Internal Medicine Curriculum
Hematology

Contact Person: Dr. Caine

Educational Purpose
Hematologic problems are extremely common in hospitalized patients and patients with chronic illnesses in the outpatient setting. These diseases may be primarily hematologic or may be secondary to other illnesses or conditions. It is important for the internist to appreciate these abnormalities and know the appropriate work-up and therapies available. Internists may use these hematologic abnormalities to uncover primary disease elsewhere in the body. Thus, it is incumbent upon the internist to have a working knowledge of typical hematologic conditions.

End of life issues, aggressiveness of care issues in patients with incurable malignancies, use of Hospice programs and discussion of pain control are regularly encountered and discussed during this rotation. Universal precautions include the handling of blood products; the complications of blood transfusions, including antibody reactions and infectious complications such as HIV and Hepatitis C are reviewed. Occupational and environmental exposures to hydrocarbons and benzene containing compounds are reviewed when patients present with leukemias.

Teaching Methods
The resident will be assigned to the hematology attending and maintain a complement of hospitalized patients and outpatients. The resident is expected to evaluate new hematologic admissions as well as consults. The resident is expected to read basic information on disease entities and to present the patients to the attending. Attending rounds will be conducted on a daily basis Monday through Friday. During these rounds the attending will review the differential diagnosis, problem list and plan for appropriate diagnostic and treatment regimens with the resident. The resident is expected to attend Tumor Clinic if the Oncology rotation resident is unable to attend.

Teaching rounds occur daily from 7:00 - 8:00 AM, Monday through Friday. The resident will be given daily reading assignments and will participate in the discussion with the hematology attending. These sessions are case based and are accompanied by five to ten appropriate questions. The resident also has the option to gain exposure to a broad spectrum of hematologic patients by spending one to two afternoons a week seeing patients in the office of the hematology attending.

The teaching methods include self-directed reading and study, especially on cases seen in the hospital; daily didactic teaching sessions between the resident and hematology attending, and attendance at conferences focusing on hematologic conditions.

The residents will gain most of the information during the rotation by seeing patients and reading about these abnormalities during the diagnostic work-up and treatment. Through participating in the hematology rotation, the resident will be able to appreciate diagnosis, treatment, prevention, and investigation of disorders of the hematopoietic, hemostatic, and lymphatic systems.
Educational Content and Disease Mix
Topics covered include:
A. Stem Cell disorders
   1. Hypoproliferative
   2. Hyperproliferative
   3. Bone marrow transplant
B. Leukocyte disorders
C. Erythrocyte disorders
   1. Production problems
   2. Hemolytic problems
D. Platelet disorders
E. Bleeding disorders
   1. Inherited and acquired
   2. Disseminated intravascular coagulation
F. Thrombotic disorders
   1. Antiphospholipid antibody syndrome
   2. Thrombotic microangiopathic anemia syndrome
   3. Thrombophilia (inherited and acquired)
   4. Antithrombotic and prophylactic therapy
G. Transfusion medicine
H. Malignant disorders
   1. Molecular biology
   2. Lymphoproliferative disorders
   3. Plasma cell disorders
   4. Leukemic disorders

Patient Characteristics and Types of Clinical Encounters
A substantial diversity of patients and types of problems will be encountered. The resident will participate in urgent consultations of hospitalized patients with life-threatening hematologic syndromes, outpatient management of chronic disorders and outpatient consultations to diagnose hematologic conditions. All patient encounters are supervised by the attending hematologist. Residents learn to appreciate the importance of the hemopathologist in the diagnostic process as well as clinical lab and blood bank personnel. The resident is expected to perform a complete physical examination. Components that will be stressed will include the ability to palpate adenopathy and appreciate splenomegaly. A cutaneous survey is necessary to look for purpura and petechiae.

Procedures
Bone marrow aspiration and biopsy can be done by the resident, if desired.

Reading List
A. References
   1. Standard textbook medicine, hematology section
   2. Wintrobe’s Clinical Hematology, Ninth Edition
   3. William’s Text of Hematology, Fifth Edition
   4. ACP Hematology Board Review
B. Required Reading
   5. MKSAP, Hematology section (14)
   6. Med Study Review
C. Selected Articles


Pathological Material
Peripheral blood and bone marrow studies are reviewed on a daily basis depending on the subject matter of the day (Harvard hematology course slides).

Required Presentations
A “Good Day Talk” or Morning Report is devoted to hematology on a monthly basis. The resident is also required to participate in the family practice lecture series.

Evaluation Methods
The resident is given an evaluation sheet at the start of the rotation. They are expected to evaluate each of the didactic sessions and note whether or not patients with these conditions have been seen. This is extremely helpful in determining if the course objectives are met. A mid-month and end-month evaluation is undertaken by the attending to appreciate the resident’s input. The resident will be evaluated formally at mid-month and at the end of the month by the attending physician. The attending will fill out the formal evaluation form.

Requirements for completion of hematology rotation are as follows:
A. Attendance at all scheduled didactic and clinical sessions
B. Completion of required reading assignments
C. Completed hematology presentation at resident morning conference
D. Completed evaluation sheet detailing clinical conditions encountered by resident during the rotation.
E. Completion of case report for poster presentation, if assigned.
F. Understands how to evaluate macrocytic, normocytic, and microcytic anemias.
G. Understands the indications for and complications of the following transfusions: red cell, platelet, clotting factor and WBC.
H. Understands how and when to evaluate a patient for hypercoagulability.
I. Understands how to evaluate patients for possible paraprotein disorders.

Objectives
The curriculum is designed to address learning objectives of the following Accreditation Council on Graduate Medical Education core competencies. Reference: http://www.acgme.org/Outcome

“Every competency can be taught with every patient.” B. Joyce, 2006

PATIENT CARE
Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents are expected to:
- communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- gather essential and accurate information about their patients
- make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
- develop and carry out patient management plans
- counsel and educate patients and their families
- use information technology to support patient care decisions and patient education
- perform competently all medical and invasive procedures considered essential for the area of practice
provide health care services aimed at preventing health problems or maintaining health
work with health care professionals, including those from other disciplines, to provide patient-focused care

MEDICAL KNOWLEDGE
Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Residents are expected to:
- demonstrate an investigatory and analytic thinking approach to clinical situations
- know and apply the basic and clinically supportive sciences which are appropriate to their discipline

PRACTICE-BASED LEARNING AND IMPROVEMENT
Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:
- analyze practice experience and perform practice-based improvement activities using a systematic methodology
- locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems
- obtain and use information about their own population of patients and the larger population from which their patients are drawn
- 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
Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients families, and professional associates. Residents are expected to:
- create and sustain a therapeutic and ethically sound relationship with patients
- use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
- work effectively with others as a member or leader of a health care team or other professional group

PROFESSIONALISM
Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Residents are expected to:
- demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
- demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
- demonstrate sensitivity and responsiveness to patients’ culture, age, gender, and disabilities
SYSTEMS-BASED PRACTICE
Residents 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. Residents are expected to:

- understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
- know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
- practice cost-effective health care and resource allocation that does not compromise quality of care
- advocate for quality patient care and assist patients in dealing with system complexities
- know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance
**Hematology Rotation Checklist**

Intern/Resident _________________________________ Circle One: PGY 2 or 3

Supervising Faculty______________________________ Month ___________________

<table>
<thead>
<tr>
<th>Rotation Check List</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewed the goals and objectives at the beginning of the rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation and feedback mid month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation and feedback at the end of rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attended all scheduled clinical sessions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed assigned readings.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed required case reports/abstracts/posters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performed at or above the expected PGY level. Please check one.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY 1 Residents are responsible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- for gathering relevant patient data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- performing and interpreting physical examination findings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- perform basic procedures and interpret data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- interpret laboratory tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- interpret basic radiographic studies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY-2 will have improved competence and demonstrate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- improved data gathering and physical examination skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- improved knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- improved decision making</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- enhanced ability to counseling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY-3 will approach mastery and demonstrate the ability to function as consultant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewed and met the core competencies as outlined. Please give at least one additional example.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A Patient Care</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Residents will obtain and document appropriate history taking, physical exam and laboratory interpretation skills for patients with hematological disorders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Enhance physical examination skills focusing on hematopoietic disorders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Document procedures appropriately</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Attend Tumor Clinic weekly if Oncology rotations resident not able to attend.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Medical Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Applies clinical epidemiologic and social-behavioral science knowledge to the care of the patient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Demonstrate appropriate skills in evaluating and managing the patients with the stated disease mix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Complete the required reading list</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Understand the indications for and complications of the following transfusions: red cell, platelets clotting factor and WBC
• Understand how to evaluate patients for possible paraprotein disorders

### C. Practice Based Learning

- Residents will develop and implement treatment plans by utilizing appropriate information systems and resources to help manage patients presenting with hematological disorders
- Undertakes self-evaluation with insight and initiative
- Will adapt learning and evidence based medicine to own patient practice

### D. Interpersonal and Communication Skills

- Residents will communicate diagnosis, treatment plan and follow up care to patients and their families

### E. Professionalism

- Residents will recognize the importance of patient preferences when selecting diagnostic and therapeutic options.
- Commitment to ethical principles pertaining to the provision or withholding of care, patient confidentiality, informed consent, and business practices

### F. Systems-Based Practice

- Residents will be able to develop, implement and evaluate treatment plans for patients that include determining when to obtain consultations
- Advocates for quality patient care and assists patients in dealing with health system complexity
- Uses systematic approaches to reduce errors and enhance care

Resident Signature___________________________________ Date________________

Supervising Faculty __________________________________ Date _______________