



ROYAL HOBART HOSPITAL

TRANSFUSION

LEARNING PACKAGE & MULTI CHOICE SELF-ASSESSMENT

*A preparation for the Transfusion Assessment
Competency in Blood Product Administration*

APRIL 2007



Name.....

Ward.....

Date.....

Transfusion nurse Ext.8549

BLOOD PRODUCT LEARNING PACKAGE

This package is designed to provide the nurse with the knowledge required to engage in safe practice of blood product transfusion. The following information and references have been included to direct the learner to the knowledge required to complete the competency assessment. **WHEN YOU ARE READY TO BE ASSESSED PLEASE CONTACT THE TRANSFUSION NURSES ON EXT 8549. ASSESSMENT REQUIRES YOU TO BE ADMINISTERING A BLOOD PRODUCT SO RING US BEFORE YOU START. IT WILL INVOLVE ABOUT 10 MINS OF YOUR TIME.**

Contents include

- Blood Products, product description and indications for use.
- ABO, Rh and HLA systems
- Testing required for obtaining blood products
- Potential side effects of blood products and their management.
- Leukodepletion of blood products
- Irradiation of blood products
- Safety essentials.

Further information – copy and paste these addresses into your search site.

ARCBS website –

<http://www.giveblood.redcross.org.au/DisplayNewsArticle.asp?ArticleID=31#top>

NHMRC website

<http://nhmrc.publications@nhmrc.gov.au/publications/series.htm>

Resources

RHH Clinical Intranet

RHH Policy No. 47 *Blood Component Transfusion*

RHH Protocol Transfusion

RHH Policy No. 40

Transfusion Nurses: Ext 8549.

With this Learning Package a Multichoice Assessment is included. All information required to complete this is in the Blood Matters Resource Folder available on all wards. On completion of the Learning Package and Self-Assessment, the nurse should be ready to complete a Competency in Blood Product Administration. Completion of the Self-Assessment is not mandatory prior to a competency.

To arrange an Assessment please contact the Transfusion Nurse on extension 8549.

Blood Products

Product	Description	Indications for Use
Red Cells	The red cell component obtained by removing most of the plasma after centrifuging whole blood collected into anticoagulant. The red cells may be resuspended in additives to prolong storage.	For treatment of clinically significant anaemia with symptomatic deficit of oxygen carrying capacity, and for replacement of traumatic or surgical blood loss. In deciding whether to transfuse red blood cells, Patient factors, signs and symptoms of hypoxia, ongoing blood loss, the risk to the patient of anaemia and the risk of transfusion should be considered.
Platelets Pooled	An adult dose of platelets obtained from a pool of buffy coats from ABO-identical donors and resuspended in a nutrient additive solution. A pool generally consists of 4-5 individual platelet units derived from whole blood donations. All platelets produced in Victoria are leukodepleted at collection. Check label on product as a small percentage of product may come from interstate.	Bone marrow failure when the platelet count is $<10 \times 10^9/L$ without risk factors or $<20 \times 10^9/L$ in the presence of risk factors such as fever, antibiotics and sepsis. Surgery or invasive procedures. Maintain the platelet count at $>50 \times 10^9/L$ Thrombocytopenia or platelet dysfunction causing bleeding in patients
Fresh Frozen Plasma (FFP)	Fresh Frozen Plasma (FFP) is separated and frozen within eighteen hours after collection of whole blood. A unit of FFP contains all coagulation factors including approximately 200 units of factor VIII plus the other labile plasma coagulation factor, Factor V.	Warfarin overdose. For use in the presence of life-threatening bleeding. Use in addition to Vitamin-K-dependent concentrates. Acute DIC Indicated where there is bleeding and abnormal coagulation. Not indicated for chronic DIC. Coagulation inhibitor May be appropriate in patients undergoing high-risk procedures. Use specific factors if available. Following massive transfusion or cardiac bypass. May be appropriate in the presence of bleeding and abnormal coagulation. Liver disease May be appropriate in the presence of bleeding and abnormal coagulation.

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Product	Description	Indications for Use
Cryoprecipitate	Cryoprecipitate is prepared by thawing Fresh Frozen Plasma (FFP) between 1°C and 6°C and recovering the precipitate. The FFP may either be derived from a whole blood collection or an apheresis collection. The cold-insoluble precipitate is refrozen. The component contains most of the factor VIII, Fibrinogen, factor XIII, VWF and fibronectin from the FFP.	Fibrinogen deficiency May be appropriate where there is clinical bleeding, an invasive procedure, trauma or DIC. Vitamin-K-dependent concentrates. DIC Fibrinogen deficiency is commonly encountered in DIC. At fibrinogen levels lower than 1.0g/L and where there is clinical bleeding, use of cryoprecipitate to keep fibrinogen levels above 1.0g/L may be indicated.
Albumex 4	Albumex 4 is prepared by a combination of the Cohn cold-ethanol fractionation process and chromatographic techniques. It is heated at 60 °C for 10 hours and incubated at low pH to inactivate viruses. Albumex 4 is a 4% w/v protein solution, which is iso-osmotic with human serum. Albumex 4 is available in two sizes: <ul style="list-style-type: none"> • 2 g of human albumin in 50 mL of electrolyte solution • 20 g of human albumin in 500 mL of electrolyte solution. 	Shock associated with significant hypoalbuminaemia (albumin concentrations less than 25 g/L) Therapeutic Plasma-Exchange Cardiothoracic surgery – pump priming in patients with poor left ventricular function (LVF) and other complicating factors such as long bypass time, repeat surgery or anaemia.
Albumex 20	Albumex 20 is prepared in the same manner as Albumex 4. Albumex 20 is a 20% w/v protein solution, which is hypo-osmotic with human serum. Albumex 20 is available in two sizes: <ul style="list-style-type: none"> • 2 g of human albumin in 10 mL of electrolyte solution; • 20 g of human albumin in 100 mL of electrolyte solution. 	<ol style="list-style-type: none"> 1. Extremely low albumin in critically-ill patients 2. Burns 3. Paracentesis of ascites in patients with cirrhosis or when the volume exceeds 6 L 4. Haemodialysis – may be used to assist rapid removal of excess extravascular fluid and to maintain perfusion pressure.
Intragam P	Intragam P is a sterile, preservative-free solution containing 6 g of human protein and 10 g of maltose in each 100 mL. At least 98% of the protein is IgG, Intragam P is made chromatographically and is pasteurised at 60°C for 10 hours and incubated at low pH to reduce the possibility of viral transmission. Intragam P is available in 3 gm (50 mL) and 12 gm (200 mL) vials sizes.	Intragam P supplies a spectrum of IgG antibodies against a wide variety of infective agents in patients with congenital or acquired forms of primary and secondary immune deficiency syndromes. See Appendix in Blood Products Administration Policy S21.6 for the list of accepted Category 1 conditions.

ABO System

There are many antigens on the surface of RBCs, but there are two major systems that are significant in terms of potential immunologic reactions: the ABO system and Rh system.

Within the ABO system there are four major blood groups that exist in humans: A, B, AB, and O. Each blood group implies a specific antigen presence on the RBC.

ABO Antigens

- Group A** Antigen A is present on the red cell
- Group B** Antigen B is present on the red cell
- Group AB** Both antigens A and B are present on the red cell
- Group O** Neither antigen A nor B is present on the red cell

Within the plasma, individuals possess naturally occurring antibodies to the RBC surface antigens that are not present on their own erythrocytes. For example, a person with type A blood will possess anti- B antibodies in their plasma, a person with type B blood will possess anti – A antibodies. A person with type AB blood will have neither antibodies in their plasma and a person with type O blood will possess both anti A and anti B antibodies in their plasma. These antibodies are called isohemagglutinins.

ABO Antibodies

- Group A** Anti B antibody is present in the plasma
- Group B** Anti A antibody is present in the plasma
- Group AB** No antibodies are present in the plasma.
- Group O** Anti A and B antibodies are present in the plasma.

These antibodies are capable of cross- reacting with A or B antigens on the surface of the “foreign” or “donor” red cells. Therefore mismatched blood cells from a red cell transfusion, or a transfusion with some red cells in it [e.g. a contaminated platelet product] will be immediately coated by the isohemagglutinins, causing the agglutination of the introduced cells and the rapid lysis of the cells by complement. The products released by the lysed cells are then dumped into the blood- stream.

Mismatched non red cell products such as platelets and plasma may still stimulate an antibody response in the patient. This is far less serious than an antigenic stimulus such as one would get with mis-matched red cells.

Therefore all fresh blood products should be ABO compatible with the recipient, but in an emergency situation, non-ABO specific products can be used. These

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 lists below have been formulated taking into consideration the likelihood and level
 of severity of antibody response.

Blood Product	Patient Blood Group	Compatible donor group
Red Blood Cells (must be group specific)	A B AB O	A, O B, O A, B, AB, O O
Platelets (ABO group specific is preferable but not required)	A B AB O	A, O B, O A, B, AB, O O
FFP (Should be group specific)	A B AB O	A, AB B, AB AB A, B, AB, O
Cryoprecipitate	May be given without regard to ABO type in adults	
Plasma Derivatives (Albumin, Intragam P)	Cross-matching not required	

Rhesus [Rh] System

The Rh system encompasses at least 40 antigens. The D antigen is the most clinically significant, since it is more immunogenic than any other Rh antigen. When the term Rh *positive* is used, the presence of antigen Rh D is implied: Rh *negative* indicates the absence of antigen D. Approximately 85% of the population has Rh positive blood.

When the Rh negative person is first exposed to Rh positive blood, Rh antibodies are formed. On subsequent exposures to Rh positive blood, the Rh antibody binds to its corresponding antigen. The Rh antibodies do not usually fix complement; therefore there is no immediate haemolysis as occurs in the ABO system. Instead, the Rh antigen RBCs are rapidly broken down by macrophages in the spleen, with conversion of haemoglobin to bilirubin resulting in jaundice.

Rh compatibility is as follows:

Blood Product	Rh considerations
Red Blood Cells	<ul style="list-style-type: none"> • All transfusions should be Rh compatible • Rh negative red cells can be given to Rh positive patients • In certain emergencies, especially bleeding emergencies, Rh positive red cells can be given to Rh negative patients.
Platelets	<ul style="list-style-type: none"> • Rh negative platelets can be given to Rh positive patients
FFP	May be transfused without regard to Rh type
Cryoprecipitate	May be transfused without regard to Rh type
Plasma Derivatives	May be transfused without regard to Rh type

Human Leukocyte Antigen [HLA] System

The HLA – Human Leukocyte Antigen system, is an identification code, which is unique for every person. The antigens are present on the surfaces of all nucleated human cells and are therefore on blood cells as well. These antigens specify a person’s tissue type and form the basis of recognition and self-tolerance. A person’s tissue type, is similar in concept to blood type but much more extensive and is determined genetically by the inheritance from his or her parents. As leukocytes move throughout the body they compare the HLAs of any structure they encounter to determine whether the encountered cell belongs in the body’s internal environment. If the encountered cell’s HLA perfectly matches the body’s HLAs, the encountered cell is considered to be self and is not acted on by the leukocyte. If the encountered cell’s surface proteins do not match the body’s HLAs perfectly, the encountered cell is considered non-self and actions are taken to neutralize, destroy, or eliminate the non-self cells. These antigens then are proteins that play a critical role in protecting the body against invading organisms such as bacteria, viruses and other foreign matter.

There are 3 classes of HLAs. Classes 1, II, and III.

Class 1 antigens are encoded at the A, B and C gene loci. These proteins are expressed on almost all nucleated cells and are responsible for cell recognition by T cells. There are nearly 80 different Class 1 HLA-A, B, and C molecules. When asking for HLA matched Platelets, the donor platelets are matched on the A, B, and C loci with often a 50 antigen match.

Class II antigens are encoded at the D locus. These antigens are split into DR, DQ and DP types. They are expressed on B lymphocytes, macrophages and

Transfusion Learning Package & Self Assessment 01/05/07 [review 01/05/08] monocytes and are involved in co-operation and interaction between cells of the immune system. They therefore play an important role in determining whether graft rejection or GvHD will occur in solid organ or blood and marrow transplantation. There are over 35 Class II HLA –DP, DQ and DR molecules recognized in humans.

The desirable “6 out of 6 match” for solid organ and blood and marrow transplants, tests and types for the HLA- A, HLA- B, and HLA-DR loci.

Class III are complement components.

The HLA system is complex and there are thousands of combinations that can occur. Therefore patients receiving many blood products may become sensitised when exposed to platelets and white cells in transfusions. Sensitisation may also occur in females during pregnancy. This can then lead to transfusion reactions in patients.

The information above is for your general knowledge and is not in the criteria for the competency assessment.

SAFETY ESSENTIALS – RIGHT SPECIMEN, RIGHT PRODUCT, RIGHT PATIENT

These Safety Essentials are one of the most important areas of this Learning Package. Of all the messages in this document, this is the key take home message.

The first step in ensuring the right product gets to the right patient is accurately identifying the patient at time of sample collection and accurately labeling the sample.

For a red cell blood product to be prepared for a specific patient, the patient’s ABO blood group needs to be identified, their Rh status identified and their blood screened for antibodies and then crossmatched to a donor unit.

The cross-match is an important step for detecting antibodies directed against low-incidence antigens that may be present on the donor’s red blood cells but not expressed on any of the red blood cells on the antibody screen panel. For the crossmatch, the donor’s red cells are mixed with the patient’s serum, and the result examined.

For a non red cell product the patient’s ABO blood group and Rh status needs to be identified and recorded in the RHH’s Pathology computer system.

VENOUS BLOOD SAMPLE

A valid **Group & Hold** request last **60 days**. Crossmatching in this time only requires a completed *Transfusion Medicine Request* form. However if the Patient has been **transfused** or was/is **pregnant in last 3 months** then a Group & Hold request expires after 72 hours.

PATIENT IDENTIFICATION for CONSCIOUS PATIENT

A) At the time of taking the venous sample for crossmatching, blood group and hold or blood group and antibody the collector and witness should ask the conscious patient to state;

1. Patients Surname
2. Patients Given Name. (Christian or Forename)
3. Date of Birth.

B) This information should be checked against the patient's identification band to make sure the details are correct and legible.

If the patient does not have an identification band the above minimum data set plus address must be checked and an identification band applied. If the patient is attending an outpatient clinic they should be asked to spell out the letters of their surname and first name to check the accuracy.

C) The information on the identity band must correspond with the Patient details on the *Transfusion Medicine Request* form.

PATIENT IDENTIFICATION for the UNCONSCIOUS PATIENT or PATIENT UNABLE TO RESPOND VERBALLY

A) The collector and witness must ensure that patient's identity band correspond exactly with

B) The patient details on the *Transfusion Medicine Request* form.



NB: Patients statement/Patients wristband information/Patients request form and medical records. All information must correspond exactly.

Resource: RHH Identification Policy NO. 40

VENEPUNCTURE and SAMPLE COLLECTION

The blood sample should be taken into the correct sample tube, 9ml K3E EDTA (purple top). The sample tubes must be accurately labelled **beside the patient at the time the blood sample is taken**. Information required on the sample tube includes the patient's:

- surname
- forename
- date of birth
- hospital number
- Ward/unit
- time sample taken
- date sample taken
- signature of collector



Sample containers must not be pre-labelled before the specimen is obtained because of the risk of putting the patient's blood into the wrong tube.

ADMINISTRATION OF BLOOD PRODUCTS

Resource: RHH Blood Component Transfusion Policy, Transfusion Clinical Protocol for details on how to safely administer blood products.

Two qualified staff members should check all blood products at the bedside.

All details on the product, the patient's identification band and the paperwork accompanying the product should match exactly.

Any inconsistencies must be checked with M.O./laboratory/haematologist and rectified **before** the product is commenced.

All patients receiving fresh blood components – Packed Red Cells, Platelets, Fresh Frozen Plasma and Cryoprecipitate must have an identification band insitu prior to the product commencing.

Principles of Blood Transfusion Administration **Red Cells, Platelets, Fresh Frozen Plasma and Cryoprecipitate**

1. Assess the Product

- **Does it look the right colour**, Red Cells, dark red not black, Platelets- straw coloured opaque, and FFP clear, straw coloured.
- **Is it the right temperature**. Red Cells cold to the touch, FFP and platelets room temperature
- **Are there any lumps or clots**.
- **Is the bag intact**, any tears or leaks
- **Invert it and mix thoroughly and look again**.

With any concern over quality of product – return to Blood Bank

2. Correctly identify the Patient & Product

- **DO** all checks at the bedside by 2 RNs/RN and EN
- **ASK** patient to say his name and date of birth
- **CHECK** the name and UR on the ID band, the Blood Product and the Crossmatch Issue Form. All must be identical, no mismatch acceptable.
- **CHECK** the donation number on the blood product and Crossmatch Issue form
- **CHECK** the blood group & any modifications (e.g. irradiation or leucodepletion) on the blood product and Crossmatch Issue form.
- **CHECK** the expiry date on the blood product.

All must match exactly - any mismatch seek clarification.

3. Commence Slowly and Stay with Patient.

- **Observe patient as product enters the vein for reactions**- dyspnoea, flushing, wheeze, hypotension.
- **Observe patient frequently throughout transfusion** - ask patient to report feeling unwell.
- **Stay with patient for 15 minutes**
- **ABSOLUTELY NO MEDICATIONS OR SOLUTIONS ADMINISTERED THROUGH SAME LINE EXCEPT FOR NORMAL SALINE.**
- **4 hour limit** - no product can run longer.

Transfusion Reactions

All fresh blood products have the potential to cause the following reactions and therefore patients should be monitored closely throughout the infusion by both vital signs observation and visual observation.

Acute Haemolytic Transfusion Reaction [HTR]

The usual cause of this type of reaction is ABO mismatch. This demonstrates as intravascular haemolysis caused by the donor red cell antigens interacting with the patient's plasma antibodies. As little as 5 to 10 mL of incompatible red cells can stimulate an HTR. The patient's antibodies agglutinate the donor red cells carrying the antigen, forming clumps, blocking the blood vessels and kidneys. The complement system is activated and the patient may be tumbled into DIC.

Undetected serologic incompatibilities can cause these reactions, but most reactions occur when clerical or identification errors lead the wrong product to be given to the wrong patient.



62% of transfusion related deaths are due to clerical error!

Signs and symptoms include shock – sense of impending doom, dyspnoea, tachycardia, hypotension, chest pains, facial flushing back pain, headache abnormal bleeding, pain radiating along transfusion site and arm. If the patient is anaesthetised then DIC and hypotension may be the first signs.



Stop the transfusion immediately and administer oxygen. Seek URGENT MEDICAL ATTENTION. Symptomatic management is then usually employed. This usually involves antihistamines, antipyretics, corticosteroids, bronchodilators and maybe even adrenaline and inotropes.

Delayed Haemolytic Transfusion Reaction.

The cause of this reaction is patient's blood carrying antibodies to donor antigens other than ABO e.g. Kidd, Kell or Duffy antigens.

It manifests as an unexplained fall in haemoglobin, 4 to 14 days following the transfusion. The patient may appear jaundiced, have fever and continued anaemia.

Following the transfusion of red cells bearing the relevant antigen, a rapid secondary immune response raises the antibody level so that after a few days, transfused red cells bearing that antigen are destroyed. Most of that red cell haemolysis is extravascular, the symptoms less dramatic and generally it doesn't activate the complement system.



There is no immediate treatment but the patient should be screened in order to define the specific antibodies so that antigen negative blood can be given in the future.

Febrile Non-Haemolytic Transfusion Reaction [FNHTR]

FNHTR is the most common transfusion reaction occurring in 1% of all transfusions. It can be caused by patient's antibodies to donor white cells or by the presence of bioreactive substances such as interleukins or complement fragments that accumulate during storage of blood components.

A FNHTR is defined as a rise in temperature greater than 38°C or 1.5°C from baseline. Chills and rigor can accompany the fever. Secondary symptoms also include headache, facial flushing, nausea and vomiting. These reactions are often dose related and tend to occur toward the end of the transfusion or even up to one hour after the procedure has been completed.

Symptomatic treatment or pre medication with antipyretics, steroids or antihistamines may be of benefit. Leukodepletion can also significantly reduce the incidence of FNHTRs.



NB an elevated temperature can also be indicative of more serious transfusion reactions such as haemolysis or bacterial contamination.

Platelet transfusions are all filtered and irradiated at the Australian Red Cross Blood Service at time of donation and therefore should contain minimal bioreactive substances. If patient experiences all the above symptoms during a platelet transfusion, consider bacterial contamination.

Septic/Bacterial Contamination

Caused by bacteria or endotoxins from gram-negative bacteria. It is more likely if high fever occurs early in the transfusion, is associated with other symptoms such as hypotension and occurs during platelet transfusions.



Bacterial sepsis is the leading microbial cause of transfusion mortality. Visual inspection for abnormal appearance prior to administration should be carried out and products should never be transfused beyond their expiry date.



Septic and toxic reactions may be life threatening, and management must be aggressive. Treatment should include broad-spectrum antimicrobials, vasopressors to maintain blood pressure and urinary flow and intravenous therapy to maintain fluid and electrolyte balance.

Anaphylactic Reaction

The cause of this reaction is a re-exposure to an offending antigen in the donor blood. Patients that are IgA deficient may have developed an antibody response to a previous donation and on receiving a subsequent transfusion of IgA positive blood, will have an anaphylactic reaction. Rarely lack of other plasma proteins and presence of the corresponding antibody have been implicated.

Cases of anaphylaxis have been described where the patient reacts to a drug e.g. aspirin or food e.g. peanuts or seafood consumed by the donor.



Symptoms include shock, hypotension, tight chest, dyspnoea, bronchospasm, hoarseness, and abdominal cramps.



Anaphylactic transfusion reactions usually begin within 1 to 45 minutes after the start of the transfusion while less severe anaphylactoid reactions can be delayed up to 2 to 3 hours after the commencement of transfusion. In general, the shorter the time between commencement of infusion and onset of symptoms, the more severe the reaction is likely to be.

Allergic Reaction

An allergic reaction can occur in 5% of all recipients. Patients react to plasma proteins in the blood product by producing histamine. Therefore this is more likely to happen with the products that have significant amounts of plasma such as FFP. With reduced plasma in red cells and platelets this should be less of a risk, but is still possible.



The majority of allergic reactions can be discovered early with symptoms of pruritis, urticaria, erythema and cutaneous flushing.



When allowed to progress, the upper airway can become involved because of laryngeal oedema, and there may be hoarseness, stridor and a feeling of a 'lump' in the throat. Lower airway involvement due to bronchoconstriction manifests with wheezing, chest tightness, substernal pain, dyspnoea, anxiety or cyanosis.

For future transfusions, washed red cells may be required or antihistamines administered prophylactically prior to plasma or platelet infusions.

Fluid Overload

Circulatory overload, manifested by pulmonary oedema, may occur when excessive volume is administered. The risk increases in the elderly, in patients with small stature and in patients with cardiac or renal co-morbidities.

Patients present with dyspnoea, productive cough, pink frothy sputum, **hypertension**/hypotension and headache.



Patients with these symptoms may also potentially be experiencing Transfusion Associated Acute Lung Injury [TRALI] See below.

Transfusion Associated Acute Lung Injury [TRALI]

This manifests as a non-cardiogenic pulmonary oedema but with similar symptoms to fluid overload. It has a distinctly unique x-ray presentation. Over several hours the CXR shows 'white-out' with diffuse alveolar and interstitial infiltrates with no cardiomegaly .



Do not give diuretics to these patients. Diuretics exacerbate the condition. Support with oxygen therapy and wait.

The cause of this is unclear. It is potentially a granulocyte mediated reaction whereby leukoagglutination in the pulmonary circulation occurs resulting in pulmonary damage.

Symptoms usually arise within 1-6 hours of commencement of transfusion of a plasma-containing product and include respiratory distress (dyspnoea, cyanosis), tachycardia, fever, and **hypotension**.

Approximately 80% of patients with TRALI improve rapidly (clinically and radiologically) over 48 hours provided there is prompt and vigorous respiratory support. Many patients will require intubation and respiratory support. It usually resolves completely within 96 hours.

SPECIAL REQUIREMENTS

The Medical Officer is responsible for ordering special requirements on the *Transfusion Medicine Request* form and the *Transfusion IV Order* chart.

Resource: NMHRC Guidelines [see back of *Transfusion Medicine Request* form]

LEUKODEPLETION OF BLOOD PRODUCTS

Some patients such as organ, marrow or blood transplant patients require leukodepleted blood products.

All platelets produced in Victoria/Tasmania are filtered and irradiated at the Australian Red Cross Blood Service prior to arrival at hospital blood banks. These products are all specifically labeled as leukodepleted. Check the label on the product. In times of shortages products are brought in from interstate and may not be leukodepleted.

From December 2006 50% of all **Packed Red Cells** will be leucodepleted at the red Cross Blood Bank at the time of manufacture. These products are clearly identified as leucodepleted and therefore **do not require** filtration using a Pall filter, at the time of transfusion.

IRRADIATED BLOOD PRODUCTS

Irradiation of cellular blood products prevents transfusion associated Graft-Versus-Host Disease(GVHD), a rare but usually fatal transfusion complication following engraftment of donor T lymphocytes in the patient's marrow into a recipient with an immune system incapable of rejecting them. Irradiated products are indicated where the patient is highly immunosuppressed and specifically for:

- Intrauterine and Exchange transfusions
- Direct donations from blood relatives
- Chemotherapy recipients
- Stem cell and Bone Marrow transplant recipients
- Patients with Congenital Immune deficiencies
- Hodgkins Lymphoma and Non Hodgkins Lymphoma patients
- Patients with aplastic anaemia receiving immunosuppressive therapy
- Patients receiving Purine Analogue treatment
- Recipients of granulocyte transfusion or HLA-matched single donor platelets.

CMV NEGATIVE BLOOD PRODUCTS

CMV negative blood products minimize the risk of transfusion transmitted cytomegalovirus. CMV negative products should be used for example for immunosuppressed, pregnant & neonatal patients.

WASHED RED CELLS

Removes plasma, white cells and platelets and may be considered to prevent allergic reactions in patients with a history of FNHR.

SELF ASSESSMENT QUESTIONNAIRE

Circle correct answers.

There **may be more than one correct answer** per question.

1. Within the ABO system which are the four main blood groups?
 - (a) A,B,C,D
 - (b) A,B,C,O
 - (c) AO,B,AB,A
 - (d) A,AB,B,O

2. The most important factors to consider when deciding if a patient requires a transfusion of Packed Red Cells are
 - (a) The Patient's Hb
 - (b) The patient wants one.
 - (c) Early discharge for the patient.
 - (d) The patient's symptoms.
 - (e) The clinical indicators for transfusion as described in the NHMRC Guidelines.

CROSSMATCHING

3. To take an adult sample for a Group and Hold or crossmatching I require
 - (a) A 9ml Purple Top EDTA tube
 - (b) A white top gel tube
 - (c) A Transfusion Medicine Request form signed by a doctor.
 - (d) A blue specimen request form
 - (e) Patient identification sticker.

4. How do I check that I am taking blood from the correct patient
 - (a) Ask them if they are Mr/Mrs..... and that their date of Birth is
 - (b) Ask them to state their name and date of birth.
 - (c) You know who they are so you don't need to check.
 - (d) Check the ID band details match the details on the *Transfusion Medicine Request* form.

5. Why is a cross match performed prior to transfusion of Packed Red cells?
 - (a) To check patient's haemoglobin
 - (b) To check for viruses in blood
 - (c) To check that there is no antigen/antibody incompatibility.

6. As the person collecting the blood for cross matching I am required to sign
 - (a) The specimen tube and the request form
 - (b) The specimen tube only
 - (c) The request form only
 - (d) I don't need to sign anything.

7. My signature in the witness section on the *Transfusion Medicine Request* form indicates
 - (a) I have taken the blood
 - (b) Witnessed the blood been taken by someone else
 - (c) Completed the verbal and documentation ID checks
 - (d) That I am confident that my colleague performed the correct identity checks, though I was on the phone at the time.

8. The details required on a cross match tube before the Laboratory can begin matching must include
 - (a) Patients surname and first name
 - (b) Patients middle name
 - (c) Date, time and collectors initials
 - (d) Patients URN and DOB
 - (e) Patients nick name
 - (f) Collectors DOB

9. The Laboratory require which signatures on the *Transfusion Medicine Request* form
 - (a) Any staff member
 - (b) Requesting Dr. and witness
 - (c) Requesting Dr, collector and witness
 - (d) A Dr. and the patient

10. It is acceptable to alter details on the specimen tube –
- (a) If you discover the wrong details on the tube after you have left the patient
 - (b) Only if you have not left the bedside, and with the appropriate cross-checks
 - (c) After the lab. has telephoned you to say the form details and tube details don't match
11. What is the worst consequence of incorrect tube labeling?
- (a) The patient doesn't get any blood
 - (b) The transfusion is delayed
 - (c) The nurse gets into trouble
 - (d) The patient receives incompatible blood
- 12.. If a patient needing a crossmatch is not wearing an ID band I should –
- (a) Take the blood anyway
 - (b) Not take the blood
 - (c) Do the appropriate cross checks with the patient, take the blood and apply an ID band if the patient is remaining in the hospital
 - (d) Ask another nurse if this is the right patient.

BLOOD STORAGE and TRANSPORTATION

13. Before collecting blood products from the laboratory., nursing staff should check that –
- (a) Patent IV access is available.
 - (b) The patient has been fasted.
 - (c) The patient has been verbally consented by the doctor
 - (d) All the appropriate paperwork is complete
 - (e) The patient doesn't want to go out for a cigarette first
 - (f) You have a patient sticker.
14. On collecting the **first** unit you should also collect from the Lab.
- (a) Only the blood product in an Eski
 - (b) The product in an Eski for transport and the clipboard copy of the *Transfusion History Record*
 - (c) The blood product and the corresponding *Transfusion History Record*. You don't require an Eski.

15. Once Packed Red Cells have been removed from the designated fridge the transfusion should be commenced

- (a) Anytime
- (b) As soon as possible and within 30 minutes
- (c) Within 4 hours.

16. When removing the blood product from the lab what details do you need to enter on the sign out sheet?

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17. Can platelets and packed cells be transported in the same Eski?

- (a) Yes.
Why?.....
- (b) No.
Why?.....

18. Why are autologous blood, whole blood and packed cells stored in a designated blood product fridges?

- (a) So it won't get lost
- (b) To ensure cell viability
- (c) To reduce the risk of bacterial contamination
- (d) So it's cold when it goes into the patient's veins

19. If you have collected blood from the lab and then discover that the patient's IV has tissued and no one is available to re-site it you should –

- (a) Put the blood in the ward fridge
- (b) Leave the blood at the patients bedside
- (c) Return the unit to the lab fridge immediately & notify Lab.

DOCUMENTATION

20. It is the doctor's responsibility to

- (a) Obtain verbal consent for transfusion where possible
- (b) Explain the risks and benefits of transfusion to the patient.
- (c) Make sure pre transfusion observations are done.
- (d) Make sure the patient gets lunch.

21. Which of the following needs to be recorded in the patient's notes
- (a) Clinical indications for transfusion (by the M.O)
 - (b) Reason if verbal consent unattainable
 - (c) Administration of blood products (by the nursing staff)
 - (d) Adverse Transfusion Events (Medical and nursing intervention)
 - (e) Patient refusal of transfusion
 - (f) All of the above.
22. It is a legal requirement that a record of transfused blood components be kept for
- (a) 10 years
 - (b) 20 years
 - (c) 7 years
 - (d) Not at all

OBSERVATIONS

23. Baseline observations are important to –
- (a) See how fit the patient is
 - (b) Ascertain if the patient is febrile prior to transfusion
 - (c) Provide a benchmark for further obs.
 - (d) Assess the nurses skills.
24. Pre and Post transfusion observations should be done -
- (a) For Packed Red Cells only
 - (b) For IV administered blood components [fresh & fractionated]
 - (c) Only if the Dr specifically orders them.
25. Routine observations for packed cells are -
- (a) Only needed for the first unit.
 - (b) Required for each unit.

BLOOD PRODUCT ADMINISTRATION

26. The optimal infusion time for –
- (a) Packed red cells/whole blood is.....
 - (b) Platelets is
 - (c) Fresh Frozen Plasma is
27. The only IV fluid compatible with blood is
28. A PALL filter will be issued by the lab. for -
- (a) All transfusions
 - (b) Organ transplant recipients
 - (c) For pregnant women, babies & children
 - (d) For patients that have had two consecutive febrile transfusion reactions
 - (e) No one, as all our red cells are filtered in Red Cross.
29. Hospital policy states that –
- (a) Any drugs can be given via a blood component line
 - (b) Drugs can be given via a blood component line at the Drs discretion
 - (c) No drugs can be given via a blood component line.
30. Who is qualified to check blood products at the bedside before transfusion?
- (a) The patient and a nurse
 - (b) An RN & EN [non medication endorsed]
 - (c) An RN & MO
 - (d) An RN & RN or EN [medication endorsed]
31. Complete the following. The following checks are required prior to commencing a transfusion –
- (a) points of Patient Identification
 - (b) The Patient has in situ.
 - (c) Patient can state
 - (d) consent has been obtained and signed for (where possible) by Dr.
 - (e) Patient ID on *Transfusion History Chart*, *IV Fluid Order form*, *Observation Chart* are all.....
 - (f) The *Transfusion history Chart*, blood pack label and tag have identical.....
 - (g) The blood pack is intact with no

32. Is it acceptable to share bags or bottles of any blood component between patients?
- (a) Yes
 - (b) No
33. A blood warmer should be used for -
- (a) All patients having blood
 - (b) For patients with cold agglutins
 - (c) Rarely for patients requiring mass transfusion
 - (d) If a patient complains they are cold
34. Irradiated blood products are required for transfusion of highly immunosuppressed, Bone Marrow & Stem Cell Transplant patients –
- (a) Yes
 - (b) No
35. After hours transfusions of blood products should occur-
- a. If ordered by the doctor.
 - b. To get the patient discharged earlier.
 - c. If it is deemed as an emergency and in consultation with haematologist.
 - d. In critical care areas.

TRANSFUSION ADVERSE EVENTS

36. A haemolytic transfusion reaction is caused by –
- (a) Fluid overload
 - (b) Bacterial infection
 - (c) Incompatible blood transfusion
 - (d) An allergy
37. What would your **first** action if you suspected a transfusion reaction?
- (a) Telephone the Dr or send a MET call
 - (b) Administer Oxygen
 - (c) Stop the transfusion
 - (d) Commence a N/Saline infusion

38. Which is the only thing not required following a transfusion reaction?
- (a) Ring the lab for a Transfusion Reaction Pack
 - (b) Monitoring the patient
 - (c) Get the Dr. to order more blood
 - (d) Collect bloods and urine samples, including blood cultures
 - (e) Fill out Transfusion Reaction Form
 - (f) Send complete pack and blood bags with lines attached to lab.
39. A transfusion of only 5-10ml can result in an acute transfusion reaction –
- (a) Yes
 - (b) No
40. Match the symptoms of the following types of Transfusions Reactions
(draw a line to correct answer) –

- (a) Non Hemolytic
- (b) Fluid Overload
- (c) Allergic Reaction
- (d) Haemolytic Incompatibility

- i. Localised hives, rash, flushing, wheeze, dyspnoea, hypotension
- ii. Chills, rigors, unexpected fever, nausea, vomiting, headache
- iii. Dyspnoea, headache, productive cough, pink frothy sputum
- iv. Chills, fever, back pain, hypotension, pain at IV site, feeling of doom, haemoglobinuria

SELF ASSESSMENT QUESTIONNAIRE ANSWERS

1. d
2. d e
3. a c e
4. b d
5. c
6. a
7. b c
8. a c d
9. c
10. b
11. d
12. c
13. a c d f [& possibly e]
14. b
15. b
16. Date/Time, Ward & signature
17. b Platelets are kept at room Temp [20-24°C] but Red Cells are stored at 2-6°C so will cool platelets & reduce their viability.
18. b c
19. c
20. a b
21. f
22. b
23. b c
24. b
25. b
26. a 90 mins, b Stat, c within 30 mins
27. N/Saline
28. b c d
29. c
30. b c d
31. a-3 ,b-patent IV access, c-full name and DOB ,e-identical ,f-Donation number,expiry date and crossmatch date, g-discoloration clots and tampering.
32. b
33. b c
34. a
35. c d
36. c
37. c
38. c
39. a
40. a ii, b iii, c i, d iv

**Acknowledgements: Royal Melbourne Hospital, Peter Mac.Melbourne.
BeST website, NHMRC Guidelines, ARCBS.**