Using of pre- printed labels/ any form of sticker labels are not allowed. The label should include, at the minimum the patient's full name, identity card (IC) number, hospital registration number, the date of collection and the initial of the

phlebotomist.

(c) Never label 2 or more patient's samples at the same time.

2.2.3 Volume of blood to be collected

A **4ml blood sample** collected in **4ml EDTA tube** is required for all tests sent to Transfusion Medicine Laboratory.

A **fresh sample** (of not more than 48 hours from collection) is required for every request for blood and test. This is important to avoid a potentially fatal delayed haemolytic transfusion reaction.

(a) Sample from **adult** and **children above 4 months** of age.
- 4 ml blood sample in **4 ml EDTA tube** accompanied by one request form.
- If the patient requires repeated transfusions during the current admission, a new blood sample is needed for each request.

(b) Sample from **infant less than 4 months** of age.
- Infant's blood sample should be accompanied by a sample of the mother's blood.
- At least 2.0 ml blood sample in EDTA tube from infant and 4 ml blood sample in EDTA tube from mother.
- Both samples are to be sent to Blood Bank using one request form.
- **Mother's name and full IC number** should be clearly documented on the form.

3.0 TESTS

3.1 Group, Screen & Hold (GSH)

3.1.1 GSH is a procedure that consists of ABO and RhD grouping and antibody screening for the patient's sample. The patient's serum or plasma is subsequently retained for 48 hours.

3.1.2 GSH request received after 7 pm will only be run at 8 am the next day. This is to ensure that the sole Medical Laboratory Technologist (MLT) on call after office hours will not be overwhelmed with non-urgent requests and can attend promptly and properly to urgent request.

3.1.3 It is recommended only for cases where there is a higher chance of requiring blood transfusion during admission.

3.1.4 For **elective clinical procedures**, GSH shall be requested in accordance to the locally established **Maximum Surgical Blood Ordering Schedule (MSBOS)**.

3.1.5 Screening for unexpected antibody is done by performing and indirect antiglobulin test (IAT), also known as indirect Coomb's test. If the patient's plasma/serum does not have any red cell antibody, "ANTIBODY SCREENING: NEGATIVE" will be stamped on the form. The serum/plasma is retained for **48 hours** in the blood bank in the event that **cross-matched blood is required within this period.**

3.1.6 If there is presence of red cell antibody in the patient's plasma/serum, **"ANTIBODY SCREENING: POSITIVE"** will be stamped on the form. Subsequently, additional sample (**8 ml venous blood in 2 x 4 ml EDTA tubes**) will be required from the patient to perform **antibody identification test** and suitable blood will be reserved. The ward doctor will be informed.

3.1.7 To convert GSH to GXM, the ward doctor should send the duplicate copy of PER-SS-BT 105 Form and fill in the request note printed at the back of the form. **Conversion of GSH to GXM should only be made if patient requires transfusion/ likely to be transfused.**

3.1.8 In the event that the blood is required urgently, the doctor should inform the blood bank medical officer/ staff immediately and give the patient's details. The duplicate copy of PER-SS-BT 105 Form with a note URGENT CROSS MATCH and blood collection slip should be sent to blood bank. A saline cross matching (immediate spin) will be performed and blood will be supplied within 30 minutes. The full cross match will be carried out immediately after the blood is issued and if there is any incompatibility detected, the requesting doctor will be informed.

3.2 Grouping & Cross matching (GXM)

GXM consists of checking ABO and RhD grouping, antibody screening for the patient's sample and crossmatching of patient' serum/ plasma and the donor unit (red cells) for compatibility. GXM should be requested for cases with high certainty for transfusion at that time.

3.2.1 GXM for elective surgery

The request should reach Transfusion Medicine Laboratory at least **24 hours before the operation**. In case of **rare blood group** such as Rh negative/ patient having red cell antibody/ ies, initial verbal request must be made to the medical officer in charge of blood bank **at least 1 week before the surgery** (depending on the number of blood units required).

3.2.2 GXM for non-urgent transfusion.

Request for **non-urgent cases** e.g. thalassaemias, leukemia, anemia etc. should be sent during **normal working hours** (8.00 am to 5.00 pm). This is to ensure that the sole Medical Laboratory Technologist (MLT) on call after office hours will not be overwhelmed with non-urgent requests and can attend promptly and properly to urgent request.

3.2.3 Emergency Transfusion

3.2.3.1 The normal cross match takes **2 hours** to complete. If blood is required urgently, the appropriate box on the request form should be ticked and the ward doctor who makes the request should **run to blood bank immediately to get the blood fast.**

3.2.3.2 The choice of blood for transfusion in cases of life threatening bleeding is dependent on the urgency for transfusion and the time available. The options include:

3.2.3.2.1 Uncrossmatched Group O RhD positive packed red cells (Safe O)

3.2.3.2.2 Emergency crossmatch

3.2.3.3 Uncrossmatched Group O RhD positive packed red cells (Safe O)

In Malaysia, where RhD negative phenotype is not common, **group O RhD positive packed cells** is used as **Safe O**. Safe O can be used for resuscitation in dire emergency while waiting for group specific or crossmatched blood to be available.

Any **decision to use Safe O** shall only be made after the clinician has carefully assessed the urgency of the patient's need for blood. The requesting doctor shall clearly state the **reasons for the transfusion in the patient's records and in the request form.** A

sample of the patient's blood shall be taken before the transfusion of Safe O for the purpose of determining the patient's actual blood group, and for subsequent management.

3.2.3.4 Emergency crossmatch

If blood is needed immediately, for instance, in patients with polytrauma or those with massive bleeding and could not wait for the full crossmatch process to be completed, blood can be issued within 30 minutes by performing the **Saline GXM / Immediate Spin**. However, **compatibility is not guaranteed** as it cannot detect unexpected antibodies. The full GXM will be carried out after blood is issued. The medical officer/ ward staff will be informed by blood bank staff if any incompatibility detected for appropriate action.

3.2.4 Reservation of Cross matched Blood

Blood cross-matched will only be kept in reserve for **maximum of 24 hours**. After 24 hours, the blood will be **released automatically** without informing the ward, unless the doctor informs the Transfusion Medicine Laboratory for further reservation.

4.0 REQUEST FOR BLOOD COMPONENTS

Several types of blood component are available in the blood bank. Please refer to Table 1 on page 29 for their content and usage.

A **new request** for blood components other than red cells shall be accompanied by a **blood sample collected in EDTA 4ml tube**.

For a patient who has at least 2 previous blood grouping records at the hospital blood bank, a new blood sample need NOT accompany the request for blood component. However, a copy of the previous request form clearly stating the blood grouping results shall be attached to the new request form.

If previous request form is not available, a fresh sample shall be sent to the hospital blood bank to determine the patient's blood group.

4.1 Platelet Concentrate

Limited units of screened platelet concentrate are available daily for emergency usage. Since platelet concentrates have a **shelf life of 5 days** and screening takes at least 24 hours, the notice of requirement must be given early so that, production can be stepped up accordingly.

4.2 Fresh Frozen Plasma (FFP) & Cryoprecipitate

These are to be transfused within **30 minutes of thawing**. Therefore, the fresh frozen plasma (FFP) and cryoprecipitate should only be collected just before use.

Note: FFP HAS NO ROLE AS A VOLUME EXPANDER OR SOURCE OF PLASMA.

5.0 ISSUE OF BLOOD AND BLOOD COMPONENTS

5.1 Issue of packed red cell/ whole blood

5.1.1 For all wards which do not have a dedicated blood refrigerator, all crossmatched blood will be kept in the Transfusion Medicine Laboratory. Blood must be collected from the Transfusion Medicine Laboratory only when it is required for transfusion.

5.1.2 For wards which have a dedicated blood refrigerator, blood can be collected at any time. However, it is very important that the blood is stored at 2-6°C in the refrigerator at any time.

5.1.3 To maintain the quality of the blood, there must be a quality control programme for the dedicated blood refrigerator. Blood should never be stored in an unmonitored refrigerator/ domestic refrigerator.

5.2 Issue of Fresh Frozen Plasma and cryoprecipitate

5.2.1 These components are stored at – 25°C or colder. They should be requested only when transfusion is certain. These components must be thawed and transfused within 30 minutes of issue for maximum efficacy.

5.3 Issue of platelets

5.3.1 Platelets must be stored at 22-24°C at continuous agitation.

6.0 COLLECTION OF BLOOD AND BLOOD COMPONENTS

6.1 Blood and blood components will only be issued to hospital personnel. They need to bring appropriate documentary proof of the patient's identity which are the **duplicate copy of the PER-SS-BT 105 Form** and the **Blood/ Blood Component Collection Slip - Appendix 2 of HSJ/PAT/TM/QP/013 rev.1.**

6.2 The blood collection slip should be completed by the treating doctor in the ward with correct patient details by referring to the patient's case notes. This is important to ensure correct blood / blood component is collected for the correct patient. This slip should be stamped and signed by the requesting doctor.

7.0 TRANSPORTATION

7.1 Blood, Fresh Frozen Plasma and Cryoprecipitate

These products must be transported in well-insulated container with icepack inside. However, **BLOOD MUST NOT BE IN DIRECT CONTACT WITH ICE PACKS**.

7.2 Platelets.

Platelet must be stored at **22 ± 2ºC**. Container for transportation of platelets **MUST NOT** contain any ice. Containers to transport platelets must not contain any ice packs. However, for long distance transportation of platelets in hot and humid conditions or in a non- air conditioned transport, an ice pack may be put at the bottom of the container in order to sustain an ambient temperature for the viability of the platelets. The platelets must never come into contact with the ice pack and kept as far away as possible with a gap of air space in between them.

8.0 ADMINISTERING BLOOD

Please refer to

a. Guidelines for the Rational Use of Blood and Blood products by Pusat Darah Negara

b. Transfusion Practice Guidelines For Clinical and Laboratory Personnel by Pusat Darah Negara.

9.0 TRANSFUSION REACTION

In the event of transfusion reaction, a doctor should take relevant blood samples and fill certain forms.

(a) Blood samples :

Test	Tube	Amount	Necessity
To repeat ABO/Rh grouping and crossmatching. Antibody detection Coomb's test	EDTA (GXM 4 ml tube)	8 ml (2 x 4ml)	Mandatory for all cases
Full Blood Count	EDTA (2 ml tube)	2 ml	If hemolysis is suspected
Full Blood Picture	EDTA (2 ml tube)	2 ml	
PT/APTT	Citrated tube	1.8 ml	
Renal profile Liver Function Test	Plain tube with gel	3 ml	

(b) Urine sample ;

Test	Container	Amount	Necessity
Urine FEME	Universal urine container	15 – 20 ml	Mandatory for all cases

Samples are to be sent:

a. Immediately after transfusion reaction, and
b. After 24 hours of transfusion reaction

Forms to use: PER PAT 301

The request form should be written as follow;

a. Post Transfusion Reaction I or Immediate Sample Of Transfusion Reaction
b. Post Transfusion Reaction II or After 24 hours Sample Of Transfusion Reaction

Transfusion Reaction forms to be filled;

BTS/HV/3/2016 - Send the completely filled forms to Blood Bank.

10.0 OTHER INVESTIGATION

Blood Bank also provides other related investigation besides the main activity of Group & Cross matching blood. Please refer to page 30 for further information. All these investigations are available upon request on daily basis.

11.0 BLOOD DONORS AND BLOOD REPLACEMENT

11.1 All blood collected by Blood Bank Hospital Seberang Jaya is only from voluntary donors and NO CHARGE is made for the blood used by any patient. All donated blood is screened for HIV, Hepatitis C virus, Hepatitis B virus and Syphilis. Any charges occurred is solely for tests (Screening, grouping and cross matching). This fact must be stressed to the patients.

11.2 Replacement donors are not accepted. Blood and blood products are provided free of charge to the patients, whether they are from Government Hospital or Private Hospital. Nevertheless, the private hospital is required to pay a minimal charge to cover the cost incurred for the blood bag, serology screening, blood grouping and cross matching. In any circumstances of massive blood transfusion or when blood transfusion is anticipated, the patient's family and friends should be encouraged to donate by the attending doctor.

12.0 DONOR PROCUREMENT

Our blood donation centre is open on every **working days** from 8 am to 5 pm. On weekdays, weekends and on public holidays, there will be mobile blood donation campaign/s carried out according to schedule. For any enquiry regarding blood donation and mobile blood donation campaign organization, please contact **04- 3827333 ext. 602**.

13.0 COMMUNICATON

If there are any problems or matter requiring clarification please contact:

1. Dr Khairulnisa Bt A. Manap
   Transfusion Medicine Specialist
   Head of Transfusion Medicine Unit Ext. 163

2. Medical Officer In Charge of blood bank Ext. 420

3. Transfusion Medicine Laboratory Ext. 164

Blood Components Available In Blood Bank and Their Uses

NO	BLOOD COMPONENT	CONTENT	VOLUME	STORAGE	USES
1.	Cryoprecipitate	Factor VIII, Fibringen (each bag contain about 100 units of Factor VIII activity and about 250 mg Fibrinogen	30 – 40 ml	-25ºC or colder	1. Hypofibrinogenaemia or Dysfibrinogenaemia 2 To replace fibrinogen in DIC (Std. dose: 6 bags transfuse over 10 – 20 min. Children: 1 unit/5 Kg)
2.	Fresh Frozen Plasma	All coagulation factors	150 – 200ml	-25ºC or colder, 2 years	1.Deficiency of multiple clotting factors e.g.: a) DIC b) Liver disease c) Septicaemia d) Massive transfusion 2. Replacement of single factor deficiency where specific or combined factor concentrate is not available. 3. For reversal of wafarin effect.
3.	Whole Blood	RBC and Plasma	300 – 450 ml	2 – 6ºC 35 days	1. Acute haemorrhage 2. Exchange transfusion
4.	Red Cell Concentrate	Packed RBC	200 - 350 ml RBC with/ without added nutrient solution	2 – 6ºC 35 – 42 days	RBC replacement for anaemia or bleeding
5.	Platelet	Platelets	50 – 70 ml	Room temp. (20- 24ºC) on agitation 5 days	Thrombocytopaenia or platelet dysfunction (not in TTP) Std. dose: 4 – 6 donors units within 1 hour. Children: 1 unit/10 Kg

Table 2: List of Investigations Done In the Blood Bank

NO	TEST	SPECIMEN	FREQUENCY	FORM
1.	ABO – Rh Grouping only	2 ml blood in EDTA tube	Daily	PER – PAT 301
2.	GSH / GXM	4 ml blood in EDTA tube	Daily	PER-SS-BT 105 Form
3.	Cold Agglutinin Test	2 x 4 ml blood in EDTA tube	Office hour	PER – PAT 301
4.	Coomb's Test (Direct and Indirect)	4 ml blood in EDTA tube (adult) 2 ml blood in EDTA tube (baby)	Daily	PER – PAT 301
5.	Investigation of Blood Transfusion Reaction	As instruction no. 7	Daily	BTS/HV/3/2016
6.	Rh Antibody Titre	4 ml blood in EDTA tube	Office hour	PER – PAT 301
7.	Rh phenotyping	4 ml blood in EDTA tube	Daily	PER – PAT 301
8.	Antibody Identification	2 x 4 ml blood in EDTA tube	Office hour	PER- PAT 301
9.	RBC phenotyping (Minor Blood Group)	4 ml blood in EDTA tube	Office hour	PER – PAT 301