



## TRANSFUSION MEDICINE

Transfusion medicine is a one-month per year rotation for a total of three months. During each rotation the resident is exposed to the basic concepts of transfusion medicine. Specific areas are covered more in depth as follows:

**TM1:** Blood collection and component preparation; donor screening and testing; pretransfusion compatibility testing; blood components utilization review; transfusion reactions

**TM2:** Therapeutic apheresis; stem cell collection; indications and monitoring the efficacy of various blood components

**TM3:** Evaluation and management of hemolytic disease of the newborn and hemolytic anemia; parentage testing; quality control; quality assurance and management.

### Patient Care

Working under the direction of the medical director, the resident will be involved with, transfusion recipients in providing patient-focused care, including: gathering accurate clinical information, utilizing medical knowledge to make informed decisions, and interacting with patients, patient's family and other health care professionals to provide appropriate and effective patient care

1. Provide consultation to clinicians regarding:
  - a. Blood components for hemorrhaging patients;
  - b. Switching blood component ABO/Rh types in certain situations;
  - c. Rh immunoglobulin
  - d. Pooled random donor versus single donor apheresis platelets
  - e. Leukocyte reduced cellular blood components
  - f. Irradiated cellular blood components
  - g. Cryoprecipitate
  - h. Saline-washed RBC
  - i. Therapeutic phlebotomies
  - j. Clinical application and type and appropriate mix of components in the performance of exchange transfusion therapy for hemolytic disease of the newborn or other disorders.
2. Be able to recognize and treat donor reactions of all levels of severity
3. Be able to appropriately intervene, diagnose, and manage severe adverse reactions to blood component transfusion
  - a. ABO incompatibility with acute hemolysis
  - b. Advising on further transfusion for patients with adverse reactions
  - c. Anaphylaxis
  - d. Septic shock
  - e. Acute respiratory distress syndrome (Transfusion Related Lung Injury – “TRALI”)
4. Be able to assist in the decision and provide expertise in the clinical application of erythrocyte and platelet leukocyte-reduction techniques to prevent febrile transfusion reactions, reduce HLA alloimmunization and reduce or prevent disease transmission



5. Be able to assist in the decision to use least incompatible or crossmatch Incompatible blood in appropriate clinical settings such as a patient with life threatening autoimmune hemolytic anemia or alloimmunization with non-compatible blood available
6. Be able to assist in the interpretation of tests to detect fetal-maternal hemorrhage and assist in the determination of the appropriate dose of Rh immune globulin.
7. Be able to assist in the need and determination of the appropriate dose of Rh immune globulin in instances where Rh-positive blood components are administered to Rh-negative patients.
8. Be able to provide consultation on massive transfusion of trauma patients.
9. Be able to assist in determining the clinical applicability of and provide appropriate arrangements for the performance of preoperative autologous collection and transfusion procedures and applicability of directed donations.
10. Be able to provide consultation on transfusion of patients with coagulation disorders.
11. Be able to recommend appropriate therapy for patients refractory to platelet transfusions.

### **Medical Knowledge**

1. The resident will be given a working background on each task and be made aware of established procedures and evolving sciences and how to apply this knowledge to patient care.
2. Learning resources, computer based journals, textbooks and didactic teaching, are also provided by the transfusion medicine director and the education coordinator of the transfusion service.
3. Lectures provided by the blood bank medical director, on a weekly basis, monthly clinical pathology conference, Journal club and pathology Grand Rounds.
4. The residents will observe therapeutic apheresis procedures, red cell exchange, stem cell collection, storage and infusions, performed by the hematology service.
5. Donor center exposure takes place at Mississippi Blood Services, donor screening, blood and platelets collection, blood component preparation and donor deferrals and look back procedures.
6. The principles of HLA –matching and crossmatching platelets, for refractory patients.

### **Professionalism**

1. The resident will be expected to show a commitment to carrying out professional responsibilities. He/she will exhibit behavior appropriate to activities of blood bank
2. Commitment to ethical principles (confidentiality, informed consent, and HIPPA regulations)
3. Attendance, punctuality at conferences, in particular required conferences.
4. Organizational skills and ability to prioritize
5. Sensitivity to culture, age, gender, disabilities, etc.
6. Assumption of responsibility

### **System-Based Practice**

1. Understand different types of health systems, and how our hospital affects other systems and society.
2. Cost-effective laboratory practices, hospital budget, instrument purchase, computer informatics and legal issues.
3. Business, reimbursement, resource allocation and work with management to improve patient care.



4. The resident will be aware of and responsive to the larger context and system of health care as it relates to our patient base

#### **Interpersonal and Communication Skills:**

1. The resident will learn how to effectively exchange information with patients, patient's families and other health professionals.
2. Presenting cases and conferences (clinical pathology and monthly interesting case conferences).
3. The resident will review and discuss all antibody panels on a daily basis with the blood bank medical director and the chief technologist, and arrange for further tests required assuring safe transfusion.
4. Residents are expected to assist in directing blood components for massive transfusions upon request from the clinical staff, this gives the residents an abundant opportunity for interacting with physicians, nurses and laboratory personnel.

#### **Practice-Based Learning and Improvement**

1. The resident will learn a systematic approach to the investigation and evaluation of the clinical situation and how to make appropriate decisions. Ex: quality Assurance monitor, utilization reviews for blood components, laboratory CAP institutional inspections and may participate in other facilities, CAP inspections and regulatory requirements (JCAHO, CAP, FDA, AABB).
2. The resident will be able to locate and apply literature and other scientific evidence, utilizing library, web-based, and other educational sources like Computers and hospital laboratory system.

#### **Technical Instruction:**

With senior blood bank personnel at the bench, the resident will perform procedures, which will not be used for patient care under any circumstances

#### **Orientation:**

1. Organization of blood bank and transfusion service
2. Introduction to blood bank personnel
3. Policies and procedures
4. Specimen and requisition accession and processing

#### **Donor area:**

1. Criteria for donor selection
2. Donor recruiting
3. Donor interview
4. Arm preparation techniques

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5. Blood collection techniques
6. Donor reaction evaluation and management
7. Testing for diseases transmitted by transfusion

**Crossmatch station:**

1. ABO and Rh typing
2. Antibody screen
3. Compatibility testing
4. Massive transfusion procedures
5. Direct antiglobulin testing
6. Prenatal evaluation and monitoring
7. Neonatal and cord blood evaluation
8. Rh immune Globulin evaluation
9. Special studies station
10. Antibody identification
11. Antibody absorption
12. Antibody elution
13. Antigen typing techniques
14. Multiple and auto-antibodies evaluation
15. Warm and cold-auto-antibodies
16. Allo and auto-adsorption

**Component preparation station:**

1. Fresh frozen plasma preparation
2. Platelet concentrate pooling
3. Cryoprecipitate preparation
4. Preparation of syringes for neonates
5. Leukoreduction of blood components

**Inventory management and billing, charges and credits:**

1. Therapeutic Apheresis station:
2. Plasma exchange
3. Leukocyte reduction
4. Red cell exchange
5. Peripheral stem cell collection

**Stem cell cryopreservation laboratory:**

Observe stem cell processing, freezing and thawing procedures

**Outcome Assessment**

During the first day of rotation the medical director of the blood bank will review objectives with the resident and provide an orientation to the section

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The medical director will discuss with the resident his/her progress toward meeting objectives, and will make suggestions for improvement if needed.

If at any time the resident feels that there is a problem or deficiency with the rotation, he/she should consult with the medical director of the blood bank, the chief resident, the section director or the residency program director

The resident will be formally evaluated at the end of the rotation, take an exam encompassing the entities listed under medical knowledge above, that were covered during the rotation. If less than 60% score, another test is administered in two weeks. Repeated failures will necessitate meeting with the faculty to determine problems and solutions.

### **Transfusion Medicine Resident Assignment Checklist**

- |     |   |       |
|-----|---|-------|
| 1.  | Read and understand rotation objectives and assignments       | _____ |
| 2.  | Antibody panels   | _____ |
| 3.  | Transfusion reaction workup                                   | _____ |
| 4.  | Complete reading assignment                                   | _____ |
| 5.  | Laboratory bench work, typing, antibody screen, crossmatching | _____ |
| 6.  | Laboratory bench work, DAT, elution, auto and allo-adsorption | _____ |
| 7.  | Fetal cell screen and kleihauer-Betke test                    | _____ |
| 8.  | Utilization reviews of blood components                       | _____ |
| 9.  | Attend CP, PI meetings and teleconferences                    | _____ |
| 10. | Take the test   | _____ |

#### **Recommended Readings:**

##### **Textbooks**

1. Huestis, D.W., Bove, J.R., Case, J.: Practical Blood Transfusion (4<sup>th</sup> Ed.). Boston: little, Brown and company.
2. Petrides, M. : Practical guide to transfusion medicine, AABB press.

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3. Mollison, P.L. Blood Transfusion in Clinical Medicine Oxford: Blackwell Scientific Publications.
4. Petz, L.D. et al.:Clinical Practice of blood Transfusion. New York Churchill Livingstone.
5. Rossi, E.C. et al: Principles of Transfusion Medicine. Baltimore: Williams & wilkins

#### **References:**

1. Menitove, J.E. Standards for blood banks and transfusion services. Bethesda, MD: AABB.
2. Vengelen-Tyler, V. Technical Manual. Bethesda, MD: AABB.
3. Popovsky. Transfusion Reactions, AABB press.
4. Blood Transfusion Therapy, A physician handbook, 6<sup>th</sup> edition, AABB.
5. Transfusion Medicine Standard Operating Procedures "SOP".
6. Code of Federal Regulations. Title 21 – Food and Drugs 2001.

#### **Journals:**

1. Transfusion
2. Vox Sanguinis
3. Archives of Pathology & Laboratory Medicine
4. American Journal of Clinical Pathology
5. Blood
6. American Journal of Hematology
7. Journal of pediatric Hematology and and Oncology
8. Seminars in Hematology