Patients with Special Transfusion Needs

AABB standards require transfusion services to (1) have policies regarding transfusion of patients that need special blood components and (2) have a process to ensure that all subsequent blood components for that patient meet the special transfusion requirements for as long as clinically indicated. The following policy discusses the rationale and availability of suitable products at LifeServe for transfusion of patients with the following special needs or circumstances:

- Leukocyte-Reduced Components
- Cytomegalovirus (CMV) Seronegative Blood Products
- Irradiated Blood Products
- Washed products
- Sickle Cell Patients
- Massive Transfusion
- HLA-Matched Platelets
- Transfusion-Associated Circulatory Overload

- **Leukocyte-Reduced Components (aka Leukoreduced or Leukodepleted)**
  - All blood components produced by LifeServe Blood Center undergo prestorage leukocyte-reduction
  - Leukocyte-reduction is designed to remove greater than 99.9% of white blood cells in a blood component
  - Leukocyte-reduction virtually eliminates the risk of CMV transmission, febrile non-hemolytic transfusion reactions, and HLA alloimmunization. Additionally, it potentially reduces the chance of immunosuppression, transmission of other white or red blood cell-mediated pathogens (e.g. Babesiosis), and bacterial contamination.
  - Blood products that are imported from other blood centers rarely may not be leukocyte-reduced and may require the use of a leukocyte-reduction filter at the time of transfusion

- **CMV (Cytomegalovirus) Seronegative Blood Products**
  - The CMV virus is carried in the WBCs of the blood donor. Patients with prior infection may intermittently shed virus despite having antibodies to CMV. CMV may be transmitted by the transfusion of cellular blood products (red blood cells, platelets, granulocytes) from donors who were previously infected with CMV.
  - **CLINICAL STUDIES INDICATE THAT LEUKOCYTE-REDUCED BLOOD PRODUCTS ARE AS EFFECTIVE IN PREVENTING TRANSMISSION OF**

    CMV INFECTION AS BLOOD COMPONENTS FROM CMV-SERONEGATIVE DONORS
  - LifeServe provides CMV seronegative cellular blood products

- Patients at the highest risk for transfusion-transmitted CMV disease are immunosuppressed, CMV seronegative, and have one of the following conditions/situations:
    - Severely immunosuppressed
    - Congenitally immunodeficient
    - Pregnant (CMV is transmissible to the fetus)
    - Intrauterine transfusion
    - Low-birth weight neonates
    - Recipients of an allogeneic hematopoietic progenitor cell transplant
    - Recipients of a solid organ transplant
    - Patients infected with HIV

- **Irradiated Blood Products**
    - Transfusion of a cellular blood product containing viable leukocytes has the potential to cause transfusion-associated graft-versus host disease (TA-GVHD) in a severely immunocompromised patient
    - Irradiation destroys lymphocytes or renders them incapable of proliferation. This virtually eliminates the risk of TA-GVHD.
    - Since TA-GVHD is almost universally fatal, the key is to prevent it from occurring
    - Patients at risk for TA-GVHD require irradiation of their cellular blood products:
        - Hematopoietic stem cell transplant recipients beginning at the time they start transplant conditioning therapy
        - Patients with congenital immunodeficiency who exhibit defective cell-mediated immunity
        - Intrauterine and exchange transfusions
        - All infants during the first 6 months of life
        - Patients receiving HLA-matched blood components
        - Recipients receiving cellular blood components from genetically-related relatives
        - Patients with hematologic malignancy including Hodgkin's disease, lymphoma, leukemia, multiple myeloma, and myelodysplastic syndromes
        - Patients receiving granulocyte transfusions
        - Patients being treated with fludarabine, cladribine therapy (purine analogues), bendamustine or clofarabine therapy (purine antagonists), or alemtuzumab (anti-CD52)
        - Patients with aplastic anemia or unexplained cytopenias, particularly if treated with anti-lymphocyte or anti-thymocyte globulin
    - Irradiation of blood products is **NOT** indicated in the following circumstances:
        - Patients with nonhematologic cancer without intense therapy
        - Patients with HIV
        - Recipients of solid organ transplants (although GVHD has occurred in these patients, it has been caused by passenger lymphocytes in the organ graft, not the transfused blood components)

- **Washed products**
  - Blood products are typically washed to remove plasma proteins
  - Indications for washing include the following:
    - Recipient history of severe allergic reactions to components containing plasma
    - The presence of antibodies against immunoglobulin A (IgA) in an IgA-deficient recipient when IgA-deficient products are not available
    - The presence of maternal antibodies to human platelet antigens (HPA)-1a (e.g. when using maternal blood for a neonatal transfusion)
    - The need for complement removal for recipients experiencing posttransfusion purpura
  - RBC units for intrauterine transfusions are typically washed to remove some of the preservative solutions and excess potassium that accumulates during storage

- **Sickle Cell Patients**
  - Patients with sickle cell disease should receive sickle cell-negative RBCs
  - LifeServe maintains an inventory of sickle cell-negative RBC units
  - Red cell units should be antigen-matched for Rh (D, E/e, C/c) and K
  - If the patient has already formed an antibody then the units should be additionally matched for S/s, Jk, and Fy

- **HLA-Matched Platelets**
  - Multiply transfused patients may develop HLA antibodies and no longer increment to randomly selected platelet units
  - Platelet refractoriness can also be due to non-immune or other immune causes:
    - Non-immune: infection, DIC, active bleeding, veno-occlusive disease, GVHD
    - Immune: human platelet antigen (HPA) antibodies, ABO incompatibility, drug-induced antibodies
  - When platelet refractoriness is suspected, a corrected count increment (CCI) should be performed
  - HLA-typing of the patient and testing for HLA antibodies should be performed in refractory patients
  - "HLA-matched" platelets can usually be obtained within 3-5 days
  - Until HLA-matched platelets can be obtained, pooled (Acrodose) and/or ABO-matched platelets may be used
  - **HLA-MATCHED PLATELETS MUST BE IRRADIATED TO PREVENT POTENTIAL TA-GVHD**

- **Massive Transfusion**
  - A massive transfusion is typically defined as "the replacement of one or more blood volumes in 24 hours"
  - Following a massive transfusion, a patient's blood type (forward and back type) may be altered or ambiguous and any pre-existing RBC alloantibodies may be undetectable
  - Blood selected for compatibility testing should be…

1. ABO type-specific (if the patient's ABO type is known) or ABO-compatible with the blood type(s) used during the resuscitation
2. Negative for any known alloantibodies
3. Crossmatch compatible to the anti-globulin phase

- **Transfusion-Associated Circulatory Overload (TACO)**
  - Patients who are at an increased risk for developing TACO should be transfused slowly and over the maximum allowable 4 hour time period
  - If the entire product cannot be infused within the allowed four hours, the product should be split into smaller aliquots using a sterile connecting device and transfer bags appropriate for the blood product
  - If multiple units are to be transfused, the use of diuretic therapy between units may be of value