|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Principle | | | | | | |
|  | To select the appropriate blood component for transfusion.  To select blood components for patients requiring specialized transfusion products. | | | | | |
| Scope and Related Policies | | | | | |
|  | 2.1 | A mechanism shall be established to identify inappropriate blood product use and facilitate necessary corrective action.9.1 Requests not meeting these criteria should be referred to a Medical Director for review. See QCA.020 – Medical Director Consultation Protocol. | | | |
|  | 2.2 | Criteria to consider when selecting blood components for transfusion:     * Appropriateness of the component requested | | | |
|  |  |  | Availability of the component requested | | |
|  |  |  | Special Attributes required | | |
|  |  |  | Availability of autologous or directed donor units reserved for patient | | |
|  |  |  | Patient ABO/Rh grouping | | |
|  |  |  | Patient antibody screen result | | |
|  |  |  | Patient diagnosis | | |
|  |  |  | Amount and type of blood components requested | | |
|  |  |  | Date and/or time blood component is required for transfusion | | |
|  | 2.3 | Recipients shall receive ABO compatible red cells.9.1 | | | |
|  |  | 2.3.1 | | When there is insufficient time to complete the ABO and Rh group of the recipient or specimen cannot be obtained, group O red cells shall be issued. 9.1 See 2.7 for more. | |
|  |  |  | |  | |
|  | 2.4 | If red cell units are issued before compatibility testing is complete, the label attached shall indicate that testing is incomplete. Information shall be documented in the patient’s medical chart. Should the red cell units subsequently prove incompatible, the attending physician and the Medical Director or designate shall be informed. 9.1 | | | |
|  | 2.5 | Infusion of incompatible units must be stopped immediately and the units set aside pending the physicians’ decision.9.1 | | | |
|  | 2.6 | When clinically significant red cell antibodies are found or the patient has a past history of such antibodies, RBC components that do not contain the corresponding antigen and are crossmatch compatible shall be prepared for transfusion. 9.1 Clinical circumstances may warrant deviation when approved by the Medical Director or designate. | | | |
|  | 2.7 | Rh negative women of child bearing age and Rh negative children shall receive Rh negative red cells, unless the situation is life-threatening and Rh negative red cells are not available.9.1 | | | |
|  |  | 2.7.1 | | | Other Rh negative recipients should receive Rh negative red cells.9.1 Each facility should have a policy for component selection when Rh negative red cells are in short supply. |
|  |  | 2.7.2 | | | RhIG administration is recommended whenever Rh positive platelets or granulocytes are transfused to an Rh negative recipient.9.1 When Rh positive red cells are inadvertently transfused to an Rh negative patient, RhIG may be given in an attempt to prevent alloimmunization, but only after careful consideration of the risks and benefits. |
|  | 2.8 | Plasma and platelet concentrates shall be ABO compatible with the recipient’s red cells.9.1 ABO compatible cryoprecipitate should be provided whenever possible. See Procedural Notes 8.1.4. | | | |
|  | 2.9 | **Historical Blood Group:** If a patient has been tested on at least two separate occasions, the Group and Rh may be taken from the Transfusion Medicine records (history) for selection of plasma products (FFP, CRYO, Platelets), as per facility policy. If no record exists, or only one previous history testing, a Group and Rh must be done. | | | |
|  | 2.10 | When a patient has received, a massive transfusion, compatibility testing may be abbreviated at the discretion of the Medical Director or designate.9.2 Each facility or region should have a policy defining the number of units comprising a massive transfusion and what percentage of the total blood volume of the patient needs to be replaced in order to discontinue further crossmatching. See Procedural Notes 8.2 for blood volumes | | | |
|  | 2.11 | Facilities must establish policies defining when cellular blood components selected or processed to reduce the risk of CMV transmission are required. 9.1 Leukocyte reduced red blood cells and platelet concentrates are considered reduced risk for CMV transmission. All cellular blood products produced by CBS are white cell reduced (leukocyte reduction (LR)) by leukocyte reduction filtration or (in the case of apheresis platelets) during the apheresis procedure. Plasma components are not uniformly leukocyte reduced by filtration; however processing steps maintain a residual leukocyte level that averages <5x106 per unit. 9.2 | | | |
|  |  |  | | | |
|  | 2.12 | When a patient is identified as being at risk for transfusion associated graft-vs-host disease, all cellular blood components shall be irradiated.9.1 | | | |
|  |  | 2.12.1 | | | Irradiated red cells have an expiry of 28 days as of date from time of irradiation, or it retains the original expiry date of product, whichever is less. Each irradiated product shall be permanently labeled to include:9.1   * Component has been irradiated * Facility performing irradiation * The expiry date if changed |
|  | 2.13 | If a non-group O neonate is to receive non-group O RBC components that are not compatible with the maternal ABO group, the neonatal plasma shall be tested for anti-A or anti-B. Testing methods shall include an antiglobulin phase using either donor or reagent A1 or B cells. If anti-A or anti-B is detected, RBC components lacking the corresponding antigen shall be transfused.9.1 | | | |
|  | 2.14 | If a patient is identified as having Thalassemia or Sickle Cell Disease, these patients should be Rh and Kell phenotyped wherever possible and phenotype similar blood for Rh and Kell should be provided.9.3 | | | |
|  | 2.15 | Facilities must establish policies defining when red cells that are negative for hemoglobin S shall be used. 9.1 | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Specimens – N/A | | | |
| Materials – N/A | | | |
| Quality Control | | |
|  | 5.1 | O Rh negative RBC components should be retyped for ABO and Rh when used as O Rh negative unmatched blood. |
|  | 5.2 | If the electronic crossmatch is utilized, the ABO and Rh group of all  RBC components must be confirmed upon receipt. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Procedure | | | | |
|  | Select autologous or donor directed blood components, if available. | | | If autologous or directed donor blood is no longer available (e.g. is transfused or outdated), the request for transfusion using allogeneic blood must be confirmed by the ordering physician. |
|  |
|  | Select ABO group specific red blood cell (RBC) components whenever possible. See Procedural Notes 8.1. If group specific RBC components are not available or if other ABO groups of RBC components are outdating, select an alternative ABO group for adults as outlined in CSP.001-Table1. | | | |
|  | Select group O RBC components when the patient blood group cannot be determined and/or when no blood sample is available. | | | |
|  | Select Rh specific blood products for transfusion. | | | If Rh specific RBC components are not available, consider the age and gender of the patient before selecting Rh positive RBC components for Rh negative patients. See Scope and Related Policies 2.7 and Procedural Notes 8.1. |
| Rh negative RBC components may be selected for Rh positive patients when the Rh negative components are outdating and redistribution (interhospital exchange) is not practical. |
|  | Select ABO group specific plasma components whenever possible. | | | Compatibility testing is not necessary, although ABO-compatible component is preferred. |
| If group specific component is not available or if other ABO groups are close to outdate, select an alternative ABO group as outlined in CSP.001-Table 1. |
|  | Select group AB plasma components when the patient blood group cannot be determined. | | | |
|  | Select ABO group specific platelet products whenever possible. | When group specific platelet products are not available or when other ABO groups of platelet products are close to outdate, select an alternative ABO group as outlined in CSP.001-Table 2. See Procedural Notes 8.1.4 for reduced volume. | | |
|  | Select antigen negative RBC components for patients with a clinically significant antibody(ies). Patients with clinically insignificant antibody(ies) may receive crossmatch compatible RBC components. | | | |
|  | For selection of blood components for neonates younger than four months of age refer to CSP.001-Table 3. | | | |
|  | For selection of CMV seronegative blood components refer to CSP.001-Table 4. | | | |
|  | Select irradiated cellular products (RBC, platelets, granulocytes) to prevent graft-vs-host disease. For indications for irradiated components see CSP.001-Table 5 | | | |
|  | Select IgA deficient blood products for IgA deficient patients who have or are being investigated for anti-IgA antibodies. | | For red blood cell (RBC) components, select washed or deglycerolized blood. | |
| For platelet components, order washed platelets or platelets collected from IgA-deficient blood donors. See CSP.006 Washing Platelets. | |
| For other blood components, order components prepared from IgA-deficient blood donors. | |

CSP.001-Table 1 ABO Selection/Substitution RBC and Plasma

|  |  |  |
| --- | --- | --- |
| **Patient**  **ABO Group** | **RBC**  **Component**  **ABO Group** | **Plasma Component ABO Group** |
| **O** | **O** | **O, A, B, AB** |
| **A** | **A, O** | **A, AB** |
| **B** | **B, O** | **B, AB** |
| **AB** | **AB, A, B, O** | **AB** |

**Rh substitution guidelines:**

* Rh negative females of child bearing potential must receive Rh negative RBC
* Rh negative males and other Rh negative females should first be switched to ABO compatible components before switching to Rh positive RBC depending on available supply. In a massive transfusion, the switch to ABO compatible Rh positive RBC may take priority to avoid depletion of Rh negative stock.

**CSP.001-Table 2 ABO Selection/Substitution for Platelets**

|  |  |  |  |
| --- | --- | --- | --- |
| **Patient**  **ABO Group** | **Platelet Donor**  **ABO Group** | | |
|  | **1st Choice** | **2nd Choice\*** | **3rd Choice\*** |
| **O** | O | A, B, AB | N/A |
| **A** | A | AB | B, O |
| **B** | B | AB | A, O |
| **AB** | AB | A, B | O |
| \* Consult hospital policy if the first choice is not available.  \* Volume reduce non-Group AB products for all patients other than  Group O.  **Rh substitution guidelines:** Rh negative females of child bearing potential should receive Rh negative platelets if available. If Rh positive platelets are given, RhIG should be recommended. | | | |

**CSP.001-Table 3 Neonatal Blood Component Selection**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Small volume (TOP UP)** | **Exchange Transfusion** |
| RBC Components  ABO/Rh compatible | | < 35 days old | < 7 days old  screened negative for  Hgb S |
| **Must** be irradiated | |
| If maternal antibody screen is negative, a crossmatch is not required until the neonate is four months of age or older | |
| If maternal clinically significant antibody is present, crossmatch antigen negative for the corresponding antibody in mother's plasma | |
| If a maternal specimen is not available for antibody screening, selected cells may be tested on a neonatal peripheral blood specimen | |
| If mother is CMV negative or unknown, then CMV negative RBC components are required for low neonatal birth weights (less than 1200 g) | |
| Cryoprecipitated AHF | ABO compatible (If available see CSP 003 Thawing and Pooling Cryoprecipitate) | | |
| **Plasma Components** | ABO compatible or group AB | | |
| Platelet Components | | ABO/Rh group specific | |
| **Must** be irradiated. | |
| If the neonate is Rh negative and Rh negative platelet components are not available, RhIG must be recommended. | |

**CSP.001-Table 4 CMV Seronegative Blood Component Selection9.4**

|  |  |
| --- | --- |
| **Component** | **Indication** |
| **RBC components or Platelets** | CMV-seronegative pregnant women |
| Intrauterine transfusions |
| Neonates with a birth weight less than 1200 grams and the neonate or the mother is CMV-seronegative or unknown. |
| CMV-seronegative allogeneic bone marrow or hematopoietic stem cell (HPSC) transplant recipients |

**CSP.001-Table 5 Irradiated Blood Component Selection9.4**

|  |  |
| --- | --- |
| **Component** | **Indication** |
| **RBC components or Platelets** | Patients with congenital immunodeficiency |
| Intrauterine transfusions |
| Neonatal top up and exchange transfusion |
| Patients with lymphoproliferative disorders |
| Patients undergoing bone marrow or HPSC transplant |
| Recipients of directed donation transfusions from a family member |
| Recipient of HLA-matched components |
| Patients treated with purine analogs (e.g. fludarabine), purine antagonists (e.g. bendamustine) and anti-thymocyte globulin. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Reporting – N/A | | | | | | |
| Procedural Notes | | | | | | |
|  | | 8.1 | | Suggested alternatives when there is a temporary shortage of group specific blood/blood products: | | |
|  | |  | | 8.1.1 | It may be possible to obtain group specific blood and blood products from the nearest hospital before ordering from the blood supplier or selecting another blood group (if time permits). | |
|  | |  | | 8.1.2 | If Rh negative blood is not available, follow the facility policy on Rh negative males and age of females that should receive Rh positive blood, providing their plasma does not contain anti-D. | |
|  | |  | | 8.1.3 | Only in the most extreme life-threatening emergencies should Rh positive blood be given to Rh negative females of child bearing potential. If Rh negative blood is not available for an Rh negative female and transfusion cannot be delayed, a Medical Director or designate must be notified if the patient receives Rh positive blood. | |
|  | |  | | 8.1.4 | When giving platelets that are of a different ABO group, the volume of plasma of pooled platelets should be reduced if possible by centrifugation if plasma is ABO incompatible with recipient’s blood group, unless the use of full volume platelets are approved by Medical Director, designate or attending physician. Each facility must establish its own substitutions when ABO/Rh compatible platelets are not available 9.1 See method on Reduced Volume Platelets, CSP.005. | |
|  | 8.2 | | The Medical Director or designate will decide what constitutes a massive blood transfusion and what percentage of the total blood volume of the patient needs to be replaced in order to discontinue further crossmatching. See CSP.001-Table 6 below for examples of total blood volumes (TBV).9.4 | | |

CSP.001-Table 6 Examples of TBV to Define Massive Transfusion

|  |  |  |
| --- | --- | --- |
| **Category** | **mL/kg** | **Approx. Blood Volume** |
| Adult Male | 66 mL/kg | 90 kg = 5940 mL |
| Adult Female | 60 mL/kg | 60 kg = 3600 mL |
| Child | 66 mL/kg | 30 kg = 1980 mL |
| Neonate | 87-108 mL/kg | 3 kg = 261-324 mL |

8.3 A record should be made in the patient’s transfusion file if they are identified to receive components with special attributes such as CMV seronegative, irradiated or IgA-deficient. A special needs wallet card should be provided to the patient to carry with them to alert other facilities in the event they require future transfusion.9.4

|  |  |  |  |
| --- | --- | --- | --- |
| References | | | |
|  | 9.1 | Standards for Hospital Transfusion Services Version 3 – February 2011. Canadian Society for Transfusion Medicine, 1.4, 5.4.2.1, 5.3.7.4, 5.3.7.2.3, 5.4.2.3, 5.4.2.2, 5.4.5.4, 5.4.3, 5.3.7.2.4, 5.4.4.2.1, 5.4.4.1.1, 5.5.8.4, 5.9.2.4, 5.4.4.4.1, 5.4.3. |
|  | 9.2 | Clinical Guide to Transfusion (On-line edition at www.transfusionmedicine.ca) **Chapter 2** (Updated March 2013 p.1- of 16. |
|  | 9.3 | Roback JD, ed. American Association of Blood Banks Technical Manual, 17th ed. Bethesda, MD: American Association of Blood Banks, 2011: 402. | | |
|  | 9.4 | Callum J et al, Bloody Easy 3, 3rd ed. ORBCoN; 2011 :63,67. | | |

# Revision History

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| --- | --- |
| **Revision Date** | **Summary of Revision** |
| September 1, 2014 | * Revised name of manual * Revised wording in section 2.2 to align with standards * Revised 2.3 to remove reference to whole blood * Added to 2.7.1 need for policy for component selection when red blood cells are in short supply * Added reference to total blood volume in 2.10 * Revised 2.11 to define CMV safe and leukocyte reduced (removed 2.11.1 and 2.11.2) * Removed 2.12.2 and 2.12.3 * 2.15 revised wording – require policy for issuing Hgb S negative units * Section 6 change ‘products’ to ‘components’ * Added 6.9 (neonate) and 6.10 (CMV) selection * Added Procedural note 8.3 * Updated all references to include the most recent version/edition and adjusted the page numbers cited as necessary |