

Hematology Oncology Fellowship Curriculum
UIC Inpatient Oncology Service
(Inpt Onc-UIH)

I. Educational Goals (knowledge, skills, attitudes)

The educational goals of the Inpatient Oncology Service at UIH are to prepare fellows to act as qualified sub-specialty physicians in the setting of primary solid tumor diseases. Fellows should display competency in the treatment and management of the complications that may arise as a result of malignant disease and as a result of the respective treatments.

Fellow Year 1:

During time on service it is important to become more familiar with the general practices of oncology and patient management.

Knowledge

Oncologist should have an in-depth knowledge base of the various disease states with the field. During the first year of training it is important for the fellow to familiarize themselves with the basic pathophysiology of each disease state. During their time on service fellows will learn the staging for each disease sub-type and general aspects in treatment and monitoring of disease status. The fellow will also be the first in-line to field questions from other services as to how to workup and make diagnosis in patients who present with likely malignancy.

Skills

Fellows in the first year of fellowship must acquire new skills in the field of oncology. They are already familiar with these skills in the setting of general internal medicine.

1. How to obtain a comprehensive history, perform a good physical exam, and focus the history and physical examination for each major oncologic disease
2. How to gather important data from the electronic medical records, looking for information on symptoms at presentation, clinical course, labs/imaging and prior treatment the patient has received up to this point
3. How to seek more information from other persons, including family members, outside hospitals who transferred the patient (primary or oncologists, labs, imaging and pathology)
4. How to select appropriate tests to help with medical decisions
5. How to use the relevant information to develop an assessment and diagnostic and therapeutic plan

6. How to lead the team of fellow, resident(s) and student(s) in order to be effective in order to complete the clinical tasks within a reasonable time
7. How to review the medical literature to gather evidence supporting patient care decisions
8. How to teach the medical students and residents on the consultation team
9. How to present cases seen on the Inpatient Oncology service at case conferences

Fellow Year 2+3:

They should be familiar with basic disease pathology and physiology. During their second and third years fellows should now be focusing appropriate treatment strategies and management of acute toxicities either from the disease or the therapies themselves.

Knowledge

At this level of training, fellows need to develop a deeper knowledge of the areas of listed below. They should already be familiar with most diagnoses being evaluated. They will explore the recent literature to deepen their level of understanding of interesting cases. Within the areas of knowledge fellows should identify and actively pursue areas they do not know as well for improvement.

Skills

Fellows in the second and third years of fellowship must perfect their skills. The most important may be for the senior fellow to function as a junior attending in many ways and be able to run service in an independent manner, although still under the supervision of the attending on service. They should be able to provide reasonable diagnostic and therapeutic plans in most consultations except in the most complex cases.

Areas of Knowledge

Will be learned throughout the three years of fellowship.

Basic Principles of Oncology Diagnosis and Management

1. Basic science and pathogenesis of specific tumor type
 - a. Risk factors
2. Epidemiology of specific tumor types
 - a. Geographic variations
 - b. Gender differences
3. Pathophysiology
 - a. Understanding the molecular and evolving physiologic traits of specific tumor types

4. Introduction to chemotherapy
 - a. Indications
 - b. Pharmacokinetics
 - c. Side effect profiles
 - d. Drug interactions
 - e. Contraindications
 - f. Dose adjustments
5. Introduction to targeted/immunotherapy
 - a. Indications
 - b. Pharmacokinetics
 - c. Side effect profiles
 - d. Drug interactions
 - e. Contraindications
 - f. Dose adjustments

Major Clinical Syndromes

- Anal Carcinoma
- Bladder Cancer
 - o Bladder Cancer
 - o Upper Tract Tumors
 - o Urothelial Carcinoma of the Prostate
- Bone Cancer
 - o Chondrosarcoma
 - o Ewing's Sarcoma
 - o Osteosarcoma
- Breast Cancer
 - o Noninvasive
 - o Invasive
 - o Phyllodes Tumor
 - o Paget's Disease
 - o Breast Cancer During Pregnancy
 - o Inflammatory Breast Cancer
- Cancer of Unknown Primary
- Central Nervous System Cancers
 - o Adult Low-Grade Infiltrative Supratentorial Astrocytoma/Oligodendroglioma
 - o Adult Intracranial Ependymoma
 - o Anaplastic Gliomas/Glioblastoma
 - o Limited (1-3) Metastatic Lesions
 - o Multiple (>3) Metastatic Lesions
 - o Leptomeningeal Metastases
 - o Primary CNS Lymphoma
 - o Metastatic Spine Tumors
 - o Meningiomas
- Cervical Cancer
- Colorectal Carcinoma

- Colon Cancer
 - Rectal Cancer
- Esophageal Cancer
- Gastric Cancer
- Head and Neck Cancers
 - Cancer of the Lip
 - Cancer of the Oral Cavity
 - Cancer of the Oropharynx
 - Cancer of the Hypopharynx
 - Cancer of the Nasopharynx
 - Cancer of the Glottic Larynx
 - Cancer of the Supraglottic Larynx
 - Ethmoid Sinus Tumors
 - Maxillary Sinus Tumors
 - Unresectable/Recurrent/Persistent Head and Neck Cancer
 - Occult Primary
 - Salivary Gland Tumors
 - Mucosal Melanoma
- Hepatobiliary Cancer
 - Hepatocellular Carcinoma
 - Gallbladder Cancer
 - Intrahepatic Cholangiocarcinoma
 - Extrahepatic Cholangiocarcinoma
- Kidney Cancer
- Malignant Pleural Mesothelioma
- Melanoma
- Neuroendocrine Tumors
 - Carcinoid Tumors
 - Islet Cell Tumors (Pancreatic Endocrine Tumors)
 - Neuroendocrine Unknown Primary
 - Adrenal Gland Tumors
 - Pheochromocytoma
 - Poorly Differentiated (High Grade or Anaplastic)/Small Cell
 - Multiple Endocrine Neoplasia, Type 1
 - Multiple Endocrine Neoplasia, Type 2
- Non-Melanoma Skin Cancers
 - Basal and Squamous Cell Skin Cancer
 - Dermatofibrosarcoma Protuberans
 - Merkel Cell Carcinoma
- Non-Small Cell Lung Cancer
- Ovarian Cancer
 - Epithelial Ovarian Cancer
 - Borderline Epithelial Ovarian Cancer
 - Less Common Ovarian Histologies
- Pancreatic Adenocarcinoma
- Prostate Cancer

- Small Cell Lung Cancer
 - o Small Cell Lung Cancer
 - o Lung Neuroendocrine Tumors
- Soft Tissue Sarcoma
 - o Extremity
 - o Retroperitoneal/Intra-Abdominal
 - o Gastrointestinal Stromal Tumors (GIST)
 - o Desmoid Tumors
- Testicular Cancer
- Thymic Malignancies
- Thyroid Carcinoma
 - o Nodular Evaluation
 - o Papillary Carcinoma
 - o Follicular Carcinoma
 - o Hurthle Cell Neoplasm
 - o Medullary Carcinoma
 - o Anaplastic Carcinoma
- Uterine Neoplasms
 - o Endometrial Cancer
 - o Uterine Sarcoma

Overview of the Rotation:

The Inpatient Oncology Service is a high pace clinical rotation. During the rotation, fellows work with an attending, one resident, two interns and may have medical student(s). It is the responsibility of the fellow to ensure that the team is appropriately managing the acute needs of the patients on service.

II. Core Competencies and Curriculum

Teaching Methods / Clinical Encounters

During this rotation, the fellows on UIC Onc, UIC Hem/Onc, VA Hem and VA Onc will be responsible for giving one lecture each during the month as part of a curriculum that has been created for the residents on service at any of these locations. Fellows are also encouraged to do case-based teaching on a daily basis with their respective residents.

Patient Characteristics / Disease Mix

The patient mix is very broad on this service. Patients have newly diagnosed malignancies, currently undergoing treatment, complications of therapy or have chronic

issues related to their cancer/treatment. Patients come from all ethnic and socioeconomic backgrounds.

Faculty Supervision

Fellow ability to clinically approach patient's disease status will be judged by the supervising attending physician during the rotation. The attending physicians will outline the goals of the rotation to the fellows early during the rotation and provide feedback mid-rotation and at the end of the rotation. Importantly, they will report to the Program Director any significant problem that is identified so that early corrective action can be implemented. They will complete a formal evaluation through the "New Innovations" software in a timely manner once they receive a request via e-mail.

Methods of evaluation

At the end of the rotation, the attending physician will receive a "New Innovation" evaluation form by e-mail and will complete this evaluation within a reasonable time. The New innovation evaluation form allows documentation of the fellow competency (competencies: patient care, medical knowledge, professionalism, and interpersonal and communication skills). The evaluation should be discussed with the fellow at the end of the rotation.

Fellows document milestones of their training: interesting cases, presentations, unusual or new situation faced on the service, etc. in their portfolios. They will also complete an attending evaluation through New Innovations.

Medical students and residents rotating on the service complete an evaluation of the fellow's teaching abilities adapted from the ACGME toolbox.

Attitudes / Behaviors

***Patient Care:* fellows must provide patient care that is compassionate, appropriate, and effective for the treatment oncologic diseases. They must communicate effectively and demonstrate caring and respectful behaviors when interacting with patients; gather accurate information about their patient; advise diagnostic and therapeutic plans based on patient information, up-to-date scientific evidence, and clinical judgment; use information technology to support patient care decisions; work with health care professionals, including those from other disciplines, to provide patient-focused care**

Medical Knowledge: fellows must demonstrate knowledge about basic and clinical sciences in the area of oncology, and apply this knowledge to patient care.

Practice-Based Learning and Improvement: fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. They must locate, appraise, and assimilate evidence from scientific studies related to their patients' disease; apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness; use information technology to manage information, access on-line medical information; and support their own education; facilitate the learning of students and other health care professionals

Interpersonal and Communication Skills: fellows must demonstrate interpersonal and communication skills that result in effective information exchange especially within the team and when acting as consultants to other physicians. They need work effectively with others as a member and leader of the oncology team.

Professionalism: fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. They must demonstrate respect, compassion, and integrity; a commitment to excellence and on-going professional development; a commitment to ethical principles; sensitivity and responsiveness to patients' culture, age, gender, and disabilities

System-Based Learning: fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. They are expected to practice cost-effective health; advocate for quality patient care, and assist patients in dealing with system complexities

Inpatient Hematology/ Stem Cell Transplant Services

I. Educational Goals (knowledge, skills, attitudes)

The educational goals of the joint service of inpatient hematology and stem cell transplant (SCT) rotation at UIH are:

1. To allow fellows to acquire insights into the care of patients undergoing high dose chemotherapy and allogeneic or autologous transplantation
2. To obtain a high degree of exposure to management of patients with lymphoma, leukemia and myeloma.

Fellow Year 1:

First year fellows rotate on the SCT service for approximately 1-2 months. This is an intensive rotation and it is expected that fellows will quickly gain knowledge and skills in malignant hematology and stem cell transplant.

Knowledge

In this rotation fellows will be expected to increase their knowledge in the complex fields of malignant hematology and stem cell transplant. This includes several uncommon disorders which are treated with modalities which may not be familiar to the first year fellow. Fellows in the first year of their fellowship must acquire a lot of new knowledge in this area. Because there is much to learn, this process takes time, and the depth of knowledge must increase progressively. At every stage of their training, fellows need to challenge themselves by reading further about patients they evaluate on the service. They should actively look for relevant articles about any unfamiliar situation. Progressively, they must develop expertise at recognizing the major clinical syndromes and their treatment.

More specifically, first year fellows need to learn about all the areas of knowledge listed below. Within each area of knowledge, they should first learn the information most relevant to the care of their patients. They should read regularly about their patients either from established texts (available on line through the university library) or from review articles published frequently in either hematology journals or core internal medicine journals.

As fellows become increasingly knowledgeable, they improve the quality of their teaching and consultations. They also become more independent over time, although attending back-up is available 24/7 and must be sought for any unfamiliar situation.

Skills

Fellows in the first year of their fellowship must acquire new skills in the fields of hematology and oncology. They may already be familiar with these skills in the context of general internal medicine.

1. How to obtain a comprehensive history, perform a good physical exam, and focus the history and physical examination for major hematologic and oncologic conditions
2. How to gather important data from the electronic medical records, looking for information on vital signs, prior antineoplastic therapy, other medications, laboratory data (including blood counts and pathology reports), imaging studies, and surgical findings.
3. How to seek more information from other persons, including family members, outside hospitals who transferred the patient (primary or hematology/ oncology physicians, pathology laboratories), patient's primary care physician, hospital physicians at UIC (surgeons about OR findings not documented fully in the record, other consultants about their opinions)
4. How to select appropriate tests to help with medical decisions
5. How to use the relevant information to develop an assessment and diagnostic and therapeutic plan
6. How to interpret special laboratory tests such as serological tests, PCR tests, cytogenetic tests, coagulation tests or biopsy results, paying attention to the positive and negative predictive values of these tests.
7. The indications for performing bone marrow aspiration and biopsy as a diagnostic test.
8. How to obtain and transport clinical specimens in an appropriate manner.
9. How to lead the team of fellow, resident(s) and student(s) in order to be effective in order to complete the clinical tasks within a reasonable time
10. How to review the medical literature to gather evidence supporting patient care decisions
11. How to teach residents on the service

Fellow Year 2 and 3:

Second and third year fellows rotate on the SCT service for approximately 1-2 months. Typically, they are already familiar with many of the areas of knowledge and skills required for this rotation. Still, they will emphasize further their supervision of the team

(Team Leaders), and their involvement with teaching residents (Clinical Teachers). Senior fellows should be seen as role models by the more junior members of the team.

Knowledge

At this level of training, fellows need develop a deeper knowledge of the areas of listed below. They should already be familiar with most diagnoses being evaluated. They will explore the recent literature to deepen their level of understanding of interesting cares. Within the areas of knowledge, they will select the areas they do not know as well for improvement.

Skills

Fellows in the second and third year of their fellowship must perfect their skills. The most important may be for the senior fellow to function as a junior attending in many ways. They manage the consultation team in a more independent manner, although still under the supervision of the attending on service. They should be capable of providing reasonable diagnostic and therapeutic plans in most consultations except in the most complex cases.

Areas of Knowledge

Fellows will learn about many of these areas of knowledge in hematology during the three-year fellowship, but will need to supplement their knowledge by reading about areas of knowledge not addressed during the training. Fellows review this list to identify any gap in their knowledge. Although the focus of this rotation is upon malignant hematology and stem cell transplant many areas relevant to benign hematology and solid tumor oncology may also be emphasized.

- I. Basic Principles
 1. Basic Laboratory Concepts and Techniques
 - a. Role of DNA, RNA and proteins in normal cellular processes
 - b. Concepts of translation and transcription in normal cellular processes
 2. Pharmacology
 - a. Pharmacokinetics, mechanism of action, metabolism, route of administration, indications, dosages, and toxicities of pharmacologic and biologic agents.
 - b. Current experimental therapeutics, such as monoclonal antibodies, radioimmunotherapy, etc.
 - c. Working knowledge of the mechanism of new drug development and approval process.
 3. Clinical Laboratory Techniques
 - a. Automated complete blood count with white blood cell differential
 - b. Hemoglobin electrophoresis

- c. Reticulocyte count
- d. Osmotic fragility
- e. Red blood cell (RBC) enzyme assays
- f. Specific techniques for microscopic identification of RBC parasites
- g. High pressure liquid chromatography (HPLC)
- h. Flow cytometry of peripheral blood, bone marrow, body fluids, lymph nodes and other tissues
- i. Cytogenetics, including fluorescence in-situ hybridization (FISH)
- j. Prothrombin time and activated partial thromboplastin time
- k. Coagulation factor and inhibitor assays
- l. Bleeding time
- m. Platelet function studies
- n. Heparin induced thrombocytopenia (HIT) assays
- o. Tissue (e.g. HLA) typing
- p. Southern blot
- q. Polymerase chain reaction (PCR)
- r. Reverse transcriptase – PCR (RT-PCR)
- s. Serum and urine protein electrophoreses and immunoelectrophoreses and/or immunofixation
- t. Hematopathology tissue assessment techniques, including standard morphologic evaluation and the use of immunostaining
- u. Blood banking techniques of cross-matching, antibody identification, direct antiglobulin test and indirect Coomb's test
- v. Apheresis, plasmapheresis, plateletpheresis, leukopheresis
- w. Therapeutic phlebotomy
- x. Exchange transfusion
- y. Immunocytochemistry
- z. Cytochemistry

4. Transfusion Medicine

- a. Knowledge of the procedures used to collect, evaluate and prepare blood products
- b. Components of blood products typically administered to patients, including red blood cell (RBC) preparations, platelet preparations, granulocyte preparations, fresh frozen plasma and cryoprecipitate.
- c. Various methods by which these blood products can be handled and prepared
- d. Clinical indications for use of specific blood products
- e. Potential risks associated with the administration of various blood products.
 - a. allergic (anaphylactic) reactions
 - b. graft versus host disease
 - c. introduction of infectious organisms
 - d. alloimmunization
 - e. delayed transfusion reactions
 - f. hemolytic reactions
 - g. febrile reactions
- f. alternatives to blood product therapies.

- g. mechanism by which apheresis can be used to isolate and collect specific blood components
- h. use of emergent plasmapheresis (as used in TTP) and leukapheresis (as used in AML)
- i. methods used for peripheral blood stem cell collections.

5. Radiation Therapy

- a. Basic principles of radiation biology.
- b. Basic approaches of administering radiation therapy, including the different radiation source types
- 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.

6. Normal Hematopoiesis

- a. Working understanding of hematopoiesis including:
 - a. Stem cell plasticity, embryology and differentiation
 - b. Erythropoiesis
 - c. Leukocyte differentiation, maturation and trafficking
 - d. Basics of lymphocyte biology
 - e. Thrombopoiesis
- b. Understanding of cell surface receptor and cell surface protein changes in normal development and differentiation of hematopoietic cells.
- c. Understanding of the role of growth factors and cytokines.
- d. Knowledge of hemoglobin synthesis
- e. Knowledge of normal platelet development and the role of thrombopoietin and other platelet growth factors.

II. Bone Marrow Failure States and Aplastic anemia

1. Bone marrow failure states

- a. Clinical characteristics of the inherited and congenital forms of bone marrow
- b. Demonstrate the ability to provide a differential diagnosis and the acquisition of practical knowledge of the role of medications, other drugs and environmental pathogens (including chemicals and infectious diseases) in the development of bone marrow failure states.

2. Aplastic Anemia

- a. Diagnosis of aplastic anemia.
- b. Understanding of the indications and risks of various treatment approaches (including stem cell transplantation, anti-thymocyte globulin, cyclosporine, other immune mediators)

III. Hematologic Neoplastic Disorders

Have understanding and knowledge of the diagnosis and treatment of the following diseases

1. Chronic Myeloproliferative Diseases
 - a. Chronic Myelogenous Leukemia
 - b. Polycythemia Rubra Vera
 - c. Chronic Idiopathic Myelofibrosis
 - d. Essential Thrombocythemia
 2. Acute Myeloid Leukemias
 3. Myelodysplastic Syndrome Disorders
 4. B-cell Neoplasms
 - a. B-Lymphoblastic Leukemia/Lymphoma
 - b. Lymphoplasmacytic Lymphoma (Waldenström's Macroglobulinemia)
 - c. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma
 - d. Hairy Cell Leukemia
 - e. Plasma Cell Disorders
 - f. Plasma Cell Myeloma (Multiple Myeloma), Plasmacytomas and
 - g. Other Plasma Cell Disorders
 - h. Amyloidosis
 - i. B-cell Lymphomas
 - j. B-cell Proliferations of Uncertain Malignant Potential
 - k. Post-transplantation Lymphoproliferative Disorders
 5. T-cell and NK-cell Neoplasms
 - a. Adult T-cell Leukemia/Lymphoma
 - b. Mycosis Fungoides, Sezary Syndrome and Cutaneous T-cell Lymphoma
 - c. T-cell Lymphomas
 6. Hodgkin's Disease
 7. Histiocytic and Dendritic Cell Neoplasms
 8. Mastocytosis
 9. Complications of Hematologic Malignancies
 - a. Febrile Neutropenia
 - b. Tumor Lysis Syndrome
 - c. Disseminated Intravascular Coagulation
 - d. Superior Vena Cava Syndrome
 - e. Spinal Cord Compression
 - f. Paraneoplastic Disorders
- VI. Palliative Care

1. Pain Management

- a. Practical competency in managing pain in patients with hematologic disorders.
- b. Understanding of the pharmacology, indications, dosage, administration potential toxicities and potential interactions of narcotics
- c. Practical competency in the indications and use of nonpharmacologic methods for treating pain.

2. Nutrition

- a. Practical competency for the role of nutrition in the care of patients with hematologic disorders. The trainee should understand the physical and psychological significance, and limitations, of nutrition in hematologic disease.

3. Hospice/End-of-Life Care

- a. Practical competency in discussing and delivering end-of-life care and counseling to those patients whose hematologic diseases are leading to the patient's death.
- b. Understanding of the types of end-of-life care that can be delivered by different health care models, including in-home hospice, residential hospice and other nursing services and settings.

VII. Bone Marrow Transplantation/Stem Cell Transplantation

1. Working knowledge of the basic, cellular and molecular biology of hematopoiesis and BMT/SCT.
2. Understanding of tumor immunology and the biologic and immunologic relationships between a donor's hematopoietic cells and host.
3. Knowledge and practical competency of the indication and role of autologous, full intensity allogeneic, low intensity allogeneic and tandem BMT/SCT in the management of hematologic diseases.
4. Be familiar with the role of the National Marrow Donor Program (NMDP) in identifying unrelated stem cell donors.
5. Knowledge of the preparative regimens used in anticipation of autologous and allogeneic BMT/SCT.
6. Understand the method of collecting and handling bone marrow and peripheral stem cells for transplantation.
7. Understand the approaches used to mobilize hematopoietic stem cells to the peripheral blood

8. Practical competency of the process of performing autologous and allogeneic BMT/SCT.
9. Understand the need for prophylactic and supportive care measures in patients undergoing BMT/SCT.
10. Understand approaches to preventing infectious diseases
11. Understand the use of immunosuppressive therapies to prevent or decrease graft-versus-host disease
12. Understand the complications that can occur post-transplant, including marrow engraftment failure, acute and chronic graft-versus-host disease, opportunistic infections, veno-occlusive disease, and others.

Overview of the Rotation:

During this rotation, fellows work with an attending, one resident and 2 interns to cover patients on the inpatient hematology service. The fellow and attending are responsible for the care of inpatients undergoing autologous and allogeneic stem cell transplant. Patients on this joint service are often very sick and of a high level of acuity.

II. Core Competencies and Curriculum

Teaching Methods / Clinical Encounters

During this rotation, fellows evaluate inpatients on the service on a daily basis. This service deals with all hematology inpatients except those with sickle cell disease. Patients admitted to the service are first evaluated by the resident, intern or fellow, then discussed when possible with the fellow, and finally presented formally to the attending and the rest of the team. Prior to the presentation, whenever a case is difficult, unusual, or challenging, fellows and residents will locate and print an article that addresses the problem being evaluated.

This rotation values and emphasizes teaching. Frequently, every person on the team participates in teaching: attendings, fellows and residents. Fellows teach during short lectures to the team usually when the attending is not present. Attendings teach both during sitting rounds (presentation of new consultations and follow-up problems) and during walking rounds (at the bedside). They also present “mini-lectures”, and more formal lectures on the topic of their choice. Frequently, the fellow or one member of the team will request a specific topic.

Patient Characteristics / Disease Mix

The patient mix is predominantly patients with malignant hematologic disorders who are in hospital for treatment of the underlying disease or for complications of their disease/ treatment. The degree of illness severity is variable. Patients may be evaluated in the intensive care units. Otherwise patients are evaluated on the wards or within the bone marrow transplant unit. Less often diagnoses such as TTP and hemophilia will be encountered. Patients will often have known diagnoses however occasionally patients with newly diagnosed hematologic malignancies are admitted to the service or transferred from outside institutions,

Procedures and Skills

Several invasive procedures are performed on this service. The diagnostic and therapeutic procedures required on this service are:

1. Performance and interpretation of peripheral blood smears.
2. Performance and interpretation of bone marrow aspiration and biopsy for diagnosis and staging.
3. Performance of lumbar puncture and instillation of intrathecal chemotherapy
4. Access of ommaya reservoir and instillation of intraommaya chemotherapy

Frequently the performance of invasive procedures such as biopsies and insertion of central lines will be recommended to patients. Therefore, attending physicians will advise that the trainees properly explain any invasive procedures performed to the patient, discuss the possible risks and discomforts of the procedure, and obtain informed consent.

Faculty Supervision

Fellow ability to clinically approach problems in hematology will be judged by the supervising attending physician during the hematology/ SCT rotation. The attending physicians will outline the goals of the rotation to the fellows early during the rotation and provide feedback mid-rotation and at the end of the rotation. Importantly, they will report to the Program Director any significant problem that is identified so that early corrective action can be implemented. They will complete a formal evaluation through the “New Innovations” software in a timely manner once they receive a request via e-mail.

Methods of evaluation

At the end of the rotation, the attending physician will receive a “New Innovation” formal evaluation form by e-mail and will complete this evaluation within a reasonable time. The New innovation evaluation form allows documentation of the fellow competency (competencies: patient care, medical knowledge, professionalism, and interpersonal and communication skills). The evaluation should be discussed with the fellow at the end of the rotation.

Fellows document milestones of their training: interesting cases, presentations, unusual or new situation faced on the service, etc. in their portfolios. They will also complete an attending evaluation through New Innovations.

Attitudes / Behaviors

Patient Care: fellows must provide patient care that is compassionate, appropriate, and effective for the treatment and the prevention of hematologic and oncologic disease. They must communicate effectively and demonstrate caring and respectful behaviors when interacting with patients; gather accurate information about their patient; advise diagnostic and therapeutic plans based on patient information, up-to-date scientific evidence, and clinical judgment; use information technology to support patient care decisions; work with health care professionals, including those from other disciplines, to provide patient-focused care

Medical Knowledge: fellows must demonstrate knowledge about basic and clinical sciences in the area of hematology/ oncology, and apply this knowledge to patient care.

Practice-Based Learning and Improvement: fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. They must locate, appraise, and assimilate evidence from scientific studies related to their patients’ disease; apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other

information on diagnostic and therapeutic effectiveness; use information technology to manage information, access on-line medical information; and support their own education; facilitate the learning of students and other health care professionals

Interpersonal and Communication Skills: fellows must demonstrate interpersonal and communication skills that result in effective information exchange especially within the team and when acting as consultants to other physicians. They need work effectively with others as a member and leader of the hematology/ oncology consultation team.

Professionalism: fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. They must demonstrate respect, compassion, and integrity; a commitment to excellence and on-going professional development; a commitment to ethical principles; sensitivity and responsiveness to patients' culture, age, gender, and disabilities

System-Based Learning: fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. They are expected to practice cost-effective health; advocate for quality patient care, and assist patients in dealing with system complexities

Resources

1. UIC medical library. <http://library.uic.edu/>
1. The Medical library holds numerous journals and older volumes of journals that are relevant to hematology and oncology, and are not accessible on line
2. Key Oncology Websites
 1. American Society of Clinical Oncology
www.asco.org
Professional society website with extensive educational resources
 2. National Comprehensive Cancer Network
www.NCCN.org
Extensive step by step guidelines on each malignancy as well as supportive care
 3. Chemoregimen.com
www.Chemoregimen.com

Online resource to help search for appropriate antineoplastic regimen by disease type

4. Chemoorders.com

www.Chemoorders.com

Online resource to help search for appropriate treatment regimens and aid in correct prescribing of antineoplastic agents

5. Oncology Stat

www.Oncologystat.com

Educational website with links to articles and presentations, including journal watch section

3. Key Hematology Websites

1. American Society of Hematology (ASH)

www.hematology.org

Professional society website with educational and teaching resources for fellows as well as links to publications as information on upcoming meetings

2. ASH image bank

<http://ashimagebank.hematologylibrary.org/>

Extensive collection of images of normal and abnormal hematopoietic cells

3. ASH self assessment program

<http://www.ash-sap.org/>

Free text for hematology trainees on benign and malignant hematology with self assessment questions for each chapter

4. Bloodline.net

<http://www.bloodline.net/>

Reference site with links to online hematology resources including journal watch section

Conferences:

Fellows are excused from conferences of the fellowship teaching curriculum during this rotation.

Specific to this rotation, fellows are required to attend and help direct multidisciplinary rounds on Friday at 2pm. Fellows will present the patients currently on the service and give updates on their clinical condition.

University of Illinois Hematology/ Oncology Consult Rotation

I. Educational Goals (knowledge, skills, attitudes)

The educational goals of the hematology/oncology consult (H/O consults) rotation at UIH is to prepare fellows to act as qualified consultants in the sub-specialty, specifically in the setting of a hematology and oncology consultation service at a tertiary hospital.

Fellow Year 1:

First year fellows rotate on the H/O consults service usually for 1 to 2 months over the entire first year. Therefore, it is expected that they will develop greater and greater knowledge and skills in the field of hematology and oncology. Fellows need also adopt the right attitudes to make this rotation successful.

Knowledge

Hematology and oncology consultants are mostly called upon for their expert knowledge in the broad and complex fields of solid tumors as well as malignant and benign hematologic disease. H/O consults includes a broad spectrum of diseases and differential diagnoses that are seen in a tertiary referral center.

Fellows in the first year of their fellowship must acquire a lot of new knowledge in hematology and oncology, mostly during this and other consult rotation. Because there is much to learn, this process takes time, and the depth of knowledge must increase progressively. At every stage of their training, fellows need to challenge themselves by reading further about patients they evaluate on the service. They should actively look for relevant articles about any unfamiliar situation. Progressively, they must develop expertise at recognizing the major clinical syndromes, use anti-neoplastic therapy effectively, and learn about the major tumors in some details.

More specifically, first year fellows need to learn about all the areas of knowledge listed below. Within each area of knowledge, they should first learn the information most relevant to the care of their patients. They should read regularly about their patients either from the established hematology and oncology texts (all available on line through the University library) or from review articles published frequently in either hematology or oncology journals (such as Blood and the Journal of Clinical Oncology) or core internal medicine journals (New England Journal of Medicine).

During the first year of their fellowship, fellows need build their differential diagnosis trees (including the benign diseases that mimic malignant ones) and learn the most important diagnostic and therapeutic approaches to common malignancies and hematologic conditions.

As fellows become increasingly knowledgeable, they improve the quality of their teaching and consultations. They also become more independent over time, although attending back-up is available 24/7 and must be sought for any unfamiliar situation.

Skills

Fellows in the first year of their fellowship must acquire new skills in the fields of hematology and oncology. They are already familiar with these skills in the context of general internal medicine.

12. How to obtain a comprehensive history, perform a good physical exam, and focus the history and physical examination for major hematologic and oncologic conditions
13. How to gather important data from the electronic medical records, looking for information on vital signs, prior antineoplastic therapy, other medications, laboratory data (including blood counts and pathology reports), imaging studies, and surgical findings.
14. How to seek more information from other persons, including family members, outside hospitals who transferred the patient (primary or hematology/ oncology physicians, pathology laboratories), patient's primary care physician, hospital physicians at UIC (primary team, surgeons about OR findings not documented fully in the record, other consultants about their opinions)
15. How to select appropriate tests to help with medical decisions
16. How to use the relevant information to develop an assessment and diagnostic and therapeutic plan
17. How to interpret special laboratory tests such as serological tests, PCR tests, cytogenetic tests, coagulation tests or biopsy results, paying attention to the positive and negative predictive values of these tests.
18. The indications for performing bone marrow aspiration and biopsy as a diagnostic test in the assessment of abnormal blood counts.
19. How to obtain and transport clinical specimens in an appropriate manner
20. How to offer phone advice that is relevant and to the point, while knowing when a curbside consultation is not appropriate and a full consultation is required
21. How to lead the team of fellow, resident(s) and student(s) in order to be effective in order to complete the clinical tasks within a reasonable time
22. How to review the medical literature to gather evidence supporting patient care decisions
23. How to teach the medical students and residents on the consultation team

24. When it is appropriate to transfer patients to the inpatient hematology or oncology services and to be a liaison between general medicine and specialist services in these instances.

Fellow Year 2 and 3:

Second and third year fellows rotate on the H/O consult service usually for 1-2 months. Typically, they are already familiar with many of the areas of knowledge and skills required for this rotation. Still, they will emphasize further their supervision of the team (Team Leaders), and their involvement with teaching residents and students (Clinical Teachers). Senior fellows should be seen as role models by the more junior members of the team and consulting services.

Knowledge

At this level of training, fellows need develop a deeper knowledge of the areas of listed below. They should already be familiar with most diagnoses being evaluated. They will explore the recent literature to deepen their level of understanding of interesting cases. Within the areas of knowledge, they will select the areas they do not know as well for improvement.

Skills

Fellows in the second and third year of their fellowship must perfect their skills. The most important may be for the senior fellow to function as a junior attending in many ways. They manage the consultation team in a more independent manner, although still under the supervision of the attending on service. They should be capable of providing reasonable diagnostic and therapeutic plans in most consultations except in the most complex cases.

Areas of Knowledge

Fellows will learn about many of these areas of knowledge during the three-year fellowship, but will need to supplement their knowledge by reading about areas of knowledge not addressed during the training. Fellows review this list to identify any gap in their knowledge.

II. Basic Principles

7. Basic Laboratory Concepts and Techniques
 - f. Role of DNA, RNA and proteins in normal cellular processes
 - g. Concepts of translation and transcription in normal cellular processes

8. Pharmacology
 - d. Pharmacokinetics, mechanism of action, metabolism, route of administration, indications, dosages, and toxicities of pharmacologic and biologic agents.
 - e. Current experimental therapeutics, such as monoclonal antibodies, radioimmunotherapy, etc.
 - f. Working knowledge of the mechanism of new drug development and approval process.

9. Clinical Laboratory Techniques

- aa. Automated complete blood count with white blood cell differential
- bb. Hemoglobin electrophoresis
- cc. Reticulocyte count
- dd. Osmotic fragility
- ee. Red blood cell (RBC) enzyme assays
- ff. Specific techniques for microscopic identification of RBC parasites
- gg. High pressure liquid chromatography (HPLC)
- hh. Flow cytometry of peripheral blood, bone marrow, body fluids, lymph nodes and other tissues
- ii. Cytogenetics, including fluorescence in-situ hybridization (FISH)
- jj. Prothrombin time and activated partial thromboplastin time
- kk. Coagulation factor and inhibitor assays
- ll. Bleeding time
- mm. Platelet function studies
- nn. Heparin induced thrombocytopenia (HIT) assays
- oo. Tissue (e.g. HLA) typing
- pp. Southern blot
- qq. Polymerase chain reaction (PCR)
- rr. Reverse transcriptase – PCR (RT-PCR)
- ss. Serum and urine protein electrophoreses and immunoelectrophoreses and/or immunofixation
- tt. Hematopathology tissue assessment techniques, including standard morphologic evaluation and the use of immunostaining
- uu. Blood banking techniques of cross-matching, antibody identification, direct antiglobulin test and indirect Coomb's test
- vv. Apheresis, plasmapheresis, plateletpheresis, leukopheresis
- ww. Therapeutic phlebotomy
- xx. Exchange transfusion
- yy. Immunocytochemistry
- zz. Cytochemistry

10. Transfusion Medicine

- j. Knowledge of the procedures used to collect, evaluate and prepare blood products
- k. Components of blood products typically administered to patients, including red blood cell (RBC) preparations, platelet preparations, granulocyte preparations, fresh frozen plasma and cryoprecipitate.

- l. Various methods by which these blood products can be handled and prepared
- m. Clinical indications for use of specific blood products
- n. Potential risks associated with the administration of various blood products.
 - a. allergic (anaphylactic) reactions
 - b. graft versus host disease
 - c. introduction of infectious organisms
 - d. alloimmunization
 - e. delayed transfusion reactions
 - f. hemolytic reactions
 - g. febrile reactions
- o. alternatives to blood product therapies.
- p. mechanism by which apheresis can be used to isolate and collect specific blood components
- q. use of emergent plasmapheresis (as used in TTP) and leukapheresis (as used in AML)
- r. methods used for peripheral blood stem cell collections.

11. Radiation Therapy

- a. Basic principles of radiation biology.
- b. Basic approaches of administering radiation therapy, including the different radiation source types
- 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

12. Normal Hematopoiesis

- a. Working understanding of hematopoiesis including:
 - f. Stem cell plasticity, embryology and differentiation
 - g. Erythropoiesis
 - h. Leukocyte differentiation, maturation and trafficking
 - i. Basics of lymphocyte biology
 - j. Thrombopoiesis
- b. Understanding of cell surface receptor and cell surface protein changes in normal development and differentiation of hematopoietic cells.
- h. Understanding of the role of growth factors and cytokines.
- i. Knowledge of hemoglobin synthesis
- j. Knowledge of normal platelet development and the role of thrombopoietin and other platelet growth factors.

II. Red Blood Cell Disorders

1. Anemias

- a. Production Disorders
 - Nutritional Deficiencies
 - Anemia of Chronic Disease

- Red Cell Aplasia and Hypoplasia
 - Sideroblastic Anemias
 - b. RBC Destruction Disorders (Hemolytic Anemias)
 - Hemoglobinopathies
 - Thalassemias
 - Sickle Cell Anemia
 - Other Congenital Hemoglobinopathies
 - c. Hemolytic Anemias
 - Autoimmune Hemolytic Anemias
 - Metabolic Enzyme Deficiency Hemolytic Anemias
 - Paroxysmal Nocturnal Hemoglobinuria
 - RBC Membrane Disorders
 - Microangiopathic Hemolytic Anemias
 - Non-autoimmune, Acquired Hemolytic Anemias
 - d. Erythrocytosis
 - e. Porphyrias
 - k. Hemochromatosis
2. White Blood Cell Disorders
- a. Granulocyte Dysfunction Disorders
 - b. Granulocytopenia
 - c. Lymphopenia and Lymphocyte Dysfunction Syndromes
 - d. Leukocytosis
3. Platelet and Megakaryocyte Disorders
- a. Hereditary Platelet Disorders
 - b. Acquired Platelet Function Disorders
 - c. Thrombocytopenia
 - Decreased Platelet Production
 - Increased Destruction or Consumption of Platelets
 - d. Thrombocytosis
 - e. Anti-Platelet Function Drugs
4. Bone Marrow Failure States
- a. Aplastic Anemia
- III. Hemostasis
- 1. Normal Mechanisms of Hemostasis
 - 2. Bleeding Disorders
 - 3. Thrombotic Disorders

- a. Heparin-induced Thrombocytopenia
- b. Antiphospholipid Syndrome

4. Pharmacologic Manipulation of Bleeding and Thrombosis

IV. Complications of Malignancies

- 1. Febrile Neutropenia
- 2. Tumor Lysis Syndrome
- 3. Disseminated Intravascular Coagulation
- 4. Superior Vena Cava Syndrome
- 5. Spinal Cord Compression
- 6. Mucositis
- 7. Paraneoplastic Disorders

V. Management and treatment of hematologic neoplastic disorders

- 4. Chronic Myeloproliferative Diseases
- e. Chronic Myelogenous Leukemia
- f. Polycythemia Rubra Vera
- g. Chronic Idiopathic Myelofibrosis
- h. Essential Thrombocythemia

2. Acute Myeloid Leukemias

3. Myelodysplastic Syndrome Disorders

4. B-cell Neoplasms

- l. B-Lymphoblastic Leukemia/Lymphoma
 - m. Lymphoplasmacytic Lymphoma (Waldenström's Macroglobulinemia)
 - n. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma
 - o. Hairy Cell Leukemia
 - p. Plasma Cell Disorders
 - q. Plasma Cell Myeloma (Multiple Myeloma), Plasmacytomas and
 - r. Other Plasma Cell Disorders
 - s. Amyloidosis
 - t. B-cell Lymphomas
 - u. B-cell Proliferations of Uncertain Malignant Potential
 - v. Post-transplantation Lymphoproliferative Disorders
- 5. T-cell and NK-cell Neoplasms
 - d. Adult T-cell Leukemia/Lymphoma
 - e. Mycosis Fungoides, Sezary Syndrome and Cutaneous T-cell Lymphoma
 - f. T-cell Lymphomas

6. Hodgkin's Disease
7. Histiocytic and Dendritic Cell Neoplasms
8. Mastocytosis

VI. Management and treatment of individual cancers

1. Head and neck cancers
2. Lung cancer and mesothelioma
 - a. Small-cell lung cancer
 - b. Non-small-cell lung cancer
 - c. Mesothelioma
3. Gastrointestinal cancers
 - a. Esophageal cancer
 - b. Gastric cancer
 - c. Colon cancer
 - d. Anal cancer
 - e. Hepatobiliary cancers
 - f. Pancreatic cancer
4. Genitourinary cancers
 - a. Renal cell cancer
 - b. Urothelial cancers
 - c. Penile cancer
 - d. Prostate cancer
 - e. Germ cell tumors
5. Gynecologic malignancies
 - a. Ovarian cancer
 - b. Uterine cancer
 - c. Cervical cancer
 - d. Vulvar and vaginal cancers
6. Breast cancer
7. Sarcomas
 - a. Bone sarcomas
 - b. Soft tissue sarcomas
8. Skin cancers
 - a. Melanoma
 - b. Basal cell and squamous cell cancers

9. Endocrine cancer
10. Central nervous system malignancies
11. Carcinoma of unknown primary site

Overview of the Rotation:

During this rotation, fellows work with an attending, one or more resident(s) and medical student(s) to offer consultations in hematology and oncology. The consult team takes care of very sick and very complex patients. Over the course of the rotation, fellows see quite a significant number of new consultations and follow-ups.

II. Core Competencies and Curriculum

Teaching Methods / Clinical Encounters

During this rotation, fellows evaluate inpatients referred to the H/O consultation service. This consultation service deals with all patients except those with sickle cell disease. Patients are first evaluated by one medical student, resident, or fellow, then discussed when possible with the fellow, and finally presented formally to the attending and the rest of the team. Prior to the presentation, whenever a case is difficult, unusual, or challenging, fellows and residents will locate and print an article that addresses the problem being evaluated.

This rotation values and emphasizes teaching. Frequently, every person on the team participates in teaching: attendings, fellows, residents, and medical students. Students who review the literature about one of their patients may present a short summary to the group. Students interested in hematology/ oncology may choose to review an antibiotic or antibiotic group and present a short summary to the group. Fellows teach during short lectures to the team usually when the attending is not present. Attendings teach both during sitting rounds (presentation of new consultations and follow-up problems) and during walking rounds (at the bedside). They also present “mini-lectures”, and more formal lectures on the topic of their choice. Frequently, the fellow or one member of the team will request a specific topic.

Patient Characteristics / Disease Mix

The patient mix is very broad on this service. The degree of illness severity is variable. Many patients are evaluated in one of the intensive care units: medical ICU, surgical

ICU, and neurosurgical ICU. Others are evaluated on the wards within the medical, surgical, OBGYN, psychiatry. Benign hematology problems make up a significant number of the consults from these services. These consults are generally for common problems abnormalities in the complete blood count or screening coagulation tests. Less often diagnoses such as TTP and hemophilia will be encountered. Patients with known malignant diagnoses will be seen by the consult service if they are in hospital and not in the inpatient oncology or stem cell services. Patients may also be newly diagnosed with malignant disease on general medicine or surgical services.

Procedures and Skills

The only invasive procedure performed by this service is bone marrow aspiration and biopsy. Some procedures are performed during this rotation, while others may only be performed during other rotations. The diagnostic and therapeutic procedures required on this service are:

5. Performance and interpretation of peripheral blood smears. This will be evaluated by the supervising attending during consult rounds.
6. Performance and interpretation of bone marrow aspiration and biopsy.
7. Evaluation of solid tumors at diagnosis and after treatment by the use of diagnostic imaging

Hematology and oncology consultants frequently recommend the performance of invasive procedures such as biopsies. Therefore, attending physicians will advise that the trainees properly explain any invasive procedures performed to the patient, discuss the possible risks and discomforts of the procedure, and obtain informed consent.

Faculty Supervision

Fellow ability to clinically approach problems in hematology and oncology will be judged by the supervising attending physician during the H/O consult rotation. The attending physicians will outline the goals of the rotation to the fellows early during the rotation and provide feedback mid-rotation and at the end of the rotation. Importantly, they will report to the Program Director any significant problem that is identified so that early corrective action can be implemented. They will complete a formal evaluation through the “New Innovations” software in a timely manner once they receive a request via e-mail.

Methods of evaluation

At the end of the rotation, the attending physician will receive a “New Innovation” formal evaluation form by e-mail and will complete this evaluation within a reasonable time. The New innovation evaluation form allows documentation of the fellow competency (competencies: patient care, medical knowledge, professionalism, and interpersonal and communication skills). The evaluation should be discussed with the fellow at the end of the rotation.

Fellows document milestones of their training: interesting cases, presentations, unusual or new situation faced on the service, etc. in their portfolios. They will also complete an attending evaluation through New Innovations.

Attitudes / Behaviors

Patient Care: fellows must provide patient care that is compassionate, appropriate, and effective for the treatment of hematologic and oncologic disease. They must communicate effectively and demonstrate caring and respectful behaviors when interacting with patients; gather accurate information about their patient; advise diagnostic and therapeutic plans based on patient information, up-to-date scientific evidence, and clinical judgment; use information technology to support patient care decisions; work with health care professionals, including those from other disciplines, to provide patient-focused care

Medical Knowledge: fellows must demonstrate knowledge about basic and clinical sciences in the area of hematology/ oncology, and apply this knowledge to patient care.

Practice-Based Learning and Improvement: fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. They must locate, appraise, and assimilate evidence from scientific studies related to their patients’ disease; apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness; use information technology to manage information, access on-line medical information; and support their own education; facilitate the learning of students and other health care professionals

Interpersonal and Communication Skills: fellows must demonstrate interpersonal and communication skills that result in effective information exchange especially within the team and when acting as consultants to other physicians. They need work effectively with others as a member and leader of the hematology/ oncology consultation team.

Professionalism: fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. They must demonstrate respect, compassion, and integrity; a commitment to excellence and on-going professional development; a commitment to ethical principles; sensitivity and responsiveness to patients’ culture, age, gender, and disabilities

System-Based Learning: fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. They are

expected to practice cost-effective health; advocate for quality patient care, and assist patients in dealing with system complexities

Resources

2. UIC medical library. <http://library.uic.edu/>
4. The Medical library holds numerous journals and older volumes of journals that are relevant to hematology and oncology, and are not accessible on line
5. Key Oncology Websites
 6. American Society of Clinical Oncology
www.asco.org
Professional society website with extensive educational resources
 7. National Comprehensive Cancer Network
www.NCCN.org
Extensive step by step guidelines on each malignancy as well as supportive care
 8. Chemoregimen.com
www.Chemoregimen.com
Online resource to help search for appropriate antineoplastic regimen by disease type
 9. Chemoorders.com
www.Chemoorders.com
Online resource to help search for appropriate treatment regimens and aid in correct prescribing of antineoplastic agents
 10. Oncology Stat
www.Oncologystat.com
Educational website with links to articles and presentations, including journal watch section
6. Key Hematology Websites
 5. American Society of Hematology (ASH)
www.hematology.org
Professional society website with educational and teaching resources for fellows as well as links to publications as information on upcoming meetings
 6. ASH image bank

<http://ashimagebank.hematologylibrary.org/>

Extensive collection of images of normal and abnormal hematopoietic cells

7. ASH self assessment program

<http://www.ash-sap.org/>

Free text for hematology trainees on benign and malignant hematology with self assessment questions for each chapter

8. Bloodline.net

<http://www.bloodline.net/>

Reference site with links to online hematology resources including journal watch section

Conferences:

Fellows are expected to attend the conferences of the fellowship teaching curriculum during this rotation. All fellows are expected to participate in the discussions during these sessions. This includes:

Didactic conference (7.30-8.30am Friday mornings and 7.30-8.30am every other Tuesday)

Journal club (8.30-9.30am on Friday morning alternating with hematopathology conference)

Hematopathology conference (8.30-9.30am on 2nd and 4th Friday of every month)

In addition attendance is required at monthly research meetings of the section and monthly clinical trials meetings.

Fellows should also attempt to attend Tumor Board (Monday 12-1pm) and Thoracic multidisciplinary conference (Thursday 5-6pm).

Hematology and Oncology Fellowship Curriculum
General Hematology and Oncology Service
MacNeal Hospital Rotation/ UIC Cancer Center at MacNeal

Description of the Rotation

During the fellowship, fellows will rotate at MacNeal Hospital for an average of 4 weeks per year of fellowship. This rotation provides fellows the opportunity to practice hematology-oncology in an urban community teaching hospital. Patients at MacNeal are frequently non-English speaking, minorities, undocumented, and lack formal health insurance (diverse ethnic and cultural backgrounds). Fellows will perform inpatient consultations on both hematology (benign and malignant) and oncology topics on patients from all services (medical, surgical, Rehab, psychiatry, OB, etc). Fellows will participate in weekly Tuesday tumor board and be responsible for teaching of the house staff. Fellows are expected to participate in the clinics.

Educational Goals (knowledge, skills, attitudes)

The educational goals of the General Hematology and Oncology rotation at MacNeal Hospital are to:

- to provide clinical training experiences in Hematology in the context of a community hospital environment with an ethnically diverse referral population.
- to provide clinical training experiences in Medical Oncology in the context of a community hospital environment with an ethnically diverse referral population.
- to provide training experiences in the conduct of clinical research in the context of a community hospital environment with an ethnically diverse referral population.
- to enhance systems based learning in the context of a community hospital with a preponderance of managed care patients.
- to sensitize trainees to the special needs and concerns of patients from diverse ethnic and cultural backgrounds.

Patient Characteristics / Disease Mix

The rotation at MacNeal Hospital will provide fellows with exposure to a wide variety of hematology/oncology patients in the setting of community hospital. This rotation provides a diverse and intensive outpatient and inpatient experience. It will allow fellows to provide primary care to patients and to participate in clinical research efforts in the community setting.

The strength of the MacNeal Hospital rotation is that it focuses on community which has a diverse ethnic and cultural backgrounds. The Hematology/Oncology practice sees a variety of tumors and hematological conditions.

Rotation

Fellows rotate at MacNeal service for 1 month/year. Therefore, it is expected that they will develop greater and greater knowledge and skills in the field of general Hematology and Oncology.

Faculty

Fellows will be supervised by UIC Faculty at MacNeal. The currently faculty include Irene Ma, MD, Nina Yedevalli, MD, and John Berry, MD.

The attending physicians will outline the goals of the rotation to the fellows early during the rotation and provide feedback mid-rotation and at the end of the rotation.

Evaluation

At the end of the rotation, the attending physician will receive a “New Innovation” evaluation form by e-mail and will complete this evaluation within a reasonable time. The New innovation evaluation form allows documentation of the fellow competency (competencies: patient care, medical knowledge, professionalism, and interpersonal and communication skills). The evaluation should be discussed with the fellow at the end of the rotation.

Miscellaneous

- Call: Specific call schedule will need to be planned with the attending on service at the time. This will vary from attending to attending and any plans (e.g. meeting attendance) should be discussed with the attending on service in advance to make adjustments.
- Contact Numbers:
 - Dr. Berry 708-324-0242 (pager); 312-375-9965 (cell phone)
 - Dr. Ma 708-906-5146 (cell phone)
 - Dr. Neena Yedavalli 312-399-7572 (cell phone)The fellow will have a MacNeal pager which will be shared amongst the fellows
- Office Location: 6801 West 34th Street, Berwyn 60402; 708-484-8400
- Outpatient: Drs. Ma, Yedevalli, and Berry generally see patients every day. Usually the fellow makes sure the new consults and follow up inpatients are evaluated and then proceeds to clinic. Clinics generally start at 8:30-8:40 AM. Fellows will maintain their continuity clinic at the Jesse Brown VA while rotating at MacNeal. The fellow will be excused to attend two ½ day continuity clinics at UIC or the VA. For the remainder of the day the fellow shall report to MacNeal Hospital/UIC Cancer Center. Fellows who have 3 clinics a week will be assigned coverage for one of those while rotating at MacNeal.
- ID Cards: You must obtain an ID card that is issued by MacNeal. MacNeal GME will help you with this.
- Parking: Your MacNeal ID will allow you to get into the parking structure. Again, the GME will help with this.

- Medical Records: The outpatient clinic uses Cerner. All documentation must be in the chart within 24 hours (this is different than the main campus). MacNeal Hospital also used an EMR for labs and radiology reports. Currently, charts are being utilized for inpatient notes and consultations.
- MacNeal Home access:
<https://gateway.vhschicago.com/Citrix/AccessPlatform/auth/login.aspx>

Hematology and Oncology Fellowship Curriculum
General Hematology and Oncology Service
Mercy Hospital Rotation

I. Educational Goals (knowledge, skills, attitudes)

The educational goals of the **General Hematology and Oncology** rotation at Mercy hospital are to

- (i) develop fellow's skills in the area of comprehensive care of cancer patients and in the diagnosis and management of hematological disorders in both in-patient and outpatient settings at a tertiary community hospital.
- (ii) Train fellows in the specifics of hematopathology, radiation oncology, blood banking and gynecology oncology.

Teaching Methods / Clinical Encounters

During this rotation, fellows evaluate inpatients referred to the hematology and oncology consultation service and patients admitted to hematology and oncology service.

Patients are first evaluated by one medical student, resident, or fellow, then discussed when possible with the fellow, and finally presented formally to the attending and the rest of the team. Prior to the presentation, whenever a case is difficult, unusual, or challenging, fellows and residents will locate and print an article that addresses the problem being evaluated.

This rotation values and emphasizes teaching. Frequently, every person on the team participates in teaching: attendings, fellows, residents, and medical students. Students, residents, and fellows present cases at conferences, usually presenting their own patients. Students who review the literature about one of their patients may present a short summary to the group. Students interested in infectious diseases may choose to review an antibiotic or antibiotic group and present a short summary to the group. Fellows teach during short lectures to the team usually when the attending is not present, for example on infections commonly seen on the general medicine service. Attendings teach both during sitting rounds (presentation of new consultations and follow-up problems) and during walking rounds (at the bedside). They also present "mini-lectures" usually on antibiotics or common infections, and more formal lectures on the topic of their choice. Frequently, the fellow or one member of the team will request a specific topic.

Patient Characteristics / Disease Mix

The rotation at Mercy Hospital will provide fellows with exposure to a wide variety of hematology/oncology patients in the setting of a busy inner city, community hospital. This rotation provides a diverse and intensive inpatient and outpatient experience. It will allow fellows to provide primary care to patients and to participate in clinical research efforts in the community setting. Fellows are encouraged to concentrate on a specialized area of hematology or oncology.

The strength of the Mercy Hospital rotation is that it focuses on community teaching and the patient population comprises of the surrounding ethnic groups. The Hematology/Oncology practice sees a variety of tumors and hematological conditions. A limitation of the program is the amount of BMT transplant conducted at the Mercy site. The base program (UIC) will provide the BMT transplants to patients seen at Mercy Hospital.

Fellow Year 1:

First year fellows rotate on the Mercy hospital service for 4 weeks. Therefore, it is expected that they will develop greater and greater knowledge and skills in the field of general Hematology and Oncology. Fellows need also adopt the right attitudes to make this rotation successful.

Knowledge

Hematology and Oncology consultants are mostly called upon for their expert knowledge in the broad and complex field of Hematology and Oncology. "General Hematology and Oncology" includes a broad spectrum of hematology and oncology conditions in both inpatient and outpatient settings.

Fellows in the first year of their fellowship must acquire a lot of new **knowledge** in general hematology and oncology, during their Mercy rotation. Because there is much to learn, this process takes time, and the depth of knowledge must increase progressively. At every stage of their training, fellows need to challenge themselves by reading further about patients they evaluate on the service. They should actively look for relevant articles about any unfamiliar situation. Progressively, they must develop expertise at recognizing the major clinical syndromes, use anti-neoplastic therapy effectively, and learn about the major pathology in some details.

More specifically, first year fellows need to learn about all the **areas of knowledge** listed below. Within each area of knowledge, they should first learn the information most relevant to the care of their patients. They should read regularly about their patients either from the *DeVita Principles and Practice of Oncology* (available on line, with regular updates) or from review articles published frequently in hematology and oncology journals (such as *Journal of Clinical Oncology, Blood*) or core internal medicine journals (*New England Journal of Medicine, Annals of Internal Medicine, Archives of Internal Medicine, Journal of the American Medical Association*).

As fellows become increasingly knowledgeable, they improve the quality of their teaching and consultations. They also become more independent over time, although attending back-up is available 24/7 and **must** be sought for any unfamiliar situation.

Educational Objectives:

1. Learn diagnostic and therapeutic approaches to new and complex patients with hematologic malignancies
2. Learn diagnostic and therapeutic approaches to new and complex patients with breast cancer
3. Learn diagnostic and therapeutic approaches to new and complex patients with lung cancer, mesothelioma or other thoracic malignancies.
4. Learn diagnostic and therapeutic approaches to new and complex patients with genitourinary malignancies
5. Learn diagnostic and therapeutic approaches to new and complex patients with gastrointestinal malignancies
6. Learn diagnostic and therapeutic approaches to new and complex patients with head and neck malignancies
7. Learn diagnostic and therapeutic approaches to new and complex patients with brain, spinal cord, and other rare neurologic malignancies and CNS metastatic disease
8. Learn diagnostic and therapeutic approaches to new and complex patients with gynecologic malignancies
9. Learn diagnostic and therapeutic approaches to new and complex patients with bone and soft tissue sarcomas
10. Pathology and Radiology correlations

You are required to arrange a teaching schedule with Dr. Kanji, Dr. Weiss, Dr. Garcia and Dr. Papari at times that are acceptable to all parties involved. Following is a sample schedule. The meeting times will be in addition to the schedule activities mentioned below.

Sample schedule during Mercy rotation

Monday

Round in the morning

10AM Dr Subramanian Clinic for new patients

1:30-7 Gyne Onc Clinic 12th floor

Tuesday

8AM Family Health Center 1st floor Dr Subramanian Clinic

Round with Dr Subramanian following Clinic

Dr Papari Transfusion Medicine

Wednesday

8AM Tumor Board

Round with Dr Subramanian following Tumor Board

Write chemo orders for the following week to be reviewed with Dr Sub on Fri.

Thursday

Round in the morning

10AM Dr Subramanian Clinic on 1st Floor for New Patients

Write chemo orders for the following week to be reviewed with Dr Sub on Fri.

Friday

Round with Dr Subramanian

Bone Marrows

1PM Bone Marrow Conference (Pathology 1st floor) alternating with Coagulation conference

2PM Sign orders in Dr Subramanian's office

Fellow Responsibilities

- Be available for rounds every day unless excused for scheduled clinics at UIC or JBVA. Please check with Dr Sub/ Dr. Ho and the resident on the service for the time and location for rounds.
- On the days that the fellow is not available for rounds, please "run the list" with the residents and facilitate any inpatient to outpatient transition as needed.
- Write in patient chemotherapy orders, call pharmacy and speak with charge nurse to ensure chemo is given
- Perform in-patient bone marrow biopsies as needed. Out patient bone marrow biopsies usually scheduled Friday AM depending on fellow availability.

According to Pathology, All Bone Marrows need to be done before noon.

- See all the new chemotherapy patients and write progress notes on all the days without AM UIC or JBVA clinics. (Infusion center nurses will provide the daily list of patients that need to be seen)
- Assist infusion center nurses with questions regarding chemo orders, infusion reactions, questions about treatment plan, etc.

- Provide rotation orientation for the new resident(s). This includes reviewing rotation objectives, discussing resident responsibility and providing key contact information for this rotation.
- Education responsibilities:

Participate in Wednesday tumor board conferences, bone marrow or coagulation conferences in the form of power point presentation. Fellow may also be asked to give a lecture to the IM residency program. This will be arranged by IM chief residents.

- Fellows are welcome to see patients with Dr Sub in the afternoon clinic if interested.

Important contact information

Dr Subramanian Office: 312-567-2350; cell phone: 312-518-1028

1st Floor Room 1-422 Private office

Infusion Center X=6595

Contact: Carla

Dr Kanji X=2218

Cancer Center 1st Floor

Dr Garcia X=2056

Pathology Department 1st Floor

Meet 2-3 times per week

Dr Papari X=2056 ; cell phone: 847-420-6889

Transfusion 1st Floor

Meet on Tuesdays

Hematology Tech-Anna X=2347

To schedule bone marrows

Carol Newsome, RN X=5567

Gyne onc 12th floor Mondays

Dr Weiss X=6734

12th floor Breast Center

In-pt Pharmacy X=2300

Research Rotation

GOALS AND OBJECTIVES FOR RESEARCH ROTATIONS

1. PATIENT CARE

- a. Makes accurate and informed decisions about diagnostic and therapeutic interventions
- b. Communicates effectively and demonstrates caring and respectful behavior when interacting with patients and families
- c. Responds to emergency situations and/or changes in the condition of the patient
- d. Provides healthcare services aimed at preventing problems and maintaining health

2. MEDICAL KNOWLEDGE

- a. Demonstrates an understanding of basic science and its relationship to hematology and oncology
- b. Demonstrates an investigatory and analytical thinking approach to research.
- c. Understands how the basic and clinically supportive sciences apply to the discipline of hematology and oncology.

3. INTERPERSONAL AND COMMUNICATION SKILLS

- a. Uses effective verbal and non-verbal skills when gathering information or communicating research findings to others
- b. Uses effective writing and documentation skills
- c. Conducts clinical presentations with clarity and quality

4. PROFESSIONALISM

- a. Demonstrates respect and commitment to ethical principles in research.
- b. Demonstrates sensitivity and responsiveness to cultural, age, gender and disability issues
- c. Acknowledges errors, accepts criticism

5. SYSTEMS-BASED PRACTICE

- a. Adheres to departmental and hospital rules and regulations
- b. Utilizes resources effectively and systematically to enhance research and improve patient care

6. PRACTICE-BASED LEARNING AND IMPROVEMENT

- a. Attends conferences promptly
- b. Identifies areas for self-improvement, takes initiative for own education

- c. Analyzes practice experience and performs practice based improvement activities using a systematic methodology
- d. Locates, appraises and assimilates evidence from scientific studies related to hematology and oncology
- e. Uses information technology to manage information, access on line medical information and support their own education
- f. Facilitates the learning of students and other healthcare professionals

Research requirements:

All fellows are required to develop a basic understanding and comply with the current rules for basic and clinical research. In our program fellows spend up to 18 months developing and managing a research project usually involving basic or clinical research. After selecting one research mentor usually during their first year, fellows decide with their mentor what project(s) they will pursue in the second year of the fellowship. The research project may be a clinical research project, a basic research project or a translational research project.

Fellows MUST be on campus while engaged in their research activities from 8am to 5pm. You will be responsible for care for your clinic patients and may need to evaluate them in clinic on short notice. If you have to be off campus, please make appropriate arrangement for coverage in case called to clinic to evaluate a patient.

The second and third years of training are focused on research and scholarly activities. The structure during these years is individualized to accommodate the fellow's research interests and career goals. During third year especially, the fellow spends most of their time engaged in research, under the mentorship of a faculty member, while continuing a longitudinal outpatient clinic experience. At UIC, there are many opportunities for cancer-related clinical, transitional, or basic research with the section of Hematology and Oncology. Most importantly, fellows may pursue cancer related research in other departments or sections within the School of Medicine, and have access to a broad array of research projects in clinical, basis, or transitional arenas.

Fellows learn how to design and conduct clinical trials. Fellows are encouraged to take an active role in clinical research by developing and implementing the treatment of patients in clinics and enrolling them in protocols.

It is expected that the research project will lead either to a presentation at a national hematology or oncology conference or to publication in a peer-reviewed medical journal. Fellows will give presentations on their work at least once a year in the department.

Educational Goals

This rotation stresses the core competencies of Medical Knowledge, Practice-based learning and Professionalism. The purpose is to provide a well-rounded research experience for the hematology-oncology fellow. The goal is to have the fellow complete

at least a research project during the training program and through conferences to expose the fellows to additional ongoing projects. In this fashion, they will learn scientific methodology and statistics, which will enable critical reading and analytical thought throughout his/her career.

This exposure to research may also stimulate the fellow to obtain further specific post fellowship research training in order to pursue basic or clinical research as part of a career.

Fellows during their senior years of fellowship have enough protected time to learn how to design and complete either clinical or bench research that is relevant to hematology or oncology field. In our fellowship, there are opportunities for both clinical research and lab research.

Fellows should select a research mentor during their first year of fellowship. It is useful to look at every faculty experience and research activities, and identify an area of interest within these activities or at least related to these activities. Once a mentor is considered, fellows should meet with him / her and ask as many questions as necessary to decide whether this mentor would be a good fit for their research interests. Once a mentor and fellow decide to work together on a project, both should notify the program director and the program coordinator. It is expected that the mentor will be responsible for monitoring all the fellow's research activities during the fellowship years.

Fellow Year 1

Knowledge

Research projects are started in the first year or early second year. Reading about the state of knowledge in the area of research being considered is encouraged during the first year.

Skills

Fellows in the first year of their fellowship must select a research mentor and if possible a research project at least 3 months before the end of the first year.

Fellow Year 2 and 3

Knowledge

Fellows are expected to conduct their research projects and become experts within their specific area of interest. By the end of their research experience, they must present the

results of their research and discuss the state of knowledge in this area in front of the fellowship faculty and fellows.

Skills

Fellows in the second and third year of their fellowship must conduct a research project with their mentor and review the state of knowledge in this area of research.

1. Review the literature to select and understand the state of knowledge in an area of research
2. Design a research protocol
3. Submit the research protocol to the institutional review board and obtain approval for the study
4. Enroll patients (randomization, obtaining proper consent, and adhering to inclusion and exclusion criteria)
5. Perform the research adhering to federal and other requirements
6. Perform an interim analysis to identify the need for modifying or interrupting the study
7. Report adverse events
8. Perform the final data analysis
9. Prepare and submit a manuscript for publication in peer-reviewed journals
10. Present the results of the research at Conferences
11. Be professional and ethical during the conduct of the research project

Clinical Research Rotation (Back-up)

To cover for emergencies, procedures, and vacations, and avoid pulling fellows throughout the year from research activities, we have devised a clinical research rotation where each fellow will be required to commit some of their research time to covering for the above-mentioned clinical activities.

1st call and 2nd call clinical fellow duties:

-be available on campus from 8am to 5pm incase of emergencies in infusion clinic that need MD Eval. Sandy and the pt's primary fellow and attending are first and 2nd call, but incase they are not available, the back fellows are expected to be available to evaluate and tirage the patient as needed

-be available via phone/pager weekends and overnight in case of emergencies and unexpected backup needs.

- please note, you may need to come in, so please do not make out of town travel plans. If called in over the weekend or overnight to cover someone you are expected to be able to come in within 1 hour.

- if called in to cover someone that person is expected to pay the back-up person back for all time covered

- clinic coverage for 1 clinic each for the fellow who is at Mercy and MacNeal
 - clinic coverage for UIC clinics for fellow(s) on vacation
 - Tues pm procedure clinic at UIC: if there are procedures, please let 1st years know so you can teach and supervise them.
 - Fri am procedure clinic at VA: only if assistance is needed by 1st years and a 2nd or 3rd yr fellow is not already on service at VA.
 - 2nd call covers when 1st call cannot (ie. covering another clinic during same time or have too many clinics during week).
- **Procedures not done on Tues pm at UIC will need to be covered by the fellow/attg assigned to the clinic for which the patient belongs. If this is impossible because of clinical duties, then procedure fellow may help out.

Conferences and Formal research Teaching

Research Presentations

The faculty members are involved in a variety of research projects, including basic laboratory bench research, translational research, clinical trials. These conferences aid the fellows in identifying a faculty mentor who will work with them to develop their own research project during their training.

Faculty members involved in bench or clinical research present data from their own research and summarize the state of the research to give the fellows instruction in the conduct of biomedical research.

The Research Conference also is critical in the development of the fellow's skills. The fellows will periodically present their project beginning with the inception and will explain the hypothesis, rationale, design and methodology employed. Subsequently, new data will be presented during the course of the training program.

Fellows are encouraged to present the result of their research at research conferences or during clinical trials meetings. These research conferences occur once a week, typically on Tuesday. Clinical trials meetings occur once a month, typically on Friday.

Outcomes

The program director requests input from the research mentor before the PD evaluation of fellows every six months. Research progress is also discussed with the fellow.

Productivity of research is evaluated, including:

1. Publications
2. Presentations at conferences

3. Awards
4. Funding

Hematology Oncology Fellowship Curriculum Hematology Pathology Rotation (UIH)

I. Educational Goals (knowledge, skills, attitudes)

The educational goals of the Hematology Pathology rotation at UIH are to prepare fellows to act as qualified sub-specialty physicians in the setting of reviewing peripheral blood smears and bone marrow biopsies/aspirate and diagnosing various hematologic disorders/diseases based on histological data. Hematopathology provides diagnostic evaluation of blood, bone marrow, lymph nodes, spleen and hematomphoid lesions. Fellows should display competency in the reviewing slides and making diagnosis based on morphologic appearance of cells.

Fellow Year 1:

Fellows will typically have 2 weeks of dedicated hematopathology during their first year of fellowship. They should be familiar with basic disease pathology and continue to sharpen skills and be able to identify increasingly complex disease morphologies.

Knowledge

The fellows should be able to incorporate traditional microscopy with ancillary techniques including general laboratory values, immunohistochemistry, flow cytometry and molecular diagnostic tests to make the most accurate diagnosis.

Skills

Fellows must continue to perfect their skills throughout their fellowship. Fellows should be able to prepare peripheral blood smears, obtain and evaluate bone marrow biopsies and bone marrow aspirate and analyze laboratory values immunohistochemistry, flow cytometry and molecular diagnostic tests.

Areas of Knowledge

Will be learned throughout the three years of fellowship

Basic Principles of Hematopathology

1. Identify the various hematopoietic cells that originate from the bone marrow and cellular components of blood including:
 - a. Red blood cells (erythrocytes)
 - b. White blood cells (leukocytes)
 - c. Platelets

2. Utilize different labs techniques in the diagnosis and management of patients' diseases
 - a. Immunohistochemistry
 - b. Flow Cytometry
 - c. Molecular diagnostics
3. Identify the following disorders
 - a. RBC disorders
 - i. Hypochromic microcytic anemia on smear
 - ii. Hypersegmented neutrophil with megaloblastic anemia on smear
 - iii. Schistocytes (fragmented rbc's) on smear
 - iv. CBC with microangiopathic hemolytic anemia (MAHA)
 - v. Howell-Jolly bodies in red blood cell on smear
 - vi. Spherocytes
 - vii. Basophilic stippling in red blood cells on smear
 - viii. Atypical lymphocytes on smear
 - ix. Pelger-Huet anomaly on smear
 - x. Sickle cell anemia
 - b. Leukemias
 - i. Acute lymphocytic leukemia in marrow and on smear
 - ii. Chronic lymphocytic leukemia in marrow and on smear
 - iii. Acute myeloblastic leukemia in marrow and on smear
 - iv. Chronic myelogenous leukemia in marrow and on smear
 - c. Lymphomas
 - i. Hodgkin Lymphoma
 - ii. Non-Hodgkin's Lymphomas
 1. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma
 2. Follicular Lymphoma
 3. Marginal Zone Lymphoma
 4. Mantle Cell Lymphoma
 5. Diffuse Large B-Cell Lymphoma
 6. Burkitt's Lymphoma
 7. Lymphoblastic Lymphoma
 8. AIDS-Related B-Cell Lymphoma
 9. Peripheral T-Cell Lymphoma
 10. Mycosis Fungoides/Sezary Syndrome
 11. Primary Cutaneous B-Cell Lymphoma
 12. Adult T-Cell Leukemia/Lymphoma
 - d. Myeloma
 - i. Multiple Myeloma
 - ii. Systemic Light Chain Amyloidosis
 - iii.

Resources

Hematology.org

- American Society of Hematology website

- Provides up to date information on how to evaluate and treat basic diseases

library.med.utah.edu/WebPath/.../HEMEIDX.htm

- Image database to aid in understanding/describing basic pathology

Hematology & Oncology Consultation Services and Longitudinal Clinic Jesse Brown VA Medical Center

I. Educational Goals (knowledge, skills, attitudes)

The educational goals of the **Hematology & Oncology** rotations and outpatient clinic at the Jesse Brown VA Medical Center are to prepare fellows to act as qualified physicians to provide longitudinal care in the outpatient setting as well as consultants, specifically in the setting of a hematology-oncology consultation service at a tertiary hospital.

Fellow Year 1:

First year fellows rotate on the Hematology & Oncology services usually for 3 to 4 months. Therefore, it is expected that they will develop greater and greater knowledge and skills in the field of hematology and oncology. Fellows need also adopt the right attitudes to make this rotation successful. In addition to the inpatient rotations, first year fellows will be managing a diverse outpatient population in both oncology and hematology diseases with 1 to 2 half day clinics per week at the VA Medical Center. The outpatient clinic is not disease specific so this will allow first-year fellows to be exposed to a broad diversity of diseases early on in their training.

Knowledge

Hematology-oncology consultants are mostly called upon for their expert knowledge in the broad and complex field of hematology and oncology. "General hematology and oncology disease" includes a broad spectrum of diagnoses. Fellows will also follow patients admitted from the longitudinal clinic as inpatients to better understand the major complications of hematology and oncology diseases as well as toxicities of treatment that require close supervision in an inpatient setting.

Fellows in the first year of their fellowship must acquire a lot of new **knowledge** in general hematology and oncology. Because there is much to learn, this process takes time, and the depth of knowledge must increase progressively. At every stage of their training, fellows need to challenge themselves by reading further about patients they evaluate on the inpatient service and longitudinal clinic. They should actively look for

relevant articles about any unfamiliar situation. Progressively, they must develop expertise at recognizing the major clinical syndromes and treatment options. Fellows must also learn how to coordinate information and care between surgeons, radiation-oncologists, and pathologists. During the outpatient and inpatient experiences, fellows will also learn what toxicities to expect, how to prevent them, and how to treat any that may arise from chemotherapy or the primary disease. In the longitudinal clinic, patients will be followed for 6 to 12 months by a specific fellow from diagnosis onwards to gain a better understanding of disease course, treatment options, and complications of different diseases.

More specifically, first year fellows need to learn about all the **areas of knowledge** listed below. Within each area of knowledge, they should first learn the information most relevant to the care of their patients. They should read regularly about their patients either from the *Hoffman's Textbook of Hematology* and *Devita's Textbook of Oncology* (available on line, with regular updates) or from review articles published frequently in either oncology journals (such as *Journal of Clinical Oncology*, *Cancer*, and *British Journal of Oncology*), hematology journals (such as *Blood*, *British Journal of Hematology*, *Blood and Bone Marrow Transplantation*), or core internal medicine journals (*New England Journal of Medicine*, *Annals of Internal Medicine*, *Archives of Internal Medicine*, *Journal of the American Medical Association*).

During the first year of their fellowship, fellows need to build their **differential diagnosis trees** in hematology and oncology, initial workups required to stage a disease, and the most important diagnostic and therapeutic approaches to common hematology and oncology diseases and clinical situations. These include hematology problems such as coagulation disorders, cell count abnormalities as well as more common oncology diagnoses such as lung cancer, colon cancer, and prostate cancer. First year fellows will focus on the initial work up of new hematology and oncology diagnoses such as staging, whom and when to treat based on disease and patient's ECOG status, and when palliative care or hospice is indicated.

As fellows become increasingly knowledgeable, they improve the quality of their teaching and consultations. They also become more independent over time, although attending back-up is available 24/7 and **must** be sought for any unfamiliar situation.

Skills

Fellows in the first year of their fellowship must acquire new skills in the field of hematology & oncology. They are already familiar with these skills in the context of general internal medicine.

1. How to obtain a comprehensive history, perform a good physical exam, and focus the history and physical examination for each hematology or oncology disease syndrome
2. How to gather important data from the electronic medical records, looking for information on medications, laboratory data (including labs to monitor disease such as tumor markers, labs to follow toxicity from treatment such as renal and liver function, complete blood counts, and molecular biology results), imaging studies, and surgical findings of recent or relevant surgical procedures.
3. How to seek more information from other persons, including family members, outside hospitals who transferred the patient (primary or hematology-oncology physicians, hematology and/or pathology laboratories), patient's primary care physician, hospital physicians at UIC (primary team, surgeons about OR findings not documented fully in the record, other consultants about their opinions)
4. How to determine a patient's performance status based on ECOG grading.
5. How to select appropriate tests to help with medical decisions
6. How to use the relevant information to develop an assessment and diagnostic and therapeutic plan
7. How to interpret special laboratory tests, such as tumor markers, PCR tests, genetic studies, or biopsy results, paying attention to the positive and negative predictive values of these tests.
8. How to perform and interpret bone marrow aspirations and biopsies.
9. How to perform and interpret lumbar punctures to obtain CSF for analysis and to administer intrathecal chemotherapy.
10. How to provide guidance on indications and types of red blood cell, platelet, and white blood cell transfusions and for indications and quantity of phlebotomy to perform.
11. How to interpret blood bank reports to understand the safety and potential complications of transfusion.
12. How to monitor responses to transfusions and know when and how to treat potential complications of transfusion.
13. How to obtain and transport clinical specimens in an appropriate manner
14. How to offer phone advice that is relevant and to the point, while knowing when a curbside consultation is not appropriate and a full consultation is required
15. How to lead the team of fellow, resident(s) and student(s) in order to be effective in completing clinical tasks within a reasonable time
16. How to review the medical literature to gather evidence supporting patient care decisions
17. How to teach the medical students and residents on the consultation team
18. How to present cases seen on the hematology-oncology service at case conferences
19. How to discuss end of life issues with patients and family members.

Fellow Year 2 & 3:

Second year fellows rotate on the hematology-oncology consultation service usually for 1 to 2 months. Typically, they are already familiar with many of the areas of knowledge and skills required for this rotation. Still, they will emphasize further their supervision of the team (**Team Leaders**), and their involvement with teaching residents and students (**Clinical Teachers**). Senior fellows should be seen as **role models** by the more junior members of the team and consulting services.

Knowledge

At this level of training, fellows need to develop a deeper knowledge of the areas of listed below. They should already be familiar with most diagnoses being evaluated. They will explore the recent literature to deepen their level of understanding of interesting cases. Within the areas of knowledge, they will select the areas they do not know as well for improvement. They will emphasize further hematology and oncology diseases that are more complicated to treat such as leukemias as well as a better understanding of the therapeutic options, what evidence is behind them, and creating more complicated treatment plans required for advanced malignancies or when first line therapy fails.

Skills

Fellows in the second and third year of their fellowship must perfect their skills. The most important may be for the senior fellow to function as a junior attending in many ways. They manage the consultation team in a more independent manner, although still under the supervision of the attending on service. They should be capable of providing reasonable diagnostic and therapeutic plans in most consultations except in the most complex cases. Second and third year fellows should also perfect their skills for bone marrow aspiration and biopsies as well as lumbar punctures being familiar with the different patient positioning for the procedures based on the patient's clinical status. As fellows progress through their second and third year, they will also learn how to use research skills to answer unknown areas of hematology and oncology. This includes both clinical and laboratory research that are available at the Jesse Brown VA Medical Center.

Areas of Knowledge

Fellows will learn about many of these areas of knowledge in hematology-oncology during the three-year fellowship, but will need to supplement their knowledge by reading about areas of knowledge not addressed during the training. Fellows review this list to identify any gap in their knowledge.

FYI first-year fellow objective

FYII second-year fellow objective

FYIII third-year fellow objective

Overview of the Rotation:

The Hematology-Oncology Consult Rotation is a high pace clinical rotation. During this rotation, fellows work with an attending, one or more resident(s) and medical student(s) to offer consultations in hematology and oncology diseases to guide the care of patients with hematology or oncology disorders. The hematology-oncology disease team takes care of very sick and very complex patients. Over the course of the rotation, fellows see quite a significant number of new consultations and follow-ups.

The outpatient clinic is also a very high pace rotation. The fellow follows his or her own clinic list, seeing new patient consultations/referrals, creating differential diagnoses and appropriate work up testing, and devising a treatment plan with the approval of the 1-2 attendings supervising the clinic. The fellow also learns how to coordinate the care plan with the hematology-oncology nurses and pharmacist in both the outpatient and inpatient setting.

II. Core Competencies and Curriculum

Teaching Methods / Clinical Encounters

During this rotation, fellows evaluate outpatients and inpatients referred to the hematology-oncology consultation service and also follow hematology or oncology patients admitted from the longitudinal clinic. This consultation services deal with all patients in the Jesse Brown Medical Center. Patients are first evaluated by one medical student, resident, or fellow, then discussed when possible with the fellow, and finally presented formally to the attending and the rest of the team. Prior to the presentation, whenever a case is difficult, unusual, or challenging, fellows and residents will locate and print an article that addresses the problem being evaluated. Pathology specimen and peripheral blood smears should be reviewed with the pathologist and heme-pathologist, respectively, either prior to the presentation or as a team during rounds.

This rotation values and emphasizes teaching. Frequently, every person on the team participates in teaching: attendings, fellows, residents, and medical students. Students, residents, and fellows present cases at conferences, usually presenting their own patients. Students who review the literature about one of their patients may present a short summary to the group. Students interested in hematology-oncology may choose to

review a particular hematology or oncology disease or chemotherapy agent and present a short summary to the group. Fellows teach during short lectures to the team usually when the attending is not present, for example on hematology or oncology diseases commonly seen on the general medicine service. Attendings teach both during sitting rounds (presentation of new consultations and follow-up problems) and during walking rounds (at the bedside). They also present “mini-lectures” usually on chemotherapy or common hematology or oncology diseases, and more formal lectures on the topic of their choice. Frequently, the fellow or one member of the team will request a specific topic. Abnormal or difficult cases will be presented at multi-disciplinary conferences (e.g. lung diseases at the chest tumor board conference, head and neck cancer cases at the weekly head and neck conference, and hematology diseases at heme-pathology conference). Fellows or residents present the case with the attending available for guidance and the fellow and residents learn how to formulate treatment plans with a team of physicians from different backgrounds.

Patient Characteristics / Disease Mix

Being at a Veteran’s Hospital, the majority of patients seen are male. Thus cases seen in high frequencies in men will be most studied. This offers a unique opportunity because whenever there are high frequencies of specific diseases, then broad presentations arise of those diseases. Patients will present with a wide spectrum of stages of disease, complications or severity of that disease, and the different treatment options and success rates. There is also a wide age range of patients so both hematology and oncology diseases of the young and elderly adults will be seen and treated. The degree of illness severity is variable. Many patients are evaluated in one of the intensive care units: medical ICU, surgical ICU, and neurosurgical ICU. Others are evaluated on the wards within the medical, surgical, or psychiatry areas. Many new diagnoses of malignancies will be made in the hospital and the proper differential diagnosis, workup and staging will be managed by the hematology-oncology service. The consultation service also evaluates many patients with coagulation disorders or blood cell count abnormalities seen on laboratory testing.

A unique opportunity at the Jesse Brown VA Medical Center is that there is a palliative/hospice service available which allows fellows to learn when it is appropriate to start end-of life and comfort care, how to coordinate care with palliative/hospice nurses, and the setting where this kind of care can be provided. Social work teams are also available to help patients’ with their home needs as per the severity of their disease or complications of therapy.

A heme-pathologist is available throughout the day so that bone marrow and peripheral blood smear specimens can be reviewed with teaching points from an expert. There is also a centralized computer system and radiograph system allowing unique opportunities for research in better understanding diseases.

Procedures and Skills

Procedures specific to the hematology-oncology subspecialty include bone marrow aspirations and core biopsy and lumbar punctures with intrathecal chemotherapy administration. These procedures are performed during the inpatient consultation rotation.

The diagnostic and therapeutic procedures required for Hematology-Oncology are:

1. Performance and interpretation of peripheral blood smears: Determining cell counts and morphologies of red blood cells, platelets, and white blood cells. This will be evaluated by the supervising attending during Consult rounds as well as in consultation with a heme-pathologist.
2. Bone marrow aspiration and core biopsy.
3. Interpretation of bone marrow aspiration and core biopsy slides. This will be evaluated by the supervising attending during Consult rounds as well as in consultation with a heme-pathologist.
4. Interpretation of special testing on pathology specimens including genetic and molecular studies.
5. Institution of chemotherapy.
6. Monitoring response to chemotherapy

Hematology-Oncology consultants also frequently recommend the performance of invasive procedures to help with diagnosing or monitoring disease. Therefore, attending physicians will advise that the trainees properly explain any invasive procedures performed to the patient, discuss the possible risks and discomforts of the procedure, and obtain informed consent.

Additional procedural skills will be determined by the trainee's personal preference and practice expectations.

Faculty Supervision

Fellow ability to clinically approach hematology and oncology disease syndromes will be judged by the supervising attending physician during the clinic and inpatient consult rotation. The attending physicians will outline the goals of the rotation to the fellows early during the rotation and provide feedback mid-rotation and at the end of the rotation. Importantly, they will report to the Program Director any significant problem that is identified so that early corrective action can be implemented. They will complete a formal evaluation through the “New Innovations” software in a timely manner once they receive a request via e-mail.

Methods of evaluation

At the end of the rotation, the attending physician will receive a “New Innovation” formal evaluation form by e-mail and will complete this evaluation within a reasonable time. The New innovation evaluation form allows documentation of the fellow competency (competencies: patient care, medical knowledge, professionalism, and interpersonal and communication skills). The evaluation should be discussed with the fellow at the end of the rotation.

Fellows document milestones of their training: interesting cases, presentations, unusual or new situation faced on the service, etc. in their portfolios. They will also complete an attending evaluation through New Innovations.

Medical students and residents rotating on the service complete an evaluation of the fellow’s teaching abilities adapted from the ACGME toolbox.

Attitudes / Behaviors

***Patient Care:* fellows must provide patient care that is compassionate, appropriate, and effective for the treatment, monitoring of, and prevention of hematology-oncology diseases. They must communicate effectively and demonstrate caring and respectful behaviors when interacting with patients; gather accurate information about their patient; advise diagnostic and therapeutic plans based on patient information, up-to-date scientific evidence, and clinical judgment; use information technology to support patient care decisions; work with health care professionals, including those from other disciplines, to provide patient-focused care**

Medical Knowledge: fellows must demonstrate knowledge about basic and clinical sciences in the areas of hematology and oncology diseases, and apply this knowledge to patient care.

Practice-Based Learning and Improvement: fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. They must locate, appraise, and assimilate evidence from scientific studies related to their patients' disease; apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness; use information technology to manage information, access on-line medical information; and support their own education; facilitate the learning of students and other health care professionals

Interpersonal and Communication Skills: fellows must demonstrate interpersonal and communication skills that result in effective information exchange especially within the team and when acting as consultants to other physicians. They need work effectively with others as a member and leader of the hematology-oncology consultation team.

Professionalism: fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. They must demonstrate respect, compassion, and integrity; a commitment to excellence and on-going professional development; a commitment to ethical principles; sensitivity and responsiveness to patients' culture, age, gender, and disabilities

System-Based Learning: fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. They are expected to practice cost-effective health; advocate for quality patient care, and assist patients in dealing with system complexities

HEMATOLOGY AND ONCOLOGY DISCHARGES

- Please email the Hem or the Onc communication group when any patient is being admitted or discharged from the inpt hematology, inpatient oncology or the consult service at UIH. Please mention the patient's out patient attending – brief, pertinent hospital course and outpatient plan especially things that will need follow up like antibiotics, pathology reports, chemotherapy, growth factor administration etc. Patients have to be 'cleared' to be seen in clinic so please plan accordingly
- In order to facilitate timely discharges, daily discharge rounds will occur on the:
 - **Oncology service from 11:30-11:45 AM every day** in the Oncology conference room (at the back of 8W)
 - **Hematology service from 9:00-9:15AM on Mondays, Wednesdays and Fridays** in the hematology conference room (across from the nurse's station.
- The patient's name, date of hospitalization, brief hospitalization update, and discharge needs/plan should be presented
- The rounds will be run by the fellow on service. Senior residents will take over this responsibility in the event that the fellow has clinic. If this is the case, the fellow should touch base with the senior resident before their clinic to formulate a plan for potential discharges.
- Should be attended by the discharge planners, social workers, pharmacists, dieticians and the charge nurse for that unit.
- goals of this meeting are to work on discharge barriers from the moment the patient is admitted so that at 48 hours prior to discharge, these problems are resolved.

Hematology and Oncology Discharge Policy

Residents or interns should start identifying potential discharges 48 hours prior to their discharge date while on rounds. At 24 hours prior to discharge, residents and interns should be starting the depart process. Within the depart process, the doctors should be placing the correct discharge diagnoses, adding educational materials about the diagnoses or chemotherapy administered, placing dates of follow up (the fellow should obtain these appointments for you) and working on medicine reconciliation with the pharmacists. Special attention should be paid to high risk medicines like expensive oral antibiotics (linezolid, voriconazole), oral chemotherapy, injectables, expensive anti-emetics (Emend) or pain medications. Some of these will require prior authorization so you should be working with the pharmacist on getting approvals (especially if the patient is self-pay). Narcotics are of special concern as we want to ensure that correct doses are given as well as DEA numbers listed on the prescriptions so that patients don't have issues filling the prescription. Prisoners will also need special attention to verify that the prison has their medications on discharge; otherwise, the pharmacist will have to

dispense prescriptions to be sent with the guards.

The actual discharge process on the hematology and oncology wards is slightly different than on the other medicine wards. Once the patient is ready to be discharged, the resident should print the depart process papers (AKA discharge instructions). The resident/intern/fellow should ask the patient's nurse to meet with them in the patient's room to go over these discharge instructions. This should be done in the presence of an interpreter if the patient is non-English speaking. Any prescriptions should be given to the patient and all questions should be answered. The resident/intern/fellow should then sign the discharge instructions to verify that education was carried out, and their role in the discharge is complete. The nurse can then remain behind to finish his/her discharge education with the patient and the patient can then leave when ready.

If the nurse is unavailable to meet, the resident/intern/fellow should still print the depart process papers, go over them with the patient, sign the discharge instructions verifying that the education was completed. Then they should drop off the discharge instructions (along with the patient's prescriptions) in the assigned bin on the Oncology or Hematology ward (behind the unit secretary's desk on each respective unit). The resident/intern/fellow should then notify the patient's nurse that this was done, and then the nurse can proceed with their own instruction when they have time.

Lastly, it is the fellow's responsibility to write an email to the patient's outpatient attending and clinic RN **on day of admit and day of discharge**; these can be brief emails including patient name, MRN, reason for admit, brief hospital course, and discharge f/u.

Prison Discharges

For all prison discharges, the discharge summary and discharge instructions should indicate dates of follow up with the MD or RN as well as what labs you want checked on the dates of follow up. We do not arrange the follow ups for these patients. If labs need to be checked at the prison and faxed to the clinic, please include in the discharge summary and instructions the date on which you want the labs checked, the specific list of labs you want done, the fax number and phone number to the clinic RN as well as the name of the attending MD. Finally the discharge summary and instructions should be faxed to Barb Johnson who will arrange for the follow up appointments and labs to be checked.

Prisoners should still have the same counseling (as stated in the discharge policy) upon discharge as with any other patient, however, you **should not** mention dates of follow up. They will also not get a copy of the discharge instructions as a typical patient would, however, it can be given to the guards.

Fellows should still maintain communication with the outpatient MD and RN (via email as per the discharge policy) about the discharge of prisoner and the anticipated dates and times that they want the prisoner to return to clinic or have labs checked.

Discharge Checklist

48 hours prior to discharge

Who is going home in next 48 hours?

Where are they going: home, SNF, hospice? Alert Discharge planner (for home, SNF) and SW (for hospice)

Do they have a foley in place? Does this need to come out before discharge?

Do they have a PICC line in place? Does this need to come out before discharge?

Do they need PT/OT? Consult PT/OT and alert discharge planner if they recommend acute rehab, SAR, home PT, DME or outpatient PT/OT

Do they need antibiotics or home IV infusions? Alert discharge planner

Do they need PICC line and home health? Alert DW

Are there barriers to discharge (insurance, prison, etc)? Alert Barb Johnson (Prison), SW

Do they need tube feeds or have special special dietary needs? Alert Nutrition and discharge planner.

Are there high risk medications that need to be continued on discharge? Alert Pharmacy

24 hours prior to discharge

Where is patient going upon discharge?

How are they getting there? If they need a ride or transport contact SW

What special needs do you anticipate the patient to have upon discharge (durable medical equipment, home PT/OT, home health, home palliative care, hospice) and is DW/SW aware?

Has depart process been started including diagnoses, educational materials?

Has fellow organized follow up in clinic?

Has med reconciliation been started informally with pharmacy?

Day of discharge

Have e-prescriptions been sent to pharmacy or printed?

Do narcotic scripts have appropriate DEA listed?

If the patient will be discharged after 3pm, have the medications been filled at UIC?

If the patient is a prisoner, have the medications been filled at UIC if needed?

Is the home services plan set during discharge rounds?

Has depart process been completed?

Has discharge order been entered?

Has the fellow arranged follow up in clinic?

Is the clinic f/u included in the discharge note?

Have discharge orders been printed and reviewed with the patient per the discharge policy?

Have discharge orders been signed and timed per the discharge policy (to reflect review was done with patient)?

Has the fellow emailed the outpatient attending, fellow, and clinic RN the discharge plan and brief summary hospital course?

Has the fellow placed the discharge chemotherapy note and forwarded to the attending and clinic RN?

Discharge Chemotherapy Notes

Discharge Chemotherapy Notes (Fellows Only)

Each inpatient that receives chemotherapy should have a chemotherapy discharge note placed by the fellow on the day of discharge. If the discharge occurs on a Friday or is anticipated on a weekend, this note should be placed **prior to 12pm Friday** so that the appropriate outpatient staff will be alerted in time. The template for the note will be provided (it will be a cut and paste document until a hospital-wide template is made). The note should be placed under “Chemotherapy Treatment Plan” and labeled “Discharge Inpatient Chemotherapy Note” until we have made our own folder and template system-wide. All parts of the template should be filled in as outlined; the F3 button allows quick scrolling through the document. The note should be signed by the fellow and forwarded to the outpatient attending (or planned outpatient attending), the clinic RN, and the fellows associated with that clinic. Outpatient follow up appointments must be made separately as this note is for information purposes only; it does not result in automatic generation of lab orders or scheduling.

This note does not need to be done for stem cell patients undergoing conditioning for transplants (autologous or allogeneic), or treatment for benign hematologic conditions unless there is plan for more cycles/doses (e.g. Rituxan for ITP). If more than one cycle is given in house (e.g. 2 inductions for AML), then only the most recent cycle needs to be documented (however please make a mention of this under the section Cycle #). For longer, complicated protocols like COG ALL protocols, list the phase of treatment under Cycle # as well as the day of treatment on the date the note is written (e.g. delayed intensification 1, day 34). For these regimens, only write out the next 2 weeks' outpatient chemotherapy orders NOT the entire chemotherapy orders for the remainder of the course as sometimes these protocols stretch out to 60+ days. The outpatient fellow needs to be notified for any intrathecal chemotherapy so they can

coordinate their schedule. Please indicate the protocol number if patient is on a protocol under the section UIC Research Protocol. If this is the case, the outpatient research nurses should be forwarded a copy of the discharge chemotherapy note.

The inpatient fellow is still responsible for coordinating with the clinic RNs the date and times of follow up, writing any necessary outpatient chemotherapy orders, and assisting the clinic RN in getting insurance approval if necessary.