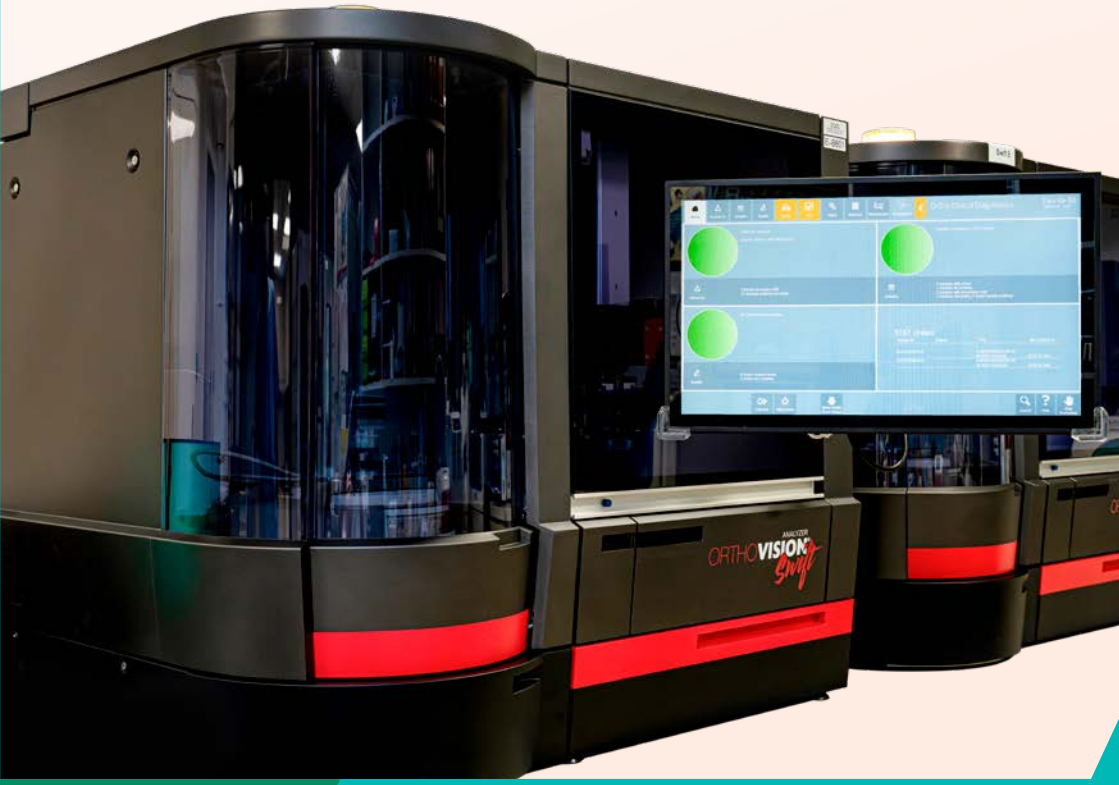
Blood Transfusion Protocol
HANDBOOK



Eighth Edition 2026

DEPARTMENT OF PATHOLOGY

Blood Transfusion Protocol HANDBOOK

Eighth Edition 2026

Department of Pathology

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1. Preface

This is the 8th Edition of the Blood Transfusion Handbook. As the Handbook is intended to be a handy reference for users of our blood bank service, it needs to be brought up to date from time to time so that the user does not have to look for other source of information.

Since the introduction of 'Type and Screen' procedure for blood request in May 2012, we have been able to have more smooth allocation and utilization of blood and reduce the need to do full cross-matching to only 10-15% of the total requests in patients who screen positive for red cell antibody.

Some further refinements have been made since then.
Submission of pink-top EDTA tube samples for Type & Screen test, or for saving samples for add-on Type & Screen test, must now have double verification of patient identity by the signature of the staff taking the blood sample and verified by the signature of a second staff, who must also checked the patient's identity.

Saved EDTA samples without double verification are no longer recommended for Type and Screen tests.

A bedside label printing system has been implemented to ensure correct patient identification and automatically printing blood draw time and staff ID directly on the label to reduce human error.

We would like to thank our editors, Dr. Edmond Ma and Ms. Esda Ng for revising this edition of the Handbook. We are also very grateful to all our Blood Transfusion Committee members for their continuous support and advice.

We hope this Handbook will continue to serve its function as an easy reference for all doctors, nurses and other staff in the Hospital who need to handle blood or blood products.

Y. C. Tsao

Deputy Medical Superintendent,
Blood Transfusion and Cell Therapy Medical Advisory Committee Chairman

2. Introduction

Transfusion medicine is a multidisciplinary clinical service, encompassing donor recruitment, blood collection, laboratory testing, component preparation, distribution, pre-transfusion testing, administration, and patient care. When used appropriately and for the correct indications, blood and blood component transfusion is lifesaving and therapeutically valuable in many clinical situations. Blood administration is often necessary for trauma victims, such as those suffering from accidents or burns, and is essential for treating conditions like thalassemia. Blood transfusion also enables procedures such as major surgeries, bone marrow transplants, and aggressive chemotherapy regimens.

Typically, each donated unit of blood referred to as whole blood is separated into multiple components, such as red blood cells, plasma and platelets. Each component has specific storage requirements and is transfused to patients with different needs.

Since May 2012, the Type and Screen procedure has been adopted as the standard pre-transfusion testing strategy at our hospital, facilitated using an automated immunohematology analyzer and a new laboratory information system that enables electronic crossmatching and blood product release. In addition to the Massive Transfusion Protocol, a new protocol designed to manage postpartum hemorrhage has been developed for hospital use.

Although transfusion therapy has made many previously unattainable treatments possible, there are inherent risks, such as transfusion reactions and disease transmission. The current focus of transfusion medicine is on patient blood management, which aims to ensure that blood transfusions are administered appropriately, with a clear benefit to the patient outweighing any potential risks.

This handbook is intended as a quick reference for medical, nursing, and other healthcare professionals responsible for prescribing and administering blood products. It provides information on the composition and indications for blood components and serves as a guide to hospital blood transfusion procedures. The goal is to ensure safe, effective, and timely blood transfusion for our patients while minimizing the potential for errors during the transfusion process.

3. Blood and Blood Component Therapy: General Guidelines on Indications and Dosages (Table 1)

Blood/ blood component	Dosage	Indications
Fresh whole blood (≤ 5 days)	1-2 units	Exchange transfusion or massive blood loss in neonates
Whole Blood / Packed red cells	Dosage depends on clinical situations: 1. One standard unit [450 mL whole blood donation] should raise Hb level by about 1.2 g/dL in a 70 kg adult 2. One small unit [350 mL whole blood donation] should raise Hb level by about 0.85 g/dL in a 70kg adult 3. For children, 4 mL/kg should raise Hb level by 1 g/dL	There is no single Hb value that must be taken as the transfusion trigger and the clinical decision to transfuse should be based on patient condition. Some general guidelines as follows: 1. Hb concentration < 7 g/dL and in relation to the rate of ongoing red cell loss 2. Hb concentration between 7 and 10 g/dL, less clear strategy but often not justified 3. A higher Hb concentration may be required in patients who may tolerate anaemia poorly e.g., patients over the age of 65 years and patients with cardiovascular or respiratory diseases 4. Single unit red cell transfusion is strongly recommended to be the standard for patients with no ongoing bleeding except those who are known to have red cell production problem (such as thalassaemia major and bone marrow failure). Additional units should only be prescribed after reassessment of patient condition and Hb value.
Leuco-depleted / Filtered cellular blood components	Same as non-leukodepleted (filtered) counterparts	1. All thalassemia patients on regular transfusion regimens 2. Hematological disease 3. Documented severe febrile non-haemolytic transfusion Reaction [≥ 2 episodes] 4. Paediatric oncology patients 5. Patient with HIV disease and are CMV negative

Blood/ blood component	Dosage	Indications
Rh[D] negative packed red cells [Issue according to priority]	Same as Rh[D] positive packed red cells	1. Haemolytic disease of newborn due to anti-D 2. Rh[D] negative individuals with anti-D 3. Rh[D] negative females prior to menopause 4. Emergency resuscitation of Caucasian females in reproductive age with unknown Rh(D) status 5. Other Rh[D] negative individuals [lower priority; availability depending on stock]
Platelet Concentrates	One standard dose for adult up to 70kg is: 1. 4 unit of donor units 2. 1 unit of apheresis platelets 3. 1 unit of pooled leuco-depleted buffy-coated platelet in platelet additive solution (PAS) +/- irradiation Dosage for paediatric patients: 5 random donor units (or equivalent)/ M^2 1. Infant: 5-10ml of platelet concentrate for every kg of body weight 2. Children: 1 unit of platelets for every 10-15kg body weight	1. Platelets <10 x 10^9/L in stable patients [usually NOT indicated in ITP, SLE, TTP and HUS] 2. Platelets <20 x10^9 /L in patients with fever or sepsis 3. Platelets <50x10^9/L with diffuse microvascular/ mucosal bleeding, major bleeding, or before invasive procedures 4. Platelets <100x10^9/L with retinal or CNS bleeding/ surgery, or with active bleeding in post cardiopulmonary bypass 5. Platelets <50x10^9/L in stable premature neonates or platelets <100x10^9/L in sick premature neonates 6. Suspected platelet dysfunction with active bleeding or before invasive procedures 7. Suspected platelet deficiency with active bleeding or following massive transfusion
Buffy coat / Granulocytes [Must be irradiated] [Require special arrangement with **HKRCBTS**]	10 units/day for ≥ 4 days or until fever subsides	Neutropenia [<0.5 x 10^9/L] with documented infection unresponsive to broad spectrum antibiotics including antifungal agents for at least 48 hours

Blood/ blood component	Dosage	Indications
Cryoprecipitate	10 units per dose for adult up to 70kg For children, 5-10 ml/kg up to 10 units	1. von Willebrand disease [if DDAVP or factor concentrate is inappropriate] 2. Documented fibrinogen deficiency [< 100 mg/dL] or dysfunction 3. Documented factor XIII deficiency
Plasma	2-4 units for adults. 12-15 mL/kg/day for pediatric patients	1. Thrombotic thrombocytopenic purpura [TTP] 2. Suspected clotting factors deficiency with active bleeding during operation or following massive transfusion 3. Immediate reversal of warfarin over-dose [bleeding or impending surgery] 4. PT/APTT >1.5 x control values with active bleeding or before invasive procedure in the following situations: • single or multiple clotting factor deficiency [other than haemophilia A or B] • disseminated intravascular coagulopathy [DIC] • Massive transfusion • Hepatic failure
Cryo-reduced plasma (CRP)	2-4 units for adults. 12-15 mL/kg/day for pediatric patients	Thrombotic thrombocytopenic purpura (CRP can be an alternative to plasma but there is no conclusive evidence to suggest that it is better than plasma)

Blood/ blood component	Dosage	Indications
Irradiated cellular blood components	Same as non-irradiated counterparts	For prevention of transfusion-related graft versus host disease in circumstances such as: 1. Fetuses requiring intrauterine transfusion 2. Patients with severe congenital cellular immunodeficiency 3. Stem cell transplantation patients 4. Patients receiving transfusion from close relatives
CMV-seronegative cellular components	Same as seropositive counterparts	1. Neonates with birth weight <1.5 kg 2. CMV seronegative pregnant women 3. CMV-antibody negative recipients or potential recipient of allogenic stem cell grafts 4. Intracellular transfusion

NOTE: Methylene blue treated plasma and psoralen treated plasma/platelets for pediatric use require special request.

4. Request for Blood and Blood Components

4.1 Request for Packed Red Cells

4.1.1 Nursing / hospital staff shall fill in the **Blood Components Request Form** properly for all blood components.

4.1.2. HKSH hospital staff or phlebotomist of the Clinical Pathology Laboratory shall collect 4 ml Pink top EDTA tube for blood bank use. The blood sample shall be properly labeled and all the information shall be identical with that on the blood transfusion form.

4.1.3 Type and Screen is performed as a routine on the sample collected. Only those patients with known antibodies to red cell antigens need to undergo the full cross match procedure.

4.1.4 To ensure accurate patient identification, a "Blood Sample Verification & Patient Identification" procedure is implemented:

- 4.1.4.1 Having another hospital staff member verify the patient's identification during sample collection/preparation of the check cell sample,
- 4.1.4.2 A check cell sample either collected with the Type and Screen sample or by a second finger prick is required to verify the ABO blood group, or
- 4.1.4.3 When a previous record at the hospital is available or relevant documentation is provided upon admission, the check cell procedure can be skipped.

4.1.5 Packed red cells shall be issued to the ward only when transfusion is required. Any un-transfused blood units must be returned to the Blood Bank IMMEDIATELY.

4.1.6 Reservation of the blood unit is normally held for 3 days. There will not be any extension if the patient has a history of transfusion or pregnancy in the preceding 3 months, or if the history is uncertain or unavailable. It may be extended for FOUR more days only if there is no history of previous transfusion and pregnancy within the last 3 months.

4.1.7 On cancellation of blood component reservation, the Blood Bank shall be notified through **Blood Component Availability Notification Form** signed and dated by nursing / medical staff.

4.2 Request for Other Components

4.2.1 Blood components with stock available in Blood Bank include:

- 4.2.1.1 Frozen plasma (FP)
- 4.2.1.2 Cryoprecipitate (CRYO)
- 4.2.1.3 Platelet concentrates (4 to 6 units)
  - 4.2.1.3.1 Random donor platelets

4.6.1.3.1.1 >55 x 10^9 platelets in 50ml plasma

4.6.1.3.1.2 Leucocytes ~ 8 x 10^7

4.2.1.3.2 Pooled platelets (4 in 1)

4.2.1.3.3 Single donor platelets

4.2.1.3.3.1 Collected by apheresis

4.2.1.3.3.2 One unit of single donor platelets is equivalent to 4-6 units of platelet concentrates

Note: Pooled and single donor platelets are pre-storage leucodepleted, but random donor platelets are not.

4.2.2 Blood components that are available from Hong Kong Red Cross Blood Transfusion Service upon case request include:

4.2.2.1 Platelet concentrates (above the stock level)

4.2.2.2 Buffy coat (granulocytes)

4.2.2.3 Cryoprecipitate reduced plasma (CRP), also known as Cryosupernatant

4.2.2.4 Other special products with prior arrangement

4.2.3 The commonest blood components required for transfusion are FP and platelet concentrates. Blood grouping will be performed if no previous record is available.

4.2.3.1 For platelets, ABO compatibility is preferred but not essential.

4.2.3.2 FP must be ABO compatible with red cells of the recipient.

4.2.3.3 Crossmatching is not required for these products.

4.2.4 The FP will be thawed in the Blood Bank prior to being issued to the ward staff. The Blood Bank should be notified at least 30 minutes before collection of thawed FP.

4.2.5 On cancellation of blood component reservation, the Blood Bank shall be notified through **Blood Component Availability Notification Form** signed and dated by nursing / medical staff.

4.3 Urgent Requests for Blood & Blood Components

4.3.1 Under emergency situations, the clinician should clearly indicate the degree of urgency so that the appropriate procedure can be initiated. It is preferable for the clinician to contact the Blood Bank directly.

4.3.2 In a desperate situation with blood group unknown, group O red cells and group AB FP are issued immediately. The clinician accepts full responsibility for blood issued under this condition.

4.3.3 The clinician can authorize the ward staff to collect uncrossmatched blood by checking the Uncrossmatched box for either Group O or Group specific red

cells and sign on the request form, and accepts full responsibility for blood issued under this condition.

4.3.3.1 Irrespective of whether the ABO and Rh(D) group is known from previous record or transfusion history at this hospital or unknown. ABO/Rh(D) grouping must be done using the latest pre-transfusion sample before group-specific red cells can be provided. Otherwise, group O red cells will be used.

4.3.3.2 If ABO/Rh(D) grouping is not conducted, group O red cells will be used. Red cells can be issued without compatibility testing within 15-30 minutes.

4.3.4 Type and Screen will be performed on the blood sample taken from the patient before transfusion of the uncrossmatched blood, and the Blood Bank will inform the ward of the test result upon completion.

4.3.5 For urgent requests of Type and Screen, blood will be available within 1 and a half hours, counting from sample arrival at Blood Bank.

4.4 Special Considerations for Neonates

4.4.1 For infants younger than 4 months of age, maternal plasma can substitute that of the infant for Type and Screen.

4.4.2 Fresh blood (≤ 5 days old) and CMV negative blood components should be used for neonatal exchange transfusion.

4.4.3 In group A or B babies born to group O mothers, group O blood should be used for transfusion.

4.4.4 If small blood transfusion volume is required, red cell multi-packs are available from the Hong Kong Red Cross Blood Transfusion Service upon request. These smaller aliquots from a single donor unit could limit donor exposure and hence decrease donor-related risks.

4.4.5 Additive solutions (AS) used as anticoagulants/ preservatives contain additional adenine and mannitol that have been associated with renal toxicity. Mannitol is also a potent diuretic and, because of its effect on the fluid dynamics in preterm infants, may cause unacceptable fluctuations in cerebral blood flow. However most evidence suggests that small volume transfusion containing AS are safe for neonates and as effective as CPDA-1 cells in increasing haemoglobin level. It is prudent to remove the AS-containing plasma for neonates or infants with underlying renal or hepatic insufficiency, particularly if multiple transfusions from the same unit are anticipated.

4.5 Rh(D) Negative Recipients

4.5.1 Rh(D) negative individuals should ideally receive Rh(D) negative blood.

However, due to shortage of supply, Rh(D) positive blood may have to be transfused, and Rh(D) negative recipients with no anti-D may receive Rh(D) positive red cells without fear of immediate transfusion reaction.

4.5.2 Rh(D) negative blood must be used for Rh(D) negative recipients with anti-D and neonates suffering from haemolytic disease of the newborn due to anti-D.

4.5.3 To avoid alloimmunization and subsequent development of haemolytic disease of the newborn, females with childbearing capacity should have priority in receiving Rh(D) negative blood.

4.5.4 Anti-D immunoglobulin, at a dosage of 250 IU or 50 mg for every 5 – 6 units, may be given to minimize the risk of alloimmunization if Rh(D) positive platelets are transfused to Rh(D) negative females with childbearing capacity.

4.5.5 The use of Rh(D) positive blood in emergency resuscitation is justified by the degree of urgency and availability.

4.5.6 The Blood Bank at Hong Kong Sanatorium & Hospital does not routinely stock Rh(D) negative blood.

4.6 Special Clinical Situations

4.6.1 Massive Blood Transfusion

- Massive Transfusion Protocol
- Massive Blood Transfusion for Postpartum Hemorrhage

4.6.1.1 Background

The purpose of massive transfusion protocol (MTP) is to provide rapid blood replacement in a setting of severe hemorrhage and to minimize the effect of dilutional coagulopathy and hypervolemia due to the unbalanced transfusion of red cell and plasma in a short period of time. Complications of massive transfusion such as hypothermia, hypocalcaemia and acid-base disturbance are anticipated and managed. An appropriate product ratio is 1:1:1, i.e., 4 units of red cell, 4 units of frozen plasma, and 4 units of random platelets. This package is called "one MTP batch".

Activation of the MTP is a clinical decision. Reference should be made to the Operation Theatre protocol of the hospital.

As blood products are urgently needed when MTP is activated, sometimes routine pretransfusion testing is bypassed. Uncrossmatched Group O Rh(D) positive red cell, Group AB plasma, and low titre any group platelets are conventionally used (see Flowchart 3).

Rh(D) negative products are usually not available at our laboratory. The use of D-positive blood components is justified by the degree of urgency and availability. Also, time- consuming blood component processing, such as irradiation or cell washing product, is not feasible.

4.6.1.2 Massive Transfusion Protocol is defined when either:

4.6.1.2.1 Patients at risk of uncontrolled bleeding in anticipation of blood transfusion of more than 10 units of packed red blood cells within 24 hours,

4.6.1.2.2 Replacement of more than 50% of total blood volume within 2 hours,

4.6.1.2.3 Estimated blood loss more than 2 liters in the presence of ongoing bleeding,

4.6.1.2.4 Bleeding continues after transfusion of 4 units of packed red blood cells in 1-2 hours, or

4.6.1.2.5 Clinical parameters of significant blood loss, e.g. systolic blood pressure <90mmHg, or heart rate >120 bpm in the presence of uncontrolled bleeding.

4.6.1.3 Massive Transfusion Protocol is defined when either:

Postpartum hemorrhage (PPH) is severe vaginal bleeding after childbirth. It is a serious condition that may lead to death. Primary PPH is bleeding that occurs in the first 24 hours after delivery while secondary PPH is bleeding that occurs 24 hours to 12 weeks postpartum. Early detection and prompt treatment can lead to a full recovery.

4.6.1.3.1 Causes of PPH:

4.6.1.3.1.1 Tone: Uterine atony is the most common cause, responsible for about 70% of cases.

4.6.1.3.1.2 Trauma: Damage to the vagina, cervix, uterus, or perineum, often linked to the use of forceps or vacuum extraction during delivery.

4.6.1.3.1.3 Retained placental tissue or other products of gestation may cause persistent bleeding.

4.6.1.3.1.4 Thrombin: Coagulopathy due to disseminated intravascular coagulation, eclampsia or other causes impair blood clotting and lead to excessive bleeding.

4.6.1.3.2 PPH is categorized by the mode of delivery and defined as blood loss >500ml following vaginal delivery and >1000ml following Caesarean delivery.

4.6.1.3.3 Special considerations in obstetrical haemorrhage:

4.6.1.3.3.1 Ensure early notification of major blood loss or likely major blood loss to Blood Bank and inform consultant obstetrician and/or consultant anesthetist to attend. MTP in PPH can be initiated by:

4.6.1.3.3.1.1 Chief Obstetrician

4.6.1.3.3.1.2 Anaesthetist in-charge

4.6.1.3.3.1.3 Any doctor involved in the resuscitation

4.6.1.3.3.1.4 Midwife in-charge of the labour suite

4.6.1.3.3.2 If the fibrinogen level is <1.5 g/L with ongoing bleeding, additional cryoprecipitate infusion on top of the MTP formula is indicated.

4.6.1.3.3.3 There will be a delay between activation of Massive Blood Transfusion Protocol in Obstetrics and delivery of fresh frozen plasma (FFP) and cryoprecipitate of approximately 30 minutes. Ongoing haemorrhage and waiting for thawed cryoprecipitate would potentially be detrimental. Purified fibrinogen concentrates (Haemocomplettan, 1g per vial) are available in the pharmacy department for emergency use.

4.6.1.3.3.4 D-negative red cells are not routinely stocked in the Blood Bank. When bleeding is expected in complicated patients, the obstetrician should contact Blood Bank to request D-negative stock from **HKRCBTS** if available.

4.6.1.4 Procedure Step

4.6.1.4.1 Massive Blood Transfusion Flow Charts
(Refer to Flowchart 1. for massive blood transfusion and Flowchart 2. for postpartum hemorrhage-specific transfusion)

4.6.1.4.2 Emergency transfusion in the OT should begin with blood obtained from two refrigerators – One located in the 2/F Operation Theatre (2/F Li Shu Pui Block) and one located in the 8/F Operation Theatre (8/F Li Shu Pui Block). Individual refrigerator is stocked with four packs of Group

O Rh(D) positive red cells. (Refer to Form 1. **Emergency Transfusion Form**). Stick the patient's and Blood WBN labels on form, check and transfuse. Please refer to Blood Bank SOP for details. Transfused red cells are not considered part of the MTP batch.

4.6.1.4.3 MTP is activated by a surgeon, obstetrician or physician in-charge and/or anesthesiologist in response to a patient that is experiencing massive bleeding by completing the MTP physician order form (Form 2. **Massive Transfusion Order Form**). OT or ward staff or delivery room should inform blood bank staff by phone and then fax over the MTP physician order and clearly indicate the degree of URGENCY. Please refer to Table 2 for emergency contact list.

Table 2. Emergency Contact Number List

	Contact	Number
2/F Operation Theater Suite 1-10	Nurse-in-charge	2835 8833 Dect Phone: 14222
2/F Operation Theater Suite 11&12	Nurse-in-charge	Dect Phone: 14243 Dect Phone: 14222
8/F Operation Theater 801-803	Nurse-in-charge	Dect Phone: 14816 Dect Phone: 14222
13/F Intensive Care Unit	Nurse-in-charge	2835 8920
27/F Delivery Room	Nurse-in-charge	2835 3270
Dr. Edmond S K Ma		2835 8017
Blood Bank		2835 8793
Blood Delivering Messenger		Dect Phone: 14174

4.6.1.4.4 Blood bank staff should check MTP physician order form and record details of Verbal Request when MTP is notified.

4.6.1.4.4.1 Name and contact number of person initiating protocol and record date and time of initiation.

4.6.1.4.4.2 Patient's name, gender, DOB (or approx. age), ID no. and patient's current location.

4.6.1.4.4.3 Name of clinician, ask for brief clinical details and whether the patient is on warfarin, pregnant or other pre-morbid condition.

4.6.1.4.4.4 Even if special requirements are needed e.g. CMV negative, irradiation or leukocyte depleted, it is stated that blood bank can only give the best suitable blood product.

4.6.1.4.4.5 Notify ward or OT staff how many units of platelets are available in blood bank, request emergency stock from **HKRCBTS** if necessary.

4.6.1.4.5 Request ward or OT staff need to collect 4 blood specimens for laboratory use:

4.6.1.4.5.1 One pink top EDTA tube

4.6.1.4.5.2 One purple EDTA tube

4.6.1.4.5.3 One citrate tube

4.6.1.4.5.4 One heparin tube

4.6.1.4.5.5 Complete the "Blood Sample Verification & Patient Identification" form.

4.6.1.4.6 Delegate a phlebotomist to ward or OT to collect blood sample IMMEDIATELY; Phlebotomist should:

4.6.1.4.6.1 Make sure patients' information is properly labeled.

4.6.1.4.6.2 Return to the laboratory IMMEDIATELY and hand over the sample to blood bank staff.

4.6.1.4.7 Blood Bank Procedure:

Once a patient is in the protocol, the blood bank can ensure rapid and timely availability of blood components to facilitate resuscitation.

4.6.1.4.7.1 Inform Laboratory in-charge for special manpower deployment.

4.6.1.4.7.2 Check the availability of Group O Rh(D) positive red cells, Group AB plasma, and other necessary blood products. If stock is insufficient, request urgent supplies from **HKRCBTS**.

4.6.1.4.7.3 Prepare Group O Rh(D) positive or group-specific matched or unmatched blood (following our routine practice) within 30 minutes, 4 units of platelets and thawed 4 units or FP as the first batch (Batch 1) of blood products.

4.6.1.4.7.4 Notify ward/OT when Batch 1 is ready and confirm if Batch 2 is needed.

4.6.1.4.7.4.1 If an additional batch is requested, prepare within 30 minutes and notify ward/OT when ready. This cycle continues until the attending physician decides to terminate the MTP.

4.6.1.4.7.5 Blood component delivery logistic

4.6.1.4.7.5.1 Ward: Send a porter to the blood bank to pick up the blood product.

4.6.1.4.7.5.2 OT (2F/8F): Laboratory staff should deliver blood products to the OT.

4.6.1.4.7.6 The order form is kept in the Blood Bank. Further notification is made by phone and the messages are recorded. The Blood Bank records the blood products being released.

4.6.1.4.7.7 Once the MTP is terminated

4.6.1.4.7.7.1 All unused blood products must be returned to the blood bank immediately for further handling.

4.6.1.4.7.7.2 Ward/OT staff should clearly document the patient's condition and the reason for terminating the MTP on the **Massive Transfusion Order Form** and fax the completed form to the blood bank without

4.6.1.5 Change of Patient Care Location

When the patient on the MTP is transferred to another department, follow the steps:

4.6.1.5.1 The initiating clinician must promptly reassess the patient and decide whether to continue the MTP.

4.6.1.5.2 All issued blood components must be transferred with the patient — no units should be delayed or left behind.

4.6.1.5.3 The receiving team must:

4.6.1.5.1.1 Confirm and record the number of MTP batches received;

4.6.1.5.1.2 Continue transfusion according to the protocol;

4.6.1.5.1.3 Inform Blood Bank of the new location and whether MTP remains active.

4.6.1.5.4 If MTP is to be terminated:

4.6.1.5.4.1 Return all unused blood components to the Blood Bank;

4.6.1.5.4.2 Complete the **Massive Transfusion Order Form** with patient status and reason for termination and fax it to the Blood Bank.

4.6.1.6 Monitoring

4.6.1.6.1 During MTP, the following should be monitored every 30 to 60 minutes

4.6.1.6.1.1 Complete blood count (CBC)

4.6.1.6.1.2 Prothrombin time (PT)

4.6.1.6.1.3 Activated partial thromboplastin time (APTT)

4.6.1.6.1.4 Fibrinogen level

4.6.1.6.1.5 Ionized calcium

4.6.1.6.1.6 Venous or arterial blood gases

4.6.1.6.2 The target values are as follows:

4.6.1.6.2.1 pH > 7.2, base excess < -6;

4.6.1.6.2.2 Calcium > 1.1 mmol/L;

4.6.1.6.2.3 Platelets > 75 x 109/L;

4.6.1.6.2.4 PT/APTT < 1.5 times normal; and

4.6.1.6.2.5 Fibrinogen > 1.5 g/L.

GEM5000 is used in ICU and OT to check electrolytes [Na/K/Ca], pH and hemoglobin level.

Form 1. Emergency Transfusion Form – Uncrossmatched Packed Red Cell

病理學部
Department of Pathology

Emergency Transfusion Form
– Uncrossmatched Packed Red Cell

姓名
Name

年歲 Age ___ 性別 Sex M / F 香港身份證號碼 HK ID No.

房 / 床號 Ward / Bed No. _____ 醫院號數 Hosp/O.P.D No. _____

Packed Red Cell

Donor unit: O POS

DIN

Checked by OT Staff: 1: _____

2: _____

Start of Transfusion Time: _____

***End of Transfusion Time:** _____

Transfusion Reaction, if any: _____

_____

Requested by: Dr. _____

*Please return empty blood bag and copy of this form to Blood Bank after transfusion.

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Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre
☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

Emergency Transfusion Form
– Uncrossmatched Packed Red Cell

養和醫療集團成員 A member of HKSH Medical Group

Form 2. Massive Transfusion Order Form

病理學部
Department of Pathology

Massive Transfusion Order Form

姓名 Name	
年齡 Age	性別 Sex M / F
香港身份證號碼 HK ID No.	
房 / 床號 Ward / Bed No.	醫院號數 Hosp/O.P.D No.

Part A: Massive Transfusion Activation ("☑" if appropriate)

Date: _____(dd/mm/yyyy) Time: _____a.m./p.m.

Diagnosis: _____

Patient Location: _____

Attending Doctor: _____

Contact Number: _____

Laboratory Label

BASELINE LABORATORY TEST			PERSON TAKING THE BLOOD	
Test		***Blood Collection***	Print Name:	
22085 Type and Screen (if not done)		Pink EDTA	Signature:	
39 CBC	8005 Fibrinogen	Purple EDTA	Withdrawn Date: (dd/mm/yyyy)	Withdrawn Time:
276 PT	284 APTT	Blue Citrate	***Patient Identity Verify By***	
632 1141 Urea and Electrolytes		Green Heparin	Print Name:	Signature:

DOCTOR CONSENT (for unmatched transfusion)

I certify that the issue of unmatched blood is genuinely required for the patient. I shall take full responsibility for the potential risk involved.

Please specify: ☐ Group O Unmatched Blood ☐ Group Specific Unmatched Blood

Requested by: _____ Signature: _____ Date: _____ (dd/mm/yyyy) Time _____a.m./p.m

Activation Batch
Please specify:

Note: No special blood product request during MTP i.e. Rh(D) Neg, Irradiated, CMV Neg

☐ **Obstetrics Postpartum Hemorrhage**
Keep fibrinogen > 1.5g/L.
Consider IV Fibrinogen Concentrate for emergency situation.
Contact Pharmacy Department.

☐ **Massive Transfusion Protocol**

	RBCs	Plasma**	PLT	CRYO**	RBCs	Plasma*	PLT	CRYO**
☐ Batch 1*	4	4	4	0	4	4	4	0
☐ Batch 2*	4	4	4	8	4	4	4	0
☐ Batch 3*	4	4	4	0	4	4	4	8
☐ Batch 4*	4	4	4	0	4	4	4	0
☐ Batch 5*	4	4	4	8	4	4	4	0
☐ Batch 6*	4	4	4	0	4	4	4	8
☐ Batch 7*	4	4	4	0	4	4	4	0
☐ Batch 8*	4	4	4	8	4	4	4	0

* Fax request form & call Blood Bank ** Thawed frozen plasma requires at least 30 minutes, call Blood Bank to prepare.

Part B: Deactivating the Massive Transfusion Protocol ("☑" if appropriate)

Requesting Doctor: Print Name: _____ Signature: _____

Phone By: Print Name: _____ Signature: _____

Patient Outcome: ☐ Stable ☐ Serious ☐ Deceased

☐Return ALL transfused unmatched RBCs blood bag to Blood Bank for investigation
☐Return ALL unused Blood Component to Blood Bank
(RBCs should return to Blood Bank within 30 minutes after issued, except those stored in OT Blood Fridge)

Date: _____(dd/mm/yyyy) Time: _____a.m./p.m.

Part C: Follow Up Investigation (For Blood Bank Use Only)

*** Inform attending doctor immediately

INVESTIGATION TESTING	RESULT	REMARKS
Perform Type and Screen if not done prior to issue blood components	Negative / Positive***	_____
Perform full cross matching if screening result positive	Compatible / Incompatible***	_____

Performed By: _____ Signature: _____ Perform Date: _____ (dd/mm/yyyy)

Flowchart 1. Massive Transfusion Work Flow Chart

Attending physician / surgeon / anesthesiologist determines that the patient meets criteria for MTP

EMERGENCY transfusion in OT begins with blood units from remote refrigerator in OT

Notify Blood Bank to activate MTP by phone and **MTP order form**

Nursing Staff

* Communication with Blood Bank staff
* Draw blood samples for T&S, CBC, Coagulation Screen (PT, INR, APTT), Fibrinogen, Chemistry test (Electrolytes, urea)

Laboratory Staff

* Assess product inventory
* Prepare and issue MTP blood components
* Anticipate patient's future transfusion requirement
* Consider staff resources
* Stock replenishment from **HKRCBTS**

Clinical Haematologist

* Advise on blood component support
* Assist in interpretation of results

Blood Components

4 units group O uncrossmatched Red cells

4 units group AB plasma

4 units of platelets

8 units of cryoprecipitate every 3rd round

NOTE:

* Group-specific blood products for patients with valid T&S result
* When the blood group of the patient is known, switch to group-specific blood products

Bleeding Controlled? NO → **Another round**

YES

Deactivate MTP

Useful Contact Numbers

Lab-IC: Alex Leung	Tel: 2835 8798
Dr. Edmond S K Ma	Tel: 2835 8017
Blood Bank	Ext: 5183 / 8793
2F OT (1-10)	Ext: 8833 / 14222
2F OT (11-12)	Ext: 14243 / 14222
8F OT (801-803)	Ext: 14816 / 14222
Delivery Room	Ext: 3270
ICU	Ext: 8920

Flowchart 2. Massive Blood Transfusion for Obstetrics Postpartum Hemorrhage Work Flow Chart

Chief Obstetrician Anaesthetist in-charge, any doctor involved, or midwife in-charge of the labour suit determines that the patient meets criteria for MTP

EMERGENCY transfusion in OT begins with blood units from remote refrigerator in OT

Notify Blood Bank to activate MTP by phone and **MTP order form**

Nursing Staff

* Communication with Blood Bank staff
* Draw blood samples for T&S, CBC, Coagulation Screen (PT, INR, APTT), Fibrinogen, Chemistry test (Electrolytes, urea)

Laboratory Staff

* Assess product inventory
* Prepare and issue MTP blood components
* Anticipate patient's future transfusion requirement
* Consider staff resources
* Stock replenishment from **HKRCBTS**

Clinical Haematologist

* Advise on blood component support
* Assist in interpretation of results

Blood Components

4 units group O uncrossmatched Red cells

4 units group AB plasma

4 units of platelets

8 units of cryoprecipitate every 3rd round

NOTE:

* Group-specific blood products for patients with valid T&S result
* When the blood group of the patient is known, switch to group-specific blood products

Bleeding Controlled? NO — **Another round**

YES

Deactivate MTP

Useful Contact Numbers

Lab-IC: Alex Leung	Tel: 2835 8798
Dr. Edmond S K Ma	Tel: 2835 8017
Blood Bank	Ext: 5183 / 8793
2F OT (1-10)	Ext: 8833 / 14222
2F OT (11-12)	Ext: 14243 / 14222
8F OT (801-803)	Ext: 14816 / 14222
Delivery Room	Ext: 3270
ICU	Ext: 8920

Form 3. Blood Component Issue Form (Unmatched red cell)

病理部
Department of Pathology

Blood Component Issue Form - Unmatched Red Cell

姓名
Name
年歲 性別 香港身份證號碼
Age Sex M / F HK ID No.
房 / 床號 醫院號數
Ward / Bed No. Hosp/O.P.D No.

Batch No.: _____

Lab Use			**Ward / OT**		
Red Cells	Blood Group	Expiry Date	Checked by	Checked by	Time
Platelet Concentrates	Blood Group	Expiry Date	Checked by	Checked by	Time
Frozen Plasma	Blood Group	Expiry Date	Checked by	Checked by	Time
Cryoprecipitates	Blood Group	Expiry Date	Checked by	Checked by	Time

Issued by : _____ Received by : _____

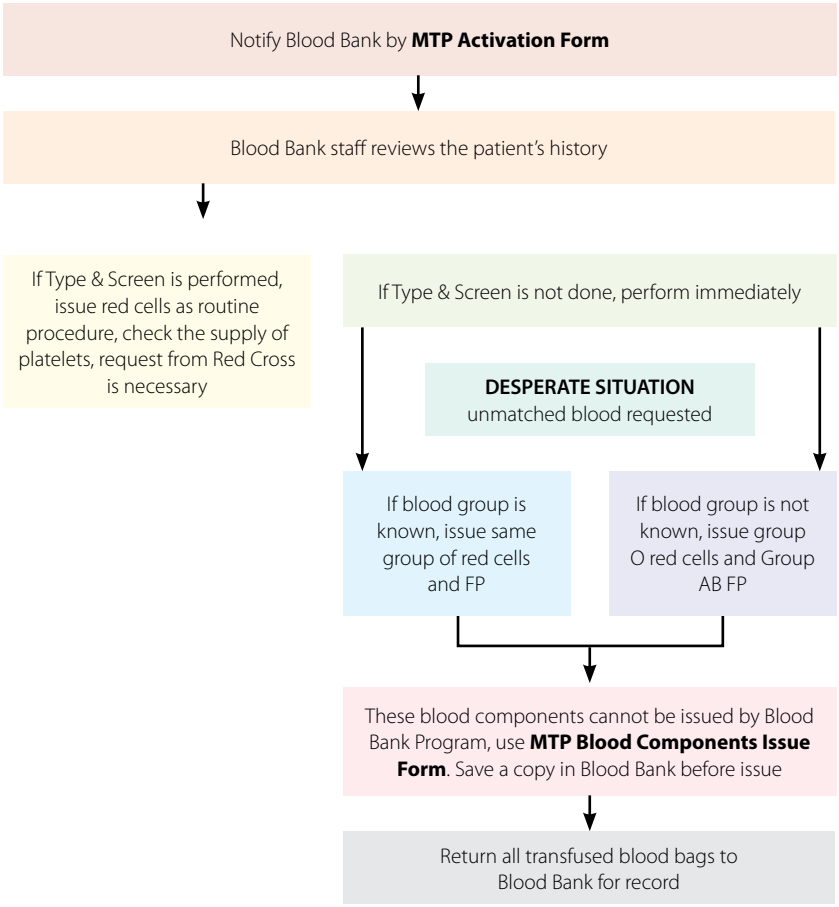
Time: _____ Time: _____

LAB.511.008/E-01-062019

Blood Component Issue Form - Unmatched Red Cell

養和醫療集團成員 A member of HKSH Medical Group

Flowchart 3. Blood Components Issue Guide during MTP/PPH



4.6.2 Autoimmune Haemolytic Anaemia (Direct Antiglobulin Test Positive)

4.6.2.1 Red cell autoantibodies interfere with blood grouping, alloantibody detection and compatibility testing, and cause haemolysis of transfused red cells.

4.6.2.2 Clinical indications for blood transfusion for autoimmune haemolytic anaemia include: incipient heart failure, development of neurological signs, rapidly progressive anaemia and preparation for splenectomy. Blood transfusion that is not strictly indicated on clinical grounds should be avoided.

4.6.2.3 The Blood Bank and Clinical Pathologist should be consulted in advance for serological study to define the nature of autoantibody and detect underlying alloantibody if any.

4.6.2.4 Serological investigations are referred to Hong Kong Red Cross Blood Transfusion Service.

4.6.2.5 For patients with autoantibody that show broad red cell antigen specificity and lack of alloantibody, transfusion of phenotype-matched blood is indicated. These units are 'incompatible but considered suitable for transfusion'. There is little evidence to support the use of least incompatible units. Patients with presence of alloantibody in addition to autoantibody should receive appropriately selected antigen negative units.

4.6.3 Transfusion Support of ABO Mismatched Allogeneic Stem Cell Transplantation

4.6.3.1 Major ABO Incompatibility

For major ABO-incompatible transplants, RBC components should be of recipient original ABO group until the DAT turns negative and the anti-donor isohaemagglutinin is no longer detectable. Plasma components should be of the donor ABO group.

4.6.3.2 Minor ABO Incompatibility

For minor ABO-incompatible transplants, RBC components should be of the donor ABO group. Plasma components should be of the recipient ABO group until original erythrocytes are no longer detectable.

4.6.3.3 Both Major and Minor ABO Incompatibility

For transplants with both major and minor ABO incompatibility, RBC components should be group O until DAT becomes negative and the anti-donor isohaemagglutinin is no longer detectable. Plasma components should be group AB until original erythrocytes are no longer detectable.

4.6.4 Interference of Drugs with Compatibility Testing for Blood Transfusion

Blood transfusion services face unique challenges when testing samples from patients receiving [1] Daratumumab and [2] Isatuximab. As these drugs can cause hemagglutination regardless of the presence of RBC alloantibodies or incompatibility between donor RBCs and patient plasma, they interfere with the interpretation of antibody screen and crossmatch tests.

4.6.4.1 Daratumumab-drug Interferences in Transfusion

4.6.4.1.1 Daratumumab is a human anti-CD38 monoclonal antibody used to treat plasma cell myeloma. It targets and eliminates CD38 expressed on myeloma and lymphoma cells and enables an antimyeloma response.

4.6.4.1.2 However, there is a low level of CD38 expressed on human red blood cells, daratumumab binds to red blood cells and can cause hemagglutination regardless of the presence of RBC alloantibodies or incompatibility between donor RBCs and patient plasma, they interfere with the interpretation of antibody screen and crossmatch tests. The effect of the monoclonal antibody persists for up to 6 months after cessation of drug use. Therefore, prior to the commencement of daratumumab, the Blood Bank should be informed to perform antibody screen and extended red cell phenotyping.

4.6.4.1.3 If daratumumab is commenced without prior antibody screen and extended red cell phenotyping. The panagglutination indicative of daratumumab interference can be abolished by DTT-treated screening cells. The additional, time-consuming, mitigation measures required to bypass interference by anti-CD38 mAbs delay provisioning of RBCs to patients.

4.6.4.1.4 When blood transfusion is required, the patient is issued crossmatch compatible donor red cell units after DTT-treatment of the donor red cells. The selection of phenotype-matched / antigen-negative / random donor red cell units depend on the clinical situation, alloantibody status and degree of urgency.

4.6.4.1.5 If life-threatening bleed occurs and emergency transfusion is required, the provision of ABO group specific or compatible unmatched blood can follow institutional protocol since ABO (and RhD) typing is not

affected by daratumumab. Note that DTT treatment denatures Kell antigen on the red cells and hence may not detect anti-K antibody.

4.6.4.2 Isatuximab-drug Interferences in Transfusion

Isatuximab, is another anti-CD38 monoclonal antibody used for the treatment of relapsed or refractory multiple myeloma. The clinical problem with this drug is similar to daratumumab interference. Instructions on the transfusion protocol should follow the one with daratumumab.

5. Blood Bank Procedure

5.1 Blood Taking

5.1.1 Prior to blood taking, the clinician should inform the patient of the indication for blood transfusion, as well as benefits and risks that are associated with the procedure.

5.1.2 The laboratory phlebotomist or nursing staff as directed by the Hospital will take patient blood sample for pre-transfusion testing in accordance with doctor's order.

5.1.3 If the patient is conscious, his or her identification should be obtained from the wristband and confirmed by DIRECT QUESTIONING, the details must match with the request form. If the patient is not conscious, the relevant information shall be obtained from the wristband.

5.1.4 Steps of the phlebotomy procedure are described in Appendix I.

5.1.5 The blood sample should be labeled with the patient's name, ID number and ward number

5.2 Completion of Request Form

5.2.1 The name of the doctor in-charge should be clearly written on the request form by nursing staff.

5.2.2 The request form shall bear the patient's name and ID number. It shall also contain the Hospital number or the OPD number, gender, date of birth (or age if date of birth is not available) and ward.

5.2.3 All necessary information, including clinical diagnosis, nature of surgical operation and relevant laboratory results shall be filled onto the request form.

5.2.4 It is recommended that computer-generated adhesive label bearing patient particulars to be used on both the request form and the blood sample to minimize any clerical errors that would arise.

5.3 Pre-transfusion Testing

5.3.1 Hospital Blood Bank staff should verify that the request form and the sample(s) contain sufficient and identical information for unique identification of the patient. Incomplete, inaccurate or illegible request shall not be accepted.

5.3.2 ABO and Rh(D) typing are determined by both cell and serum typing (for neonates under 4 months of age, only cell typing is required). Blood should not be issued until all discrepancies are resolved, unless emergency release of group O blood is requested due to clinical justification.

5.3.3 Type and Screen shall replace the conventional crossmatch.

5.3.4 The result for the Type and Screen is valid for 3 days. For patients who have received a transfusion or have been pregnant in the preceding 3 months, another blood sample will need to be collected for Type and Screen after 3 days. This is to ensure that the sample accurately reflects the current immunological status of the recipient, as recent transfusion or pregnancy may stimulate the production of unexpected red cell antibodies.

5.3.5 Two determinations of the recipient's ABO type are required:

- 5.3.5.1 One from the current sample and
- 5.3.5.2 A second check cell sample from either
  - 5.3.5.2.1 Verifying previous records or documents provided, or
  - 5.3.5.2.2 Clarifying during sample collection by another medical staff member.

5.3.6 Benefits of Type & Screen

- 5.3.6.1 Antibody screening is more sensitive than routine crossmatching in detecting red cell antibodies. Performing antibody screening in advance the Blood Bank with adequate time for antibody identification, and alerts the clinician to possible delay in the supply of compatible blood.
- 5.3.6.2 If antibody screening reveals no clinically significant antibody and there is no record of previous detection of such antibodies, computer crossmatch to ensure ABO compatibility is adequate prior to blood issue.
- 5.3.6.3 If antibody screening reveals clinically significant antibody, full crossmatch with blood tested negative for the relevant antigen will be performed and compatible units will be issued.

5.3.7 Table 3 summarizes the suggested ABO group and Rh(D) selection order for transfusion of various blood components.

Table 3.1 Suggested ABO group selection order for transfusion of RBCs

Recipient ABO Group	Component ABO Group			
	1st Choice	2nd Choice	3rd Choice	4th Choice
AB	AB	B	A	O
A	A	O		
B	B	O		
O	O			

Table 3.2 Suggested ABO group selection order for transfusion of Frozen Plasma

Recipient ABO Group	Component ABO Group			
	1st Choice	2nd Choice	3rd Choice	4th Choice
AB	AB			
A	A	AB		
B	B	AB		
O	O	B	A	B

Table 3.3 Suggested ABO group selection order for transfusion of **Platelet Concentrates & Cryoprecipitate***

Recipient ABO Group	Component ABO Group			
	1st Choice	2nd Choice	3rd Choice	4th Choice
AB	AB	B*	A*	O*
A	A	AB	B*	O*
B	B	AB	A*	O*
O	O	B	A	AB

* If the donor blood bag is labelled "Immune anti-A and/or anti-B present", the transfusion must be ABO-matched patient

In general, infants under 1 year of age should receive ABO plasma compatible platelet concentrate or cryoprecipitate.

Other patients can receive ABO-incompatible platelets or cryoprecipitate (which do not possess immune anti-A and/or anti-B) when compatible units are not readily available.

Table 3.4 Rh (D) compatibility table for common blood components

Patient's Rh (D) Type	Permissible donor's D Type				
	Whole blood	**Red Cells, Buffy coat**	**FP, CRP**	**Platelet Concentrates**	**Cryoprecipitate**
D-pos	D irrelevant		D irrelevant	D irrelevant	D irrelevant
D-pos (HDN due to anti-D)	D negative		D irrelevant	D irrelevant	D irrelevant
D-neg with anti-D	D negative		D irrelevant	D irrelevant	D irrelevant
D-neg without anti-D*	Females with child-bearing capability has priority to receive D-neg blood		D irrelevant	D irrelevant	D irrelevant

* D-negative recipients with no anti-D may receive D-positive WB/RBC without fear of immediate transfusion reaction. To avoid immunization and the subsequent development of HDN, females with childbearing capability should have priority in receiving D-negative blood.

Due to short shelf life of platelets and limited availability of D-negative donors, it is usually infeasible to have D-negative platelets at all times. For D-negative patients without history of anti-D, administration of Rh immune globulin may be considered after transfusion of D-positive platelets if prevention of D-alloimmunization is indicated. For D-negative patients with anti-D, the amount of red cell contamination in platelets is normally insignificant to result adverse haemolytic transfusion reaction; Rh prophylaxis is recommended if product is transfused to (un-immunized) D-negative recipients. Apply 250 IU RhIg for <=18 random donor platelets OR <=3 single donor platelet.

The use of D-positive blood in emergency resuscitation is justified by the degree of urgency and availablility.

Key: HDN, haemolytic disease of the newborn; FP, frozen plasma; CRP, cryoprecipitate reduced plasma (= cryosupernatent)

5.4 Issue of Blood and Blood Components

5.4.1 All units of blood or blood components shall bear a label with the recipient's unique identification information (i.e. patient's full name, ID number and blood group).

5.4.2 The blood and blood components shall be checked to be within the expiry date and have normal appearance before issue.

5.4.3 Nurse, ward aide, or pupil nurse should bring the **Blood Component Availability Notification Form** to collect the blood unit from Blood Bank. Both the laboratory and ward staff should check the blood unit against the request form. The blood unit is issued by barcode scanning of the computer verification system.

5.5 Storage and Transport of Blood Components

Table 4. Blood and blood component therapy: storage and administration

Blood/blood component	Storage Temperature	Transport Condition within hospital*	Administration
Whole Blood/Red cells	Temperature monitored blood refrigerator, 2-6°C	Insulated container	Transfuse over not more than 4 hours.
Platelets	Temperature monitored incubator 22±2 °C, with continuous agitation	Insulated container with no ice pack	Do not refrigerate, transfuse immediately, flush infusion set with saline after platelet bag empties (except volume restriction).
Buffy coat	Temperature monitored incubator 22±2 °C	Insulated container with no ice pack	Do not refrigerate, transfuse immediately but slowly over 2-4 hours, closely monitor the patient. Buffy coat should be used with minimal delay.
Frozen plasma Cryoprecipitate	Temperature monitored freezer ≤-30 °C	Insulated container	Transfuse within 4 hours after thawing at 30-37 °C.

* Use separate container for different blood components

5.6 Return and Reissue

5.6.1 Return of Unused Blood Components

Any unused blood or blood component should be returned to the Blood Bank as promptly as possible.

5.6.2 Reissuing Blood Products

Units that have left Blood Bank and then have been returned must not be reissued for transfusion unless the following conditions have been met:

5.6.2.1 The container closure has not been penetrated or punctured in any manner.

5.6.2.2 Red cell components have been maintained continuously at a temperature between 2 and 10°C, preferably 2 to 6°C. Blood centers and transfusion services normally do not reissue red cells that have remained out of a monitored refrigerator or a validated cooler for

longer than 30 minutes because, beyond that time, the temperature of the component may have risen above 10°C.

5.6.2.3 A blood refrigerator is installed in OT to store red cells temporarily before transfusion to surgical patients. Unused blood will be returned to Blood Bank without wastage.

5.6.3 Rejection Criteria of Blood Products for Reissue

Units that have left Blood Bank and then have been returned must not be reissued for transfusion:

5.6.3.1 Opened or partially transfused unit

5.6.3.2 Blood unit not cold to touch

5.6.3.3 Blood unit has been issued for more than 30 minutes

5.6.3.4 Haemolysed blood unit

5.6.3.5 Clotted blood unit

5.6.3.6 Cold platelet concentrates

5.6.3.7 Thawed FP or Cryoprecipitate

5.6.3.8 Leaked blood or blood component unit

5.6.3.9 Questionable suitability for re-issuing

5.7 Contingency Plan for Urgent Supply of Red Cell Units

The hospital blood bank shall request for emergency stock replenishment from the **Hong Kong Red Cross Blood Transfusion Centre (HKRCBTS)** in case of massive patient haemorrhage. If the access to the **HKRCBTS** is blocked, the Blood Bank Network system shall be activated and emergency stock replenishment shall be requested from the blood bank of **Pamela Youde Nethersole Eastern Hospital (PYNEH)**, using the **Emergency Blood Supply Requisition Form** and subject to sufficient stock level at PYNEH blood bank. The upper limit of urgent supply is 10 units of red cells. Our hospital blood bank is responsible for the collection, transportation and pre-transfusion testing of the urgent red cell unit supply.

6. Nursing Procedure

6.1 Pre-transfusion Checking Procedure

Hospital staff administering blood transfusion must check all identifying information immediately before beginning the transfusion, and record that this information has been checked and found to be correct on the Blood Product Issuing and Transfusion Record. One staff must be a registered nurse or medical doctor. Any discrepancy must be resolved before the transfusion is started. It is mandated that a second person should confirm the identity of the blood unit and of the patient. The following information must be reviewed and confirmed to be correct:

6.1.1 The type and quantity of blood components should be verified against the request of the attending doctor.

6.1.2 Patient's name and unique identification number must be identical to the label attached to the blood unit. It can be checked on the patient's wristband and by asking open-ended questions. In operating theatre or other areas where the identification bracelet may be inaccessible, the person responsible for pre-transfusion check shall select a reliable substitute to enable correct identification of the recipient according to hospital policies and procedures.

6.1.3 The ABO and Rh(D) group of patients on the Blood Product Issuing and Transfusion Record must be the same as the ABO and Rh(D) on the blood group report issued by the hospital. The patient's blood group and that of the component may not be identical (see Table 3), but the information on the transfusion forms and that on the container bag label must be the same.

6.1.4 The donor identification number (WBN) must be the same as that on the blood bag, the transfusion forms and the label attached.

6.1.5 The blood units shall be checked to fall before the expiry date of the unit and have normal appearance before transfusion.

6.1.6 The compatibility result should be recorded on the transfusion form. If blood was issued before compatibility tests were completed (i.e. uncrossmatched), this must be conspicuously indicated.

6.1.7 Blood components with abnormal appearance shall not be used for transfusion. If there is any evidence of haemolysis, clot formation, abnormal coloration, pack damage or leakage, the blood component must not be transfused and should be returned to the Blood Bank.

6.2 Blood Administration

6.2.1 To ensure accurate patient identification and to improve blood transfusion safety, a bedside electronic verification system is employed before administration. A hand-held scanner is used to scan staff card, patient wrist band, 2D label barcode, Red Cross DIN barcode and product barcode, the last three on the blood bag. A complete match allows a label to be printed for attachment to the Blood Product Issuing and Transfusion Record.

6.2.2 All blood and blood components shall be administered through a standard blood infusion set, drip chambers, and tubing. Sets should be primed according to the manufacturer's directions, using either the component itself or a solution compatible with blood. A blood administration set must be changed at least once every 12 hours, or after a maximum of 4 whole blood / red cell units have been given, or when the flow rate becomes inadequate, whichever earlier. In a routine clinical setting, it is reasonable to change the blood administration set after giving 2 red cell units.

6.2.3 An administration set used for red cells should never be subsequently used for platelet transfusion or vice versa.

6.2.4 Syringe-push sets with in-line filter that have small priming volume may be used for component administration under special clinical situations such as fluid restriction or paediatric transfusion.

6.2.5 Whole blood or packed red cells should be removed from a blood storage refrigerator only 1 unit each time just before transfusion for each patient unless very rapid transfusion is required under emergency situation.

6.2.6 Under normal circumstances, only one unit of red blood cells is issued at a time, and transfusion should begin as soon as possible after retrieval. Red blood cells or whole blood must be started within 30 minutes of issue and should ideally be completed within 4 hours. Platelets and thawed fresh frozen plasma should be transfused immediately to preserve coagulation function. It is recommended that each unit of plasma be fully transfused within 1 hour.

6.2.7 No drug or intravenous solution other than 0.9% sodium chloride must be added to blood or blood component. It is desirable that blood is administered through an intravenous line on its own or sequentially with medication after flushing with 0.9% sodium chloride. Under circumstances when administering medication separately is impractical, the risk of adverse reaction should be weighed against the benefit of giving both simultaneously. The solution must be calcium free, isotonic and must not have contraindication for giving with blood or blood components.

6.2.8 Empty blood bags should be discarded according to hospital policy for disposing of clinical waste. Retention of empty bags for periods of 24 hours

after transfusion is recommended to ensure their availability for investigation of transfusion reaction if necessary.

6.3 Monitoring of Patients during Transfusion

6.3.1 Catastrophic reactions from acute haemolysis, anaphylaxis or bacterial contamination usually become apparent in the first 15 minutes of the infusion. Hence, as a minimum requirement, vital signs (temperature, pulse, blood pressure and respiratory rate) shall be recorded before the start, at 15 minutes after the start and at the end of each unit of whole blood or red cell component transfused.

6.3.2 For platelet concentrates, frozen plasma and cryoprecipitate transfusion, the transfusion time is usually much shorter. As a minimum requirement, vital signs shall be recorded before the start, at 15 minutes after the start and at the end of each transfusion episode of a batch of components.

6.3.3 When adverse reactions occur, medical and nursing staff must be familiar and be prepared to deal with the different types of reactions, their etiology, symptomatology and immediate treatment.

6.4 Use of Filters, Blood Pumps and Blood Warmers

6.4.1 The blood administration set for transfusion of blood and components should contain an in-line particulate filter (around 170 μm) to remove fibrin clots and white cell aggregates.

6.4.2 The use of micro-aggregate filter should be restricted to cardio-pulmonary bypass, massive transfusion, or for filtering washed recovered blood before reinfusion.

6.4.3 A leucocyte filter can be used to prevent febrile non-haemolytic transfusion reaction or platelet alloimmunization. The manufacturer's instructions should be followed. Different filters are available for red cells and platelet concentrates that are not already leukocyte depleted by **HKRCBTS**.

6.4.4 A blood pump can be used when a large volume of blood has to be transfused over a short period of time. It should be used with a large-bore needle in place. One should follow the manufacturer's instructions and avoid high infusion rate as that may result in haemolysis of the transfused blood.

6.4.5 Blood should be warmed to body temperature by a blood warmer when administered rapidly in large amounts as in the case of severe haemorrhage. The blood warmer should have a temperature sensing device and warning system to detect malfunction. Overheating must be avoided, since it will cause haemolysis. Once blood is warmed, it cannot be reissued to another patient and the Blood Bank should be informed if warmed blood is returned.

7. Transfusion Reaction

7.1 Potential Risks of Blood Transfusion

7.1.1 Advances in infectious disease testing continue to improve the safety of the blood supply. However, viral, bacterial, and parasitic diseases can still be transmitted by transfusion, and novel agents may appear at any time. In Hong Kong, the residual infectious risk of hepatitis B is 3 in 10,000, hepatitis C is 1 in 300,000 and HIV is < 1 in 1,000,000 through blood transfusion.

7.1.2 Acute and delayed haemolytic transfusion reactions occur with an incidence of around 1 in 250,000 – 1,000,000 and 1 in 1,000 units transfused respectively. The major cause of potentially fatal transfusion reaction, acute haemolytic transfusion reactions arising from ABO-incompatibility, is often due to clerical errors resulting in patient mis-identification.

7.1.3 It is the duty of the clinician to explain clearly to the patient the benefits as well as the potential risks of blood and blood component therapy with respect to his or her particular condition.

7.2 Management of Suspected Transfusion Reaction

7.2.1 If a transfusion reaction is suspected, the transfusion should be stopped to limit the volume of blood infused. Keep intravenous line patent.

7.2.2 All labels, forms and patient identification should be checked to determine whether the transfused component was intended for the recipient.

7.2.3 It is important to note and record in the **Adverse Transfusion Reaction Reporting Form** any reaction that occurs during or after transfusion, such as fever, chills and rigor, skin rash, pain, shortness of breath, red or dark urine and hypotension.

7.2.4 After the initial assessment, notify the attending or on-duty doctor immediately. Depending on the situation, contact the Blood Bank and clinical pathology to initiate the transfusion reaction investigation protocol. The ward should return the blood bag (the administration set, and the attached intravenous solutions) to the Blood Bank using standard precautions, and collect a post-transfusion blood sample for the following laboratory tests:

- 7.2.4.1 **Blood Bank:** Perform Type and Screen, and Direct Antiglobulin Test (DAT) using the post-transfusion sample.
- 7.2.4.2 **Haematology:** Post-transfusion haemoglobin, reticulocyte percentage, coagulation screen (PT and APTT), plasma and urine free haemoglobin.
- 7.2.4.3 **Clinical Chemistry:** Electrolytes, renal function test, bilirubin, lactate dehydrogenase, haptoglobin.

7.2.4.4 **Microbiology:** Culture of the transfused unit and patient blood culture.

7.2.4.5 **Immunology:** IgA level for suspected anaphylactic transfusion reaction.

7.2.5 If the transfusion reaction is judged clinically to be minor allergic reaction (e.g. urticaria) or circulatory overload, post-reaction laboratory testing can be omitted.

7.3 Acute Transfusion Reactions

7.3.1 Acute transfusion reaction allergic reaction

It is caused by sensitivity to donor plasma protein or antibody. Symptoms and signs range from mild (flushing, itching, rash, urticaria, hives) to severe (shortness of breath, wheezing, laryngeal edema and anaphylaxis). The symptoms are usually relieved by antihistamine but if anaphylaxis occurs, adrenaline injection may be required. Washed red cells may be considered for patients with a history of severe allergic transfusion reaction.

7.3.2 Febrile non-haemolytic transfusion reaction

It is caused by immunological reaction between recipients HLA or granulocyte specific antibodies with donor leucocytes or reaction to pyrogenic cytokines released from donor leucocytes on storage. Symptoms and signs are flushing, fever (≥1°C), chills, sometimes rigors, and tachycardia. An antipyretic for example paracetamol can be given. Haemolytic transfusion reaction and septic reaction should always enter into the differential diagnosis for severe febrile reactions with an increase in temperature of >1.5°C. Repeated (>2) episodes of febrile non-haemolytic transfusion reaction is an indication for leucodepleted blood components, either pre-storage leucodepletion (preferred) or by bedside leucocyte filter.

7.3.3 Septic reactions

It is caused by transfusion of bacterial contaminated red cells or platelet concentrate, more commonly the latter. Septic reaction is characterized by rapid onset of chills and rigors, high fever usually >2°C, nausea, vomiting, diarrhea, hypotension, disseminated intravascular coagulation, microangiopathic haemolysis and renal failure. Haemolytic transfusion reaction should be excluded. After obtaining blood culture, the patient suspected of septic reaction should be started on intravenous broad-spectrum antibiotics with adequate anti-pseudomonal coverage.
Hospital Guidelines to minimize the risk of bacterial contamination of blood components.

7.3.3.1 Autologous blood pre-deposit and directed donation

7.3.3.1.1 Skin disinfection is performed by scrubbing 10% povidone- iodine over a sufficiently wide area that covers the intended venipuncture site for 30 seconds, followed by scrubbing 70% alcohol starting at the intended site of venipuncture and move outward in a concentric spiral manner for 30 seconds.

7.3.3.1.2 A stopwatch must be used to ensure the stipulated skin disinfection timing has been fulfilled.

7.3.3.1.3 The hands of the operator must be cleaned thoroughly before performing venipuncture.

7.3.3.1.4 Once the skin has been prepared, it must not be touched again except by the hand of the operator that has been cleaned thoroughly or the whole sterilization procedure has to be repeated.

7.3.3.2 Blood product storage and transportation

7.3.3.1.1 Skin disinfection is performed by scrubbing 10% povidone- iodine over a sufficiently wide area that covers the intended venipuncture site for 30 seconds, followed by scrubbing 70% alcohol starting at the intended site of venipuncture and move outward in a concentric spiral manner for 30 seconds.

7.3.3.2.1 Put on gloves or clean the hands with an alcohol-based hand rub before contacting blood products. If soiled, change gloves or clean the hands whenever necessary before contacting blood products again.

7.3.3.2.2 Blood bank 4°C refrigerator, platelet storage rack and plasma- thawing device must be cleaned by disinfectant wipes weekly with proper documentation. When the blood bank refrigerator is being cleaned, the red cell units will be stored temporarily inside the standby blood fridge of the clinical laboratory.

7.3.3.2.3 The insulated boxes for collection of blood products from the Hong Kong Red Cross Blood Transfusion Service and for transport of blood products within the hospital must be cleaned with 70% alcohol daily with proper documentation. A clean box can be used within 7 days without further cleansing if the cover is closed.

7.3.3.2.4 Therefore, the containers for collection of red cells from the ideal temperature during transportation is 2 – 10°C

for whole blood and red cells, room temperature (i.e. 20 – 24°C) for platelets and at frozen state for SP and related plasma products (i.e. <– 30°C). Hong Kong Red Cross Blood Transfusion Service should carry at least 2 cool-packs per container to ensure transportation temperature < 10°C for RBCs, and 5 packs of dry ice for frozen blood products.

7.3.4 Circulatory overload

It is caused by volume of transfused blood component exceeding what the recipient circulatory system can accommodate. The patient presents with shortness of breath and cough, and physical examination shows distended neck veins due to rise in jugular venous pressure and basal crepitations. The patient should be propped up and given diuretics and oxygen supplement. Severe cardiogenic pulmonary edema may require intubation.

7.3.5 Haemolytic transfusion reaction

It follows infusion of incompatible blood components. The Serious Hazards of Transfusion (SHOT) Program of the United Kingdom reviewed cumulative data from 1996 to 2006 and showed that acute haemolytic transfusion reaction due to 'Incorrect Blood Component Transfused' was the commonest adverse reaction of transfusion, accounting for 72.1% of all cases. Symptoms and signs include fever, chills and rigors, pain at infusion site or localized to the loins, abdomen, chest or head, hypotension and tachycardia. The patient often feels distressed, agitated and confused, may develop nausea, vomiting, shortness of breath and flushing. Haemoglobinuria due to intravascular haemolysis may occur.

The transfusion should be stopped immediately. The blood bag and administration set should be saved for investigation. A new blood giving set is used to keep the vein open with normal saline. Clerical check for compatibility between recipient and donor unit(s) shall be performed. The attending clinician is informed for urgent assessment. The blood bank is informed to return the blood bag for investigation and to collect blood and urine samples for testing. Supportive measures include treating shock and maintaining blood pressure with intravenous colloids, diuretics to ensure adequate urine output and monitoring by indwelling catheter, and dialysis if renal failure occurs.

7.3.6 Transfusion related acute lung injury (TRALI)

It is most probably caused by HLA or neutrophil-specific antibodies in the donor, which cause neutrophil activation and adherence to pulmonary endothelial and epithelial cells of the recipient. Complement activation augments the inflammatory reaction and neutrophil chemotaxis. The clinical presentation is acute respiratory distress occurring within 6 hours

of transfusion and manifesting as acute dyspnea, hypoxaemia and bilateral pulmonary infiltrates. The transfusion should be withheld immediately and circulatory overload should be excluded. The blood NT-proBNP level can supplement clinical assessment in distinguishing circulatory overload (high) from TRALI (normal). The patient should receive prompt and adequate respiratory support and the condition is reversible if properly managed. In Hong Kong, the risk of TRALI is reduced through production of FP and whole blood from male donors only.

7.4 Delayed Transfusion Reaction

7.4.1 Delayed haemolytic transfusion reaction

It is caused by destruction of donor red cells by antibody present at very low level and hence not detectable during the pre-transfusion compatibility testing, but increases due to secondary (anamnestic) response upon challenge by the corresponding antigen on donor red cells. The clinical manifestation is usually mild and includes mild jaundice or failure to show the anticipated increase in haemoglobin level after blood transfusion.

7.4.2 Transfusion associated graft-versus-host disease

In this condition, viable T-lymphocytes in cellular blood components from the donor attack the recipient tissue. The classical clinical presentation is erythromatous skin rash, diarrhoea, liver derangement and pancytopenia resulting in secondary infection and bleeding. It is a serious complication of blood transfusion with a mortality of 90%. At risk patient groups are fetus undergoing in-utero transfusion, severe congenital immunodeficiency states, stem cell transplantation recipients and transfusion from close relative. Prevention is achieved through the provision of irradiated blood components.

7.4.3 Transfusion transmitted infections

These infections are usually diagnosed incidentally on follow-up or investigation of liver derangement. Estimations of the residual risk of transfusion transmitted infections: Hepatitis A: 1 in 1,000,000; Hepatitis B: 3 in 10,000; Hepatitis C: 1 in 300,000; HIV: < 1 in 1,000,000 and HTLV I & II: 1 in 19,000 – 80,000.

7.4.4 Iron overload

Patients that require regular blood transfusions (e.g. aplastic anaemia, Cooley's anaemia and myelodysplastic syndrome) are at risk of iron deposition in the heart, liver, endocrine organs and elsewhere. The complications are hormonal dysfunction, cardiac disease including arrhythmia or heart failure, and liver cirrhosis. In these patients, the iron status should be monitored and chelation therapy started when indicated.

8. Reporting of Transfusion Reaction & Incident

8.1 Adverse Transfusion Reaction Reporting

8.1.1 If a patient shows any adverse reaction to blood or blood component transfusion, first should stop transfusion the notified Blood Bank. The **Adverse Transfusion Reaction Reporting Form** should be completed and sent to the Blood Bank.

8.1.2 Possible haemolytic transfusion reaction shall be investigated with relevant samples taken prior to further transfusion and post-transfusion samples as described under Transfusion Reaction.

8.1.3 All adverse events related to blood transfusion should be reported to the Hospital Management by the Blood Bank as soon as possible.

8.2 Transfusion Incident Reporting

8.2.1 The **Blood Transfusion Incident Reporting Form** should be completed either by the Blood Bank staff or the involved staff and sent to the Blood Bank for compilation.

8.2.2 All non-compliances or irregularities involving the procedures and process of blood transfusion should be reported to the Hospital Management by the Blood Bank.

9. Documentation

9.1 The transfusion prescription and nursing notes related to blood or blood product transfusion must be recorded in the patient's medical record.

9.2 The Blood Bank shall keep record of transfusion requests, laboratory results and blood products issued at the hospital.

9.3 Transfusion incidents and adverse transfusion reactions should be documented and reported to the Hospital Management.

10. Informed Consent for Blood Transfusion

10.1 Although stringent tests are employed for the screening of infectious diseases in donors, blood transfusion is still associated with risk. Informed consent must be obtained from the patient by a health professional (doctors or registered nurses). A patient information leaflet **(Information Sheet for Blood Product Transfusion and Consent for Transfusion of Whole Blood of Blood Components)** should support the explanation. A consent form is used to document the consent process.

10.2 In case of emergency, however, transfusion of blood or blood components can take place without consent if the patient is unable to communicate such consent, subject to any valid advance refusal or relevant objections from relatives **(Refusal of Blood Transfusion and or Blood Products Form)**.

10.3 In the case of surgery when transfusion may occur while the patient is anaesthetized, it is recommended that the surgeon and the anaesthetist should explain to the patient prior to surgery on the need of transfusion, its risk and possible alternatives as part of the process of obtaining consent for the intended surgery. They should clarify any concerns raised.

10.4 Some patients (such as Jehovah's Witness) may refuse blood transfusion even in emergency situations. Such wishes should be respected where appropriate.

10.5 Informed consent once obtained can be used for subsequent transfusion episodes within the same hospitalization. However, whenever indicated (e.g. enquiry raised from the patient, need for further explanation to the patient or there is a significant change in patient's management), a renewed consent should be obtained.

10.6 For patients with special haematological conditions requiring regular admissions for blood transfusion, it is advisable that clinician should renew the patient's understanding every year (i.e. signing a new consent form every 6 months). However, it should be subjected to the clinician's assessment on transfusion risk during each admission.

10.7 Some patients require special blood component for transfusion i.e., irradiated, CMV negative, leukocyte depleted. It is mandatory for clinicians to provide a memorandum to the blood bank which clearly state patient's diagnosis and reason for this special request.

11. Private Donor Program

Hospital patients can request for directed whole blood donations from private donor(s) with prior arrangement with the Clinical Pathologist.

11.1 Complete the **Private Donor Request Form**.

11.2 ABO and Rh(D) blood grouping and haemoglobin level are performed on prospective donors.

11.3 If the blood group is compatible and the haemoglobin level is above 12 g/dL, screening tests for infectious agents are carried out.

11.4 The private donation request form and laboratory testing request form have to be filled in.

11.5 Laboratory testing includes anti-HIV (1 & 2), anti-HTLV-1, anti-HCV, HbsAg and VDRL.

11.6 Antibody screening procedure can be undertaken if infectious disease screening is negative.

11.7 When serological compatibility between donor and recipient is confirmed, venesection is carried out.

11.8 The Clinical Pathologist will carry out the venesection procedure. The volume of donation is 450 mL ± 10%.

11.9 Blood donations from all relatives should be irradiated to minimize the risk of transfusion-associated graft versus host disease. The probability of this complication among relatives is greatest for transfusions between parents and children, next most likely for transfusions between grandparents and grandchildren or between aunts/uncles and nieces/ nephews, and third most likely among siblings.

12. Autologous Transfusion

Autologous transfusion is an option for patients who wish to avoid transfusion transmitted infections and alloimmunization associated with allogeneic blood. Clerical error, by far the commonest cause of fatal transfusion reaction due to ABO incompatibility, will not be reduced.

Autologous transfusion comprises

1. Pre-operative blood deposit
2. Acute normovolaemic haemodilution and
3. Peri-operative blood salvage

These procedures used alone or in combination would decrease or eliminate the exposure to allogeneic blood.

12.1 Pre-operative blood deposit

12.1.1 The patient should generally be in good health and able to tolerate repeated phlebotomies over a short period of time.

12.1.2 Patients undergoing surgeries that typically do not require blood transfusion should not be offered autologous blood collection.

12.1.3 Autologous transfusion can only be used for planned elective surgery, with a scheduled and fixed surgery date.

12.1.4 Autologous blood units should only be transfused based on clinical indications. The availability of autologous blood should not influence the decision to transfuse.

12.2 Exclusion criteria

Patients with the following conditions are not normally considered suitable for pre- operative blood deposit:

12.2.1 Haemoglobin level < 12 g/dL.

12.2.2 Active infection (absolute contraindication).

12.2.3 Cardiac disease (such as ischaemic heart disease, congestive heart failure, uncontrolled hypertension).

12.2.4 Cerebrovascular disease (stroke and brain tumour).

12.2.5 Inadequately controlled epilepsy.

12.2.6 Acute chest infection and acute asthma.

12.2.7 Symptomatic ulcerative colitis or Crohn's disease.

12.2.8 Pregnancy.

12.2.9 Adverse reaction to phlebotomy (such as fainting).

12.2.10 Poor venous access.

12.3 Procedures:

12.3.1 The Clinical Pathologist evaluates the appropriateness of autologous transfusion, and discusses the risk and benefits with the patient.

12.3.2 Written consent is obtained from the patient for the process of autologous transfusion. The possibility of still requiring allogeneic blood units is mentioned.

12.3.3 Request form for autologous transfusion should be completed. Pre-collection testing includes:

- VDRL, HbsAg, anti-HCV, anti-HIV (1 & 2) and anti-HTLV-1 is carried out. Autologous transfusion will not normally proceed when one of these tests is positive.
- Haemoglobin level.
- ABO and Rh(D) blood grouping.

12.3.4 The Clinical Pathologist establishes liaison with Blood Bank, surgeon and anaesthesiologists.

12.3.5 The blood collection schedule is planned, normally 5 weeks before the operation. The interval between donations should be at least 1 week apart. The last donation should be at least 72 hours before operation.

12.3.6 The number of units required (maximum 4 units) is determined.

12.3.7 Oral iron supplements are prescribed.

12.3.8 Before collection of each pre-deposited unit, donor blood testing for haemoglobin level is performed together with bacterial culture.

12.3.9 All units must be correctly labeled with demographic information of the patient. Additional labels, 'For autologous use only' and 'Donor tests passed' must be attached.

12.3.10 If blood transfusion is required, a Blood Components Request form requesting for autologous unit is submitted. Blood Bank staff follows the usual procedures to document compatibility.

12.3.11 The shelf life of autologous whole blood unit is 21 days. Unused autologous units are disposed of after expiry like other blood units.

13. References

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13.2 Procedures & Guidelines for Blood Transfusion, Queen Elizabeth Hospital, Second Edition 2003.

13.3 Standards for Blood Banks and Transfusion Services, American Association of Blood Banks, 27th Edition, 2011.

13.4 AABB Technical Manual, 17th Edition 2011.

13.5 Mintz PD ed. Transfusion Therapy: Clinical Principles and Practice. AABB Press, Second Edition 2005.

13.6 Working Party of the BCSH Blood Transfusion Task Force, Guidelines for compatibility procedures in blood transfusion. Transfusion Medicine 14:59 – 73, 2004.

13.7 Hsu Y, Haas T & Cushing M: Massive transfusion protocols: current best practice. Int. J Clin Trans Med 2016; 4:15-27.

13.8 Stansbury LG, Hess JR eds. Massive Transfusion. AABB Press 2019. ISBN 978-1-56395-964-6.

13.9 Postpartum Hemorrhage. ACOG Practice Bulletin Number 183, October 2017. Obstetrics & Gynecology 2017; 130(4): e168 – 186.

13.10 Mavrides E, Allard S, Chandraharan E, Collins P, Green L, Hunt BJ, Riris S, Thomson AJ on behalf of the Royal College of Obstetricians and Gynaecologists. Prevention and management of postpartum haemorrhage. BJOG 2016; 124: e106–e149.

13.11 Management of Postpartum Haemorrhage (PPH), Women's Health Committee (RANZCOG), 2021.

13.12 Postpartum Haemorrhage. ALSO. American Academy of Family Physician, 9th Edition 2020.

Appendix I

STEPS OF THE PHLEBOTOMY PROCEDURE

1	***Check Date of Collection***	*Carefully check the date of collection on the request form*
2	***Identification of Patient***	*At least 3 identifiers (name, DOB, identification document number) must be matched on the request form and the wristband or patient pass; oral confirmation by the patient or his/her companion is needed whenever possible*
3	***Explanation***	*Confirm doctor's order and test requirements. i.e. fasting or random, supine or upright position, trough or peak drug level, etc.*
4	***Equipment Assembly & Selection of Blood Collection Tubes***	*Disposable tourniquet, gloves, disinfectant, safety-lok blood collection set & holder, or syringe & needle, correct numbers & types of blood collection tubes, sterile gauze or gauze ball, micropore & band-aid, sharp's box, ice, aluminum foil, etc., check expiry date of consumables*
5	***Washing Hands***	*With liquid soap or alcohol-based hand rub*
6	***Selecting a Vein***	*Palpate the vein with the finger tip, select the vein with elastic feel, determine direction of vein* *Choice of vein: basilic, median cubital, Cephali or dorsal side of hand (MUST use winged needle set for anchoring)*
7	***Wearing Gloves***	*Choose the suitable sized gloves* *For veins difficult to feel with gloves on, explain to the patient & rub hands thoroughly*
8	***Positioning Patient***	*Fully extend the patient's arm on elbow rest & slightly pointing downwards*
9	***Applying Tourniquet***	*Tied 2 – 4 inches above puncture site, application less than 2 minutes Remind patient not to perform hand pumping before and during collection*
10	***Disinfecting the Site***	*Thorough cleansing of site with alcohol swab by circular motion inside out, allow to air-dry*
11	***Anchoring the Vein***	*Apply skin traction with the thumb, anchor firmly* *Disinfection of finger before re-palpating*

12	***Inserting Needle and Insertion Angle***	*Warn patient before poking, enter the vein swiftly at a 15-30º angle.*
13	***Filling Collection Tubes and mixing***	*Keep needle steady while changing tubes, collect blood in correct order of draw (Double check the patient data if pre-labeled tubes are used)* *Order of draw: blood culture, red, blue, green, lavender, pearl white, gray.* **If blood is drawn only for coagulation test sample (PT/APTT), a waste tube should be drawn first. The waste tube must also be a light-blue top tube or a tube that contains no additives. This waste tube is drawn first to remove the air in the tubing of the winged collection device. Once blood flows through the tubing, the waste tube can be removed and discarded.* *Invert the tube 5-8 times gently on each change*
14	***Releasing the Tourniquet***	*Remove the disposable tourniquet before withdrawing needle*
15	***Removing the Needle***	*Remove the needle before pressing down with gauze ball*
16	***Caring upon Needle removal***	*Fix the gauze ball with micropore, ask patient to apply pressure on the puncture site and surrounding for at least 5 minutes with arm extended*
17	***Disposing the Needle***	*Quickly discard the needle in sharp's box.* *Do not recap*
18	***Labeling the Tubes***	*Put on ward / lab labels with patient's* *3 identifiers Write appropriate information on the ward labels, e.g., fixed collection time Confirm the labelling on the specimens with the patient*
19	***Checking On the Patient***	*Ensures patient is pressing on the wound, instruct patients on prevention of hematoma and provide a band-aid for use after bleeding stops* ** Note: Enquire patient whether he/she is on anti-coagulant therapy e.g., warfarin. If yes, tell the patient to press the puncture site for at least 15 minutes.*

Appendix II

USEFUL TELEPHONE NUMBERS

Clinical Pathology Laboratory	2835 8790
	2835 8779
Blood Bank (Happy Valley)	
Enquires	2835 8793
Fax	2835 8799
Blood Bank (Eastern Medical Centre)	
Enquires	2917 5200
Fax	2892 7444
Dr. Edmond S K Ma,	
Director of Clinical and Molecular Pathology	2835 8017
Dr. William W L Choi,	
Specialist in Haematology	2835 8499
Mr. Alex C P Leung,	
Senior Medical Technologist, Laboratory in-charge	2835 8798
Ms. Esda H Y Ng,	
Medical Technologist, Blood Bank in-charge	2835 8793

Appendix III

EDITORS OF BLOOD TRANSFUSION PROTOCOL HANDBOOK

Dr. Edmond S K Ma,
Director of Clinical and Molecular Pathology

Ms. Esda H Y Ng,
Medical Technologist & Blood Bank in-charge

MEMBERS OF HOSPITAL BLOOD TRANSFUSION AND CELL THERAPY MEDICAL ADVISORY COMMITTEE, HONG KONG SANATORIUM & HOSPITAL

Dr. Yen-Chow Tsao,
Deputy Medical Superintendent & Administrative Director of Pathology Service (Chairman)

Dr. Raymond H S Liang,
Assistant Medical Superintendent

Dr. Edmond K W Chiu,
Consultant in Haematology

Dr. Wai-Chiu Tsoi,
Consultant, Hong Kong Red Cross Blood Transfusion Service

Dr. Chi-Leung Liu,
Consultant in Surgery

Dr. Tsun-Woon Lee,
Consultant in Anaesthesiology

Dr. Jacobus K F Ng,
Consultant
(by position – Chairman of OT MAC)

Dr. Edmond S K Ma,
Director of Clinical and Molecular Pathology

Dr. William W P Choi,
Specialist in Haematology

Ms. Iris S C Lam,
Head of Nursing (HKSH Inpatient Services)

Ms. Mei-Yee Lee,
Senior Nursing Officer, Operating Theatre (or representative)

Ms. Sou-Wane Lim,
Senior Nursing Sister & Coordinator

Ms. Hung-Fai Wu,
NOI. ICU

Ms. Kit-Yee Ng,
NOI, ICU

Mr. Alex C P Leung,
Senior Medical Technologist, I/C

Ms. Esda H Y Ng,
Medical Technologist, Blood Bank

Appendix IV. Other Related Forms

養和
HKSH

病理學部-血庫
Department of Pathology – Blood Bank

Blood Components Request Form

姓名 Name _____
年歲 Age _____ 性別 Sex ___ M / F 香港身份證號碼 HK ID No. _____
房 / 床號 Ward / Bed No. _____ 醫院號數 Hosp./O.P.D. No. _____

Lab Label

Request Date & Time: _____

Attending Doctor/Requested by: _____

Scheduled Admission Date (for outpatients): _____

Staff responsible for blood collection
I certify that I collected the accompanying sample from the patient named above, whose identity was confirmed by inquiry and / or examination of their name-band, and that I labelled the sample immediately following collection.

Sign: _____ Name: _____ Collection Time & date: _____

Staff responsible for sample verification: please sign on the Blood Sample Verification & Patient Identification form.

Blood Component Type	Number of units
☐ 220-8-5 Type & Screen Request (Do not request if done within 3 days)	☐ 220-17-4 Request of red cell _____ Units
☐ 220-9-3 Platelet Concentrate	_____ Units
☐ 220-10-7 Frozen Plasma (FP)	_____ Units
☐ 220-11-5 Cryoprecipitate	_____ Units
☐ 220-12-3 Cryoprecipitate Reduced Plasma (CRP) (Equivalent to cryosupernatant)	_____ Units
☐ 220-13-1 Buffy Coat / Granulocytes	_____ Units
☐ 220-15-8 Full Crossmatch (Red Cell) Request **(For Antibody Screen Positive Cases Only)**	_____ Units
☐ 220-20-4 Extended Red Cell Phenotype	

Special Request:
☐ Irradiated
☐ CMV negative
☐ Whole Blood
☐ Leukocyte depleted by filtration
☐ Paediatric Multi-mini pack
☐ Others _____

The following information must be provided:

☐ Urgent
☐ Uncrossmatched **(For desperate situation only)**
  ☐ Group O
  ☐ Group specific

☐ Medical ☐ Oncology ☐ Surgical ☐ O&G ☐ Orthopaedics
☐ Others _____

☐ Diagnosis: _____
☐ Intended date of transfusion: ☐ ASAP ☐ Date: _____
☐ Surgery type: _____
Date: _____ Time: _____

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PATH.511.005/E-12-072025

Printed at :
☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre
☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

Blood Components Request Form
養和醫療集團成員 A member of HKSH Medical Group

病理學部
Department of Pathology

Transfusion Adverse Reaction Reporting Form

姓名 Name
年歲 Age 性別 Sex M / F 香港身份證號碼 HK ID No.
房 / 床號 Ward / Bed No. 醫院號數 Hosp/O.P.D No.

Adverse reaction date and time: (dd/mm/yyyy hh:mm)							
Reporting Date: (dd/mm/yyyy)							
Name of reporting staff:							
Post:							
Patient's pre-transfusion condition: (Please ✓ in the appropriate ☐)							
☐ Critical	☐ Serious	☐ Stable	☐ Satisfactory				
Products Given	☐ Whole Blood	☐ Red Cells	☐ FP	☐ Others			
Donor unit DIN*:							
Volume transfused: _____ ml (estimated)							

Vital sign before transfusion:				**Vital sign when adverse reaction detected:**			
Blood Pressure:		Respiration:		Blood Pressure:		Respiration:	
Pulse:		SpO_2:		Pulse:		SpO_2:	
Temperature:				Temperature:			

Description of Reaction:

Symptoms and Signs

General:	☐ Chills	☐ Fever	☐ Nausea	☐ Vomiting
Pain at:	☐ Back	☐ Chest	☐ Joint	☐ Infusion site
Skin changes:	☐ Rash	☐ Pruritis	☐ Flushing	
Cardiac Distress:	☐ Tachycardia	☐ Hypotension	☐ Cardiac arrest	
Respiratory Distress:	☐ Cough	☐ Dyspnea	☐ Bronchospasm	☐ Respiratory arrest
Renal Distress:	☐ Oliguria	☐ Anuria	☐ Reddish urine	

Does patient identification (Name and ID.No.) check with the blood unit? ☐ Yes ☐ No

Patient's post-transfusion condition:

☐ Critical ☐ Serious ☐ Stable ☐ Satisfactory

Action taken:

Please contact Blood Bank for arrangement and collection of blood samples for investigation. * Donation Identification Number

Page 1 of 2

PATH.511.002/E-06-062024 **Transfusion Adverse Reaction Reporting Form**

養和醫療集團成員 A member of HKSH Medical Group

Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre ☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

病理學部
Department of Pathology

Transfusion Adverse Reaction Reporting Form

姓名
Name

年歲 Age ____ 性別 Sex _M / F_ 香港身份證號碼 HK ID No.

房 / 床號 Ward / Bed No. 醫院號數 Hosp/O.P.D No.

Indications for transfusion:	
Transfusion History:	
Blood Product Type:	
Donor unit WBN:	
To be reviewed by Hospital Blood Transfusion and Cell Therapy Medical Advisory Committee:	
Lab findings:	☐ ABO mismatch ☐ Crossmatch incompatible ☐ Culture of micro-organism Pos / Neg ☐ Antibody identified Yes / No _____ ☐ No abnormal serology finding ☐ Others _____
Major Adverse Transfusion Reaction:	**Classification** ☐ Acute haemolysis- ABO mismatch ☐ Acute haemolysis- other cause ☐ Septic reaction ☐ Anaphylactic reaction ☐ Transfusion related acute lung injury
Delayed Adverse Transfusion Reaction:	☐ Delayed haemolysis ☐ Post-transfusion hepatitis/ infection ☐ Transfusion associated graft-versus-host disease ☐ Post-transfusion purpura
Minor Adverse Transfusion Reaction:	☐ Febrile non-hemolytic transfusion reaction ☐ Minor allergic reactions
Other Reaction :	☐ Specify:
Conclusion and Recommendations:	
Completed by:	
Date (dd/mm/yyyy):	

PATH.511.002/E-06-062024

Transfusion Adverse Reaction Reporting Form

養和醫療集團成員 A member of HKSH Medical Group

Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre
☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

病理學部
Department of Pathology

Blood Transfusion Incident Reporting Form

姓名 Name	
年歲 Age	性別 Sex M/F
香港身份證號碼 HK ID No.	
房 / 床號 Ward / Bed No.	醫院號數 Hosp/O.P.D No.

Incident date and time:_____ (dd/mm/yyyy hh:mm)
Reporting date:_____ (dd/mm/yyyy)
Name of reporting staff:_____ **Post:**_____
Description of the Incident (what, where, when, how and who):

_____
_____
_____
_____
_____

Staff Involved: ☐Medical ☐Nursing ☐Blood Bank ☐Other
Nature of Incident (please ✓ in appropriate ☐)

A. Request Problem
- ☐1. Discrepancy/ Missing patient name or ID number
- ☐2. Name of requesting clinician not clear/ not indicated
- ☐3. Type of Blood product / Quantity not indicated
- ☐4. Incomplete Form (Diagnosis, Operation type and date, Hb level/Platelet count missing)
- ☐5. Delay in issuing request forms from ward (OT requesting cases)
- ☐Others_____

B. Blood Issue and Reporting
- ☐1. Prompt action not taken by ward staff after phone notification of completion (urgent cases)
- ☐2. Incomplete or wrong report issued
- ☐3. Wrong patient label on blood units
- ☐4. Wrong blood products issued/taken
- ☐5. Expired blood products issued
- ☐Others_____

C. Blood/Component administration
- ☐1. Wrong recipient
- ☐2. Fail to verify patient's identity
- ☐3. Fail to check serial number of blood component against form/ label on blood bag
- ☐4. Missing transfusion request form/record
- ☐5. Fail to recognize major transfusion reaction
- ☐6. Dissatisfactory blood product found
- ☐Others_____

D. Laboratory
- ☐1. Mix up/Wrong specimen
- ☐2. Fail to clarify request
- ☐3. Wrong ABO/Rh result
- ☐4. Wrong Crossmatch result
- ☐5. Wrong antibody screen result
- ☐6. Instrument/equipment error
- ☐7. Reagent Problem
- ☐Others_____

Page 1 of 2

PATH.511.003/E-05-062024 **Blood Transfusion Incident Reporting Form**

養和醫療集團成員 A member of HKSH Medical Group

Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre
☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

病理學部
Department of Pathology

Blood Transfusion Incident Reporting Form

姓名 Name
年齡 Age 性別 Sex M / F 香港身份證號碼 HK ID No.
房 / 床號 Ward / Bed No. 醫院號數 Hosp/O.P.D No.

E. Blood/Component Storage and Transport
- ☐1. Wrong transport container used
- ☐2. Blood refrigerator failure leading to wastage of blood products
- ☐3. Inappropriate blood /component storage
- ☐4. Delay or fail to return unused blood products

F. Miscellaneous
- ☐1. Wrong computer entry
- ☐2. Computer problem
- ☐3. Printing error
- ☐Others_____

PATIENT OUTCOME

☐Incident discovered **BEFORE** actual transfusion ☐Incident discovered **AFTER** actual transfusion

Patient condition prior to incident

☐Critical ☐Serious ☐Stable ☐Satisfactory ☐N/A (if no actual transfusion)

Transfusion given ☐Yes ☐No

Action Taken:

_____
_____
_____
_____

Findings and conclusions:

_____
_____
_____
_____

Possible underlying causes:

- ☐1. Fail to comply with policies or procedure
- ☐2. Misinterpretation of order/request
- ☐3. Technical Error (Lab)
- ☐4. Interpretation Error (Lab)
- ☐5. Computer software/ hardware problem
- ☐6. Failure in communication
- ☐7. Insufficient knowledge or skills
- ☐8. Inadequate staff/ equipment
- ☐9. Lack of supervision
- ☐Others_____

Recommendations (by HTC / HMC):

_____
_____
_____
_____

Reviewed by:_____ **Date:**_____(dd/mm/yyyy)

Page 2 of 2

PATH.511.003/E-05-062024 **Blood Transfusion Incident Reporting Form**

養和醫療
HKSH Medical Group

接受輸入全血或血液成份同意書
Consent for Transfusion of Whole Blood or Blood Components

姓名 Name_____
年歲 Age_____ 性別 Sex M / F 香港身份證號碼 HK ID No._____
房 / 床號 Ward / Bed No._____ 醫院號數 Hosp/O.P.D No._____

簽署本同意書人士 PERSON(S) SIGNING THIS CONSENT

病人姓名載於本同意書右上角 The Patient is named at the top right corner of this form.

簽署本同意書人士為：*(請 ☑適當方格)* The person(s) signing this form is / are: *(Please ☑ the appropriate box.)*

☐ 病人本人 Patient

☐ 病人家屬 / 監護人
Patient's relative / guardian 正楷姓名 Name in Block Letters : _____

☐ 病人未到法定年齡 Patient is a minor ☐ 病人未能簽名，原因：Patient is incapable of signing because : _____

- 本人 / 病人因臨床之需要，同意接受輸入全血或血液成份。其性質、目的、效果、可能引致的危險及反應，
  I hereby give consent for myself / the patient to, as clinically indicated, receive transfusion of whole blood or blood components, as recommended
  已由 _____ 醫生向本人解釋明白。
  by Dr. _____, who has explained to me the nature, purpose, effect, possible risks and reactions of the procedure.
- 本人確認收到輸血須知 (附頁)，並已閱讀及完全明白其內容。
  I confirmed that I have been provided with an Information Sheet for Blood Product Transfusion (copy attached), and that I have reviewed the same and that I fully understand the contents.

本人確認已獲得及明白此程序之資料及有關風險。我亦已有機會詢問醫護人員任何與本人 / 病人的情況及治療有關的問題並進行了討論，我已完全理解並且得到了滿意的答覆。

I acknowledge that the above information concerning this procedure have been given to me. I have been given the opportunities to ask and discuss with the medical staff questions pertinent to my / the patient's condition and management, and satisfactory answers have been provided and I fully understand them.

病人簽署 Patient's Signature	家屬 / 監護人簽署 Relative / Guardian's Signature	見證人簽署 Witness' Signature
	姓名 Name:_____	姓名 Name:_____
	身份證 / 護照號碼 ID / Passport No. :_____	身份證 / 護照號碼 ID / Passport No. :_____
日期 Date :_____ (日 / 月 / 年) (dd/mm/yyyy)	關係 Relationship:_____ 日期 Date:_____ (日/月/年) (dd/mm/yyyy)	日期 Date :_____ (日 / 月 / 年) (dd/mm/yyyy)

醫生聲明：本人已向上述之簽署者解釋是項程序的性質、風險及效益，並已解答其提出的有關問題。據本人所理解，上述之簽署者已獲得充分的資料及已簽妥同意書，而這些資料亦已記錄在病人的病歷內。
DOCTOR'S DECLARATION: I have explained the nature, risks and benefits of the procedure to the above signatory(ies) and have answered the questions asked by the above signatory(ies). To the best of my knowledge, the above signatory(ies) has / have been adequately informed and has / have consented to the procedure, and the details as such have been documented in the Patient's clinical record.

醫生簽署 Doctor's Signature	醫生姓名 Doctor's Name	日期 Date (日 / 月 / 年) (dd/mm/yyyy)

翻譯員解釋建議程序 (如適用) Explanation of the proposed procedure by Interpreter (if applicable)

本人 I, _____ 已為簽署者將此同意書的內容如實及清楚地翻譯成 certify that I have truly, distinctly and audibly interpreted the contents of this document into (語言或方言) _____ (insert language or dialect) to the above signatory(ies).

翻譯員簽署 Interpreter's Signature	翻譯員姓名 Interpreter's Name	日期 Date (日 / 月 / 年) (dd/mm/yyyy)

WARD.460.001/B-08-122023

接受輸入全血或血液成份同意書
Consent for Transfusion of Whole Blood or Blood Components

Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre
☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare ☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill

養和醫療
HKSH Medical Group

拒絕接受輸血及或血製品同意書 （只適用於是次入院）
Refusal of Blood Transfusion and or Blood Products (Valid for Single Admission Only)

姓名 Name _____
年齡 Age _____ 性別 Sex M / F _____ 香港身份証號碼 HK ID No. _____
房 / 床號 Ward / Bed No. _____ 醫院號數 Hosp/O.P.D No. _____

簽署本同意書人士 PERSON(S) SIGNING THIS CONSENT

病人姓名載於本同意書右上角 The Patient is named at the top right corner of this form.

簽署本同意書人士為： The person(s) signing this form is/are: (請✓適當之方格 Please tick the appropriate box)

☐ 病人本人 Patient

☐ 病人家屬/監護人 Patient's relative / guardian　　正楷姓名 Name in Block Letters : _____

☐ 病人未到法定年齡 Patient is a minor　　☐ 病人未能簽名，原因： Patient is incapable of signing because:

本人特此聲明：本人/病人**不願意**接受以下任何血製品輸注 *(請✓適當之方格 Please tick the appropriate box)*

I hereby state that I / the patient **DO NOT** wish to receive the following blood products transfusion:

☐ 異體血液及血液成分 All allogeneic blood and blood components
☐ 自體血液及血液成分 All autologous blood and blood components
☐ 以上全部皆是 All of the above
☐ 其他 Other (請註明 Please specify) _____

本人/病人在此次入院期間已獲悉有輸血之可能。本人/病人已知悉及明白拒絕接受輸血及/或血製品之風險及後果，即對治療或有所影響，可能對本人/病人構成永久性傷害或導致死亡。本人/病人將承擔所有風險，並接受本人/病人的醫生因應本人/病人之決定而可拒絕施行某種治療/程序。本人/病人明白診治醫生將繼續為本人/病人提供治療，並致力以其他非血液方式代替，盡可能不使用異體血。

I / the patient have been informed that I / the patient may need blood transfusion during this hospital admission. I / the patient have been informed of and understand that the risks and consequences associated with my / the patient's own wish to REFUSE blood transfusion and/or blood products may compromise my / the patient's standard of care including permanent injury to me / the patient or possible death. I / the patient accept full responsibility for those risks. I / the patient also accept that my / the patient's doctor may decline to perform some treatment/procedure as a result of my / the patient's own decision. I / the patient understand that my / the patient's doctor will continue to treat me / the patient and pursue alternative non-blood medical treatment and to treat me / the patient without using allogeneic blood as far as practicable.

本人和病人同意放棄，釋放和解除養和醫療集團及其職員因為准許本人 / 病人因遵照本人/病人於本聲明展示之意願及指示所產生而引起的損失、損害、花費、申索、開支及其他責任。

I / the patient hereby waive, release and discharge HKSH Medical Group and its staff members from any responsibility or liability for any injury, loss, damage, costs, claim, expense or other liability whatsoever and howsoever arising in relation to or as a result of following my / the patient's wishes and directions set forth in this refusal.

本人/病人作此決定時，未有受外界任何影響。本人/病人已獲予以機會提出所有有關問題，並已全數獲得完滿的解答。本人明白本人/病人可隨時改變此決定，並有責任屆時以書面方式通知養和醫療集團。

I / the patient have made this decision without any undue influence from external parties. I / the patient have been given the opportunity to ask questions and I / the patient acknowledge that my / the patient's questions have been answered to my / the patient's satisfaction. I understand that I / the patient may change my / the patient's decision at any time and that I am / the patient is responsible for informing HKSH Medical Group of any change in writing.

病人簽署 Patient's Signature	家屬 / 監護人簽署 Relative/Guardian's Signature	見證人簽署 Witness' Signature
	關係： Relationship : _____	姓名： Name : _____
	身份證/護照號碼： ID/ Passport No.: _____	身份證/護照號碼： ID/ Passport No.: _____
日期： Date: (日/月/年) (dd/mm/yyyy)	日期： Date : (日/月/年) (dd/mm/yyyy)	日期： Date : (日/月/年) (dd/mm/yyyy)

醫生聲明：本人已向上述之簽署人士解釋是項治療的性質、風險及效益，並已解答其提出的有關問題。據本人所理解，上述之簽署者已獲得充分的資料及已簽妥同意書，而這些資料亦已記錄在病人的病歷內。

DOCTOR'S DECLARATION: I have explained the nature, risks and benefits of the treatment to the above signatory(ies) and have answered the questions asked by the above signatory(ies). To the best of my knowledge, the above signatory(ies) has/have been adequately informed and has/have consented, and the details as such have been documented in the Patient's clinical record.

醫生簽署 Doctor's Signature	醫生姓名 Doctor's Name	日期 Date (日/月/年) (dd/mm/yyyy)

翻譯員解釋建議程序（如適用） Explanation of the proposed procedure by Interpreter (if applicable)

本人 I, _____ 已為簽署者將此同意書的內容如實及清楚地翻譯成 certify that I have truly, distinctly and audibly interpreted the contents of this document into _____ (語言或方言) (insert language or dialect) to the above signatory(ies).

翻譯員簽署 Interpreter's Signature	翻譯員姓名 Interpreter's Name	日期 Date (日/月/年) (dd/mm/yyyy)

MAN.460.003/B-08-062024

拒絕接受輸血及或血製品同意書(只適用於是次入院)
Refusal of Blood Transfusion and or Blood Products (Valid for Single Admission Only

Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre ☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

養和醫療
HKSH Medical Group

Information Sheet for Blood Product Transfusion

姓名 Name_____
年歲 Age____ 性別 Sex M / F 香港身份証號碼 HK ID No._____
房 / 床號 Ward / Bed No._____ 醫院號數 Hosp/O.P.D No._____

Introduction

It is the infusion of whole blood or blood components (red cells, platelets and plasma) through the veins as prescribed by your doctor to achieve a therapeutic effect.

Blood safety in Hong Kong is maintained at an international standard. The Hong Kong Red Cross Blood Transfusion Service complies with ISO 9000 and Australian Therapeutic Goods Administration Good Manufacturing Practice in order to ensure blood quality and safety. Blood is collected from volunteer non-remunerated donors only. Before giving blood, donors are assessed by a health assessment questionnaire and interviewed on their risk factors for disease. In addition to blood group determination, all blood products are then screened for infectious agents including hepatitis B, hepatitis C, HIV, HTLV and syphilis. Should transfusion be required, the hospital blood bank will ensure proper patient identification and compatibility with donor units.

Indication

It is needed to replace blood loss and to correct serious or even life threatening disorders due to deficiency of blood cells or clotting factors. Blood transfusion support enables medical procedures such as major surgery or stem cell transplantation to be carried out.

Red cells carry oxygen and alleviate symptoms of anaemia. Platelets help to stop bleeding at the site of injury. Transfusion of platelets is needed if their number is reduced or function is impaired. Plasma contains all proteins in the blood and it is used to replace clotting factor deficiency.

Risks and Complications

Similar to drug treatment or other medical procedures, blood transfusion carries a finite risk to the recipient no matter how small. When your doctor prescribes blood transfusion, the benefits of transfusion should outweigh the perceived risks. Important transfusion related risks are:

- **Fever**: Some patients experience feverishness and chills during or shortly after blood transfusion. This may subside on its own without any consequence or easily controllable by medications. However, if you have a history of febrile reactions related to transfusion, you should report to your doctor for preventive measures to be taken.
- **Allergy**: This is usually a mild reaction in the form of skin rash or itchiness, which is easily treatable. Severe allergic reaction can occur but is very rare and the chance is less than one in a hundred thousand.
- **Haemolysis**: When a blood group mismatch between you and the donor occurs, the donor red cells are destroyed in your body by a process called haemolysis. Severe haemolytic reaction is very rare and happens at a frequency of only one in a hundred thousand. However if it does arise, the kidneys may shut down and, together with other complications, may be life threatening. The hospital blood bank and nursing staff will ensure that the correct blood is given to the correct patient by following standard identification protocols.
- **Transfusion transmitted infection**: Although blood products are vigorously screened, including bacterial surveillance for platelet concentrates, the risk of transfusion-transmitted infections cannot be completely eliminated by current technology. It is estimated that the residual risk of acquiring HIV infection through transfusion is less than one in 2.4 million, whilst that for hepatitis B is less than one in 58,000 and hepatitis C is less than one in 8 million. Bacterial contamination: red cells one in 500,000 and platelet concentrates one in 10,000.
- **Transfusion related acute lung injury (TRALI)** is a rare but serious adverse reaction that can be seen in Chinese.

Risks of not having a transfusion

If acute blood loss is not replenished, your blood pressure will drop and tissue perfusion of your major organs such as brain or kidneys will be impaired. Uncorrected anaemia is associated with tiredness, shortness of breath, palpitations and decreased exercise tolerance. Inadequate platelets or deficiency of clotting factors will lead to increased likelihood of bleeding.

Alternative Treatment

It is possible to deposit your own blood in the hospital blood bank prior to surgery for your own use, so that exposure to red cells of other donors can be avoided. Pharmacological agents may be used to increase your haemoglobin level or to help stop bleeding.

Remarks

Possible risks and complications include, but not limited to, the above. The list of complication is not exhaustive as other unforeseeable complications may occasionally occur, and the risk varies from person to person. Should you have any enquiries, please consult your / the patient's doctor.

I acknowledge that the above information concerning my / the patient's treatment, any alternative treatment and consequences of no treatment have been explained to and discussed with me by the Doctor / medical staff and I fully understand them. I have been given the opportunities to ask questions pertinent to my / the patient's condition and management, and satisfactory answers have been provided.

Patient's Signature: _____ Date: _____ (dd/mm/yyyy)

Relative / Guardian's Signature : _____ Relative / Guardian's Name: _____

ID / Passport No.: _____ Relationship: _____ Date : _____ (dd/mm/yyyy)

BTMAC.460.007/E-06-032024 **Information Sheet for Blood Product Transfusion**

Printed at : ☐ Hong Kong Sanatorium & Hospital ☐ HKSH Eastern Medical Centre ☐ HKSH Cancer Centre ☐ HKSH Diagnostics Centre ☐ HKSH Healthcare Medical Centre (Admiralty) HKSH Healthcare (☐ Central ☐ Island East ☐ Taikoo ☐ Tanner Hill)

養和醫療
HKSH Medical Group

輸血須知

姓名 Name
年齡 Age 性別 Sex M / F 香港身份証號碼 HK ID No.
房 / 床號 Ward / Bed No. 醫院號數 Hosp/O.P.D No.

簡介

輸血是按照醫生處方由靜脈注入全血或血液成份（紅血球、血小板、血漿），以達致治療效果。
香港的血液安全合乎國際標準。紅十字會輸血服務中心取得 ISO9000 優質管理及澳洲醫療藥品管理局的優質生產標準証書，血液的品質及安全性均有保證。捐血人士全屬自願無償獻血。捐血者需先提供健康及疾病風險資料以作評估篩選，所有收集的血液均會按國際標準進行化驗，包括血型、乙型肝炎、丙型肝炎、愛滋病、T-淋巴細胞病毒和梅毒等測試。若醫生決定您需要接受輸血，本院血庫會為您抽取血液樣本並作配血測試，過程嚴謹，並確保血液適合您使用。

適應症

輸血可補充失血及治療血球或凝血蛋白不足的併發症。病人進行大手術或血幹細胞移植，一般要依賴輸血治療。紅血球是運送氧氣的主要工具，可紓緩貧血或失血的病徵。血小板的功能是幫助停止出血，當其數量過低或功能受損時，病者便需接受血小板輸注。血漿含有所有血液裏的蛋白質，可治療凝血蛋白缺乏症。

風險及併發症

上述措施已足夠保證輸血安全無誤，但與所有藥物治療和醫療程序無異，輸血始終會有一定風險。醫生一般只會於判斷得益遠超風險時，方才決定為您進行輸血治療。重要潛在風險如下：

- 發熱
  若干病人會在輸血時或輸血後感到寒慄或發熱，需按個別情況決定是否要以藥物治理，一般不會有嚴重後果。
  若曾經在輸血後有發熱反應，應告知醫生，以便採取預防措施。
- 敏感
  敏感反應（如皮膚出現紅疹或痕癢）普遍輕微，可用藥物控制。嚴重敏感反應則非常罕見，機會率約十萬分之一。
- 溶血性反應
  如病者和捐贈者血型不配合，輸入的紅血球會受排斥並引發溶血反應。嚴重溶血性反應非常罕見，機會率是十萬分之一，惟一旦出現，可能會引起腎功能衰竭及其他併發症，甚至致命。醫院血庫會和護士小心檢查血液，確保只為病者輸入合適的血液。
- 傳播感染
  現今血液檢查及測試（包括監察濃縮血小板內細菌）雖十分先進，但經輸血感染傳染病的風險仍然存在。據統計，感染愛滋病的機會率少於二百四十萬分之一，感染乙或丙型肝炎的機會率則分別少於五萬八千分之一及少於八百萬分之一，紅血球或濃縮血小板感染細菌的機會率亦分別為五十萬分之一及一萬分之一。
- 輸血相關的急性肺損傷（TRALI）是一種見於華人血統的輸血後不良反應，雖屬罕見但情況嚴重。

不接受輸血之不良後果

- 若然急性血液流失未能及時補充，病人血壓將會下降，其主要器官（如腦部和腎臟）會因缺氧而受損。
- 病人亦會因為貧血而感到疲倦、氣促、心跳及軟弱無力等病徵。血小板減少或凝血蛋白不足會令病者容易出血。

其他治療

本院可提供病人自體輸血服務，並提供合適藥物以供提升血色素或止血之用。

備註

可能發生的風險或併發症，不能盡錄。不可預計的併發症亦偶有發生，各類病人的風險程度亦為不同。如有查詢，請聯絡您 / 病人的醫生。

本人聲明，以上有關我 / 病人將要接受治療的資料、其他治療方法及不接受治療所帶來的後果，醫生 / 醫護人員已向我作了解釋，並與我進行了討論，我已完全理解。我也有機會詢問與我 / 病人的情況及病情處理有關的問題，並且得到了滿意的答覆。

病人簽署：_____ 日期：_____（日 / 月 / 年）

家屬 / 監護人簽署：_____ 家屬 / 監護人姓名：_____

身份證 / 護照號碼：_____ 關係：_____ 日期：_____（日 / 月 / 年）

Emergency Blood Supply Requisition Form

From : (_____) Hospital Blood Bank

Tel.: _____ Fax: _____

To : QMH / PYNEH Blood Bank (Please delete as appropriate)
Fax: (QMH : 2819 3487 PYNEH: 2558 0213)

Date & Time: _____

Number of Red Cells required: _____ ABO / Rh(D): _____

Special requirement(s): _____

Requestor's Name (PRINT): _____ Post: _____

Requestor's Signature: _____

*** Please also fax the "HKRCBTS Blood & Blood Component Stock Requisition Form" showing the approved number and type(s) of red cell units**

Reply Slip

To: _____Blood Bank Fax No.: _____

From: QMH / PYNEH Blood Bank (Please delete as appropriate)

Date & Time: _____

☐ Based on our blood stock level, we could issue _____ units of red cells of blood group _____
Please ask your staff to bring this requisition form to our Blood Bank for collection.

WBN No.	WBN No.

☐ Based on our blood stock level, we are sorry that we cannot issue any blood units to your Blood Bank.

Staff Name (PRINT): _____ Post: _____

Signature: _____

I _____(name of courier) from _____ (name of Hospital)
(Full name and signature)
acknowledge receipt of the red cell units as shown on the list at _____ (Date & time).

DEPARTMENT OF PATHOLOGY

Happy Valley
Hong Kong Sanatorium & Hospital
1/F, Li Shu Pui Block
2 Village Road, Happy Valley, Hong Kong
(852) 2835 8790 (852) 2892 7502
lab@hksh-hospital.com
www.hksh-hospital.com

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