

**University of Michigan Health System
Internal Medicine Residency**

**Hematology/Oncology Curriculum:
University Hospital Inpatient Service**

Version date: 12/16/2009

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Rotation Goals and Educational Purpose

The general internist routinely encounters benign and malignant lymphohematopoietic conditions. In addition, oncologic diseases are the second major cause of death and a leading cause of morbidity in the United States. The purpose of this rotation is therefore to provide general exposure to a broad range of hematologic and oncologic conditions commonly seen by the practicing internist. Internists must be comfortable with prevention, screening, initial diagnostic evaluation and management, indications for prompt referral, and appropriate co-management of a plethora of hematologic and oncologic conditions. They must also be knowledgeable regarding indications for transfusion of blood components, management of neutropenia and immunosuppression, care for treatment-related side effects, and palliative care.

While this rotation is elective for residents at the HO1 and HO2/3 levels, each resident must complete at least one of the three core hematology/oncology rotations: UH Inpatient Hematology/Oncology Service, UH Hematology Consultation Service, Ann Arbor VA Hematology/Oncology Consultation Service.

Rotation Competency Objectives

In supplement to the University of Michigan Longitudinal Learning Objectives, the following provide an overview of the knowledge, skills, and behaviors promoted in this rotation.

- I. Patient Care and Medical Knowledge
 - a. Core knowledge
 - i. By completion of the rotation, HO1 residents should
 1. Reflect knowledge of the pathophysiology, clinical presentations, and natural history of:
 - a. Common coagulation disorders
 - b. Multiple myeloma
 - c. Lymphomas (non-Hodgkin's and Hodgkin's disease)
 - d. Acute leukemias

- e. Cancers of the breast, lung, prostate, head and neck, GI system (e.g. esophagus, colon, pancreas), melanoma, kidney, and soft tissues (sarcomas)
 2. Describe classic clinical presentations and initial triage management of common urgent hematologic/oncologic conditions:
 - a. Acute complications of tumor or treatment (e.g. bowel obstruction, tumor lysis, hypercalcemia, neutropenic fever)
 - b. Severe anemia or thrombocytopenia
 3. Understand the basic principles of major cancer treatment modalities, including:
 - a. Surgical treatment
 - b. Radiation therapy
 - c. Chemotherapy
 - d. Immunotherapy
 4. Demonstrate knowledge of specific techniques for control of pain, nausea, and anxiety.
 - ii. By completion of the rotation, HO2/3 residents should additionally
 1. Describe the general role of oncogenes and tumor suppressor genes in the development of some malignancies.
 2. Recognize and explain the importance of the following in the development of hematologic and oncologic disorders: genetics, age, environmental exposures, socioeconomic status, behaviors (e.g. sexual behaviors, diet, recreational drugs, tobacco products, travel) and previous or co-existing diseases and therapies.
 3. Describe common side effects and drug interactions of categories of therapeutic agents commonly used for the treatment of malignant disease.
 4. Describe common palliative modalities and their indications for use in both pain and non-pain symptom control.
- b. History and physical examination
- i. By completion of the rotation, HO1 residents should be able to elicit
 1. A complete and thorough hematologic or oncologic patient history, utilizing multiple sources of information.
 2. A hematologic and oncologic systems review.
 3. Presence of palpable tumor masses and organomegaly.
 4. Physical signs that may assist in characterizing the etiology, extent and/or severity of hematologic and oncologic diseases (e.g. lymphadenopathy, organomegaly, tender bones.)
 - ii. HO2 residents should additionally
 1. Perform a physical examination that is appropriate and adequate to determine the severity and extent of the patient's hematologic or oncologic disease, including serial measurements of palpable tumor masses.
 2. Perform hematologic and oncologic history and physical examinations with appropriate efficiency and increasing autonomy.
- c. Laboratory and radiologic assessment

- i. By completion of the rotation, HO1 residents should
 - 1. Detect abnormal laboratory and radiologic findings relating to the lymphohematopoietic system and understand their significance.
- ii. HO2 residents should additionally
 - 1. Select appropriate hematologic/oncologic diagnostic studies, including nuclear imaging studies and tumor markers, bone marrow aspirate/biopsy and lymph node biopsy.
 - 2. Independently review actual radiologic films to clarify clinical correlations of radiologic findings.
- iii. HO3 residents, by completion of the rotation should additionally be able to
 - 1. Interpret reported results of tumor markers and biopsy results, using clinical information and knowledge of test characteristics.
 - 2. Independently review peripheral blood smears to clarify pathologic findings.
- d. Medical decision making and medical management
 - i. By completion of the rotation, HO1 residents should
 - 1. Integrate history, physical exam, and diagnostic studies to formulate a differential diagnosis, diagnostic plan, and initial management plan for common hematologic and oncologic syndromes:
 - a. anemia and other cytopenias
 - b. disorders of hemostasis and clotting
 - c. newly diagnosed common tumors (breast, colon, prostate, lung, and hematologic malignancies)
 - 2. Under supervision, properly order transfusion of blood products
 - 3. Under supervision, provide appropriate palliative care
 - ii. HO2 residents, by completion of the rotation, should additionally
 - 1. Integrate history, physical exam, and diagnostic studies to formulate an initial diagnostic and management plan for challenging hematologic and oncologic syndromes:
 - a. Metastatic disease of unknown origin
 - b. Acute leukemia
 - c. Acute complications of tumor or treatment (e.g. bowel obstruction, tumor lysis, hypercalcemia, neutropenic fever)
 - 2. Integrate information regarding a patient's functional status, preferences, underlying tumor pathology, and available treatment options to generate patient-centered care plans, including options for palliative care.
 - 3. Manage therapeutic and prophylactic anticoagulation
 - iii. HO3 residents, by completion of the rotation should additionally be able to
 - 1. With decreasing supervision, participate in difficult decisions regarding all aspects of management, including screening, diagnostic evaluation, treatment, and palliative care.
 - 2. Monitor use and side effects of common chemotherapies.
 - 3. With minimal supervision, manage patients with neutropenia or other immunosuppression.

4. Under supervision, initiate and provide appropriate palliative care.
- e. Procedures
 - i. HO1 residents, by completion of the rotation, should understand the indications for bone marrow biopsy/aspirate.
 - ii. All residents, throughout the rotation, should additionally understand the indications, risks, and benefits of the following procedures, and perform them under supervision: thoracentesis, lumbar puncture, and abdominal paracentesis

II. Interpersonal and Communication Skills

- a. Throughout the rotation, HO1 residents are expected to
 - i. Communicate with consultants and referring physicians in a respectful, appropriate manner.
 - ii. Demonstrate patient-centered interviewing techniques and a compassionate approach to history taking. Adapt history-taking skills to the mental status, demeanor, and psychosocial presentation of the patient and family.
- b. HO2/3 residents should additionally be able to
 - i. Assist patients and their families or advocates in decision-making regarding treatment options and discharge planning, including decisions in the end of life setting.
 - ii. Under supervision, successfully negotiate appropriate communication for most “difficult” patient encounters, such as the irate patient.
- c. HO3 residents should additionally be able to
 - i. With minimal supervision and acting as a role model for junior learners, compassionately communicate with patients and families regarding sensitive topics, including serious diagnostic and prognostic findings and end-of-life care options.

III. Professionalism

- a. By completion of the rotation, HO1 residents should
 - i. Appreciate the effects of cultural and religious background on the patient's approach to decision making, to their disease, and to treatment;
 - ii. Reflect appreciation of the impact of hematologic and oncologic disorders on patients' quality of life and their relationships with family and friends;
 - iii. Discuss common ethical issues facing patients, their families and caregivers related to treatment options and disease/treatment outcome;
 - iv. Sensitively respond to patient and family decisions regarding palliative care for terminal diseases.
- b. HO2 residents should additionally
 - i. Recognize factors that may impact treatment and outcome of hematologic and oncologic disorders, including socio-economic factors that may affect adherence with the recommended treatment.
 - ii. Recognize the implications, at a personal and societal level, of identifying a patient's genetic risks of disease on the patient's family members.
- c. HO3 residents should additionally

- i. Provide physical, psychological, social and spiritual support for dying patients and their families, including high quality palliative and hospice care.

IV. Practice-Based Learning and Improvement

- a. HO1 residents are expected to
 - i. Demonstrate self-initiative in the use of information technology to access and retrieve materials for self-education. Utilize clinical practice guidelines and current literature to generate appropriate diagnostic and therapeutic plans.
 - ii. Constructively respond to and internalize feedback from faculty, nursing, and allied healthcare providers. Demonstrate willingness to change identified behaviors and ability to learn from errors.
- b. HO2 residents are additionally expected to critically review clinical trial data.
- c. HO3 residents are additionally expected to demonstrate personally investigated knowledge of the evidence base for national guidelines on diagnosis and management of common hematologic and oncologic disorders.

V. Systems-Based Practice

- a. By completion of the rotation, HO1 residents are expected to be able to
 - i. Direct cost-effective diagnostic and treatment plans for common heme-onc symptoms and syndromes, prioritizing cost effective interventions for appropriately tiered care plans.
 - ii. Effectively access and mobilize emergent and surgical care services.
 - iii. Demonstrate awareness of indications for general internists to consult heme-onc subspecialists, surgeons, radiation oncologists, nutritionists, etc.
 - iv. Coordinate care in and out of the bone marrow transplant unit, reflecting understanding of how that unit integrates into the total care of the patient.
 - v. Facilitate cross-coverage interactions when necessary through cooperative interactions with physician assistants and hospitalists.
- b. HO 2/3 residents will additionally demonstrate ability to
 - i. Identify appropriate inpatient, outpatient, or home settings for diagnosing and treating hematologic and oncologic diseases.
 - ii. Identify psychosocial support/hospice care options for patients with terminal diseases, and appropriately consult palliative care consultation services.
 - iii. Know roles of radiation oncology/surgical oncology/social work/nursing /anesthesiology in the team management of patients, including the role of non-physician health care professionals in assisting patients and their families prepare for hospital discharge, home management, nursing home placement, and end-of-life care.
 - iv. Ensure continuity of care through appropriate “hand offs” with the primary hematology-oncology outpatient team, including nursing and allied staff as necessary.

Teaching Methods

I. Supervised Patient Care

The emphasis of the rotation is on experiential learning through management of hospitalized hematology-oncology patients. Residents perform initial hospitalization H&P and daily management care for patients under the full supervision of a faculty hematologist-oncologist. Patient-centered, case-based faculty discussions review each patient. Residents interact with nursing, fellows, and physician assistants while providing patient care; residents should consider all such interactions as opportunities for education. Patients present from a broad age range and socioeconomic backgrounds, with a spectrum of local to quaternary care needs.

II. Structured Didactics and Small Group Learning

- a. Teaching attending rounds – Core clinical topics and case-based discussions; weekday afternoons, per attending schedule
- b. Lymphoma Tumor Boards: Thursdays 4:30 – 6:30 PM; check with the fellow
- c. Journal Club – optional, third Tuesday evening of the month
- d. End of life care Schwartz Rounds – optional, monthly; check with the fellow
- e. All mandatory residency conferences (e.g. morning report, noon conferences, Grand Rounds) continue during this rotation.

III. Special projects

- a. Residents are invited to present a case for Wednesday noon Leukemia Conference; speak with the fellow or attending to schedule a presentation.

IV. Independent study (including reading lists and other educational resources)

- a. Review Article: Bain BJ. Diagnosis from the Blood Smear. *N Engl J Med* 2005;353:498-507. This is an outstanding practical review including images of common conditions. Available from through University of Michigan online library access at: <http://content.nejm.org/cgi/reprint/353/5/498.pdf>
- b. Textbooks and manuals, available through the Taubman Medical Library
 - i. Hoffman, Ronald, ed. Hematology: Basic Principles and Practice, 4th edition [or latest edition]. Philadelphia: Elsevier, 2005 [or most recent]. Available online through Taubman electronic book collections.
 - ii. Lichtman, Marshall A. et al, ed. Williams Hematology – 7th Ed. [or latest edition]. McGraw-Hill, 2006 [or most recent]. Available online through Taubman electronic book collections.
 - iii. Schmaier, Alvin H. and Petruzzelli, Lilli M., eds. Hematology for the Medical Student. Philadelphia: Lippincott Williams & Wilkins. 2003 [or most recent edition]. Available in Reserves Collection at circulation desk.
- c. Textbooks highly recommended, available for purchase or for use onsite through the hematology/oncology division library (not available for loan through Taubman Medical Library)
 - i. Devita, Vincent T., ed. Cancer: Principles and Practice of Oncology. 8th edition. Lippincott Williams & Wilkins, 2008.
- d. Clinical practice guidelines

- i. American Society of Clinical Oncology Clinical Guidelines and Special Articles are available at: <http://jco.ascopubs.org/misc/specialarticles.dtl>
 - ii. National Comprehensive Cancer Network – The NCCN Clinical Practice Guidelines in Oncology and NCCN/ACS Treatment Guidelines for Patients are both available at: <http://nccn.org/>
 - iii. University of Michigan hematology/oncology practice guidelines (<http://www.med.umich.edu/i/oca/practiceguides/>) including: Adult Cancer Screening
- e. General websites
 - i. American Society of Clinical Oncology: <http://www.asco.org/>
 - ii. National Comprehensive Cancer Network: <http://nccn.org/>
 - iii. American Society of Hematology: <http://www.hematology.org/>
- f. Core clinical journals, with free access available through the Taubman Medical Library e-journal resources:
 - i. Journal of Clinical Oncology (American Society of Clinical Oncology): <http://jco.ascopubs.org/>
 - ii. Blood (American Society of Hematology): <http://bloodjournal.hematologylibrary.org/>
 - iii. The oncology topic collection of the New England Journal of Medicine is available at: <http://content.nejm.org/cgi/collection/oncology>
 - iv. The oncology topic collection of the Annals of Internal Medicine is available at: http://cme.annals.org/cgi/hierarchy/annintcme_node;000636 (or access through Taubman electronic journals and select the “Collections” tab within the journal to find collections by internal medicine subspecialty).
 - v. The hematology topic collection of the Annals of Internal Medicine is available at: http://cme.annals.org/cgi/hierarchy/annintcme_node;000382 (or access as above)
- g. Other online resources
 - i. Microscopic Hematology, by Dr. Charles Hess and Ms. Lindsey Krstic of University of Virginia, contains excellent images of benign and malignant hematopoietic disorders, as well as summary content for major findings: <http://www.healthsystem.virginia.edu/internet/hematology/HessIDB/home.cfm>
 - ii. Hematology image bank, including normal and abnormal bone marrow findings, available for browsing by category or direct searching: <http://ashimagebank.hematologylibrary.org/>
 - iii. Hematology teaching cases with interactive elements can be found at: http://www.hematology.org/education/teach_case/
 - iv. Death and dying is approached in a thought-provoking documentary produced by Bailey Barash, a freelance television producer and journalist. The video, “203 Days” chronicles the death of Sarah, age 89. The video demonstrates roles of hospice providers and family in Sarah’s care, and highlights common end-of-life care decisions. Consider the associated discussion questions on the website before and after viewing the 27

minute long video (which can be started and stopped as needed.)

<http://fitsweb.uchc.edu/Days/days.html>

- v. Residents are encouraged to access the most recent versions of the following Johns Hopkins Internet Learning Center modules, available to all Michigan residents using their ambulatory care login (select from the list of “Available Modules”): <http://www.hopkinsilc.org/>
 1. Anemia
 2. Cancer Screening
 3. Palliative Care

Rotation Schedule

First day protocol: Obtain prior patient sign out by 7:30 AM.

Call duty: Long call is Q4 days. HO2/3 sign out to a Night Float following completion of call at 8PM. HO1 remain on overnight call duty with early departure the following day. Short call duties are scheduled until noon Q2 except on weekends.

Weekend duty: Residents will have an average of one day off in 7 over the course of a 4-week rotation block. The day off is determined based on the call schedule, and may or may not occur on a weekend. There is no short call on the weekend.

Continuity Clinic: General medicine continuity clinic continues during this rotation, one half-day weekly. Discuss your continuity clinic schedule with your attending and fellow.

Schwartz rounds: Palliative care rounds are scheduled monthly; check with your fellow for the next scheduled date and time.

	Monday	Tuesday	Wednesday	Thursday	Friday	Sa/Sun
AM	Pre-round & 7:30 AM rounds 10:30 Morning Report	Pre-round & 7:30 AM rounds 10:30 Morning Report	Pre-round & 7:30 AM rounds 10:30 Morning Report	Pre-round & 7:30 AM rounds 10:30 Morning Report	Pre-round & 7:30 AM rounds 10:30 Morning Report	Integrated teaching and management rounds
PM	12:00 Noon Conference Teaching Attending Rounds	12:30 Intern Report Teaching Attending Rounds evening: Journal Club (3 rd week of the month)	12:00 Noon Conference Teaching Attending Rounds	12:00 Noon Conference Teaching Attending Rounds 4:30 – 6:30 Lymphoma Tumor Boards	12:00 Grand Rounds Teaching Attending Rounds	Patient Care

Evaluation Methods

Formative face-to-face feedback to residents by attendings occurs at mid-month. Each month, attendings complete online competency-based evaluations of each resident. The evaluation is shared with the resident, is available for on-line review by the resident at his/her convenience, and is sent to the residency office for internal review. The evaluation is part of the resident file and is incorporated into semiannual performance reviews for directed resident feedback.

Residents complete a service evaluation of the rotation faculty monthly.