

Hematology-Oncology Educational Goals & Objectives

Cancer is second only to heart disease in leading causes of death in the United States. Blood disorders, such as anemia, hemophilia, thrombosis, and sickle cell disease, also affect millions of people. Both are commonly seen first in the office of the primary care provider and require a comprehensive approach to care. The Hematology-Oncology rotation will provide the resident with exposure to a broad range of benign and malignant conditions, from lymphohematopoietic disorders to neoplasms. The resident will have the opportunity to evaluate and manage patients across a spectrum of hematologic and oncologic disorders in both the inpatient and outpatient venues. The goal is to familiarize them with basic pathophysiology, clinical manifestations, diagnostic strategies and management of hematologic and oncologic diseases as well as disease prevalence and prevention. Depth of exposure should be such that they can develop competency in disease prevention, indications for procedures and transfusion, management of common disease and complications of therapy, palliative care, and appropriate indications for referral.

Faculty will facilitate learning in the 6 core competencies as follows:

Patient Care and Procedural Skills

- I. All residents must be able to provide compassionate, culturally-sensitive, and appropriate care for patients to prevent and treat hematologic and oncologic diseases.
 - PGY2s should seek appropriate subspecialty or surgical consultation when necessary to further patient care.
 - PGY3s should supervise and ensure seamless transitions of care between primary and consulting teams and between inpatient and outpatient care.

- II. Residents will demonstrate the ability to take a pertinent history and perform a focused physical exam. PGY1s should be able to differentiate between stable and unstable patients and elicit the following historical details:
 - systemic symptoms (e.g. fatigue, fever, poor sleep, sweats, or weight loss)
 - history of bleeding or clotting
 - personal and family history of cancer or hematologic disease
 - history of alcohol, tobacco and drug use; environmental/occupational exposures, genetic predisposition, sexual behaviors, and other risk factors that predispose patients to develop disease
 - complete medication history, including supplements and alternative medications

PGY2s should be able to collect additional historical information from electronic and/or outside records, elicit a more thorough history, and recognize the association of various systemic diseases/comorbidities with cancer.

PGY3s should be able to independently obtain the above details for patients with a history of complex hematologic or oncologic disease and multiple comorbid conditions.

- III. Residents should be able to appreciate the following physical findings with increasing confidence and independence: abdominal mass, ascites, breast mass, clubbing,

jaundice, lymphadenopathy, organomegaly, petechiae, pleural effusion, prostate nodule, rectal mass, scleral icterus, skin lesion, and thyroid nodule.

- IV. Residents will understand the indications, contraindications, complications, limitations, and interpretation of following procedures, and become competent in their safe and effective use:
- PGY1s: guaiac, lumbar puncture, paracentesis, peripheral blood smear review, and thoracentesis
 - PGY2s: bone marrow aspiration and core biopsy (optional), therapeutic phlebotomy
 - PGY3s will independently order and interpret laboratory and diagnostic tests appropriate to the condition of the patient.

Medical Knowledge

- I. PGY1s will develop an understanding of the basic pathophysiology of and initial approach to the following signs and symptoms, which often signal underlying hematologic or oncologic disease:
- Abdominal pain or distention
 - Anemia
 - Ascites
 - Bleeding – hemoptysis, GI, gums, or vaginal
 - Bone pain
 - Bowel obstruction
 - Bruising or petechiae
 - Change in bowel habits
 - Family history of bleeding or cancer
 - Fatigue or generalized weakness
 - Fever of unknown origin
 - Jaundice
 - Pallor
 - Pancytopenia
 - Pathologic fracture
 - Pleural effusion of unknown etiology
 - Persistent cough or hoarseness
 - Recurrent infections
 - Sensory polyneuropathy of unclear etiology
 - Soft tissue mass or lymphadenopathy
 - Splenomegaly
 - Thrombosis, arterial or venous
 - Unintentional weight loss

PGY2s will also develop an understanding of the pathophysiology, clinical presentation, and targeted therapy for the following hematologic and oncologic conditions:

- AIDS-related malignancies
- Amyloidosis
- Anemia – chronic disease, hemolytic, iron deficiency, macrocytic, sideroblastic
- Chronic leukemia
- Common coagulation disorders
- Common solid tumors (sarcomas, carcinomas, lymphomas)
- Drug toxicity, including cardiomyopathy and SVT, extravasation, malignant hyperpyrexia, nausea/vomiting/dehydration, neuromyopathy
- Hemochromatosis
- Hereditary cancer syndromes
- Hypercalcemia
- Metastatic disease, unknown primary
- Multiple myeloma
- Myelodysplastic syndromes
- Myeloproliferative disorders
- Paraneoplastic syndromes
- Skin cancers
- SIADH
- Thalassemia
- Thrombotic disorders

PGY3s will develop an understanding of

- pathophysiology, clinical presentation, and targeted therapy for the above conditions, with attention to differences in patient populations where appropriate
- the impact of functional status and tumor pathology on disease
- hospice, palliative care, transplant options and post-transplant care

II. Residents will be able to recognize, appropriately triage, and treat hematologic and oncologic emergencies with increasing levels of independence, including:

- Acute leukemia/blast crisis
- Cord compression
- Febrile neutropenia
- Fulminant DIC
- Intracranial metastasis with edema
- Seizure
- Severe hypercalcemia or hyponatremia
- Severe thrombocytopenia
- Superior vena cava syndrome
- Thrombotic thrombocytopenic purpura
- Tumor lysis syndrome
- Uncontrolled pain

- III. PGY2s will become familiar with the principles of cancer biology and therapy, including
- the general role of oncogenes and tumor suppressor genes in cancer development
 - scoring systems for calculating functional status and impact on therapy decisions
 - principles of treatment with surgery, radiation, chemotherapy, and immunotherapy
 - commonly used drugs, drug interactions, and side effects
 - supportive care for disease- or treatment-related complications, including cognitive dysfunction, infertility, lymphedema, premature menopause, psychosocial issues, surgical reconstruction, and survivorship issues
- IV. PGY3s will gain a better understanding of the above conditions and principles of treatment within the setting of comorbidities.
- IV. Residents will understand common principles involved in management of the hemostatic and clotting system, including
- premedication for blood products
 - transfusion of blood products and factors
 - ordering and managing anticoagulation
 - risks and benefits of antiplatelet agents
- V. PGY1s will be able to understand the indications for ordering and the interpretation of the following laboratory values and diagnostic studies:
- CBCD with indices and peripheral smear
 - Chemistries
 - Cytology and pathology
 - Free light chain ratio, SPEP, SIEP, UPEP, and UIEP
 - Hemoglobin electrophoresis
 - B12, folate, homocysteine and methylmalonic acid
 - Imaging studies, including plain radiographs, CT, mammogram, MRI, and US
 - Iron studies
 - PSA
 - Reticulocyte count
 - Serologic tumor markers
 - Stool guaiac

PGY2s will also demonstrate knowledge of the indications for ordering and the interpretation of:

- Bone marrow aspirate, biopsy, and special stains
- Clotting assays, including factor levels and mixing studies
- DNA content and molecular markers of tumor tissue

PGY3s will independently, appropriately order the above studies and be able to interpret results within the context of patient comorbidities, pretest probability of

disease, and patient values. PGY3s will also demonstrate knowledge of the indications, contraindications, and appropriate timing for the following procedures:

- Bone marrow cytogenetics, immunophenotyping, and special stains
- Chromosome analysis – bone marrow and peripheral blood
- Estrogen and progesterone receptors
- Lymph node biopsy and lymphoid cell immunophenotype
- PET scan

- VI. PGY1s should become fluent in issues of health maintenance relevant to cancer and be able to counsel patients appropriately on current screening guidelines for breast, colon, lung, and prostate cancer.

PGY2s should also be familiar with other preventative practices, such as dietary management, HPV vaccination, and chemoprevention.

PGY3s should be familiar with alternative and complementary therapies commonly used by patients.

Practice-Based Learning and Improvement

- I. All residents should be able to access current national guidelines to apply evidence-based strategies to patient care (e.g. National Comprehensive Cancer Network Clinical Practice Guidelines <http://nccn.org/>)
- II. PGY2s and PGY3s should develop progressive independence in evaluating new studies in published literature through Journal Club and independent study.
- III. PGY2s should learn to coordinate patient care as part of a larger team, including midlevel providers, nurses, pharmacist, dietician, palliative care team, social worker, and clergy to optimize patient care.
- IV. All residents should participate in case-based therapeutic decision-making, involving the primary care provider, hematologist-oncologist, radiation oncologist, and surgeon, with PGY3s taking a leadership role.
- V. All residents should respond with positive changes to feedback from members of the health care team.

Interpersonal and Communication Skills

- I. PGY1s must demonstrate organized and articulate written (electronic) and verbal communication skills that build rapport with patients and families, convey information to other health care professionals, and provide timely documentation in the chart.
- II. PGY2s must also develop interpersonal skills that facilitate collaboration with patients, their families, and other health professionals.
- III. PGY3s should demonstrate leadership skills to build consensus and coordinate a multidisciplinary approach to patient care.
- IV. PGY3s must be able to elicit information or agreement in situations with complex social dynamics, for example, identifying the power of attorney or surrogate decision

maker, dealing with a “difficult” patient, and resolving conflict among family members with disparate wishes.

Professionalism

- I. All residents must demonstrate strong commitment to carrying out professional responsibilities as reflected in their conduct, ethical behavior, attire, interactions with colleagues and community, and devotion to patient care.
- II. PGY1s should be able to educate patients and their families in a manner respectful of gender, age, culture, race, religion, disabilities, national origin, socioeconomic status, and sexual orientation on choices regarding their care.
- III. PGY2s should be able to use time efficiently in the clinic to see patients and chart information.
- IV. PGY2s should be able to counsel patients and families on diagnostic and treatment decisions, particularly in the setting of hereditary disease, and on end of life issues, transition to hospice care, and withdrawal of care.
- V. PGY3s should be able to provide constructive criticism and feedback to more junior members of the team.

Systems-Based Practice

- I. PGY1s must have a basic understanding that their diagnostic and treatment decisions involve cost and risk and affect quality of care.
- II. PGY2s must be able to discuss alternative care strategies and the cost and risks involved in current quality issues in hematologic and oncologic care, such as breast cancer screening and appropriate threshold for blood transfusion.
- III. PGY2s should recognize emotional, psychological, and spiritual needs of patients and families coping with incurable disease and be aware of resources available in our community to meet those needs.
- IV. PGY3s should demonstrate awareness of the appropriate setting (inpatient, clinic, nursing home, home, hospice) for treatment and learn how to facilitate that treatment within the parameters of available system resources and insurance restrictions.
- V. PGY3s must demonstrate an awareness of and responsiveness to established quality measures, risk management strategies, and cost of care within our system.

Teaching Methods

- I. Supervised patient care in the inpatient and outpatient setting.
 - Residents will initially be directly observed with patients, to facilitate the acquisition of excellent history taking and physical exam skills.
 - As residents become more proficient, they will interact independently with patients and present cases to faculty.
 - Initial emphasis will be on diagnosis and basic management.
 - When residents have mastered these skills, focus will be on medical decision-making, and residents will work with supervising physicians to finalize a care plan.

- II. Conferences
 - Specialty-specific didactics
 - Tumor Board
 - Present a case at least once during the month

- III. Independent study
 - Journal and textbook reading
 - Bain BJ. Diagnosis from the Blood Smear. N Engl J Med 2005;353:498-507. <http://www.nejm.org/doi/full/10.1056/NEJMra043442>
 - Cancer: Principles & Practice of Oncology, 11th edition
 - Williams Hematology, 9th edition
 - Online educational resources
 - American Cancer Society Guidelines for the Early Detection of Cancer <http://www.cancer.org/Healthy/FindCancerEarly/CancerScreeningGuidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer>
 - American Society of Clinical Oncology www.asco.org and <http://university.asco.org/>
 - American Society of Hematology www.hematology.org, Blood <http://bloodjournal.hematologylibrary.org/>, and Image Bank <http://imagebank.hematology.org/>
 - Calculators and Risk Assessment Breast cancer <http://www.cancer.gov/bcrisktool/>
 - CDC guidelines www.cdc.gov (cancer, blood disorders, breast cancer)
 - National Comprehensive Cancer Network – NCCN Clinical Practice Guidelines in Oncology and NCCN/ACS Treatment Guidelines for Patients <http://nccn.org/> (requires free registration)
 - NEJM videos in clinical medicine (bone marrow aspiration and biopsy, lumbar puncture, paracentesis, thoracentesis) <http://www.nejm.org/multimedia/medical-videos>
 - Pain management and addiction: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5980731/>
 - Reconsidering the use of race correction in clinical algorithms: <https://www.nejm.org/doi/full/10.1056/NEJMms2004740>
 - Topic collections in the NEJM and Annals of internal medicine
 - <http://www.nejm.org/medical-specialties>
 - Up to Date
 - Clinical Key

Evaluation

- I. Attending written evaluation of resident at the end of the month based on rotation observations and chart review.

Rotation Structure

- I. Residents should contact the lead hematologist-oncologist the day prior to determine start time and location.

- II. Residents should spend their time in the clinic, infusion center, or hospital, dividing their time as appropriate to achieve the above educational goals. Residents also spend 1 day per week with Radiation Oncology.
 - Residents will be involved in discussion of patient presentation, generation of a differential diagnosis, development of a treatment plan, and patient follow up.
 - When possible, residents should follow the same patients during the rotation if they are seen both in the hospital and subsequently in clinic, or if they have more than one visit to clinic during the rotation.
 - Case-based learning is most effective. Nightly reading/study should be based on patients seen during the day.
 - When doing hematology-oncology consults, the resident should understand the question asked and provide a concise answer.
- III. Residents may be asked to do focused literature searches or presentations during the course of the rotation.
- IV. Call and weekend responsibilities TBD by the attending physician
 - Hours worked must be consistent with ACGME requirements and are subject to approval by the Program Director.
 - The rotation has no night call requirements.
- V. Residents have specialty-specific didactics and should be excused in a timely fashion to attend.