Transfusion Medicine Resident Responsibilities  
Department of Pathology and Laboratory Medicine  
Loyola University School of Medicine

Training in Transfusion Medicine is an essential part of general Pathology training, encompassing areas in which practitioners are integral to clinical care. We have defined 3 levels of graduated resident competence with corresponding expectations of the residents while on the Transfusion Medicine rotation. These training levels are intended to correlate with time spent rotating through the LUMC Blood Bank/Apheresis Service and address the 6 core competencies as laid out by the ACGME.

*Training Level I*- competency expectations after 1 month on the Blood Bank/Apheresis Service
*Training Level II*- competency expectations after 2 months on the Blood Bank/Apheresis Service
*Training Level III*- competency expectations after 3 months on the Blood Bank/Apheresis Service

**ACGME Core Competencies**
IC = interpersonal and communication skills  
MK = medical knowledge  
PC = patient care  
PL = practice-based learning and improvement  
PR = professionalism  
SP = systems-based practice

**A) Blood Bank / Transfusion Medicine Consultations**

*Training Level I:*
- Describe the expected response to transfusion therapy in adult and pediatric patients [MK, PC].  
- Demonstrate knowledge of the indications for cytomegalovirus-reduced-risk blood, leukoreduction, irradiation, and washing of blood components [MK].  
- Demonstrate ability to communicate laboratory testing results, transfusion recommendations, and blood supply issues to clinicians, both verbally and in written form [IC, SP, PC].

*Training Level II:*
- Demonstrate ability to write an appropriate consult note for patients who have alloantibodies, explaining the clinical significance of the finding to the treating physicians and the additional logistical requirements for obtaining compatible blood [IC, SP, PC].  
- Recognize the symptoms and signs of hemolytic and nonhemolytic transfusion reactions and demonstrate knowledge of the pathophysiology, treatment, and prevention of these complications [MK, PC].  
- Demonstrate knowledge of the pathophysiology, prevention, and treatment of hemolytic disease of the fetus and newborn. Recognize those antibodies in pregnant patients that are clinically significant and make appropriate recommendations for blood products [MK, PL, PC].  
- Demonstrate knowledge of the pathophysiology and treatment of neonatal alloimmune thrombocytopenia [MK, PC].

*Training Level III:*
- Demonstrate proficiency in evaluating patients refractory to platelet (PLT) transfusions, including the principles of histocompatibility testing and the roles of HLA-matched PLTs versus PLT crossmatching, and apply this knowledge in selecting appropriate PLT products when indicated [PC, MK].
• Choose appropriate blood components and derivatives based on a thorough knowledge of the indications for transfusion [PL, PC, MK].
• Demonstrate a working knowledge of the principles of hemostasis and coagulation and proficiency in the initial treatment of patients with bleeding disorders [MK, PC].
• Differentiate between plasma-derived and recombinant factor products and demonstrate knowledge of on-label and off-label indications for these products [PC, MK, PL, SP].
• Demonstrate knowledge of the transfusion requirements of special patient populations (e.g., hematology-oncology, pediatrics, geriatrics, transplantation, burn, and/or trauma) [MK, PC].
• Demonstrate knowledge of the potential side effects of neonatal whole-blood exchanges and massive transfusions in neonates associated with extracorporeal circuits such as used in extracorporeal membrane oxygenation or in cardiac surgery [MK, PC].
• Demonstrate proficiency in the evaluation and appropriate transfusion therapy of adult and pediatric thrombocytopenic patients secondary to both immune and non-immune etiologies [PC, PL].
• Demonstrate knowledge of options for preventing volume overload in pediatric transfusion therapy [MK, PC, SP].
• Demonstrate knowledge of various methods of blood conservation, including pre- and perioperative autologous blood collection, and approaches to “bloodless” surgery [MK, PL, SP].
• Demonstrate proficiency in evaluating patients with immune-mediated and non–immune-mediated hemolytic anemia and in the appropriate testing and transfusion management of these patients [PC, MK].
• Apply the principles of a massive transfusion protocol [PL, IC, SP, MK].

B) Blood Donor Qualification

Training Level I:
• Demonstrate knowledge of current eligibility criteria for blood donors [MK].
• Compare and contrast the eligibility requirements for allogeneic and autologous blood donations [MK].
• Demonstrate familiarity with the types and treatment of donor adverse events [PC, MK].

Training Level II:
• Demonstrate familiarity with the steps in blood component and blood derivative preparation [MK, SP].
• Outline the assay principles (e.g., nucleic acid testing, enzyme-linked immunsorbent assay) of required donor blood tests and the associated confirmatory testing and describe examples of donor reentry algorithms [MK, SP].
• Outline the necessary steps in donor notification and counseling associated with positive infectious disease testing results and the donor lookback process [PC, SP, IC].

Training Level III:
• Observe and subsequently demonstrate competency in performing a donor interview and exam, including obtaining consent to donate (e.g., risks, benefits, alternatives, and answer questions) [PC, IC, PR].
• Demonstrate professionalism in interactions with prospective donors [PR, IC].
• Describe the factors that influence the motivation of blood donors [MK, SP].
• Demonstrate proficiency in evaluating and treating adverse reactions associated with blood donation and/or phlebotomy (both whole-blood and apheresis donations) [PC, PR, MK].
• Demonstrate knowledge of the advantages and disadvantages of directed blood donation and limited donor exposure programs [PC, MK, SP].
• Demonstrate knowledge of the techniques of safe, sterile venipuncture and the associated methods to reduce bacterial contamination of products [PC,MK].
• Demonstrate understanding of, and the ability to interpret, the major regulations and guidelines applicable to collection, processing, storage, and release of blood products and cellular therapy products [SP, MK].
• Demonstrate awareness of current concerns about emerging infections in the blood supply and describe ways that blood collection centers deal with these concerns [MK, PL].
• Demonstrate familiarity with the operational logistics required to determine appropriate blood inventory for a geographic region and the process of meeting daily, weekly, and monthly collection goals [SP, IC].

C) Transfusion Complication Evaluations

Training Level I:
• Identify the major infectious complications of blood transfusions and the current risk of these infections and explain how these infections can be prevented [MK].
• Demonstrate the ability to clinically evaluate a reported transfusion reaction and order and interpret appropriate initial laboratory testing [PC, MK, PL].

Training Level II:
• Identify the major non-infectious complications of blood transfusions, including TRALI and TACO, the risk of these complications, and strategies to prevent them [MK].

Training Level III:
• Demonstrate proficiency in evaluating and recommending treatment plans for complex transfusion reactions (e.g., IgA-deficient patients) [MK, IC, SP, PC].

D) Blood Usage Audits
• Demonstrate the ability to perform blood utilization reviews [PC, SP].

E) Immunohematology and Compatibility Testing

Training Level I:
• Demonstrate knowledge of the principles of patient and/or unit identification and pretransfusion testing, including ABO and/or Rh testing, red blood cell (rbc) antibody screen, and antibody identification [PC, MK].

Training Level II:
• Demonstrate ability to distinguish clinically significant from clinically insignificant RBC-specific antibodies [MK].
• Identify clinically significant rbc-specific antibodies from an antibody panel, determine how difficult it will be to obtain blood for this patient, and effectively communicate these results to clinicians [PC, IC].

Training Level III:
• Choose appropriate crossmatching methods for various patients (e.g., electronic, immediate-spin, antiglobulin) [PC, MK].
• Demonstrate ability to interpret difficult antibody panels including those containing multiple alloantibodies, autoantibodies, and antibodies to high-frequency antigens [MK, PC].
• Demonstrate knowledge of specialized test methods in immunohematology including elution, absorption, and use of enzymes [MK].
• Demonstrate familiarity with the appropriate use of highly specialized blood products (e.g., granulocytes, donor lymphocyte infusions, HLA-matched PLTs, coagulation factor concentrates) [MK, PC].
• Recognize and appropriately refer serologic and genotyping evaluations that are beyond the scope of a hospital-based transfusion service and/or blood bank [PC, SP].

F) Apheresis

Training Level I:
• Demonstrate knowledge of the indications for therapeutic phlebotomy [MK].
• Summarize the principles of apheresis technology, including centrifugation, filtration, photopheresis and LDL apheresis [MK].
• Demonstrate knowledge of the major indications for therapeutic apheresis including the category of evidence for each of these indications as outlined by AABB and/or American Society for Apheresis [MK, PC].
• Demonstrate knowledge of the appropriate replacement fluids to be used in an apheresis procedure [MK, PC].

Training Level II:
• Write appropriate physician orders for therapeutic apheresis procedures [PC, MK, IC].
• Demonstrate ability to triage requests for therapeutic apheresis [MK, PC, IC, PR].
• Demonstrate proficiency in evaluating and preparing patients for therapeutic apheresis, including obtaining consent for the procedure and for transfusion of blood components during the procedure [IC, PC, PR].
• Demonstrate knowledge of vascular access requirements and options for therapeutic apheresis [MK, PC].

Training Level III:
• Communicate effectively with attending clinicians and house staff regarding emergent or scheduled therapeutic apheresis procedures through conversations and writing consults notes [IC, SP, PR, MK].
• Discuss the major indications for, and limitations of, therapeutic apheresis in children [PC, MK].
• Demonstrate proficiency in treating patients with specialized apheresis methods (e.g., photopheresis, LDL separation columns) [PC, MK].
• Demonstrate proficiency in evaluating and treating adverse reactions associated with therapeutic apheresis [PC, MK, IC].
• Demonstrate proficiency in evaluating, assessing, and treating a wide variety of patients who require therapeutic apheresis for various disorders [MK, PC, IC, PR].
• Demonstrate ability to evaluate literature for therapeutic apheresis for which the data suggesting efficacy for a particular disease entity is limited and communicate effectively with primary care physicians to develop care plans [MK, PC, IC, SP, PL].
• Demonstrate knowledge of the principles of hematopoietic stem cell (HSC) transplantation, including collection, processing, and storage of these products, and the indications for use (e.g., marrow, peripheral blood, and umbilical cord blood) [MK, SP, PC].
• Demonstrate proficiency in writing physician orders for peripheral blood HSC collections and obtaining consent for the procedure and for blood product transfusion, if needed after the collection [PC, MK, IC, PR].
• Demonstrate proficiency in evaluating and treating adverse reactions associated with peripheral blood progenitor cell (PBPC) collection [PC, MK].

G) Didactic

Training Levels I-III:

• Demonstrate proficiency in evaluating and presenting findings to professional colleagues from 1) recent peer-reviewed journal articles related to TM and 2) research projects in which the resident may participate [PL, IC].
• Demonstrate proficiency at preparing educational presentations on TM topics and the ability to adapt presentations to audiences of differing experience levels (e.g., pathologists, non-Pathology physicians, technologists, nurses, and blood center workers) [IC, MK].

H) Transfusion Director/Managerial Duties

Training Level I-III:

• Triage and screen requests for blood components appropriately during inventory shortages [PC, SP].
• Demonstrate familiarity with the requirements of all applicable regulatory (FDA, IDPH, IEMA0 and accrediting agencies (e.g., TJC, CAP, AABB, FACT,) [SP].
• Demonstrate competence in managing blood inventory and ability to communicate effectively the hospital’s needs to the blood supplier [IC, SP].
• Demonstrate knowledge of landmark published studies in TM [MK, PL].
• Demonstrate ability to perform lookback investigations [SP, IC].
• Demonstrate ability to write an error or deviation report and create a corrective and preventive action plan [IC, PL, SP].
• Demonstrate an understanding of the appropriateness of transfusion of serologically incompatible blood in selected clinical circumstances [PC, MK].