

Beaumont

Beaumont Hospital – Royal Oak
3601 West 13 Mile Road
Royal Oak, MI 48073

A. Overall Fellowship Goal

The overall goal of this fellowship is to prepare a fellow with sufficient knowledge and experience to function as the Medical Director of the Blood Bank and/or Transfusion Medicine service in a community or academic hospital.

Throughout the year the fellow will learn the essential administrative, laboratory, and clinical aspects of blood donor and hospital transfusion services. This knowledge and experience will be gained by: (1) rotations through various work areas; (2) daily meetings with the Medical Director of the Blood Bank and/or Associate Medical Director of the Blood Bank; (3) specific assignments (research, literature review, or reading) supervised by the Medical Director of the Blood Bank.

The ACGME Core Competencies will be incorporated into the objectives and will also be the basis for fellow evaluation during this fellowship. The following summarizes the “six core competencies” specifically delineated for Blood Banking/Transfusion Medicine:

Patient Care (PC):

- Fellow demonstrates a satisfactory level of diagnostic competence and the ability to provide appropriate and effective consultation in the context of pathology services (specifically, Blood Banking/Transfusion Medicine services).
- Fellow provides patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
- Fellow works with health care professionals, including those from other disciplines, to provide patient-focused care.

Medical Knowledge (MK):

- Fellow demonstrates knowledge about established and evolving biomedical, clinical, and cognate (e.g., epidemiological and social-behavioral) sciences and the application of this knowledge to patient care and to pathology (specifically, Blood Banking/Transfusion Medicine).
- Fellow demonstrates an investigatory and analytic thinking approach to clinical and pathological situations (specifically, Blood Banking/Transfusion Medicine situations).
- Fellow knows and applies the basic and clinically supportive sciences appropriate to pathology (specifically, Blood Banking/Transfusion Medicine).

Practice-Based Learning and Improvement (PBLI):

- Fellow demonstrates the ability to investigate and evaluate their diagnostic and consultative practices, appraise and assimilate scientific evidence and improve their patient care practices.
- Fellow locates, appraises, uses, and assimilates evidence and information from scientific studies related to their patients' health problems.
- Fellow applies knowledge of study designs and statistical methods to the appraisal of clinical studies.
- Fellow uses information technology to manage information and support their education.
- Fellow facilitates the learning of students and other health care professionals.

Interpersonal and Communication Skills (ICS):

- Fellow demonstrates interpersonal and communication skills that result in effective information exchange and teaming with other health care professionals, patients, and their families.
- Fellow creates and sustains a therapeutic and ethically sound relationship with patients, colleagues, and other health care professionals.
- Fellow uses effective listening skills.
- Fellow works effectively with others (including faculty, other residents, and laboratory staff).

Professionalism (P):

- Fellow demonstrates a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
- Fellow demonstrates respect, compassion, and integrity; responsiveness to the needs of patients that supersedes self-interest; accountability to patients, colleagues, and the profession; and, a commitment to excellence and on-going professional development.
- Fellow demonstrates a commitment to ethical principles pertaining to confidentiality of patient information, informed consent, and business practices.
- Fellow demonstrates sensitivity and responsiveness to patients' culture, age, gender, and disabilities.

Systems-Based Practice (SBP):

- Fellow demonstrates an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care and pathology services (specifically, Blood Bank/Transfusion Medicine services) that are of optimal value.
- Fellow understands how their pathology services (specifically, Blood Bank/Transfusion Medicine services) and professional practices affect other health care professionals and organizations.
- Fellow understands principles underlying the practice of cost-effective health care and resource allocation that does not compromise quality of service or patient care.

B. Fellowship Objectives

Objectives for this fellowship are based on the AABB Taskforce on Transfusion Medicine Resident Curriculum recommendations pertaining to curriculum content in Transfusion Medicine / Blood Banking education in

pathology residency programs (Reference: Fung MK, et al. A proposal for curriculum content in transfusion medicine and blood banking education in pathology residency programs. *Transfusion* 2007;47:1930-136). These objectives are divided into three areas (i.e. Transfusion Service, Blood Collection/ Blood Center/ Cell Processing, and Therapeutic Apheresis). By achieving these objectives the fellow should achieve competency in these areas by the end of their one-year fellowship and obtain the “overall fellowship goal” (stated above).

Note: The abbreviation of each ACGME Core Competency specific to each goal is noted in brackets at the end of each statement.

Note: the skill levels of the rotation objectives are roughly divided into three categories:

Skill Level 1: Expectation of all clinical pathology residents after their initial months of training. Skill Level 2: Expectation of all clinical pathology residents by completion of residency training. Skill Level 3: Expectation for all BB and TM fellows (BB and TM fellows objectives consist of Level 1, Level 2, and Level 3).

Transfusion Service:

Skill Level 1

1. Demonstrate knowledge of the principles of patient/unit identification and pre-transfusion testing, including ABO/Rh testing, RBC antibody screen, and antibody identification [PC, MK]
2. Choose appropriate crossmatching methods for various patients (e.g. electronic, immediate spin, antiglobulin) [PC, MK]
3. Recognize and appropriately refer serologic evaluations that are beyond the scope of a hospital-based transfusion service/blood bank [PC, SBP]
4. Describe the expected response to transfusion therapy in adult and pediatric patients [MK, PC]
5. Triage and screen requests for blood components appropriately during inventory shortages [PC, SBP]
6. Demonstrate the ability to perform blood utilization reviews [PC, SBP]
7. Demonstrate the ability to clinically evaluate a reported transfusion reaction and order and interpret appropriate initial laboratory testing [PC, MK, PBLI]
8. Recognize the symptoms and signs of hemolytic and non-hemolytic transfusion reactions, and demonstrate knowledge of the pathophysiology, treatment, and prevention of these complications [MK, PC]
9. Identify the major infectious complications of blood transfusions, the current risk of these infections, and explain how these infections can be prevented [MK]
10. Identify the major non-infectious complications of blood transfusions, including transfusion-related acute lung injury (TRALI), the risk of these complications, and strategies to prevent them [MK]
11. Demonstrate knowledge of the indications for CMV-negative blood, leukocyte reduction, irradiation, and washing of blood components [MK]
12. Choose appropriate blood components and derivatives based on a thorough knowledge of the indications for transfusion [PBLI, PC, MK]
13. 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, PBLI, PC]

14. 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 (ECMO) or in cardiac surgery [MK, PC]
15. Demonstrate knowledge of the pathophysiology and treatment of neonatal alloimmune thrombocytopenia [MK, PC]
16. Demonstrate proficiency in the evaluation and appropriate transfusion therapy of adult and pediatric thrombocytopenic patients secondary to both immune and non-immune etiologies [PC, PBLI]
17. Apply the principles of a massive transfusion protocol [PBLI, ICS, SBP, MK]
18. Demonstrate a working knowledge of the principles of hemostasis and coagulation and proficiency in the initial treatment of patients with bleeding disorders [MK, PC]
19. Demonstrate knowledge of the transfusion requirements of special patient populations (e.g. hematology/oncology, pediatrics, geriatrics, transplantation, burn/trauma) [MK, PC]

Skill Level 2

20. Demonstrate knowledge of options for preventing volume overload in pediatric transfusion therapy [MK, PC, SBP]
21. 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, ICS]
22. Demonstrate ability to distinguish clinically significant from clinically insignificant RBC-specific antibodies [MK]
23. Demonstrate proficiency in evaluating and recommending treatment plans for complex transfusion reactions [MK, ICS, SBP, PC]
24. Demonstrate familiarity with the requirements of all applicable regulatory and accrediting agencies (e.g. JCAHO, CAP, AABB, FDA, FACT) [SBP]
25. Demonstrate competence in managing blood inventory and ability to communicate effectively the hospital's needs to the blood supplier [ICS, SBP]
26. Demonstrate knowledge of various methods of blood conservation, including pre- and peri-operative autologous blood collection, and approaches to "bloodless" surgery [MK, PBLI, SBP]
27. Demonstrate proficiency in evaluating patients refractory to platelet transfusions, including the principles of histocompatibility testing and the roles of HLA-matched platelets vs. platelet crossmatching, and apply this knowledge in selecting appropriate platelet products when indicated [PC, MK]
28. 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]
29. Demonstrate ability to communicate laboratory testing results, transfusion recommendations, and blood supply issues to clinicians, both verbally and in written form [ICS, SBP, PC]
30. Demonstrate ability to write an appropriate consult note for a patient who has an alloantibody, explaining the clinical significance of the finding to the treating physicians and the additional logistical requirements for obtaining compatible blood. [ICS, PC]
31. Demonstrate knowledge of landmark published studies in transfusion medicine [MK, PBLI]

32. Demonstrate proficiency in evaluating and presenting findings to professional colleagues from 1) recent peer-reviewed journal articles related to transfusion medicine and 2) research projects in which the resident may participate [PBLI, ICS]
33. Demonstrate proficiency at preparing educational presentations on transfusion medicine 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) [ICS, MK]
34. Differentiate between plasma derived and recombinant factor products and demonstrate knowledge of on-label and off-label indications for these products [PC, MK, PBLI, SBP]

Skill Level 3

35. Demonstrate ability to interpret difficult antibody panels including those containing multiple alloantibodies, autoantibodies, and antibodies to high frequency antigens [MK, PC].
36. Demonstrate knowledge of specialized test methods in immunohematology including elution, absorption, and use of enzymes [MK].
37. 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].
38. Demonstrate ability to select appropriate factor replacement product(s) including creating an appropriate dose-time schedule for a patient through collaborative discussion with the patient's primary team physician [PC, MK, ICS].
39. Compare and contrast the various methods of performing blood utilization, including prospective versus retrospective review, and the role of peer review as required by Joint Commission and AABB standards [SBP, PBLI, ICS].
40. Demonstrate ability to perform lookback investigation [SP, IC].
41. Demonstrate ability to write an error or deviation report and create a corrective and preventive action plan [ICS, PBLI, SBP].
42. Demonstrate an understanding of the appropriateness of transfusion of serologically incompatible blood in selected clinical circumstances [PC, MK].
43. Demonstrate familiarity with the scientific, legal, and ethical issues surrounding allocation of resources, cost containment, and role of gatekeeper [PBLI, ICS, P, SBP].
44. Demonstrate familiarity with ethical issues in BB and TM (e.g., confidentiality as it relates to the blood donor or patient, HIV testing and reporting, a patient's right to refuse blood transfusion, the use of hematopoietic growth factors in normal donors, and informed consent) [P, PC].
45. Demonstrate knowledge of the basic principles of blood conservation and bloodless medicine and surgery programs, including specific methods of preserving RBC mass, supporting hemostasis, and adjunctive therapies that may be used when the oxygen supplied by the patient's hemoglobin is insufficient [MK, SBP, PBLI].
46. Demonstrate familiarity with the relevant regional plan for major disasters and explain the roles of the local blood supplier and the transfusion service or blood bank in this plan [SBP, ICS].
47. Participate in an accreditation inspection of a laboratory related to TM and/or BB (this may be either an official inspection or an unofficial and /or interim inspection) [SBP, P, ICS].
48. Demonstrate familiarity with the requirements for proper storage, preparation, and traceability of tissue-derived grafts received and dispensed by the transfusion service or blood bank [MK, SBP, PC].

Blood Collection/ Blood Center/ Cell Processing:

Skill Level 1

1. Demonstrate knowledge of current eligibility criteria for blood donors [MK]
2. Compare and contrast the eligibility requirements for allogeneic and autologous blood donations [MK]
3. Perform a donor interview and exam, including obtaining consent to donate (e.g. risks, benefits, alternatives, and answer questions) [PC, ICS, P]
4. Demonstrate knowledge of the indications for therapeutic phlebotomy [MK]
5. Demonstrate proficiency in evaluating and treating adverse reactions associated with blood donation/phlebotomy (both whole blood and apheresis donations) [PC, P, MK]
6. Outline the assay principles (e.g. NAT, ELISA) of required donor blood tests and the associated confirmatory testing, and describe examples of donor re-entry algorithms [MK, SBP]
7. Demonstrate professionalism in interactions with prospective donors [P, ICS]
8. Demonstrate familiarity with the steps in blood component and blood derivative preparation [MK, SBP]
9. Describe the factors that influence the motivation of blood donors [MK, SBP]
10. Demonstrate knowledge of the advantages and disadvantages of directed blood donation and limited donor exposure programs [PC, MK, SBP]
11. Demonstrate knowledge of the techniques of safe, sterile venipuncture, and the associated methods to reduce bacterial contamination of products [PC, MK]
12. Demonstrate familiarity with the types and treatment of donor adverse events [PC, MK]

Skill Level 2

13. Outline the necessary steps in donor notification and counseling associated with positive infectious disease testing results and the donor look-back process [PC, SBP, ICS]
14. 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 [SBP, MK]
15. Demonstrate awareness of current concerns about emerging infections in the blood supply and describe ways that blood collection centers deal with these concerns [MK, PBLI]
16. 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 [SBP, ICS]
17. Demonstrate knowledge of the principles of hematopoietic stem cell transplantation, including collection, processing, and storage of these products, and the indications for use (e.g. bone marrow, peripheral blood, and placental/umbilical cord blood) [MK, SBP, PC]
18. Demonstrate proficiency in writing physician orders for peripheral blood hematopoietic stem cell collections and obtaining consent for the procedure and for blood product transfusion, if needed following the collection [PC, MK, ICS, P]
19. Demonstrate proficiency in evaluating and treating adverse reactions associated with peripheral stem cell collection [PC, MK]

Skill Level 3

20. Demonstrate ability to review quality control data from the collecting, processing, and storage of individuals HSC products and actions needed when product or processing irregularities are identified [MK, SBP, PC].
21. Demonstrate familiarity with emerging areas of cellular therapy, including hematopoietic graft engineering and cellular immunotherapeutics [MK, PBLI, PC].
22. Demonstrate understanding of the elements of current good manufacturing practices and current good tissue practices as they apply to the collection, processing, ex vivo manipulation, and storage of all cellular therapy products (e.g., pancreatic islet cells, negative and/or positive selection and/or purging of HSCs, gene manipulation, donor lymphocyte infusions, dendritic cell vaccines, ex vivo expansion of progenitor cells) [MK, SBP, PC].
23. Demonstrate familiarity with requirements and procedures for source plasma donors [MK, SBP, PC].
24. Demonstrate familiarity with standards and regulations that apply to blood collection centers, clinical tissue banks, and PBPC processing laboratories (FDA, AABB, FACT, CAP) [MK, SBP, PC].
25. Demonstrate familiarity with quality systems as they apply to blood collection centers and PBPC processing laboratories (i.e., AABB Quality System Essentials, ISO 9000, lean manufacturing, Six Sigma) [SBP, PBLI].
26. Participate in quality review of the manufacturing or processing of products [PBLI].

Therapeutic Apheresis:

Skill Level 1

1. Summarize the principles of apheresis technology, including centrifugation, filtration, and immunoabsorption [MK]
2. Demonstrate knowledge of the major indications for therapeutic apheresis including the category of evidence for each of these indications as outlined by AABB/ASFA [MK, PC]
3. Demonstrate knowledge of the appropriate replacement fluids to be used in an apheresis procedure [MK, PC]
4. Demonstrate knowledge of vascular access requirements and options for therapeutic apheresis [MK, PC]
5. Demonstrate proficiency in evaluating and preparing patients for therapeutic apheresis, including obtaining consent for the procedure and for transfusion of blood products during the procedure [ICS, PC, P]
6. Communicate effectively with attending clinicians and housestaff regarding emergent or scheduled therapeutic apheresis procedures through conversations and writing of consult notes [ICS, SBP, P, MK]

Skill Level 2

7. Discuss the major indications for, and limitations of, therapeutic apheresis in children [PC, MK]
8. Demonstrate ability to triage requests for therapeutic apheresis [MK, PC, ICS, P]
9. Demonstrate proficiency in evaluating and treating adverse reactions associated with therapeutic apheresis [PC, MK, ICS]
10. Write appropriate physician orders for therapeutic apheresis procedures [PC, MK, ICS]

Skill Level 3

11. Demonstrate proficiency in treating patients with specialized apheresis methods (e.g., photopheresis, immunoadsorption columns) [PC, MK]
12. Demonstrate proficiency in evaluating, assessing, and treating a wide variety of patients who required therapeutic apheresis for various disorders [MK, PC, ICS, P]
13. 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 physician to develop a plan of care [MK, PC, ICS, SBP, PBLI]