# 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. J10.0006 Tc0.0008 Tw[ rotation3 TD0.0001h05.7(c

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 (1month)
    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: [1] 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

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:

| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
|---|---|---|---|---|
| -J Club | Hematology | Grand Rounds | Research | Clinical |
| -Hematology case | Core Curriculum | | Conf | Care Conf |

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.

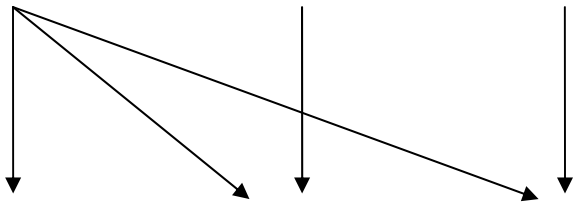
VI) **Research and Scholarly Activity**

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

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 |
|---|---|---|---|



| 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) | 2 years | 1 year | 2 years |
| 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 therapy and

**Overall Goals and Objectives: Adult Hematology Training**

1.3.16. principles of, indications for, and complications of autol

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. hematopoesis;
  - 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

**Objectives:**

3.1. Critique one's practice experience to recogn

## 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.

# 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

# 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 myelodisplasia.
- 2.1.2. Lymphomas including B and T cell Lymphoma, plasma to cell disorders, amyloidosis, Waldenstroms macroglobulinemia, Hodgkins 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.

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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 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 onef0 -1.1vef0 -0011 ve gr.15 TD2.0008 Tc-0.0010 -1.15 TD(_

# 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

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

# 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

# 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

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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. The fellow is expected to:

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**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

# 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

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**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.

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**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 hemachromatosis
- 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.

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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 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.

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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 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.

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# Goals and Objectives: Inpatient Consultative Hematology

**Objectives:**

5.1.

# 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 immunosuppresive 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

# 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.

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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. 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

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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:

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**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 myelodisplasia.

2.1.2. Lymphomas including B and T cell Lymphoma, plasma to cell disorders,

# 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.

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**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. 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

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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. 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

2.2

# 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.
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# 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

# 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:

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**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

# Goals and Objectives: Outpatient Hemostasis and Thrombosis Rotation

## Assessment Method (Program Evaluation)

# Goals and Objectives: General Hematology/Sickle Cell Disease

## Overall Description

The Fellow will be assigned to this rotation

# 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.

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**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. 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 a

# 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 tranfusion 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

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**3.**

# 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

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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

# 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 hybrinizations (FISH)
- 2.2.4. Hematopathology tissue assessment techniques including standard morphological evaluation and immunostaining.
- 2.2.5. Serum and urine electrophoresis and immunoeloctrophoresis.

2.3. Have an understanding of basic whiTj/iitu hybrinizaθ.0002 Tc-0.0023Tw(2.2.3. )-5(nd y(by oradi

# 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

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**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

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**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

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Objectiv21 1 TfT 90 445.68 54 1.14 re f BT 122j 1602 144 0.00TJ his ro715 TDsed Practice:

# 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

# 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:

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**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

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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:

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# 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:

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**Objectives:**

4.1.

# 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.

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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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**<u>Objectives</u>:**

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

# 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

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

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**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.

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**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:

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**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).

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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. 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 a

# Goals and Objectives: Research

6.3. Work with their mentor to identify appropr

# Goals and Objectives: Research

## Educational Resources

1. As dictated by the fellow's mentor