

**CLINICAL PERFORMANCE OBJECTIVES IN IMMUNOHEMATOLOGY**  
**DEPARTMENT OF MEDICAL AND RESEARCH TECHNOLOGY**  
**UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE**  
**SPRING 2008**

Upon completion of the Clinical Immunohematology rotation the MT student will be able to:

**I. SPECIMEN HANDLING AND PROCESSING/LABORATORY SAFETY**

1. Follow departmental protocol and demonstrate safe work practices by:
  - Wearing personal protective equipment (PPE) as required.
  - Handling and disposing of contaminated materials according to standard precautions.
  - Handling chemicals according to safety procedures.
2. Identify the types of blood samples and collection tubes appropriate for routine testing in the blood bank.
3. Determine the acceptability of a sample for compatibility testing based on sample age, sample appearance and institutional policy.
4. List the minimum information required for labeling samples for blood bank testing.

**II. QUALITY ASSURANCE/QUALITY CONTROL AND REGULATORY ISSUES**

1. Perform daily quality control for routine testing according to the operating procedures of the laboratory with 100% accuracy.
2. Recognize discrepant results in routine ABO, Rh and antibody screen testing with 100% accuracy.
3. Report all discrepant results to the clinical instructor.
4. List the quality control activities that are performed monthly, quarterly, bi-annually and annually.
5. Perform or observe basic laboratory computer applications where relevant.
6. State the patient confidentiality policy of the facility that complies with HIPPA guidelines for testing and reporting procedures.
7. List the accrediting and inspection agencies that monitor blood banks and transfusion services.

### III. ROUTINE TECHNICAL PROCEDURES – ABO/RH, AB SCREEN AND DAT

1. Using a “0 to 4+” scale, grade macroscopic agglutination reactions within  $\pm 1$  agglutination grade of the instructor.
2. Prepare a 3-5% red cell suspension as needed for tube testing.
3. Label test tubes for routine testing according to laboratory procedure without error.
4. Perform ABO and Rh testing on a minimum of 25 samples with 100% accuracy.
5. Interpret the results of ABO and Rh testing without error.
6. Perform weak D testing on designated patient samples when available. (optional)\*
7. Perform ABO confirmatory testing on a minimum of 20 donor segments with 100% accuracy.
8. Suggest a plan of action for the preliminary investigation of the following ABO discrepancies:
  - Hypogammaglobulinemia
  - Cold reacting alloantibody
  - Cold reacting autoantibody
  - Subgroup of A with anti-A1
  - Mixed field agglutination
9. Identify mixed field agglutination in 2 samples to the satisfaction of the clinical instructor.
10. Perform antibody screening on a minimum of 20 samples to the satisfaction of the clinical instructor.
11. Explain the next step/s to be taken to investigate a positive antibody screen.
12. Compare and contrast direct and indirect antiglobulin testing with regard to principle, procedure and application.
13. Identify sources of false negative and false positive error in antiglobulin testing.
14. Perform DAT and DAT Battery on a minimum 2 samples to the satisfaction of the clinical instructor.

**IV. ROUTINE TECHNICAL PROCEDURES – CROSS-MATCHING AND TRANSFUSION MANAGEMENT**

1. Label test tubes for routine compatibility testing according to laboratory protocol without error.
2. Perform the appropriate crossmatch procedure, immediate spin (IS) or Full (IAT), on a minimum of 10 samples when given the relevant patient information and the policy of the laboratory.
3. Select the most appropriate donor units to crossmatch with a patient when ABO specific red cells are available and when not available.
4. Select the most appropriate donor units when the patient presents with:
  - single alloantibody
  - basic multiple alloantibodies
5. Interpret the results of crossmatching with 100% accuracy.
6. Explain possible causes of an incompatible crossmatch.
7. Discuss the policies for emergency release and massive transfusion.
8. Distinguish ABO and Rh-related HDN according to clinical and serologic presentation.
9. Perform or discuss the prenatal (mother) and postnatal (mother and newborn) serologic workups for managing cases of HDN.
10. Observe or discuss the procedures for Rhlg administration including candidate selection, FMH screening, and dosage determination.
11. Compare and contrast the following adverse reactions to transfusion with regard to cause, classic signs & symptoms, and serologic investigation (if applicable):

Immediate Hemolytic	Urticarial
Delayed Hemolytic	Anaphylactic
Febrile Non-hemolytic	Bacterial sepsis
TRALI (optional)	Volume Overload (optional)
12. Recommend approaches for future transfusion in patients who have experienced the transfusion reactions listed above.
13. Perform or describe a minimum of 1 transfusion reaction work-up, according to laboratory protocol.
14. Compare and contrast warm and cold reacting autoantibodies with regard to serologic presentation, related testing and transfusion approaches.

## V. REFERENCE PROCEDURES

1. Perform routine antibody identification panels on a minimum of 5 samples according to the acceptable precision of the laboratory.
2. Interpret the results of routine and selected cell panels to determine the specificity of single and multiple antibodies (simple).
3. Perform or discuss the following reference techniques to assist in antibody identification:
  - Selected cell panel
  - Red cell (antigen) phenotyping
  - Enhancement media (PeG & LISS)
  - Acid Elution
  - Pre-warmed technique
  - Enzyme treatment
  - Neutralization
  - Adsorption
  - Saline replacement
  - ReST
  - Cold panel (optional)
4. Compare and contrast the serologic characteristics of antibodies to the following blood group systems:

Rh	Kell
Kidd	Duffy
MNSs	Lewis
Lutheran	I
P <sub>1</sub>	

5. List 5 antigens of low incidence and 5 antigens of high incidence.\*

## VI. DONOR /COMPONENTS/PRODUCT DISPOSITION

1. Discuss the physical and medical criteria used in the selection of the following blood donors:
  - Allogeneic
  - Autologous
  - Directed
  - Therapeutic (optional)
2. Describe, and, if available, perform the processing of a donor to include:
  - Donor history
  - Physical exam
  - Donor acceptability
  - Proper unit collection and handling

3. Identify the blood bank serologies and viral marker testing required on all allogeneic, autologous and directed units.
4. Explain the preparation of the following components from whole blood:
  - Packed red blood cells
  - Fresh frozen plasma
  - Random platelets
  - Cryoprecipitate
5. Discuss the following forms of blood product handling and manipulation:
  - Pooling
  - Aliquoting
  - Washing
  - Irradiating
6. Identify the shelf life, storage requirements and therapeutic use of:
 

Packed red blood cells	Fresh frozen plasma
Platelets (random & single donor)	Cryoprecipitate (single unit & pooled)
Frozen red blood cells	Leukoreduced red blood cells
Irradiated red blood cells	Washed red blood cells
Factor VIII & IX concentrates	Rh Immune globulin
7. Review the daily inventory and inspection of blood products.
  - Observe routine paperwork for receiving or shipping blood products
8. Issue or observe the issue (release) of a minimum of 5 blood products for administration.

## **VII. PROFESSIONAL QUALITIES**

1. Arrive at the laboratory on time.
2. Adhere to the established student uniform policy.
3. Notify the clinical supervisor of any unavoidable absences prior to the scheduled arrival time and make arrangements to make up the time on a mutually convenient date.
4. Demonstrate the ability to follow verbal and written instructions.
5. Communicate in a constructive, professional manner (i.e. polite, considerate, pleasant and unhurried) with members of the laboratory and hospital staff, peers and patients.
6. Organize work in a logical sequence.
7. Complete work and assignments within established deadlines.

8. With the approval of the clinical instructor, demonstrate the initiative to perform tasks without being reminded.
9. Demonstrate constructive utilization of all training time by examining available study materials during periods of time not devoted to instruction.
10. Demonstrate flexibility in changes to the scheduled daily learning activities due to laboratory staffing, emergencies, etc.
11. Demonstrate the ability to recognize and admit mistakes or discrepancies and take appropriate corrective measures, including seeking help when needed.
12. Demonstrate the ability to accept professional constructive criticism regarding work.
13. Maintain the confidentiality of all patient information when questioned by patients or other unauthorized individuals.
14. Adhere to all published safety regulations in the laboratory.
15. Demonstrate professionalism in attitude, appearance and work ethic 100% of the time.