

**Curriculum for Training in Adult Benign Hematology**  
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**I. Introduction**

1) Overview

The following curriculum is meant to fulfill the ACGME requirements for adult hematology training with an emphasis on clinical and research training in benign (non-malignant) hematology. It is structured to exist, if applicable, within a program where most trainees will seek certification in adult hematology/oncology. The ACGME allows hematology specific training to occur if an Institution is only training one individual in straight hematology (within the combined hematology/oncology program) on average, every other year. By adhering to the ACGME requirements for hematology training, on which this curriculum is based, the fellow will be eligible for his/her adult hematology boards. Accompanying this curriculum will be overall competency based goals and objectives as well as specific objectives for each rotation. These goals and objectives are meant to be generic, so as to have broad applicability to training programs. This curriculum will interact with the Hematology Curriculum produced by the American Society of Hematology (ASH) <sup>1</sup> It is anticipated that trainees interested in a career in non-malignant hematology will take advantage of additional mentored research training as a junior faculty member.

2) Background

The need for greater clinical and research training in benign hematology is well chronicled. This has been well documented by an RFA from the NHLBI three years ago. <sup>2</sup> There is also a mandate to train physicians to assume care of patients with common hematologic disorders such as sickle cell disease, hemophilia, and congenital thrombophilia as well as to expand the number of providers in pediatric and adult transfusion medicine. Care of patients with chronic hematologic conditions has become more complex and these patients are entering adult life with few providers available to administer care. <sup>3</sup> Accordingly, it is essential for new adult and med-peds trained physicians to assume this role.

The lack of hematology focus in adult programs is multi-factorial:

- 1) There are numerous adult hematology/oncology programs in the United States (136; ACGME approved), but very few hematology focused programs or hematology/oncology programs that offer the flexibility to train in benign hematology
- 2) There remains an underlying concern that clinical mandates dictate that a greater number of adult oncologists are needed for patient care compared to hematology focused providers
- 3) The starting salary for a private practice oncologist is greater than that for an academic hematologist. Given the current debt burden of graduating residents, this discrepancy is often problematic for increased training in benign hematology

4) There are few model programs that offer training in adult benign hematology. In 2009, there are only 8 ACGME approved hematology programs in the United States and little opportunity for a hematology focused curriculum to exist in conjunction with a combined adult hematology oncology program.

Accordingly, there should be an opportunity for existing adult hematology/oncology programs to work to identify individuals who desire to pursue a career in benign hematology and to structure a clinical and research program which meets the ACGME requirements for training (2 years) along with opportunity for additional research training as a faculty member

### 3) Pathways for benign hematology training

Med/peds residency training is 4 years in duration and these graduates have three options to pursue hematology training. They may choose to be certified in both pediatric hematology/oncology and adult hematology (4 years total) or may seek certification in adult hematology (2 years) or pediatric hematology/oncology (3 years) alone. Both the ABIM and ABP allow for med-peds resident graduates to do combined training in adult and pediatric hematology/oncology, but no competency-based curriculum is currently available and each applicant may have to present an individualized curriculum to the each respective board for scrutiny. For reasons previously cited, the focus of the curriculum described here is on adult hematology training. Other training opportunities (e.g. transfusion medicine) will not be incorporated into this curriculum, but could be offered after the minimum period for certification in hematology is completed.

Table 1 provides an overview of the training pathways available which lead to a career emphasis in benign hematology. In general, hematology training can be initiated from internal medicine or pediatric residency training or from medicine/pediatric (med/peds) residency programs. As Table 1 outlines, residency training from internal medicine or pediatrics usually leads to certification in adult hematology/oncology or pediatric hematology/oncology, respectively. Pediatric hematology/oncology fellows will often pursue a career in benign hematology via an ACGME approved pediatric hematology/oncology fellowship training program. Additionally, recruiting pediatric providers in non-malignant hematology has been more successful than in adult medicine. It is much less common for adult hematology/oncology fellows to pursue a benign hematology career option, particularly if they are training in a combined hematology/oncology program. Thus, the focus of this curriculum is on training in adult hematology, with entry pathways from either internal medicine or med/peds residency programs.

### 4) Curriculum Overview

This curriculum possesses three unique features:

- 1) A clinical focus on training in benign hematology (but still allow the fellow to be board eligible for hematology)
- 2) Continuity clinic experience with an emphasis in non-malignant hematology
- 3) Provide a foundation for additional (non ACGME required) research training.

Clinical experiences for training in this adult benign hematology program will consist of clinical rotations, exclusively during the first year and 25% clinical exposure (night call and continuity clinic) during the second year. Research training will comprise 75%

of the trainee's effort during the second year. Total time in training will be two years. Additional years of research training/mentoring **after** fellowship training will be offered at the faculty level (e.g Instructor level or similar position). This additional training is not required for certification.

## II) Clinical Rotations

1. Inpatient (6 months)
  - a. Leukemia/Lymphoma service (2 months)
  - b. Bone marrow (autologous, allogenic and stem cell) transplantation (1 month)
  - c. Consultative hematology (2 months)
  - d. Sickle cell disease (1 month)
2. Outpatient (6 months)
  - a. Leukemia/lymphoma (1 month)
  - b. General hematology/sickle cell disease (2 months)
  - c. Hemostasis/thrombosis (1 month)
  - d. Laboratory rotation (1 month)
  - e. Transfusion medicine (1 month)
3. Overview: Overall goals and objectives for the Adult Hematology Training Program as well as a specific goals and objectives for all clinical and research rotations are defined in the accompanying sections. Vacation time will be taken during the rotations of two months duration (inpatient leukemia/lymphoma service, inpatient consultative hematology, and outpatient general hematology/sickle cell disease). The equal distribution between inpatient and outpatient hematology is more in keeping with the current practice of hematology.
4. **Error! Reference source not found.** testing overview: <sup>1</sup> For the outpatient experience in general hematology and sickle cell disease, practical case discussions and review of hemoglobin electrophoresis by HPLC or isoelectric focusing and review of important RBC testing procedures such as osmotic fragility, red blood cell (RBC) enzyme assays, and microscopic identification of RBC parasites will take place. Additionally, during the hemostasis/thrombosis rotation, focused learning in testing pertinent to special coagulation testing will be undertaken including: coagulation screening testing (prothrombin time and activated partial thromboplastin time), coagulation factor and inhibitor assays, bleeding time, platelet function studies and heparin induced thrombocytopenia (HIT) assays. During the laboratory rotation month, specific methodologies pertinent to hematology will be reviewed, including Northern blot, Southern blot, Western blot, ELISA, polymerase chain reaction (PCR), immunoprecipitation, microarrays, colony forming unit (CFU) assays and other cellular assays. The fellow will learn specific testing methodology including:
  - a. Automated complete blood count with white blood cell differential
  - b. Reticulocyte count
  - c. Flow cytometry of peripheral blood, bone marrow, body fluids, lymph nodes and other tissues
  - d. Cytogenetics and fluorescence in-situ hybridization (FISH)
  - e. Hematopathology tissue assessment techniques, including standard morphologic evaluation and the use of immunostaining
  - f. Serum and urine protein electrophoreses and immunoelectrophoreses and/or immunofixation

Besides learning about the preceding testing and review of bone marrow, peripheral blood and CSF smears, the laboratory month will also include a structured overview to radiation oncology.<sup>1</sup> The following topics will be reviewed:

- a. Basic principles of radiation biology.
  - b. Approaches of administering radiation therapy, including the different radiation source types (e.g. electron beam, external beam, brachytherapy).
  - c. Short-term toxicities and the potential long-term consequences of radiation therapy (e.g. secondary malignancies, coronary artery disease).
  - d. Interactions of radiation therapy with medications, including antineoplastic pharmacologic agents
5. Transfusion medicine rotation will include an overview of the discipline as well as practical aspects of collection and cellular therapies. Topics will include<sup>1</sup> :
- a. Procedures used to collect, evaluate and prepare blood products for administration to patients.
  - b. Components of blood products typically administered to patients, including red blood cell (RBC) preparations, platelet preparations, granulocyte preparations, fresh frozen plasma and cryoprecipitate. This should include an understanding of various methods by which these blood products can be handled and prepared in response to specific clinical situations, including irradiation, washing and filtering techniques.
  - c. Clinical indications for use of specific blood products and the scenarios for which they are used.
  - d. The potential risks associated with the administration of various blood products. These should include, but are not limited to, allergic (anaphylactic) reactions, graft versus host disease, rejection reactions, introduction of infectious organisms, alloimmunization, delayed transfusion reactions, hemolytic reactions, febrile reactions and others.
  - e. Understanding of alternatives to blood product therapies.
  - f. Indications and processes of assays typically performed in a Blood Bank. These should include cross matching, direct antiglobulin tests (direct Coomb's test), antibody screen (indirect Coomb's test), ABO and Rh typing of red blood cells, and other antibody identification procedures.
  - g. Mechanism by which apheresis can be used to isolate and collect specific blood components from individuals.
  - h. The use of emergent plasmapheresis (as used in TTP), leukapheresis (as used in AML) and RBC exchange (as used in sickle cell anemia).
  - i. Methods used for peripheral blood stem cell collections.

### III) Continuity Clinic

Continuity clinic is an important aspect of ambulatory exposure and an essential part of the curriculum. The fellow will be able to provide longitudinal follow-up of a core group of patients in both malignant and non-malignant hematology. During the first year, the fellow will have two, 6 month blocks. The first 6 months will entail one half day of continuity clinic per week. These first 6 months will encompass malignant hematology patients and the second 6 months of the first year will comprise a broad spectrum of benign hematology patients including those with sickle cell disease, bone marrow failure, disorders of platelets and those with disorders of hemostasis and thrombosis.

In the second year of fellowship training, the fellow will focus on his/her clinical area of expertise in benign hematology (hemoglobinopathies, hemostasis/thrombosis, platelet disorders, bone marrow failure, etc). This continuity clinic will entail one half to three quarters of one day each week to allow for building greater depth in one area of benign hematology. Ideally, the clinic patient mix should match the fellow's research interest. Due to the slightly longer continuity clinic time during the second year, the fellow will still be able to follow a few patients picked up during their first year. Total clinical effort during this second year of training will be approximately 25%, including night and weekend call (an essential aspect of fellowship training).

#### IV) Conferences

There will be formal educational offerings each day of the week during the academic year (September – June). During July and August of each year, there will be specific topics related to research, teaching and ethics. These will be discussed later in this document. An overview of the core conferences is as follows. The conferences and days are a suggestion as each Institution develops their specific curriculum. Key faculty will always be in attendance at these educational offerings. Participation by faculty members is important to the didactic program and attendance will be monitored:

<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
-J Club	Hematology	Grand Rounds	Research	Clinical
-Hematology case	Core Curriculum		Conf	Care Conf
-Slide review		Multidisc Case Conf (e.g. Tumor Board)		

On one day of the week (e.g. Monday), there will be a rotating conference schedule to comprise journal club one week, a detailed hematology case discussion the next week (which is patient based and involving an in depth review of the literature with focus on evidence-based medicine) and slide review on the remaining weeks. The hematology case will be prepared and presented by the fellows with mentorship by the faculty. On the third, fourth, and possibly fifth weeks of each month there will be peripheral, bone marrow and CSF slide review, organized and delivered by the faculty.

On another day, an essential component of the fellow's teaching curriculum will comprise the hematology core curriculum which meets regularly throughout the year. This conference will be modeled after the detailed curriculum provided by educators from the American Society of Hematology (ASH). It will meet on a weekly basis over a ten month time frame (40 topics) and will be repeated yearly. This core curriculum will be organized by and have contribution from the fellows but will for the most part be prepared and delivered by the faculty.

Another day of the week will involve Grand Rounds followed later in the day by a multi-disciplinary conference with input from multiple specialties. This is usually known as "tumor board" but could comprise benign hematology topics. Hematology fellows are involved with preparing and presenting these multidisciplinary conferences and faculty will always be in attendance. A morbidity and mortality conference will be held every three months during this time slot. In both of these conference offerings, imaging studies are reviewed and pathological material are displayed and discussed. On the fourth day, a research conference will be held utilizing in-house faculty, other members within the Department of Medicine as well as visiting faculty. During the second year of training, the fellow will present his/her research in progress at least once during the academic year.

Finally, on the final day of the work week, a case conference reviewing all patients on the respective services will take place. There should be focus at these case related conferences on both malignant and benign hematology. Hospitalized patients should be reviewed each week as well as current consults and complicated or interesting outpatient cases. This conference provides the opportunity to review complicated patient care decisions as well as important ethical scenarios.

Other pertinent educational sessions will include a regular business/administrative meeting with quarterly involvement of the fellows. Additionally, each year there will be an educational retreat, first for the fellows to identify important aspects of the program which might need improvement followed by a combined fellow/faculty retreat where process improvement is put in place to address concerns and to bring out other pertinent information related to the curriculum.

In July and August of each year, the Department of Medicine or the Division of Hematology/Oncology will have set in place formal didactic sessions to address research, teaching and ethics. Research topics will include an overview of clinical research and how to perform appropriate literature reviews, searches and citations. Additionally, the spectrum of clinical research including health services research, clinical trials, clinical epidemiology and other clinical research will be addressed. Topics centering on the ethics of biomedical research will also be addressed, including the integrity of scientific research and conflicts of interest and compliance. The regulatory aspect of human subjects and special issues such as drugs and devices will also be reviewed. Finally, the course will address a broad overview of fundamental statistical concepts as well as model how to write a grant and how best to get these grants approved and funded. It would be helpful for the fellow to be introduced in overview fashion to statistical software programs (e.g. SPSS software).

These introductory summer courses will also focus attention on assisting the fellow to help him/her become a better teacher and mentor. Important topics to address include the role of teaching in academic medicine, how to write proper learning objectives, addressing strategies and style in convincing the audience, dynamics in small group teaching, giving and getting feedback, and how to deliver a presentation with the use of powerpoint.

Finally, introduction to bioethical principles important to the practice of hematology will be formally addressed. These include medical futility and end of life discussion, institutional ethics and ethics committees, transplantation in bioethics and the role of the physician in ethical decision making.

## **V) Procedures**

It is essential that there be a mentored setting for learning key procedures such as bone marrow aspirate/biopsy and lumbar puncture with installation of chemotherapy. These will be taught in a direct proctored setting of an attending physician or an advanced care practitioner. Direct observation and supervision will take place, usually for the first five procedures. However, the Program Director, with input from the faculty, will determine the minimum number of procedures that must be successfully performed under direct observation by qualified faculty before the fellow can be deemed to have sufficient proficiency to perform the procedure under less structured supervision.

## **VI) Research and Scholarly Activity**

Approximately 40% of the hematology fellow's training will be focused on research. It is expected that appropriate "work products" such as grants, abstracts and manuscripts will result from this effort. Each fellow will have a faculty mentor and dedicated work space for their research project. Additionally, the Division should set in place a Scholarship Oversight Committee (SOC) of independent investigators who may periodically monitor and nurture the fellow in the attainment of their research goals (similar to a thesis committee). All types of scholarly activity may be proposed, as long as the SOC approves the activity. The research plan should be outlined with focused aims and the work product produced from this investigation clearly mapped. The SOC should be comprised of both clinical and basic researchers, ideally two of each. One of these four should be from outside the Division to provide greater objectivity to the SOC. However, the Program Director and faculty mentor should not be involved as voting members in adjudicating whether the fellow is accomplishing his/her research goals in a satisfactory fashion.

It is recommended that clinical researchers become involved in a Masters of Science program or a similar Masters level program for formal training in clinical investigation. Additionally, it is suggested that all fellows be offered the opportunity for additional research mentoring as a faculty member (i.e. Instructor) once fellowship training is completed. As previously described, this additional mentoring is not tied to fellowship certification nor will it prolong fellowship training.

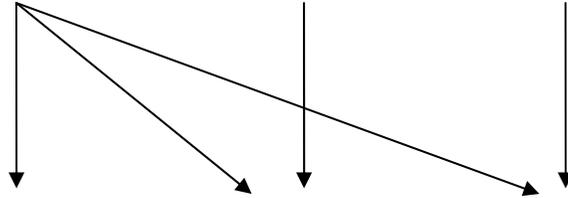
## VII) Evaluations and Fellow Portfolio

- 1) Evaluations: The specifics of each evaluation and their timing is found under each rotation's goals and objectives.
  - a) Evaluation of the fellow: This is generally from two sources. One is from the supervising faculty members who may often pool their evaluations (if the faculty rotate on service weekly or biweekly) so that the fellow may receive a compilation of end of rotation evaluations. This process usually occurs monthly. There will also be a multi-source evaluation comprised of social workers, advanced care practitioners and nurses as well as patients. These evaluations take place on a semi-annual basis.
  - b) Evaluation of the program: The fellows will evaluate the program formally, on a yearly and anonymous basis. Additionally, they will be involved with a yearly fellow's retreat where the program is scrutinized and process improvement can be initiated. The faculty will also contribute in both the yearly retreat and the evaluation process. Finally, the fellow will evaluate each faculty member on an anonymous basis and turn these evaluations into the Program Director. The Program Director then compiles a summary evaluation of each faculty member to present to the Division Chief. The Program Director may make recommendations based upon these fellow evaluations to the Division Chief.
  - c) Final summation evaluation: The Program Director is required by the ACGME to write a final evaluation statement at the end of the training period documenting the fellow's performance during the final time block of education that the "fellow has demonstrated sufficient competence to enter the practice of adult hematology without direct supervision".
- 2) Portfolio: Each fellow will contribute to his/her portfolio and present this to the Program Director twice a year for them to evaluate the progress that the fellow is making in teaching other learners as well as the progress he/she is making in the competency of practice based learning and improvement. The portfolio should include presentations

from: a) Tumor Boards or other multi-disciplinary conferences, b) journal clubs and c) patient care conferences. Any evaluations that the fellow has received from medical students or residents are also important to include. Each fellow should have a copy of their current continuity clinic patient list as well as their procedure list. Finally, key research documentation such as progress reports, abstracts, manuscripts and reviews should also be included. It should be stressed to the fellow that this portfolio information is essential both for fellowship training and for later accreditation at hospitals once they finish their training is complete.

**Table 1. Overview of Clinical/Research Pathways for Training in Adult and Pediatric Benign Hematology**

Entry Residency Pathways	Med/Peds	Internal Medicine	Pediatrics
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Fellowship Training Required for Certification	Adult/Pediatric Hematology	Adult Hematology	Pediatric Hematology/Oncology
a) Clinical Training	2 years	1 year	1 year
b) Research (Clinical or Basic)	<u>2 years</u>	<u>1 year</u>	<u>2 years</u>
Total	4 years	2 years	3 years
Suggested Research Mentoring at Faculty Level (Instructor)			
a) Clinical Research	1 year	2 years	1 year
b) Basic Research	2 years	3 years	2 years
Total Research Training: Fellowship and Faculty Levels			
a) Clinical	3 years	3 years	3 years
b) Basic	4 years	4 years	4 years
Total Years Training (Clinical and Research): Fellowship and Faculty Levels	5-6 years	4-5 years	4-5 years

- 1) Med/Peds trained Residents may choose one of three Fellowship Training Pathways: Adult/Pediatric Hematology, Adult Hematology or Pediatric Hematology/Oncology.
- 2) One year specialty fellowships (e.g. Transfusion Medicine) occur after completion of the core (ACGME required) fellowship training.
- 3) Masters of Science (or similar) degrees are recommended for all fellows undertaking clinical research training.

## **Table 2 Hematology Core Curriculum**

### Benign Hematology Topics

- 1) Normal hematopoiesis
- 2) Sickle cell disease
- 3) Disorders of hemoglobin
- 4) Thalassemia syndromes
- 5) Bone marrow failure
- 6) Disorders of iron and anemia of inflammation
- 7) Megaloblastic anemia
- 8) Storage diseases and disorders of the spleen
- 9) Immunodeficiency for the hematologist
- 10) Transfusion medicine and autoimmune hemolytic anemia
- 11) RBC enzyme and membrane defects and PNH
- 12) Microangiopathic hemolytic anemia
- 13) Erythrocytosis, porphyria and hemochromatosis
- 14) Disorders of platelets
- 15) Physiology of hemostasis
- 16) Acquired hemostatic defects
- 17) Rare hereditary defects
- 18) Hemophilia/VWD
- 19) Thrombophilia and thrombosis
- 20) Neutrophil disorders

### Malignant Hematology Topics

- 1) Principles of chemotherapy
- 2) Chronic myeloproliferative disorders
- 3) AML
- 4) Myelodysplasia
- 5) B cell leukemia/lymphoma
- 6) Waldenstrom's macroglobulinemia
- 7) CLL
- 8) Hairy cell leukemia
- 9) Plasma cell disorders
- 10) Amyloidosis
- 11) B cell lymphoma
- 12) T cell leukemia
- 13) T cell lymphoma
- 14) T cell LGL
- 15) Hodgkin's disease
- 16) Histiocytosis and lymphoproliferative disorders
- 17) Hematologic emergencies
- 18) Stem cell transplantation
- 19) Palliative care
- 20) Hematologic manifestations of systemic and infectious disease

## References

1. Gitlin, SD, Melnick AM and the Hematology Curriculum Subcommittee of the American Society of Hematology Committee on Training Programs
2. RFA HL-06-006; NHLBI
3. Gortmaker SL, Sappenfield W. Chronic childhood disorders: prevalence and impact. *Pediatr Clin North Amer* 1984; 31 3-18.

## Overall Goals and Objectives: Adult Hematology Training

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1. **Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. Fellows are:
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### **Objectives:**

- 1.1. Expected to learn the practice of health promotion, disease prevention, diagnosis, care, and treatment of men and women from adolescence to old age, during health and all stages of illness.
- 1.2. Demonstrate appropriate evaluation and assessment of patients seen in consultation, during inpatient service, and while in the outpatient setting, including taking a history and performing a physical, and appropriate assessment encompassing management, diagnostic testing and procedures.
- 1.3. Develop and provide rationale for the management plans of adolescents and adults with hematologic disease. These include but are not limited to:
  - 1.3.1. acquired and congenital disorders of red cells, white cells, platelets and stem cells;
  - 1.3.2. hematopoietic and lymphoid malignancies, including disorders of plasma cells;
  - 1.3.3. congenital and acquired disorders of hemostasis and thrombosis, including the use of antithrombotic therapy;
  - 1.3.4. transfusion medicine, including the evaluation of antibodies, blood compatibility, and the indications for and complications of blood component therapy and apheresis procedures;
  - 1.3.5. effects of systemic disorders and drugs on the blood, blood- forming organs, and lymphatic tissues;
  - 1.3.6. chemotherapeutic drugs, biologic products, and growth factors and their mechanisms of action; pharmacokinetics, clinical indications, and their limitations, including their effects, toxicity, and interactions;
  - 1.3.7. correlation of clinical information with cytology, histology, and immunodiagnostic imaging techniques;
  - 1.3.8. principles and application of radiation medicine to hematopoietic and lymphoid malignancies;
  - 1.3.9. treatment of patients with disorders of hemostasis and the biochemistry and pharmacology of coagulation factor replacement therapy;
  - 1.3.10. indications and application of imaging techniques in patients with blood disorders;
  - 1.3.11. personal development, attitudes, and coping skills of physicians and other health-care professionals who care for critically ill patients;
  - 1.3.12. rehabilitation and psychosocial aspects of clinical management of patients with hematologic disorders;
  - 1.3.13. participation in a multidisciplinary case management conference or discussion;
  - 1.3.14. human immunodeficiency virus-related malignancies;
  - 1.3.15. care and management of geriatric patients with hematologic disorders;

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- 1.3.16. principles of, indications for, and complications of autologous and allogeneic bone marrow or peripheral blood stem cell transplantation and peripheral stem cell harvests, including the management of post-transplant complications;
- 1.4. Discriminate between changes in clinical status of patients or severity of clinical status of patients who need to be reported to the attending, from those who can be presented during rounds.
- 1.5. Develop and provide rationale for the management plans of adults with acute life threatening or major organ threatening disease or complications related to their hematologic diagnosis. These include but are not limited to:
  - 1.5.1. Febrile neutropenia and sepsis
  - 1.5.2. Acute chest syndrome
  - 1.5.3. Tumor lysis
  - 1.5.4. Acute neurological compromise (seizures and stroke)
  - 1.5.5. Spinal cord compression
  - 1.5.6. Superior vena cava syndrome
  - 1.5.7. Disseminated intravascular coagulation (DIC)
  - 1.5.8. Paraneoplastic disorder
- 1.6. Recognize the indications for and the risks of the following therapies and develop appropriate management plans for the common complications of:
  - 1.6.1. Central Venous Lines
  - 1.6.2. Chemotherapy / Immunotherapy / Immune suppression
  - 1.6.3. Transfusion therapy
  - 1.6.4. Apheresis
  - 1.6.5. Radiation therapy
  - 1.6.6. Surgical therapy
  - 1.6.7. Anti-coagulation therapy
  - 1.6.8. Chelation therapy
  - 1.6.9. Nutritional support
  - 1.6.10. Pain management
  - 1.6.11. Bone marrow/stem cell harvest
- 1.7. When requesting consultation services, demonstrate the ability to formulate an appropriate question and provide rationale supported by pertinent points of the history, physical examination and laboratory data.
- 1.8. The Fellow should be provided formal instruction in and understand the application of testing in hemostasis (e.g. PT, aPTT, platelet aggregation testing) and the complete blood count (CBC).
- 1.9. Recognize the indications for, the common complications of and how to perform the following procedures:
  - 1.9.1. Bone marrow aspiration and biopsy
  - 1.9.2. Lumbar puncture with instillation of chemotherapy

## Overall Goals and Objectives: Adult Hematology Training

- 1.9.3. Preparation of and microscopic examination of peripheral blood films and bone marrow aspirates.

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2. **Medical Knowledge:** Understand the scope of established and evolving biomedical, clinical, epidemiological and social-behavior knowledge sciences, as well as apply this knowledge to patient care.
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### **Objectives:**

- 2.1. Learn the scientific method of problem solving, evidence-based decision making, a commitment to lifelong learning, and an attitude of caring that is derived from humanistic and professional values.
- 2.2. Develop a prioritized differential diagnosis for adults with cancer or hematologic diseases hospitalized for acute illnesses, seen in new consultation, the outpatient setting or in continuity clinic.
- 2.3. Formal instruction should be provided for the fellows to demonstrate understanding of the following areas:
- 2.3.1. Pathogenesis, diagnosis and treatment of disease.
- 2.3.1.1. the basic molecular and pathophysiologic mechanisms, diagnosis, and therapy of diseases of the blood, including anemias, diseases of white blood cells and stem cells, and disorders of hemostasis and thrombosis, and
- 2.3.1.2. etiology, epidemiology, natural history, diagnosis, pathology, staging, and management of neoplastic diseases of the blood, blood-forming organs, and lymphatic tissues.
- 2.3.2. Genetics and developmental biology
- 2.3.2.1. molecular genetics;
- 2.3.2.2. prenatal diagnosis;
- 2.3.2.3. the nature of oncogenes and their products; and
- 2.3.2.4. cytogenetics.
- 2.3.3. Physiology and pathophysiology of:
- 2.3.3.1. cell and molecular biology;
- 2.3.3.2. hematopoiesis;
- 2.3.3.3. principles of oncogenesis;
- 2.3.3.4. tumor immunology;
- 2.3.3.5. molecular mechanisms of hematopoietic and lymphopoietic malignancies;
- 2.3.3.6. basic and clinical pharmacology, pharmacokinetics, toxicity; and
- 2.3.3.7. pathophysiology and patterns of tumor metastases.
- 2.3.4. Clinical epidemiology and biostatistics:
- 2.3.4.1. clinical epidemiology and medical statistics; and
- 2.3.4.2. clinical study and experimental protocol design, data collection, and analysis.

## Overall Goals and Objectives: Adult Hematology Training

- 2.3.5. Basic principles of laboratory and clinical testing, quality control, quality assurance and proficiency standards.
- 2.3.6. Immune markers, immunophenotyping, flow cytometry, cytochemical studies, and cytogenetic and DNA analysis of neoplastic disorders.
- 2.3.7. Malignant and hematologic complications of organ transplantation.
- 2.3.8. Gene therapy.
- 2.4. Demonstrate knowledge of hematological and oncologic conditions including but not restricted to the following (a complete topic list is found in Table 2 of the Curriculum:
  - 2.4.1. Hemoglobinopathies, including the thalassemia syndromes
  - 2.4.2. Inherited and acquired disorders of the red-blood-cell membrane and of red-blood cell metabolism
  - 2.4.3. Autoimmune disorders including hemolytic anemia
  - 2.4.4. Nutritional anemia including iron deficiency
  - 2.4.5. Inherited and acquired disorders of white blood cells
  - 2.4.6. Hemophilia, von Willebrand's disease, and other inherited and acquired coagulopathies
  - 2.4.7. Platelet disorders, including idiopathic thrombocytopenic purpura (ITP) and acquired and inherited platelet function defects
  - 2.4.8. Congenital and acquired thrombotic disorders
  - 2.4.9. Congenital and acquired immunodeficiencies
  - 2.4.10. Leukemia, including acute lymphoblastic leukemia and acute and chronic myeloid leukemia and myelodysplastic syndromes
  - 2.4.11. Hodgkin's disease and Non-Hodgkin's lymphomas
  - 2.4.12. Bone marrow failure of single and multiple lineages
  - 2.4.13. Transfusion medicine and use of blood products
  - 2.4.14. Management of the patient undergoing long-term transfusion therapy
  - 2.4.15. Bone marrow transplant (reconstitution) including:
    - 2.4.15.1. Use of bone marrow transplant as a curative therapy for malignancy and specific genetic diseases including hematologic disorders
    - 2.4.15.2. Use of different sources of stem cells including bone marrow, peripheral blood, and umbilical cord for allogeneic transplant
    - 2.4.15.3. Mechanisms to prepare the patient for receiving an allogeneic marrow including medications and radiation
    - 2.4.15.4. Treatment of graft-versus-host disease and use of post transplant immunosuppression.
    - 2.4.15.5. Recognition and treatment of complications specific to bone marrow transplant

**3) Practice Based Learning and Improvement:** Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence and to continuously improve patient care based on constant self-evaluation and life-long learning. Fellows are expected to develop skills and habits to be able to meet the following goals:

## Overall Goals and Objectives: Adult Hematology Training

### **Objectives:**

- 3.1. Critique one's practice experience to recognize strengths, deficiencies, and limits in knowledge and expertise; then identify and utilize the appropriate resources for remedying those identified deficiencies.
  - 3.2. Set learning and improvement goals.
  - 3.3. Identify and perform appropriate learning activities.
  - 3.4. Systematically analyze practice, using quality improvement methods and implement changes with the goal of practice improvement. This goal is best met by the quality improvement project.
  - 3.5. Incorporate formative evaluation feedback into daily practice.
  - 3.6. Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems.
  - 3.7. Use information technology to optimize learning.
  - 3.8. Participate in the education of patients, families, students, fellows and other health professionals.
- 

**4. Interpersonal and Communication Skills:** The fellow must demonstrate interpersonal and communications skills that result in effective exchange of information and collaboration with patients, their families and health professionals. Fellows are expected to:

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### **Objectives:**

- 4.1. Communicate effectively with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds.
- 4.2. Communicate effectively with physicians, other health professionals and health related agencies.
- 4.3. Work effectively as a member or leader of a health care team or other professional group.
- 4.4. Effectively communicate with other physicians who are either consulting on a primary patient, or are requesting hematology consultation.

## Overall Goals and Objectives: Adult Hematology Training

- 4.5. Maintain comprehensive, timely and legible medical records on primary continuity patients.
- 

**5. Professionalism:** Fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. They are expected to:

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### **Objectives:**

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that supersedes self-interest.
  - 5.2. To maintain all appropriate educational activities necessary for clinical certifications necessary for the appropriate practice of medicine, including but not limited to CPR, ACLS, and Internal Medicine board certification; To maintain all institutional educational activities necessary to remain a member in good standing of a hospital staff, or institutional review board (IRB).
  - 5.3. Continually demonstrate accountability to all patients (even if other physicians are primarily responsible for their care) and the health care team.
  - 5.4. Demonstrate a commitment to excellence and ongoing professional development by being prepared, on-time, in appropriate attire and contributing in rounds, teaching conferences and didactic lectures.
  - 5.5. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in the daily care of inpatients.
  - 5.6. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communications and care decisions.
  - 5.7. Honestly assess one's contribution to errors that are made, accept responsibility for personal mistakes and implement plans to prevent one's self and others from making the mistake again.
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**6. Systems Based Practice:** Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Fellows are expected to:

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## Overall Goals and Objectives: Adult Hematology Training

### Objectives:

- 6.1. Prioritize the various modes of diagnostic testing and select the most appropriate testing modality, with a goal toward preventing unnecessary laboratory or imaging tests. This cost awareness should extend to all aspects of patient care.
- 6.2. Incorporate risk-benefit analysis in patient and/or population-based care as appropriate.
- 6.3. Demonstrate the ability to work effectively with other members of the health care team, including, but not limited to, other physicians, nurses, pharmacists, dietitians, child life specialists, discharge planners, social workers and chaplains.
- 6.4. Acknowledge medical errors in a forthright manner, and report observed medical errors (real or potential) to the appropriate member of the care team, then work with the team to develop a plan for preventing future errors.
- 6.5. Comply and participate with institutional systems that have been developed to prevent errors in the administration of medications or procedures; this includes “high risk” medications, such as chemotherapy and immunosuppressive medications, as well as “time out” in surgical procedures.
- 6.6. Recognize the different mechanisms of funding medical treatment, and understand the specific problems and challenges associated with each system.
- 6.7. Advocate for the patient as needed, whether within the hematology team, hospital system, schools, or insurance systems

## Goals and Objectives: Inpatient Leukemia Lymphoma Service

### Overall Description

The Fellow will be assigned to the Adult Leukemia/Lymphoma Service for two months duration during the first year of training. They will work alongside a faculty member dedicated to the inpatient service, along with internal medicine house staff, advanced care practitioners, medical students, nurses and other healthcare providers such as specialists in pain management, drug therapy, and nutrition. The fellow will be part of a multidisciplinary team to help manage these patients.

The educational purpose of this rotation is for the fellow to gain an in depth exposure to the non-bone marrow/stem cell transplant management of patients with hematologic malignancies including diagnosis, treatment, management of complications and follow-up. Patients on this service will include the various types of acute and chronic leukemias as well as the lymphomas and lymphoproliferative disorders.

The rotation will comprise only inpatient exposure and is only given during the first year. The fellow will be expected to enroll several of these inpatient leukemia/lymphoma patients for follow-up in his/her continuity clinic. This exposure will encompass follow-up in the outpatient setting, off therapy follow-up and transition to care, in some cases to hospice care. These activities are an important part of the overall training experience.

By the end of this first clinical year, the fellow will have made significant progress toward practicing independently. Call experiences and continued continuity clinic during the second year will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. The fellow will:

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### Objectives:

- 1.1. The fellow will demonstrate effective patient management experience in:
  - 1.1.1 Diagnostic evaluations and staging of new patients and determining treatment plans for new patients
  - 1.1.2 Staging and reassessment of established patients who relapse
  - 1.1.3 Administration of chemotherapy
  - 1.1.4 Management of complications such as nausea and vomiting, bleeding, febrile neutropenia, mucositis and pain.
  - 1.1.5 Provision of nutrition, both enteral and parenteral
  - 1.1.6 Use of blood components
  - 1.1.7 Care of terminally ill patients

## Goals and Objectives: Inpatient Leukemia Lymphoma Service

- 1.2. Demonstrate through presentations of patients the ability to report a detailed and appropriate history and physical examination along with pertinent diagnostic studies.
- 1.3. Develop and provide a rationale management plan for adults with leukemia/lymphoma disorders.
- 1.4. Learn to manage leukemia/lymphoma patients that can be followed within the fellow's continuity clinic under the supervision of a faculty member.
- 1.5. Be able to discriminate changes in clinical status of patients while regularly reassessing the severity of clinical status in patients who need to be reported to the attending immediately as differentiated from more routine problems discussed on daily rounds.
- 1.6. Develop and provide a rationale for the management of adults with acute life threatening or major organ threatening diseases such as those listed below. (refer to the overall Goals and Objectives section):
  - 1.6.1. Sepsis and febrile neutropenia
  - 1.6.2. Acute tumor lysis
  - 1.6.3. Acute neurologic compromise
- 1.7. Recognize the indications for and the risks of the following therapies and develop appropriate management plans for the common complications of:
  - 1.7.1. Central venous lines
  - 1.7.2. Chemotherapy
  - 1.7.3. Transfusion therapy
  - 1.7.4. Radiation therapy
  - 1.7.5. Surgical therapy
  - 1.7.6. Nutritional support
  - 1.7.7. Pain management
- 1.8. When utilizing consultative services, be able to demonstrate the ability to pose appropriate questions and provide the rationale for the consultation.
- 1.9. Be able to differentiate between patients able to be managed on the inpatient unit compared to those who require more intensive support in the critical care setting.

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**2. Medical Knowledge:** Demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. The fellow is expected to:

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## Goals and Objectives: Inpatient Leukemia Lymphoma Service

### Objectives:

- 2.1. Gain knowledge and experience in management of patients with the following diagnoses
    - 2.1.1. Acute and chronic leukemias, including various types of leukemia (myeloid or lymphoid leukemia) and myelodysplasia.
    - 2.1.2. Lymphomas including B and T cell Lymphoma, plasma cell disorders, amyloidosis, Waldenstrom's macroglobulinemia, Hodgkin's Disease
    - 2.1.3. Histiocytosis and lymphoproliferative disorders
    - 2.1.4. Hematologic emergencies
    - 2.1.5. Palliative care
  - 2.2. Develop a prioritized differential diagnosis for adults with presumed leukemia or lymphoma hospitalized in the evaluation of these conditions or related to an acute illness secondary to their primary diagnosis.
- 

### **3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and health professionals. As listed below in the objectives, the fellow will:

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- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Be able to lead a discussion with a patient and family regarding a newly diagnosed leukemia/lymphoma condition
- 3.3. Be able to obtain informed consent for bone marrow aspirates/biopsy, cerebrospinal fluid assessment and administration of intrathecal chemotherapy and conscious sedation.
- 3.4. Effectively communicate changes in patient status to attending physicians and other members of the interdisciplinary team
- 3.5. Be able to communicate effectively to other members in the leukemia/lymphoma service regarding the patients the fellow is managing in the weekly clinical care conference.
- 3.6. Maintain comprehensive, timely and legible medical records

## Goals and Objectives: Inpatient Leukemia Lymphoma Service

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- 4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:
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### Objectives:

- 4.1. Utilize the cooperative group website and other information to stay abreast of up to date and pertinent information regarding clinical trials as they relate to patients with disorders of leukemia or lymphoma.
  - 4.2. Present new cases at interdisciplinary conferences (e.g. Tumor Board) with a detailed evidence based medicine search of the literature in defense of the treatment strategy being recommended for the patient. Utilize feedback from these conferences to improve his/her ability to present information
  - 4.3. Utilize objective feedback from the annual yearly hematology site exam to improve ones knowledge base in leukemia/lymphoma
  - 4.4. Participate in the education of the patients families, students and residents and other health care professionals.
    - 4.4.1. Provide daily updates to the patients and their families with regarding their plan of care
    - 4.4.2. Participate in the education of residents and medical students and other healthcare professionals while on the inpatient service
- 

- 5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below the fellow will:
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- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Demonstrate accountability to all patients and the healthcare team
- 5.3. Demonstrates a commitment to excellence and ongoing professional development by being prepared for patient care in rounds demonstrating punctuality and dressing in appropriate attire and contributing in rounds, teaching conferences and didactic lectures

## Goals and Objectives: Inpatient Leukemia Lymphoma Service

- 5.4. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
  - 5.5. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
  - 5.6. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
  - 5.7. Demonstrate empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
  - 5.8. Demonstrate advocacy for patients and their families
  - 5.9. Determine to honestly assess ones contribution in errors that are made, accept responsibility for mistakes or untoward outcomes and implement plans to prevent yourself and others from repeating the mistake.
- 

**6. Systems - Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:

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### Objectives:

- 6.1. Prioritize the various modes of diagnostic testing and select the most appropriate testing modality with the goal towards preventing any unnecessary laboratory or imaging testing
- 6.2. Demonstrate the ability to work effectively with other members of the healthcare team, including but not limited to, other physicians, nurses, pharmacists, nutritionist and social workers
  - 6.2.1. Be able to work effectively with discharge planners to arrange home-care and follow-up for soon to be discharged patients
  - 6.2.2. Correspond with the pain-management team to provide appropriate and adequate pain control to hospitalized patients.
  - 6.2.3. Work with nutrition support to provide appropriate level of nutritional expertise including TPN support to hospitalized patients.
- 6.3. Comply with institutional systems that have been developed to prevent errors in the administration of “high risk” medications, such as chemotherapy and immunosuppressive medications.

## **Goals and Objectives: Inpatient Leukemia Lymphoma Service**

- 6.4. Avoid the use of ambiguous or unacceptable abbreviations in the medical record or in writing prescriptions and in ordering tests or other lab or medications.

### **Learning Activities**

1. Direct patient care
2. Supervision of house staff and advanced care practitioners who are providing the patient care
3. Performance of procedures (lumbar puncture with installation of chemotherapy, bone marrow aspirate and biopsy and conscious sedation) and review of bone marrow, peripheral blood, and cerebrospinal fluid samples.
4. Assigned reading
5. Project/conference preparation
6. Inpatient “sit down” rounds including inter-disciplinary team members and daily “walk” rounds with other learners and faculty. These rounds will include at least two hours of interaction per day. Half of that time will be focused on education including differential diagnosis, evaluation, treatment plan, and appropriate follow-up.
7. Continuous interaction with faculty on all decisions made in the inpatient setting
8. Weekly clinical care conference
9. Weekly inter-disciplinary (e.g. tumor board) conference
10. Weekly hematology core curriculum and slide review
11. Addition of lectures, procedures and continuity clinic patients to portfolio

### **Assessment Methods (Fellows)**

1. Global evaluation completed by the faculty at the end of each monthly rotation (this may comprise input from several faculty members and is shared verbally with the fellow and by electronic communication. This will be reviewed with them during their semi-annual meeting by the Program Director).
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients themselves and family members.

### **Assessment Method (Program Evaluation)**

1. Fellows should complete an evaluation of all the rotations at the end of each rotation as well as the program, once per year, utilizing an anonymous evaluation tool.
2. Semi-annual, anonymous evaluation of each faculty member by the fellow
3. Yearly meeting between the faculty and the fellows to review the overall program.
4. Monthly meeting of the educational committee which addresses items of focus which surface regularly and areas of importance recognized after the yearly

## **Goals and Objectives: Inpatient Leukemia Lymphoma Service**

faculty/fellow retreat. This forum is essential to put into place required improvements.

5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision**

1. The fellow on the leukemia/lymphoma service works under the direct supervision of a faculty member at all times.
2. During night call there is an oncology faculty member available, on call, to discuss calls and patient related issues.

### **Educational Resources**

1. The ASH reading list associated with pertinent leukemia/lymphoma topics
2. Other specific reading list provided by the faculty.

## Goals and Objectives: Bone Marrow (Stem Cell) Transplantation

### Overall Description

This rotation is exclusively an inpatient rotation of one month duration during the first year of fellowship training. They will work alongside a faculty member dedicated to the bone marrow transplant service, along with advanced care practitioners, medical students, nurses and other healthcare providers such as specialists in pain management, drug therapy, and nutrition. The fellow will be part of a multidisciplinary team to help manage these patients.

The educational purpose of this rotation is to be learn the unique aspects of bone marrow or stem cell transplantation as they relate to malignant and non-malignant conditions necessitating more aggressive therapy. The fellow will understand not only the conditions for which transplantation should be considered but also the complications and will gain experience in viewing pathologic material related to assessment of graft vs. host disease such as: skin biopsies and liver, intestinal and lung biopsy material.

By the end of this first clinical year, the fellow will have made significant progress toward practicing independently. Call experiences and continued continuity clinic during the second year will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. For the objectives, the fellow will:

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### Objectives:

- 1.1. The fellow will gain experience in management of patients with the following emphases:
  - 1.1.1. Assessment of proper indications for performing a bone marrow or stem cell transplantation
  - 1.1.2. Understanding the evaluation that must take place prior to initiating a bone marrow transplantation
  - 1.1.3. Principles of administration of marrow ablation, chemotherapy/radiation therapy
  - 1.1.4. Management of complications of bone marrow transplantation such as nausea and vomiting, febrile neutropenia, mucositis and pain.
  - 1.1.5. Provision of nutrition both enteral and parenteral
  - 1.1.6 Use of blood components
  - 1.1.7 Able to asses graft vs. host disease
  - 1.1.8 Understand when different clinical problems of bone marrow transplantation occur in relation to the timing of the stem cell transplant

## Goals and Objectives: Bone Marrow (Stem Cell) Transplantation

- 1.2. Demonstrate through patient presentations, the ability to report a detailed and appropriate history and physical examination along with supporting diagnostic studies.
  - 1.3. Develop and provide the rationale for the management plan of adults undergoing bone marrow/stem cell transplant.
  - 1.4. Be able to recognize both early and late signs of graft vs. host disease.
  - 1.5. Be able to discriminate changes in clinical status of patients, reassessing their clinical severity and understanding the importance of reporting these results to the attending, either immediately or for more routine problems, on daily rounds.
  - 1.6. Develop and provide a rationale for the management of adults with acute life threatening or major organ threatening diseases such as:
    - 1.6.1. Sepsis
    - 1.6.2. Acute tumor lysis
    - 1.6.3. Acute neurologic compromise
    - 1.6.4. Management of graft vs. host disease
  - 1.7. Recognize the indications for and the risks of the following therapies and develop appropriate management plans for the common complications of:
    - 1.7.1. Central venous lines
    - 1.7.2. Chemotherapy
    - 1.7.3. Transfusion therapy
    - 1.7.4. Radiation therapy
    - 1.7.5. Surgical therapy
    - 1.7.6. Nutritional support
    - 1.7.7. Pain management
  - 1.8. Understand when to utilize consultative services, either in the acute or chronic post-bone marrow transplant setting. These consultants include but are not limited to: dermatology, infectious disease, gastroenterology, and hepatology.
  - 1.9. Be able to differentiate between patients able to be managed on the inpatient unit compared to those who require more aggressive support in the intensive care setting.
  - 1.10. The fellow must demonstrate understanding of when the appropriate biopsies must be taken (liver, lung, GI tract, and skin) and how to consult the proper physician.
- 

2. **Medical Knowledge:** Understand the scope of establishment and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by adult hematologist; demonstrate the ability to acquire critically interpret and apply this

## **Goals and Objectives: Bone Marrow (Stem Cell) Transplantation**

knowledge in patient care. As listed below in the objectives, the fellow is expected to:

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### **Objectives:**

- 2.1. Understand when bone marrow/stem cell transplantation should be utilized, the key problems which may occur from this treatment modality and the long term morbidity including graft vs. host disease.
  - 2.2. Develop an understanding of the unique complications specific to bone marrow transplantation and their treatment:
    - 2.2.1. Viral infections
    - 2.2.2. Pulmonary hemorrhage
    - 2.2.3. Vasoocclusive disease of the liver
    - 2.2.4. Acute graft vs. host disease
    - 2.2.5. Sepsis
    - 2.2.6. mucositis
    - 2.2.7. Multi-system organ failure
- 

- 3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and professional associates. As listed below, the fellow will:
- 

### **Objectives:**

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Lead a discussion with the patient and the family about the diseases which might be amenable to bone marrow/stem cell transplantation and relate the efficacy and potential complications of the procedure
- 3.3. Effectively communicate changes in patient status to attending physicians and other members of the interdisciplinary team
- 3.4. Be able to communicate effectively to other members on the bone marrow transplant service regarding the patients the fellow is managing/supervising on rounds and in the weekly clinical care conference.
- 3.5. Maintain comprehensive, timely and legible medical records

## Goals and Objectives: Bone Marrow (Stem Cell) Transplantation

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- 4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. The fellow is expected to:
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### **Objectives:**

- 4.1. The fellow will learn how to incorporate feedback from case discussions with the faculty to improve on their understanding of the unique clinical parameters associated with bone marrow transplantation. There should be at least two of these presentations to the faculty during the month, supported by evidence based medicine and review of the literature, so that the fellow can objectively track improvement.
  - 4.2. Utilize the scores on the bone marrow transplant section of the annual in-training examination to point out areas of need for increased knowledge and understanding.
- 

- 5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:
- 

### **Objectives:**

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Continually demonstrate accountability to patients and the healthcare team
- 5.3. Demonstrates a commitment to excellence and ongoing professional development by being prepared for patient care in rounds demonstrating punctuality and dressing in appropriate attire and contributing in rounds, teaching conferences and didactic lectures
- 5.4. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities

## **Goals and Objectives: Bone Marrow (Stem Cell) Transplantation**

- 5.5. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
- 5.6. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
- 5.7. Demonstrate empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
- 5.8. Demonstrate advocacy for patients and their families
- 5.9. Determine to honestly assess ones contribution in potential

- 6. System Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. The fellow is expected to:

### **Objectives:**

- 6.1. Prioritize the various modes of diagnostic testing in the bone marrow transplant setting and select the most appropriate testing modality with the goal towards preventing any unnecessary laboratory or imaging testing
- 6.2. Demonstrate the ability to work effectively with other members of the healthcare team, including but not limited to, other physicians, nurses, pharmacists, nutritionist and social workers
  - 6.2.1. be able to work effectively with discharge planners to arrange home-care and follow-up for soon to be discharged patients
  - 6.2.2. Correspond with the pain-management team to provide appropriate and adequate pain control to hospitalized patients.
  - 6.2.3. Work with nutrition support to provide appropriate level of nutritional expertise including TPN support to hospitalized patients.
- 6.3. Comply with institutional systems that have been developed to prevent errors in the administration of “high risk” medications, such as chemotherapy and immunosuppressive medications.
- 6.4. Avoid the use of ambiguous or unacceptable abbreviations in the medical record or in writing prescriptions and in ordering tests or other lab or medications.

## **Goals and Objectives: Bone Marrow (Stem Cell) Transplantation**

### **Learning Activities**

1. Inpatient “sitting” rounds including inter-disciplinary team members and daily “walk” rounds with other learners and faculty. These rounds will include at least two hours of interaction discussion per day. Half of that time will be focused on education including proper differential diagnosis, evaluation, treatment plan, and appropriate follow-up.
2. Since learners such as house staff and medical students are not as available on the bone marrow transplant service, the fellow has the opportunity for primary patient care and works closely with the attending and mid-level providers.
3. Continuous interaction with faculty on all decisions made for this inpatient group
4. Weekly BMT patient care conference
5. Weekly inter-disciplinary (tumor board) conference
6. Weekly hematology core curriculum and slide review
7. Performance of procedures (lumbar puncture with installation of chemotherapy, bone marrow aspirate and biopsy and conscious sedation) and review of bone marrow, peripheral blood, and cerebrospinal fluid samples.

### **Assessment Methods (Fellows)**

1. Global evaluation completed by the faculty at the end of each monthly rotation (this may comprise input from several faculty members and this is shared with the fellow by electronic communication). These are reviewed with them during their semi-annual meeting with the Program Director.
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients themselves and family members.
3. Detailed medical record review such as a chart simulated recall where the attending may review and discuss with the fellow what was written and get further insight beside his thoughts on the impression, plan and any laboratory performed.
4. View of procedure logs and continuity patients should occur on a semi-annual basis by the Program Director and/or the mentor.
5. All conference presentation should be assessed by those in attendance (including fellows and faculty) and written feedback provided to the fellow.
6. Medical knowledge can be assessed objectively with the yearly in-service training exam which the fellow can compare his or her progress on an annual basis.

### **Assessment Method (Program Evaluation)**

1. Fellows should complete and evaluation of the program and all the rotations once per year utilizing an anonymous evaluation tool.
2. Semi-annual evaluation of each faculty member by each fellow
3. Yearly meeting between the faculty and the fellows to review the program in general.

## **Goals and Objectives: Bone Marrow (Stem Cell) Transplantation**

4. Monthly meeting of the educational committee which addresses items of importance and focus after the yearly faculty/fellow meeting to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision**

1. The fellow on the BMT service works directly under the direct supervision of a faculty member at all times.
2. During night call there is an oncology faculty member available to discuss calls and patient related issues.

### **Educational Resources**

1. The ASH reading list associated with bone marrow/stem cell related topics
2. Other specific reading list provided by the faculty.

## Goals and Objectives: Inpatient Consultative Hematology

### Overall Description

The Fellow will be assigned to this rotation for two months of a longitudinal rotation and will be given during the first year. This will be an inpatient rotation but may occasionally involve consultation in the Emergency Department or in the outpatient setting. The fellow will work alongside a faculty member dedicated to the consult service and may often have other learners, residents and medical students, who they will supervise and teach.

The educational purpose of the consultative hematology rotation is to expose the fellow to the broad range of inpatient non-malignant hematology. This includes disorders of hemoglobin, bone marrow failure, anemia, immune deficiency, transfusion medicine, disorders of red cells and platelets, coagulation defects and neutrophil disorders. The purpose is not only to learn about each of these areas, but to be able to integrate evaluation, diagnosis, and treatment in the important area of consultation.

By the end of this first clinical year the fellow will have made significant progress for competency to enter practice without direct supervision. Call experiences and continued continuity clinic during the second year will broaden skills in consultative hematology by the completion of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. For the objectives, the fellow will:

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### Objectives:

- 1.1. Develop and provide the rationale for a management plan for adults with hematologic disorders.
- 1.2. Recognize the indications for and the risks of the following therapies in the inpatient setting and develop an appropriate management for the common complications of:
  - 1.2.1. Exchange transfusion therapy
  - 1.2.2. Simple transfusion therapy
  - 1.2.3. Factor replacement therapy
  - 1.2.4. Anti-coagulation therapy
- 1.3. Understand the hospital management and appropriate consultation of those patient with bleeding disorders, either acquired or congenital as well as thrombosis, anemias and white blood cell disorders.

## Goals and Objectives: Inpatient Consultative Hematology

- 1.4. When utilizing consultative services, be able to demonstrate to the consulting physician the ability to pose an appropriate question for them to address as well as the rationale for the consultation.
- 1.5. Recognize the indications for and the common complications of the following procedures:
  - 1.5.1. Conscious sedation
  - 1.5.2. Bone marrow aspiration and biopsy
  - 1.5.3. Lumbar puncture with installation of chemotherapy.
- 1.6. Recognize the indications for and the risks of the following therapies and develop appropriate management plans for the common complications of:
  - 1.6.1. Central Venous Lines
  - 1.6.2. Chemotherapy
  - 1.6.3. Transfusion Therapy
  - 1.6.4. Radiation Therapy
  - 1.6.5. Surgical therapy
  - 1.6.6. Nutritional Support
  - 1.6.7. Pain Management

2. **Goal: Medical Knowledge.** Understand the scope of establishment and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by adult hematologist; demonstrate the ability to acquire critically interpret and apply this knowledge in patient care.

### Objectives

- 2.1. To prioritize a differential diagnosis for adults with hematologic disease or for those hospitalized for acute illness related to a hematologic disorder. Also to how to evaluate and recommend treatment.
- 2.2. Demonstrate knowledge of the following conditions:
  - 2.2.1. Bone marrow failure syndromes.
  - 2.2.2. Disorders of iron and anemia of inflammation
  - 2.2.3. Megaloblastic anemia
  - 2.2.4. Storage disorders and storage disorders of the spleen
  - 2.2.5. Immuno-deficiency for the hematologist
  - 2.2.6. Red cell membrane defects
  - 2.2.7. Microangiopathic hemolytic anemia
  - 2.2.8. Erythrocytosis, porphyria, and hemochromatosis
  - 2.2.9. Disorders of platelets
  - 2.2.10. Acquired and congenital hemostatic defects
  - 2.2.11. Thrombophilia and thrombosis
  - 2.2.12. Neutrophil disorders

## Goals and Objectives: Inpatient Consultative Hematology

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- 3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and professional associates.
- 

### Objectives:

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
  - 3.2. Be able to obtain informed consent for fellow performed procedures and conscious sedation.
  - 3.3. Be able to communicate effectively to other members of the consult service regarding the patient's the fellow is managing on daily patient rounds and in the weekly clinical care conference.
- 

- 4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:
- 

### Objectives:

- 4.1. Present new cases to hematology faculty with a detailed literature review in defense of the treatment being recommended to the patient. Utilize feedback from this experience to improve in future presentations
  - 4.2. Utilize objective feedback from the annual yearly hematology site exam to improve ones knowledge base in consultative hematology
  - 4.3. Actively participate in the education of patients, families, medical students and other health professionals.
- 

- 5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:
-

## Goals and Objectives: Inpatient Consultative Hematology

### Objectives:

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Demonstrate a commitment to excellence and ongoing professional development by being prepared for patient care rounds, demonstrating punctuality, dressing in appropriate attire and contributing in rounds, teaching conferences and didactic lectures
- 5.3. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
- 5.4. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
- 5.5. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
- 5.6. Demonstrate empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
- 5.7. Demonstrate advocacy for patients and their families
- 5.8. Determine to honestly assess ones contribution in errors that are made, accept responsibility for mistakes or untoward outcomes and implement plans to prevent ones' self and others from repeating the mistake.

- 6. System - Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow will:

### Objectives:

- 6.1. Prioritize the various modes of diagnostic testing and select the most appropriate testing modality, preventing any unnecessary laboratory or imaging testing
- 6.2. Demonstrate the ability to work effectively with other members of the healthcare team, including but not limited to, other physicians, nurses, pharmacists, nutritionist and social workers

## **Goals and Objectives: Inpatient Consultative Hematology**

- 6.3. Comply with institutional systems that have been developed to prevent errors in the administration of blood transfusion and high risk medication such as immunosuppressive medications, coagulation factor concentrates and anti-coagulants.
- 6.4. Avoid the use of ambiguous or unacceptable abbreviations in the medical record or in writing prescriptions and in ordering tests or other lab or medications.

### **Learning Activities:**

1. Direct patient care
2. Supervision of house staff who are involved with patient care
3. Performance of procedures (lumbar puncture with installation of chemotherapy, bone marrow aspirate and biopsy and conscious sedation) and review of bone marrow, peripheral blood, and cerebrospinal fluid samples.
4. Assigned reading
5. Project/conference preparation
6. Inpatient “sit down” rounds including inter-disciplinary team members and daily “walk” rounds with other learners and faculty. These rounds will include at least two hours of interaction per day. Half of that time will be focused on education including differential diagnosis, evaluation, treatment plan, and appropriate follow-up.
7. Continuous interaction with faculty on all decisions made in the inpatient setting
8. Weekly clinical care conference
9. Weekly inter-disciplinary (e.g. tumor board) conference
10. Weekly hematology core curriculum and slide review
11. Addition of lectures, procedures and continuity clinic patients to portfolio

### **Assessment Methods (Fellows):**

1. Global evaluation completed by the faculty at the end of each monthly rotation (this may comprise input from several faculty members and is shared with the fellow by electronic communication or reviewed with them during their semi-annual meeting with the program director). Needing the feedback from each attending is strongly encouraged in addition to these written evaluations.
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients themselves and family members.

### **Assessment Method (Program Evaluation):**

1. Fellows should complete and evaluation of the program and all the rotations once per year utilizing an anonymous evaluation tool.
2. Semi-annual evaluation of each faculty member by each fellow

## **Goals and Objectives: Inpatient Consultative Hematology**

3. Yearly meeting between the faculty and the fellows to review the program in general.
4. Monthly meeting of the educational committee which addresses items of importance and focus after the yearly faculty/fellow meeting to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision:**

1. Continuous supervision of the hematology/consult faculty member for all patient care decisions.
2. During night call there is a hematology faculty member available to discuss calls and patient related issues.

### **Educational Resources:**

1. The ASH reading list associated with pertinent non-malignant hematology topics
2. Other specific reading list provided by the faculty.

## Goals and Objectives: Inpatient Sickle Cell Disease

### Overall Description

The Fellow will be assigned to the Inpatient Sickle Cell Service for one month during the first year of training and as the name implies, will be an entirely inpatient experience. They will work alongside a faculty member dedicated to the this service, along with internal medicine house staff, advanced care practitioners, medical students, nurses and other healthcare providers such as specialists in pain management, drug therapy, and nutrition. The fellow will be part of a multidisciplinary team to help manage these patients.

Educational purpose: This rotation will provide an in depth experience for the fellow to learn the multi-disciplinary aspects of the complications surrounding various sickle hemoglobinopathies. These include but are not limited to: management of vaso-occlusive crises and end organ dysfunction such as chronic lung disease, renal involvement, skin ulcers, and priapism. Focus on chronic transfusion therapy and other therapies will also take place. The learner will be managing patients with sickle hemoglobinopathies including hemoglobin SS, SC, and S-Beta thalassemia as well as the thalassemia syndromes.

By the end of this first clinical year, the fellow will have made significant progress towards practicing independently. Call experiences and continued continuity clinic during the second year will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. For the objectives, the fellow will:

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### Objectives:

- 1.1. Learn the appropriate diagnostic evaluation and management of the complications of sickle cell disease including, but not limited to, vaso-occlusive, pain, chest syndrome, priapism, and stroke and post-operative management
- 1.2. Know how to diagnose and manage the thalassemia syndromes.
- 1.3. Recognize the indications for and the risks of the following therapies in the inpatient setting and develop appropriate management for the common complications of:
  - 1.3.1. Exchange transfusion therapy
  - 1.3.2. Simple transfusion therapy

## Goals and Objectives: Inpatient Sickle Cell Disease

- 1.4. Be able to discriminate between those patients who need treatment in the inpatient unit or those who require escalation of care, such as: worsening chest syndrome, stroke and the need for intensive care management.
- 

**2. Medical Knowledge.** Demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:

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### **Objectives:**

- 2.1. Ability to diagnose and differentiate the various hemoglobinopathies.
  - 2.2. Understand how to manage the complications of sickle cell disease.
  - 2.3. Develop a thorough understanding of vaso-occlusive pain management and how to interact with experts in pain medicine.
  - 2.4. Understand the complications of sickle hemoglobinopathies such as splenic sequestration, stroke, chest syndrome, overwhelming sepsis, renal dysfunction, priapism, vaso-occlusive pain, and chronic skin ulcers.
- 

**3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and professional associates. As listed below in the objectives, the fellow will be expected to:

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### **Objectives:**

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Be able to communicate effectively to other members in the sickle cell service regarding the patients the fellow is managing, both in rounds and in the weekly clinical care conference.

## Goals and Objectives: Inpatient Sickle Cell Disease

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4. **Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:
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### Objectives:

- 4.1. Present new sickle cell and hemoglobinopathy cases to hematology faculty with a detailed literature review in defense of the treatment being recommended to the patient and utilize the feedback from these sessions to grow professionally.
  - 4.2. Learn to participate in the education of patients, families, medical students and other health professionals.
  - 4.3. Utilize objective feedback from the annual yearly hematology site exam to improve ones knowledge base in sickle cell disease
- 

5. **Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity.
- 

### Objectives:

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Continually demonstrate accountability to all patients and the healthcare team
- 5.3. Demonstrate a commitment to excellence and ongoing professional development by being prepared for patient care in rounds demonstrating punctuality and dressing in appropriate attire and contributing in rounds, teaching conferences and didactic lectures
- 5.4. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
- 5.5. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions

## **Goals and Objectives: Inpatient Sickle Cell Disease**

- 5.6. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
  - 5.7. Demonstrate empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
  - 5.8. Demonstrate advocacy for patients and their families
  - 5.9. Determine to honestly assess ones contribution in errors that are made, accept responsibility for mistakes or untoward outcomes and implement plans to prevent ones' self and others from repeating the mistake.
- 

- 6. System Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:
- 

### **Objectives:**

- 6.1. Prioritize the various modes of diagnostic testing and select the most appropriate testing modality with the goal towards minimizing unnecessary laboratory or imaging testing
- 6.2. Demonstrate the ability to work effectively with other members of the healthcare team, including but not limited to other physicians, nurses, pharmacists, nutritionist and social workers
- 6.3. Understand the difficulty in securing healthcare for some patients with sickle hemoglobinopathies who are under insured while working within the system to improve their healthcare and the medical home concept.
- 6.4. Avoid the use of ambiguous or unacceptable abbreviations in the medical record or in writing prescriptions and in ordering tests or other lab or medications.

### **Learning Activities:**

1. Inpatient rounds with faculty and appropriate house staff and medical students.
2. Formal review of the literature with evidence based medicine of hematology cases presented monthly
3. Review with faculty members on a three times per monthly basis peripheral blood smear and bone marrow aspirate/biopsy
4. Participation in a weekly hematology core curriculum
5. Participation in the weekly care conference

## **Goals and Objectives: Inpatient Sickle Cell Disease**

### **Assessment Methods (Fellows):**

1. Global evaluation completed by the faculty at the end of each monthly rotation (this may comprise input from several faculty members and this is shared with the fellow by electronic communication or reviewed with them during their semi-annual meeting with the program director). Feedback from each attending is strongly encouraged in addition to these written evaluations.
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients themselves and family members.

### **Assessment Method (Program Evaluation):**

1. Fellows should complete and evaluation of the program and all the rotations once per year utilizing an anonymous evaluation tool.
2. Semi-annual evaluation of each faculty member by each fellow
3. Yearly meeting between the faculty and the fellows to review the program in general.
4. Monthly meeting of the educational committee which addresses items of importance and focus after the yearly faculty/fellow meeting to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision:**

1. Continuous supervision of the hematology/consult faculty member for all patient care decisions.
2. During night call there is a hematology faculty member available to discuss calls and patient related issues.

### **Educational Resources:**

1. Institutional and multi-center protocols focusing on the management of sickle cell disease.
2. The ASH reading list on sickle cell disease

## Goals and Objectives: Outpatient Leukemia Lymphoma Service

### Overall Description

The Fellow will be assigned to the Adult Leukemia/Lymphoma Outpatient Service for one month duration during the first year of training. They will work alongside a faculty member dedicated to and present in the outpatient clinic, along with internal medicine house staff, advanced care practitioners, medical students, nurses and other healthcare providers. Additionally, the fellow will perform several procedures such as bone marrow aspirate and biopsy and lumbar puncture/administration of intrathecal chemotherapy in this outpatient setting.

The educational purpose of this four week rotation, given once during the first year of fellowship training is for the fellow to have an outpatient and more longitudinal setting for managing patients with disorders of leukemia or lymphoma. The patients seen in this exclusively outpatient setting will comprise the full spectrum of acute and chronic leukemias, myelodysplasia and various lymphomas including diagnosis, treatment, management of complications and follow-up.

By the end of this first clinical year, the fellow will have made significant progress toward practicing independently. Call experiences and continued continuity clinic during the second year will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. For the objectives, the fellow will:

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### Objectives:

- 1.1. Develop and provide a rationale for the management plan of adults with leukemia/lymphoma disorders.
- 1.2. Be able to perform diagnostic evaluations and staging of new patients as well as determine treatment plans for these patients.
- 1.3. Understand the cooperative group environment and how standardized and investigative treatment arms relate to patient care.

## Goals and Objectives: Outpatient Leukemia Lymphoma Service

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- 2. Medical Knowledge:** Understand the scope of establishment and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by adult hematologist; demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:
- 

### Goals:

- 2.1. Develop an attitude of scientific discipline and evidence-based decision making in the care of patients with disorders of leukemia/lymphoma, including, but not limited to:
    - 2.1.1. Acute and chronic leukemias, including various types of leukemia (myeloid or lymphoid leukemia) and myelodysplasia.
    - 2.1.2. Lymphomas including B and T cell Lymphoma, plasma cell disorders, amyloidosis, Waldenstrom's macroglobulinemia, Hodgkins Disease
    - 2.1.3. Histiocytosis and lymphoproliferative disorders
- 

- 3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and professional associates. As listed below in the objectives, the fellow will:
- 

### Objectives:

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Be able to lead a discussion with a patient and family regarding a newly diagnosed leukemia/lymphoma condition
- 3.3. Be able to obtain informed consent for bone marrow aspirates/biopsy, cerebrospinal fluid assessment and administration of intrathecal chemotherapy and conscious sedation.
- 3.4. Demonstrate the ability to maintain comprehensive, timely and legible medical records; crucial to the care of oncology patients on cooperative group protocol studies

## Goals and Objectives: Outpatient Leukemia Lymphoma Service

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4. **Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:
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### Objectives:

- 4.2. Utilize cooperative group websites and other information to stay abreast of up to date and pertinent information regarding clinical trials as they relate to patients with disorders of leukemia or lymphoma.
  - 4.2. Maintain a portfolio which updates a list of patients and procedures
  - 4.3. Set learning and improvement goals for this outpatient rotation
  - 4.4. Present new cases at interdisciplinary conferences (eg Tumor Board) with a detailed evidence based medicine search of the literature in defense of the treatment strategy recommended for the patient. Utilize feedback from this experience to improve in the next presentation.
  - 4.5. Participate in the education of the patients families, students and residents and other health care professionals.
- 

5. **Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:
- 

### Objectives:

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Demonstrate accountability to all patients and the healthcare team
- 5.3. Demonstrates a commitment to excellence and ongoing professional development by being prepared for patient care in the outpatient setting, demonstrating punctuality and dressing in appropriate attire and contributing in the outpatient clinic, teaching conferences and didactic lectures

## **Goals and Objectives: Outpatient Leukemia Lymphoma Service**

- 5.4. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
- 5.5. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
- 5.6. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
- 5.7. Demonstrate empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
- 5.8. Demonstrate advocacy for patients and their families in the outpatient setting
- 5.9. Determine to honestly assess ones contribution in errors that are made, accept responsibility for mistakes or untoward outcomes and implement plans to prevent ones' self and others from repeating the mistake. This is essential in a specialty which utilizes potentially toxic drugs such as chemotherapy

**6. System Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:

### **Objectives:**

- 6.1. Recognize that the frequency of diagnostic testing could be reduced and take this fact into account in scheduling outpatient laboratory and imaging testing
- 6.2. Comply with institutional systems that have been developed to prevent errors in the administration of "high risk" medications, such as chemotherapy and immunosuppressive medications.
- 6.3. Learn to coordinate patient care within the healthcare system

### **Learning Activities**

1. Interactions with faculty in the outpatient clinic on decisions made for this group of patients
2. Weekly clinical patient care conference
3. Weekly inter-disciplinary (tumor board) conference
4. Weekly hematology core curriculum and slide review

## **Goals and Objectives: Outpatient Leukemia Lymphoma Service**

5. Provision of ambulatory care to patients enrolled in cooperative group protocols, including: evaluation of new patients, as well as laboratory testing and follow-up management of patients previously enrolled
6. Perform key procedures including:
  - Bone marrow aspirate and biopsy
  - Lumbar puncture/administration of intrathecal chemotherapy
7. Interactions with faculty in the outpatient clinic on decisions made for this group of patients

### **Assessment Methods (Fellows)**

1. Global evaluation completed by the faculty at the end of each monthly rotation.
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients themselves and family members.

### **Assessment Method (Program Evaluation)**

1. Fellows will complete an evaluation of the rotation utilizing an anonymous evaluation tool.
2. Semi-annual evaluation of each faculty member by each fellow
3. Yearly meeting between the faculty and the fellows to review the program in general.
4. Monthly meeting of the educational committee which addresses items of importance and focus after the yearly faculty/fellow meeting to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision**

1. An outpatient faculty member is continuously present and actively involved in every clinic setting for direct supervision.

### **Educational Resources**

1. Information from cooperative group protocols.
2. Didactic information provided by the ASH reading list.

## Goals and Objectives: Outpatient Hemostasis and Thrombosis Rotation

### Overall Description

The Fellow will be assigned to this rotation for one month of a longitudinal rotation. This experience will be given during the first year and will be an exclusively outpatient rotation. The fellow will work alongside a faculty member dedicated to the outpatient clinic and may often have other learners, residents and medical students present in the clinic setting, who they will supervise and teach.

The educational purpose of this rotation is for the fellow to learn the outpatient management surrounding disorders of hemostasis or thrombosis. Management of these patients in the clinic setting is extremely important as patients with inherited bleeding or clotting disorders are rarely admitted to the hospital. The patient characteristics of this disorder include inherited bleeding disorders such as factor VIII or IX and von Willebrand Disease, rare bleeding disorders and congenital thrombophilia.

By the end of this first clinical year the fellow will have made significant progress for competency to enter practice without direct supervision. Call experiences and continued continuity clinic during the second year will broaden skills in disorders of hemostasis and thrombosis by the completion of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. The fellow will:

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### Objectives:

- 1.1. Gain experience in management of patients with the following disorders:
  - 1.1.1. Diagnostic evaluation of new patients with an unknown bleeding or clotting disorder, focusing on the history and appropriately utilizing the coagulation laboratory
  - 1.1.2. Outpatient management of hemophilia and von Willebrand Disease
  - 1.1.3. Pre and post-operative management of patients with bleeding disorders
  - 1.1.4. Evaluation of those with potential thrombophilia, including appropriate testing
- 1.2. Recognize the indications for and the risks of administering factor replacement therapy in the outpatient setting. This should include home management:
  - 1.2.1. Component therapy transfusion (cryoprecipitate, fresh frozen plasma)
  - 1.2.2. Factor replacement therapy (recombinant, plasma-derived)
  - 1.2.3. Anti-coagulation therapy

## Goals and Objectives: Outpatient Hemostasis and Thrombosis Rotation

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- 2. Medical Knowledge:** Understand the scope of establishment and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:
- 

### Objectives:

- 2.1. To develop a differential diagnosis for adults with bleeding or clotting disorders seen in the outpatient setting.
  - 2.2. Demonstrate knowledge of the conditions associated with the following diseases:
    - 2.2.1. Hemophilia, von Willebrand Disease (VWD) and other inherited and acquired coagulopathies
    - 2.2.2. Platelet disorders including ITP and acquired or inherited platelet function defects
    - 2.2.3. Congenital and acquired thrombotic disorders
  - 2.3. Understand how the various coagulation laboratory tests utilized in establishing a diagnosis are performed. A list of these tests are found in the overall curriculum.
  - 2.4. Demonstrate scientific-based decision making by utilizing standard textbooks and literature reviews in the management of patients with disorders of hemostasis and thrombosis
- 

- 3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and health professionals. As listed below in the objectives, the fellow will:
- 

### Objectives:

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Learn to function effectively as a comprehensive bleeding/clotting disorders team member

## Goals and Objectives: Outpatient Hemostasis and Thrombosis Rotation

- 3.3. Be able to function as a consultant to physicians in disorders of hemostasis and thrombosis
  - 3.4. Be able to communicate effectively the status of the outpatients to community physicians.
- 

**4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:

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### **Objectives:**

- 4.1. Demonstrate learning acquisition by presenting one coagulation case/week to the hematology faculty and utilizing literature review in defense of the treatment being recommended to the patient.
  - 4.2. Utilize the feedback provided during the hematology seminar and the patient care discussions to expand their portfolio and expertise.
- 

**5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:

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### **Objectives:**

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Demonstrate accountability to all patients and the healthcare team
- 5.3. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
- 5.4. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
- 5.5. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families

## **Goals and Objectives: Outpatient Hemostasis and Thrombosis Rotation**

5.6. Show empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues

5.7. Demonstrate advocacy for patients and their families

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**6. System Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:

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### **Objectives:**

6.1. Participate in identifying system errors and in implementing potential systems solutions; this is especially important in the very expensive arena of delivering comprehensive care to the bleeding disorders community

6.2. Demonstrate the ability to work effectively with other members of the comprehensive healthcare team, including but not limited to, other physicians, nurses, pharmacists and social workers

6.3. Comply with institutional systems that have been developed to prevent errors in the administration of coagulation factor concentrates and anti-coagulants.

### **Learning Activities**

1. Daily outpatient clinic and weekly comprehensive clinic care
2. The fellow will learn about key coagulation lab testing and the relevance of these tests to patients with disorders of hemostasis
3. Pre and post-clinic summary discussions with faculty, house staff and medical students.
4. Formal review of the literature with evidence based medicine of hematology cases presented monthly
5. Participation in a weekly hematology core curriculum
6. Participation in the weekly patient care conference

### **Assessment Methods (Fellows)**

1. Global evaluation completed by the faculty at the end of the month rotation (this may comprise input from several faculty members). The information will be shared with the fellow by electronic communication or reviewed with them during their semi-annual meeting with the program director.
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients themselves and family members.

## **Goals and Objectives: Outpatient Hemostasis and Thrombosis Rotation**

### **Assessment Method (Program Evaluation)**

1. Fellows should complete an evaluation of the rotation utilizing an anonymous evaluation tool.
2. Semi-annual evaluation of each faculty member by each fellow
3. Yearly meeting between the faculty and the fellows to review the program in general.
4. Monthly meeting of the educational committee which addresses items of importance and focus after the yearly faculty/fellow meeting to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision**

1. Continuous outpatient supervision by the hematology faculty member for all patient care decisions.

### **Educational Resources**

1. The ASH reading list and associated with pertinent hemostasis/thrombosis topics
2. Other specific reading lists provided by the faculty.

## Goals and Objectives: General Hematology/Sickle Cell Disease

### Overall Description

The Fellow will be assigned to this rotation for two months of a longitudinal rotation and will be given during the first year. This will be an exclusively an outpatient. The fellow will work alongside a faculty member dedicated to the outpatient clinic and may often have other learners, residents and medical students, who they will supervise and teach.

The educational purpose of the general hematology/sickle cell disease rotation is to broaden the fellow's learning opportunities to outpatient non-malignant hematology and sickle cell disease. This includes disorders of hemoglobin and sickle cell disease, bone marrow failure, anemia, immune deficiency, disorders of red cells and platelets and neutrophil disorders. The fellow will be able integrate evaluation, diagnosis, and treatment into the outpatient setting.

By the end of this first clinical year the fellow will have made significant progress for competency to enter practice without direct supervision. Call experiences and continued continuity clinic during the second year will broaden skills in consultative hematology by the completion of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. For the objectives, the fellow will:

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### Objectives:

- 1.1. Demonstrate experience in management of patients with hemoglobinopathies and other non malignant hematology diagnoses encompassing the following clinical areas:
    - 1.1.1. Diagnostic evaluations and management of the complications of sickle cell disease including, but not limited to, vaso-occlusive pain, chest syndrome, priapism, stroke and post-operative management.
    - 1.1.2. Diagnosis and management of the thalassemia syndromes.
    - 1.1.3. Interpretation of the blood smear in benign hematology conditions
    - 1.1.4. Evaluation and treatment of disorders of platelets, white blood cells and other anemias
- 

**2. Medical Knowledge.** Demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:

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## Goals and Objectives: General Hematology/Sickle Cell Disease

### Objectives:

- 2.1. The fellow will demonstrate understanding in the outpatient management of patients with the following sickle cell diagnoses: hemoglobin SS, hemoglobin SC, hemoglobin S Beta Thalassemia
- 2.2 Utilize the medical literature and an evidence-based medicine approach to understand the following benign hematology disorders:
  - 2.2.1. Thalassemia syndromes:
  - 2.2.2. Storage disorders and storage disorders of the spleen
  - 2.2.3. Immuno-deficiency for the hematologist
  - 2.2.4. Red cell membrane defects
  - 2.2.5. Microangiopathic hemolytic anemia
  - 2.2.6. Erythrocytosis, porphyria, and hemochromatosis
  - 2.2.7. Disorders of platelets
  - 2.2.8. Neutrophil disorders
- 2.3. Understand how to manage the complications of sickle cell disease in the outpatient, longitudinal setting: enlarged spleen, stroke, chronic chest syndrome, renal dysfunction, chronic pain and chronic skin ulcers

- 3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and health professionals. As listed below in the objectives, the fellow will:

### Objectives:

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Be able to communicate effectively to other outpatient team members (e.g. nurses, social workers) in the hematology service

- 4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:

## Goals and Objectives: General Hematology/Sickle Cell Disease

### Objectives:

- 4.1. Utilize the medical literature in managing hematology cases in the outpatient setting. Utilize this evidence based approach when discussing these outpatient cases to the faculty.
  - 4.2. Demonstrate knowledge acquisition with an evidence-based medicine search of the literature in defense of the treatment strategy being recommended for patients presented at the hematology conference. Utilize feedback from this conference to improve his/her ability to present information.
- 

- 5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:
- 

### Objectives:

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Continually demonstrate accountability to all patients and the healthcare team
- 5.3. Demonstrates a commitment to excellence and ongoing professional development by being prepared for outpatient care, demonstrating punctuality and dressing in appropriate attire and contributing in rounds, teaching conferences and didactic lectures
- 5.4. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
- 5.5. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
- 5.6. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
- 5.7. Show empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
- 5.8. Demonstrate advocacy for patients and their families

## Goals and Objectives: General Hematology/Sickle Cell Disease

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- 6. System Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:
- 

### **Objectives:**

- 6.1. Prioritize the various modes of outpatient diagnostic testing and select the most appropriate testing modality with the goal towards preventing any unnecessary laboratory or imaging testing
- 6.2. Demonstrate the ability to work effectively with other members of the healthcare team, including but not limited to, other physicians, nurses, and social workers
- 6.3. Understand the difficulty in securing healthcare for some patients with sickle hemoglobinopathies who are under insured working within the system and to improve their healthcare and the medical home concept.

### **Learning Activities**

1. Daily outpatient rounds with faculty and appropriate house staff and medical students.
2. Formal review of the literature with an evidence based medicine approach surrounding the monthly hematology case presentations.
3. Daily outpatient encounters, including those within the comprehensive clinic setting
4. Participation in a weekly hematology core curriculum
5. Participation in the weekly care conference

### **Assessment Methods (Fellows)**

1. Global evaluation completed by the faculty at the end of each monthly rotation (this may comprise input from several faculty members and this is shared with the fellow by electronic communication or reviewed with them during their semi-annual meeting with the program director).
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients and family members.

### **Assessment Method (Program Evaluation)**

1. Fellows should complete an evaluation of the rotation utilizing an anonymous evaluation tool.

## **Goals and Objectives: General Hematology/Sickle Cell Disease**

2. Semi-annual evaluation of each faculty member by the fellow
3. Yearly meeting between the faculty and the fellows to review the program in general.
4. Monthly meeting of the educational committee which addresses items of importance and focus after the yearly faculty/fellow meeting to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized

### **Level of supervision**

1. Continuous supervision of the hematology/consult faculty for all patient care decisions in the outpatient setting.

### **Educational Resources**

1. Institutional protocols dealing with management of sickle cell disease and other hematology topics.
2. The ASH reading list focusing on non-malignant hematology and sickle cell disease.

## Goals and Objectives: Transfusion Medicine Rotation

### Overall Description

This rotation is one month in duration and will take place during the first year of fellowship training. The fellows will work alongside faculty in transfusion medicine.

The educational purpose of this rotation provides an overview of topics pertinent to the hematologist regarding transfusion medicine and cellular therapies. The Fellow will gain direct experience in both the blood donor service and the transfusion medicine service aspect of this discipline. There will be involvement with patients with both malignant and benign hematology conditions but the clinical encounters will only be in relationship to performing a procedure (e.g. apheresis/exchange of a patient with a high white blood cell count or a sickle cell patient with a stroke) where the fellow is observing as part of this rotation.

By the end of this first clinical year, the fellow will have made significant progress toward practicing independently. This transfusion medicine rotation will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training.

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**1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. For the objectives, the fellow will:

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There will be no planned direct patient care that takes place on this rotation however; the fellow may interact with patients undergoing various transfusion medicine and cellular therapy procedures

### Objectives:

- 1.1. Develop and provide the rationale for the use of blood products and cellular therapies in both malignant and benign hematology conditions and understand.
- 1.2. Recognize the indications for and the risk of the following therapies in patients with hematologic disorders:
  - 1.2.1. Exchange transfusion therapy
  - 1.2.2. Simple transfusion therapy
  - 1.2.3. Apheresis therapy

## Goals and Objectives: Transfusion Medicine Rotation

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- 2. Medical Knowledge:** Demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:
- 

### **Objectives:**

- 2.1. Understand how to collect, evaluate, and prepare blood products for administration to patients
  - 2.2. Learn about the essentials of component therapy of blood products including red blood cell, platelet, white blood cell transfusions, fresh frozen plasma and cryoprecipitate
  - 2.3. Understand the potential risk of transfusion of blood products and other cellular therapies
  - 2.4. Understand the indications of the types of assays performed in the blood bank important to the evaluation and treatment of patients undergoing transfusion therapy
- 

- 3. Interpersonal Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and health professionals. As listed below in the objectives, the fellow will:
- 

### **Objectives:**

- 3.1. Maintain comprehensive records in the course of performing blood banking procedures (e.g. apheresis therapy)
- 3.2. Demonstrate effective communication with patient and families across a broad range of socioeconomic and cultural backgrounds
- 3.3. Learn how to communicate with other laboratory personnel and faculty that the fellow will be associated during this rotation.

## Goals and Objectives: Transfusion Medicine Rotation

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**4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:

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- 4.1. Be able to perform a literature review utilizing scientific studies as it relates to various transfusion medicine procedures essential for patient care
  - 4.2. Set learning and improvement goals for the rotation
  - 4.3. Be able to prepare (using an evidence based approach) and present one seminar pertinent to the topic of transfusion medicine
- 

**5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:

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### **Objectives:**

- 5.1. To prepare before hand by reading appropriate educational material provided so that learning may be enhanced in this transfusion medicine setting.
  - 5.2. Show compassion, integrity, and respect for others.
  - 5.3. Demonstrate respect for the patient's privacy and autonomy in light of the transfusion medicine procedures being accomplished
- 

**6. Systems Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:

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### **Objectives:**

- 6.1. Understand the important transfusion therapy procedures and their benefit and cost and how to facilitate these life saving therapies

## **Goals and Objectives: Transfusion Medicine Rotation**

- 6.2. Understand the potential risk and toxicities which accompany the various procedures and component therapy in the transfusion and cellular therapy arena.
- 6.3. Work within the transfusion medicine teams to enhance patient safety and improve patient care quality, for the various procedures being accomplished

### **Learning Activities**

1. Use of case based laboratory scenarios
2. Learning of component therapy (red blood cell, white blood cell, and platelet) transfusion.
3. Learning the techniques of plasma and red blood cell exchange transfusion and apheresis.
4. Reading and interacting with a policy manual established for various blood banking procedures
5. Informal teaching and interaction with the supervising transfusion medicine physician
6. Weekly hematology conferences
7. Weekly fellow's core curriculum conference

### **Assessment Methods of the Fellows**

1. Global evaluation by the responsible transfusion medicine physician along with input from the blood banking personnel regarding the fellow's ability to interact and learn in this setting

### **Assessment Methods of the Program**

1. Fellows complete an evaluation of the faculty and the rotation in conjunction with input to the Program Director
2. They also participate in a fellow's retreat and faculty/fellow retreat where the curriculum and rotations are specifically evaluated

### **Level of Supervision**

1. Each respective transfusion medicine physician/supervisor is responsible for the fellow's teaching and evaluation.

### **Educational Resources**

1. Reading assignments as provided by the faculty
2. ASH teaching curriculum

## Goals and Objectives: Laboratory Rotation

### Overall Description

This rotation is one month in duration and will take place during the first year of fellowship training. The fellows will work alongside faculty in laboratory medicine, radiation oncology and hematology.

The educational purpose of this rotation is to allow the fellow to learn about specific methodologies in hematology along with laboratory testing which is crucial to the practice of hematology and an overview of radiation oncology. This experience will take place both in the clinical laboratory and in the radiation oncology suite. The rotation will broadly address laboratory samples from those who have leukemia/lymphoma disorders or from those representing non-malignant hematology conditions such as the anemias and white blood cell and platelet disorders. There are no clinical encounters during this rotation other than the few patients seen undergoing radiation therapy.

By the end of this first clinical year, the fellow will have made significant progress toward practicing independently. This laboratory experience will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training.

- 
- 1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and the promotion of health. The fellow will:
- 

### Objectives:

- 1.1. Learn about the role of the hematologist in their role as a consultant in organizing treatment with the radiation oncologist.
- 

- 2. Medical Knowledge:** Demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:
- 

### Objectives:

- 2.1. Be knowledgeable regarding specific laboratory methodologies necessary to the practice of hematology such as; northern blot, southern blot, western blot, and ELISA testing as well as polymerase chain reaction (PCR), immunoprecipitation, microassays, colony forming unit (CFU) and other cellular assays.

## Goals and Objectives: Laboratory Rotation

- 2.2. Understand how specific hematology testing is performed such as:
  - 2.2.1. Automated complete blood count with white blood cell differential and the reticulocyte count
  - 2.2.2. Flow cytometry of peripheral blood, bone marrow, body fluids, lymph nodes and other tissues
  - 2.2.3. Cytogenetics including fluorescence insitu hybridizations (FISH)
  - 2.2.4. Hematopathology tissue assessment techniques including standard morphological evaluation and immunostaining.
  - 2.2.5. Serum and urine electrophoresis and immunoelectrophoresis.
- 2.3. Have an understanding of basic overview of radiation oncology including:
  - 2.3.1. Basic principles of radiation biology
  - 2.3.2. Approaches of administering radiation therapy, including the different radiation source types (e.g. electron beam, external beam, brachytherapy).
  - 2.3.3. Short term toxicities and potential long term consequences of radiation therapy
  - 2.3.4. Interactions of radiation therapy with medication

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**3. Interpersonal Skills and Communication:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and health professionals. As listed below in the objectives, the fellow will:

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### **Objectives:**

- 3.1. Be able to converse with faculty and consulting physicians surrounding the pertinent details of laboratory testing important to the practice of hematology
  - 3.2. To maintain appropriate communication with multidisciplinary team members and work effectively as a team member in the laboratory and in radiation oncology
  - 3.3. To maintain appropriate documentation in the laboratory setting
- 

**4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:

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## Goals and Objectives: Laboratory Rotation

### **Objectives:**

- 4.1. Use information technology to optimize learning
  - 4.2. Locate, appraise and assimilate evidence from scientific studies related to laboratory aspects of hematology
  - 4.3 Set learning and improvement goals based upon the objectives of the rotation
- 

**5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:

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### **Objectives:**

- 5.1. Demonstrate professional behavior both in the laboratory and radiation oncology areas while on this rotation
  - 5.2 Manifest sensitivity to diversity amongst laboratory personnel including: gender, age, culture, age, race, religion, disabilities, and sexual orientation
  - 5.3 Demonstrate accountability and punctuality to other healthcare professionals while on the rotation
- 

**6. Systems-Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:

---

### **Objectives:**

- 6.1. Participate in identifying system error in the laboratory setting and in implementing potential systems
- 6.2. To work effectively within the laboratory multidisciplinary team
- 6.3. Incorporate considerations of cost awareness and risk-benefit analysis in laboratory testing

## **Goals and Objectives: Laboratory Rotation**

- 6.4. Understand the various modes of diagnostic testing and relate the most appropriate testing modality and why it should be performed.

### **Learning Activities**

1. Didactic conferences
2. One on one practical laboratory/case discussions with faculty
3. Assigned reading

### **Assessment Methods (Fellows)**

1. Competency-based written evaluations and feedback from the laboratory attending
2. 360 degree, competency-based evaluations of the fellow by laboratory personnel

### **Assessment Methods (Program)**

1. Complete an evaluation of the faculty and the rotation in conjunction with input to the Program Director
2. Participate in a fellow's retreat and faculty/fellow retreat where the curriculum and rotations are specifically evaluated

### **Level of Supervision**

1. Direct supervision of the fellow is provided by the faculty responsible for the fellow's specific laboratory experience

### **Educational Resources**

1. The ASH reading list associated with pertinent laboratory topics
2. Other specific reading list provided by the faculty.

## **Goals and Objectives: Continuity Clinic**

### **Overall Description**

The Fellow will be assigned to the continuity clinic on a weekly basis (1/2- 3/4 day per week) at the beginning of the fellowship training program. This continuity clinic experience will last for the two years of fellowship training. They will work alongside a faculty member dedicated to outpatient clinic, along with internal medicine house staff, advanced care practitioners, medical students, nurses and other healthcare providers in the outpatient setting. The fellow will be part of a multidisciplinary team to help manage these patients. The continuity clinic experience particularly allows for this progressive level of independence as the same patients are seen over a prolonged time frame (6 months to two years). In some aspects, the care that these patients might necessitate cannot be encountered exclusively during the first year of training (e.g. transition to off therapy follow-up, recurrence of primary disease, and possibly the need for overseeing hospice care or transition to bone marrow/stem cell transplantation). These can only occur as a longer period of longitudinal follow-up are offered

The rotation will comprise only inpatient exposure and is only given during the first year. The fellow will be expected to enroll several of these inpatient leukemia/lymphoma patients for follow-up in his/her continuity clinic. This exposure will encompass follow-up in the outpatient setting, off therapy follow-up and transition to care, in some cases to hospice care. These activities are an important part of the overall training experience.

Educational purpose: The primary purpose of the fellows' continuity clinic is to learn to care for hematology patients in a supervised and mentored environment so that they may practice independently at the end of their fellowship training. They will also learn about chronic disease management from a longitudinal perspective. Additionally, the fellow will learn to develop a therapeutic relationship with the patients and their families. The types of patients which the fellow sees over this time frame will include a mixture of those with both malignant and benign hematologic disorders. The fellow's continuity clinic will generate greater specificity during the second year of training as the fellow will be afforded the opportunity to develop greater depth in one aspect of non malignant hematology management, ie: sickle cell disease. The clinical encounters for this rotation will be mostly comprised in the outpatient setting but the fellow will have the opportunity to follow his/her patient if they are admitted for complications or for planned chemotherapy and supportive care.

The objectives listed below are the same for the entire longitudinal experience. But it is expected that by the end of the first clinical year, the fellow will have made significant progress towards practicing independently. Call experiences and the continuity clinic during the second year will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training.

## Goals and Objectives: Continuity Clinic

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- 1. Patient Care:** This should be compassionate, appropriate, and effective for the treatment of health programs and for the promotion of health. For the objectives, the fellow will:
- 

### **Objectives:**

- 1.1. Learn to take increasing responsibility for direct management of patients in the outpatient setting such as writing chemotherapy orders in a supervised environment, working with nursing and schedulers to schedule certain diagnostic tests and imaging studies needed in follow-up. Enroll both malignant and benign hematology patients which the fellow can provide care under the supervision of a faculty member (this objective occurs for both years with increasing independence by the end of the second year)
  - 1.2. The fellow will gain experience and management in the patients with the following problems:
    - 1.2.1. Diagnostic evaluations and staging of new patients and determining treatment plans for new patients
    - 1.2.1. Staging and reassessment of established patients who relapse
    - 1.2.2. Care of terminally ill patients and managing them in the hospice setting
  - 1.3. Recognize the indications for and the common complications of and be able to perform the following procedures:
    - 1.3.1. Conscious sedation
    - 1.3.2. Bone marrow aspiration
    - 1.3.3. Lumbar puncture with instillation of chemotherapy
  - 1.4. Learn how to manage certain hematologic disorders which are of a chronic nature (e.g. ITP, sickle hemoglobinopathies) utilizing the comprehensive care model
- 

- 2. Medical Knowledge:** Demonstrate knowledge of established and evolving biomedical, clinical, epidemiologic and social behavior knowledge needed by the adult hematologist. Fellows will also demonstrate the ability to acquire critically interpret and apply this knowledge in patient care. As listed below in the objectives, the fellow is expected to:
-

## Goals and Objectives: Continuity Clinic

### Objectives:

- 2.1. Be able to apply the specific content objectives developed by the American Society of Hematology (ASH) in their continuity clinic patient population.
  - 2.2. Demonstrate knowledge of the broad range of hematology topics including, but not restricted to:
    - 2.2.1. leukemias and lymphomas
    - 2.2.2. anemias
    - 2.2.3. disorders of platelets
    - 2.2.4. disorders of neutrophils and white blood cells
    - 2.2.5. disorders of hematostasis and thrombosis
- 

3. **Interpersonal Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and health professionals. As listed below in the objectives, the fellow will:
- 

### Objectives:

- 3.1. Communicate effectively and in an appropriate manner with patients and families to create and sustain a professional and therapeutic relationship across a broad range of socioeconomic and cultural backgrounds
- 3.2. Be able to lead a discussion with a patient and family regarding a newly diagnosed leukemia/lymphoma condition
- 3.3. Be able to obtain informed consent for bone marrow aspirates/biopsy, cerebrospinal fluid assessment/administration of intrathecal chemotherapy and conscious sedation.
- 3.4. Effectively communicate treatment plans to the precepting faculty member who is present with the fellow in clinic
- 3.5. To effectively present their continuity clinic patients and review chart documentation with the supervising faculty member
- 3.6. Maintain comprehensive, timely and legible medical records

## Goals and Objectives: Continuity Clinic

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- 4. Practiced Based Learning and Improvement:** Demonstrate knowledge, skills, and attitudes needed for continuous self-assessment using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. As listed below in the objectives, the fellow is expected to:
- 

### Objectives:

- 4.1. In the weekly interactions with supervising faculty members, be able to assess his/her care delivery and where improvements in communication, documentation or health planning can occur.
  - 4.2. Utilize chart review sessions with faculty members to improve care of patients under his/her supervision in continuity clinic. The feedback from these sessions will help to accomplish this process improvement
  - 4.3. Be able to communicate on a one-on-one basis with key allied professionals such as nursing, social workers, as well as supervising faculty members.
  - 4.4. Actively participate in education of patients, families students residents and other health professionals
  - 4.5. Utilize information technology such as literature searches on an ongoing basis to improve the healthcare delivery for the fellow's patients
- 

- 5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. As listed below in the objectives, the fellow will:
- 

### Objectives:

- 5.1. Consistently maintain respect, compassion, integrity, honesty and responsiveness to the needs of patients and the health care team in a way that rises above self-interest.
- 5.2. Continually demonstrate accountability to all patients and the healthcare team
- 5.3. Demonstrates a commitment to excellence and ongoing professional development by demonstrating punctuality and dressing in appropriate attire and contributing in post clinic evaluation sessions

## Goals and Objectives: Continuity Clinic

- 5.4. Exercise sensitivity to the needs of the patient and the family by applying cultural awareness, negotiation, compromise and mutual respect in these daily care activities
  - 5.5. Recognize and demonstrate an understanding of ethical, cultural, religious or spiritual values of import to patients and families during communication and care decisions
  - 5.6. Demonstrate a commitment to confidentiality, privacy, and respect for patients and families
  - 5.7. Demonstrate empathy towards the family in negotiating and designing goals of treatment, including relevant medical, legal, and psychological issues
  - 5.8. Demonstrate advocacy for patients and their families
  - 5.9. Determine to honestly assess one's contribution in errors that are made, accept responsibility for mistakes or untoward outcomes and implement plans to prevent one's self and others from repeating the mistake.
- 

- 6. System Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the healthcare system. As listed below in the objectives, the fellow is expected to:
- 

### Objectives:

- 6.1. Prioritize the various modes of diagnostic testing and select the most appropriate testing modality with the goal towards preventing any unnecessary laboratory or imaging testing
- 6.2. Demonstrate the ability to work effectively with other members of the healthcare team, including but not limited to, other physicians, nurses, pharmacists, nutritionist and social workers
- 6.3. Acknowledge medical errors in a forth right manner, and report real or potential medical errors to the appropriate member of the care team. Then work with the team to develop a plan for preventing future errors. This in some cases may involve the implementation of a task-force.
- 6.4. Comply with institutional systems that have been developed to prevent errors in the administration of "high risk" medications, such as chemotherapy and immunosuppressive medications.

## **Goals and Objectives: Continuity Clinic**

- 6.5. Avoid the use of ambiguous or unacceptable abbreviations in the medical record or in writing prescriptions and in ordering tests or other lab or medications.

### **Learning Activities**

1. Daily one-on-one interaction with faculty and other healthcare team members in the outpatient setting
2. Weekly patient care conference.
3. Performance of procedures including lumbar puncture with intrathecal administration of chemotherapy, bone marrow aspirate and biopsy and conscious sedation
4. Administration of chemotherapy
5. Weekly patient care in continuity
6. Performance of bone marrow and lumbar puncture procedures
7. Reading assignments regarding the fellow's continuity patients

### **Assessment Methods (Fellows)**

1. Global evaluation completed by the faculty at the end of each monthly rotation (this may comprise input from several faculty members and this is shared with the fellow by electronic communication or reviewed with them during their semi-annual meeting with the program director).
2. Twice-yearly 360-degree or multi-source evaluations from multiple members of the inter-disciplinary team along with the patients and family members.

### **Assessment Method (Program Evaluation)**

1. Fellows should complete an evaluation of the Continuity Clinic rotation twice per year, utilizing an anonymous evaluation tool.
2. Semi-annual, anonymous evaluation of each faculty member by the fellow
3. Yearly meeting between the faculty and the fellows to review the overall program, including Continuity Clinic.
4. Monthly meeting of the educational committee which addresses items of focus which surface regularly and areas of importance recognized after the yearly faculty/fellow retreat. This forum is essential to put into place required improvements.
5. Once a year fellow retreat where program improvement is emphasized.

### **Level of Supervision**

1. The precepting faculty member (which would be the same faculty member on a longitudinal basis) will be supervising the fellow when he/she is in their weekly continuity clinic.

## **Goals and Objectives: Continuity Clinic**

### **Resources**

1. Appropriate textbooks/articles from the faculty
2. ASH teaching curriculum.

## **Goals and Objectives: Research**

### **Overall Description**

This activity will be almost entirely focused over the second year of fellowship training. However, selection of a project will occur during the end of the first year. During the second year of fellowship training, the fellow will have approximately 70 - 80% protected time for research endeavors. By the end of the fellowship training, the fellow will have achieved the goals and objectives of this research activity and will also understand that additional research mentoring as a junior faculty member is optimal. Direct patient care will not be a part of this activity

The educational purpose of this activity during fellowship training is to train the fellow in the scholarly approach to scientific discovery, investigation and dissemination of findings. During the latter half of the first year of fellowship training, the fellow will choose a project and will begin to investigate an appropriate faculty member to serve as a mentor. At the end of the first year or the beginning of the second year of training, the fellow will also present his/her research project to the Scholarship Oversight Committee (SOC) for additional vetting and approval. The SOC is comprised of four researchers (2 clinical researchers and 2 physician scientists). This group will provide guidance for the fellow in their progress through a research project. The timeline for progress and completion will vary depending on the type of project and area of research chosen. The fellow will prepare a written individualized research plan and present this to their SOC twice in the second year (later fall and late spring) outlining their progress and plans. It is the responsibility of the SOC and the research mentor to guide the fellow through project development → approval → data generation → data analysis and presentation → manuscript and/or grant submission.

By the end of this first clinical year, the fellow will have made significant progress toward practicing independently. Call experiences and continued continuity clinic during the second year will allow the fellow to demonstrate competence to enter practice without direct supervision by the end of training. Though not directly related to patient care, the research experience will allow the fellow to be able to think critically, learn to work in a group setting and will teach the fellow the value of an evidence-based approach to health care. Each fellow will be expected to be involved with either a clinical or research project. The description below is an overview of what the emphasis of these two research areas should be:

### **Clinical projects:**

1. Fellows will usually participate in a Masters of Science in Clinical Research or similar degree
2. Fellows will write a formal research proposal for submission to the appropriate institutional approval committees
  - a. IRB
  - b. CTSA/CRC, if necessary
3. They will submit data in abstract form as it matures for presentation at regional and national meetings

## **Goals and Objectives: Research**

4. The fellow may submit grants for project funding to institutional, regional and national funding organizations as appropriate
5. The fellow will also submit a peer-reviewed publication with project data as it matures

### **Laboratory projects:**

1. Fellows will participate in the laboratory of their research mentor, participating in appropriate lab meetings, journal clubs, lab training and other didactic training as suggested by the mentor.
2. Fellows will also write a formal research proposal for submission to the appropriate institutional approval committees if they are involved with a translational project
  - a. IRB
  - b. CTSA CRC and/or animal use committee, if necessary
3. Each fellow will submit data as it matures for presentation at regional and national meetings
4. The fellows will submit grants for project funding to institutional, regional and national funding organizations as appropriate
5. Fellows will submit a manuscript for peer-reviewed publication as project data matures

1. **Patient Care:** that is compassionate, appropriate, and effective for the treatment of health programs and the promotion of health.

### **Objectives:**

N/A – fellows will not be see their primary patients in this activity but will have ample opportunity during their continuity clinic experience which occurs on a weekly basis.

2. **Medical Knowledge:** Understand the scope of established and evolving biomedical, clinical, epidemiological and social-behavior knowledge needed by a pediatric hematologist-oncologist; demonstrate the ability to acquire, critically interpret and apply this knowledge in research. The fellow will:

### **Objectives:**

- 2.1. Identifies appropriate research question of interest (end of Year 1).
- 2.2. Identifies and acquires new information related to the research question.”
- 2.3. Demonstrates the ability to form relevant hypothesis(es) (beginning of Year 2).

## Goals and Objectives: Research

- 2.4. Demonstrate ability to design feasible experiments relevant to research question (beginning of Year 2).
  - 2.5. Demonstrate knowledge of relevant statistical methodologies (Year 2).
  - 2.6. Demonstrate ability to execute a research plan (Year 2).
  - 2.7. Recognizes deficiencies of the research plan (Year 2).
  - 2.8. Demonstrate ability to overcome obstacles to execution of the research plan (Year 2).
  - 2.9. Demonstrates the ability to critically evaluate strengths and weaknesses of data obtained (Year 2).
- 

- 3. Interpersonal and Communication Skills:** Demonstrate interpersonal and communications skills that result in information exchange and partnering with patients, their families and professional associates. The fellow is expected to:
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### **Objectives:**

- 3.1. Develop effective communication with physicians and other research professionals in the laboratory setting.
  - 3.2. Demonstrate written communication skills specific to research development, recording, and reporting.
  - 3.3. Demonstrate the ability to communicate (verbally) research plans effectively to colleagues (departmental and divisional research meetings) and members of the SOC.
  - 3.4. Develop a collegial relationship with mentors and co-workers to facilitate progress of the research activity.
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- 4. Practice Based Learning and Improvement:** Demonstrate knowledge, skills and attitudes needed for continuous self-assessment, using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice. The fellow will:
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### **Objectives:**

- 4.1. "Demonstrate successful development of an individualized research and learning plan, clearly presented with logical defense, to the SOC three times during the research year.

## Goals and Objectives: Research

This is to include research project goals and objectives for the next meeting and as well as overall learning within the fellowship as outlined below:

- 4.1.1. Current academic objectives and activities
  - 4.1.2. Self evaluation for clinical skills and knowledge; research skills and knowledge; teaching skills and knowledge
  - 4.1.3. Planned academic activities
  - 4.1.4. Clinical/research/ teaching
  - 4.1.5. Presentations given and evaluations received
  - 4.1.6. Abstracts submitted; abstracts presented; papers submitted/accepted; grants submitted/granted
  - 4.1.7. Career plans
- 4.2. Identifies strengths, deficiencies and limits in one's plan as outlined above
  - 4.3. Demonstrate ability to critically evaluate the published literature.

- 5. Professionalism:** Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity. The fellow is expected to demonstrate:

### Objectives:

- 5.1. Respect, compassion, integrity, honesty and responsiveness to the needs of the research team and colleagues
- 5.2. A commitment to excellence and ongoing professional development by being prepared, on-time, in appropriate attire and contributing in teaching conferences and didactic lectures
- 5.3. Adherence to ethical principles in the performance their research activity.

- 6. Systems Based Practice:** Understand how to practice high quality health care and advocate for patients within the context of the health care system. The fellow is expected to:

### Objectives:

- 6.1. Demonstrate the ability to work effectively with other members of the research team.
- 6.2. Become familiar with the Office of Sponsored Programs and other Departments and Organizations and how they interface with the regulatory and Institutional funding of research.

## **Goals and Objectives: Research**

- 6.3. Work with their mentor to identify appropriate funding mechanisms for their research activity.
- 6.4. Become familiar with the patient regulatory aspects of research (IRB, etc) and learn how these entities are essential for completing clinical investigation.

### **Learning Activities**

1. Interaction with the supervising faculty member in a weekly mentored experience in either a laboratory or clinical research project
2. Reading lists in preparation for the research project
3. Abstract preparation
4. Grant preparation and writing
5. Manuscript preparation
6. Oral and poster presentations

### **Assessment Methods (Fellows)**

Overview: The first year fellows will meet regularly with the Program Director in the process of project vetting and once a project and mentor are chosen, will be guided by the mentor to begin the process of project implementation. During the second year, the SOC, along with the mentor, will be responsible to guide the fellow in the research process and development of specific research goals. As previously stated, this evaluation will be three times during the second year.

1. Each fellow meets with their mentor, at minimum, on a weekly basis. Written evaluation will be compiled on a semi-annual basis.
2. Semi-annual formal evaluation by the SOC with written and oral feedback.
3. Fellows meet with the Program Director at least twice per year for formal evaluation and review of progress
4. Written evaluation of the second year fellow's oral presentation of their research project

### **Assessment Methods (Program Evaluation)**

1. Fellows complete an annual evaluation of the program director and the research/SOC process. Additionally, they participate in a fellow's retreat and faculty/fellow retreat where research activity is evaluated

### **Level of supervision**

1. Supervision provided by the mentor, SOC and Program Director.

## **Goals and Objectives: Research**

### **Educational Resources**

1. As dictated by the fellow's mentor