American Board of Internal Medicine Guidelines for Training in Hematology and Medical Oncology

ATTRIBUTES OF THE GENERAL INTERNIST

A general internist is a physician who provides scientifically based, empathic care for the nonsurgical illnesses of adolescents and adults. This care tends to be characterized by a mutual personal commitment between doctor and patient, by stability over time, by substantial breadth, by availability, and by an appropriate attention to elements of human support, sensitivity, and concern. It is marked by technical sophistication and major professional expertise. The general internist functions as a consultant to other specialists and is competent to handle critically ill patients and nonsurgical disorders in adolescents and adults seeking aid in the emergency room setting. The well-trained internists are unique in their ability to deliver with broad competence primary, secondary, and tertiary care.

The general internist provides continuing, comprehensive care for common and complex multisystem illnesses in the ambulatory as well as the hospital setting. The internist serves as the patient's advocate and accepts responsibility for all the patient's health needs, obtaining assistance from other specialists and from allied health professionals as required. One of the hallmarks of the general internist is a continuing personal interest in the patient.

The practice of internal medicine requires the knowledge and application of advances in the science and technology of medicine. The internist provides care which combines the scientific and technologic successes of recent decades with the empathic care of the patient. Progress in technology may complicate the relationship between the patient and physician. Therefore the personal and caring relationship takes on even greater significance.

ATTRIBUTES OF THE SUBSPECIALIST IN INTERNAL MEDICINE

Attributes of the Subspecialist in Internal Medicine

Subspecialists must first be certified by the American Board of Internal Medicine in the broad field of internal medicine. They should be dedicated to excellence and compassion in patient care. They should appreciate the relationship of their particular discipline to the whole of internal medicine, and, although mainly concerned with being clinically competent in their subspecialty, they should always practice their subspecialty with a broad knowledge of its relationship to diseases of other organ systems.

Teaching and learning should continue throughout the careers of subspecialists. Sincere dedication to continuing education will enable them to advance their competence with changes in medical knowledge and practice, to exercise...
appropriate clinical skill and thoughtful judgment in utilizing technologic procedures, to demonstrate wisdom in the comprehensive evaluation of diagnostic tests, and to provide sound recommendations for therapeutic modalities or clinical management. Since experience in either fundamental research or clinical investigation fosters life-long habits of scholarship and critical thinking, they should be capable of interpreting experimental data and be familiar with the scientific basis for medical practice.

Subspecialists should seek to cooperate with and provide consultation for physicians within and outside the field of internal medicine, as well as other allied health professionals, whose participation in the diagnosis and care of patients is essential.

General Guidelines for Training the Subspecialist in Internal Medicine

Subspecialty training should be received in an institution with a residency program in internal medicine approved by the Liaison Committee on Graduate Medical Education, although training may be appropriate in certain outstanding institutions of recognized quality which are enriched by an academic atmosphere but do not have an approved training program in internal medicine. During training, the subspecialist should be afforded the opportunity to develop the cognitive knowledge, clinical skills, personal attributes, and professional attitudes appropriate for an internist competent to practice the subspecialty both as a primary physician and as a consultant. As in programs in the broad specialty of internal medicine, evaluation of the clinical skills of the subspecialty trainee to function as a consultant as well as an internist will be required of program directors and should be expected by trainees.

These guidelines are intended to provide direction and are not to be interpreted as requirements unless specifically stated.

GUIDELINES FOR TRAINING IN HEMATOLOGY

The American Board of Internal Medicine requires two years of subspecialty training before admission to a subspecialty examination. In some instances one year of clinical experience in blood disease, if sufficiently broad and intense, followed by one year of research in a specific aspect of hematology will provide adequate training in the subspecialty. The content of the second year should, therefore, be considered flexible. An opportunity to follow some patients over long periods is essential. If a large amount of time over the two years is to be devoted to research, care must be taken to provide adequate clinical training.

Such training programs should take place in an institution which has an approved residency in internal medicine. A medical school environment is highly desirable. Training in a small number of other institutions with a recognized reputation for advanced educational programs in hematology and a good academic atmosphere may be acceptable.

Trainees should have a minimum of three years of training in general internal medicine, preferably prior to beginning training in the subspecialty, and the opportunity to maintain their skills in general internal medicine throughout the training in hematology. During training in hematology, the trainee should acquire enough experience and knowledge to be able to diagnose the nature of the disease process affecting the blood tissue in the vast majority of patients with such problems, to analyze the nature of the therapeutic problem, and to be thoroughly familiar with all potential approaches to treatment. In all aspects of its educational process, the program should attempt to instill in its trainees an attitude of scholarship and skills which will enable continuing education and growth in later professional life.
Program Director and Faculty

The training faculty should include a full-time director and several other individuals on a full-time or part-time basis. All faculty members should be recognized as qualified hematologists. The faculty should include individuals with competence in the performance and interpretation of laboratory and pathologic aspects of blood diseases and the use of isotopic substances. There must be sufficient exposure of trainees to these individuals.

Environment

During training in hematology, the program must provide the trainee an opportunity to serve as a consultant to general medical, medical subspecialty, or other specialty services (i.e., surgery, clinical pathology, radiology, and pathology) regarding blood disease problems and hematologic manifestations of systemic diseases. Experience with children and pediatric aspects of hematologic disease is desirable. Ideally there should be basic research programs in fundamental phenomena related to blood diseases with formal contact between the clinical and investigative staff.

Educational Program

The clinical experience provided during a training program in blood diseases should be sufficient to acquire the competency of a specialist in the field. Such experience should include opportunities to observe patients with a wide variety of blood diseases both on an inpatient and an outpatient basis. The trainee should be given the opportunity to assume continuing responsibility for chronically ill patients throughout the training period in order to observe the evolution of blood diseases as well as the benefits and toxicity of therapy. There should also be responsibility for the care of a reasonable number of patients hospitalized for acute illness. There should be ample opportunity to become competent in managing the emotional problems which commonly appear in patients with these diseases.

The program’s faculty must provide supervision and discussion of cases being followed by the trainee through rounds, clinic conferences, seminars, and other formal, structured educational experiences. The trainee must gain experience in the supervision, performance, and interpretation of results of laboratory tests, isotopic procedures, and biopsies. Personal experience in the methodology of pertinent laboratory tests is highly desirable.

The trainee should have an opportunity to observe and engage in comprehensive programs of therapy for blood diseases. There should be participation in clinical investigation and therapeutic trials, including studies of the evolution and natural history of blood diseases. It is desirable that the trainee be able to take part in fundamental or basic research in a problem related to blood disease, but this should be considered an optional component of the clinical training program.

The trainee should assume the role of an educator, gaining experience in teaching other physicians, house officers, undergraduate medical students, and allied health professionals in the fundamentals of the approaches to blood diseases. The trainee should function as a consultant to colleagues with less experience, to primary care physicians, and to other specialists.

Appropriate supervision, review, and/or audit of all trainees’ activities should be documented. There should be regular, recorded evaluation and feedback concerning the trainee’s clinical skills and knowledge in all the individual areas with which the hematologist should be familiar.

Modern facilities to accomplish the foregoing educational program must be available and functioning. A comprehensive library must be readily accessible.

Specific Knowledge and Skills

Specific aspects of the knowledge, skills and attitudes which the training program must provide for trainees to develop clinical competence in the field of hematology include:

1. The morphology, physiology, and biochemistry of marrow, lymphatic tissue, and spleen.
2. Pertinent basic immunology and pharmacology.
3. The basic pathophysiologic mechanisms and therapy of diseases of the blood, including anemias, diseases of white cells, and disorders of hemostasis and thrombosis.
4. Neoplastic diseases of the blood and blood-forming organs.
5. Genetics and clinical pharmacology, including drug effects, toxicity, and interactions.
7. Acquired abnormalities of coagulation, e.g., disseminated intravascular coagulation and circulating anticoagulants.
8. Performance of bone marrow aspiration and biopsy and interpretation of films of blood and marrow.
9. Coagulation tests, regulation of anticoagulant therapy, and evaluation for autoantibodies and blood compatibility.

GUIDELINES FOR TRAINING IN MEDICAL ONCOLOGY

The training program in medical oncology must provide advanced training that will make it possible for the physician to acquire the expertise to practice as a consultant in medical oncology. The program should not only provide training in the techniques required and fundamental clinical skills necessary for the practice of medical oncology, but should also provide an emphasis on scholarship, continuing self-instruction, development of critical judgment, and the ability to make appropriate decisions.

Medical oncology programs should be offered in institutions with residencies fully approved in internal medicine by the Liaison Committee for Graduate Medical Education. However, selected subspecialty programs of recognized excellence in institutions with an academic atmosphere but without a training program in internal medicine may be accepted. The minimum period of training for medical oncology is two years.

Medical oncologists must first be competent internists. The trainee in medical oncology should have three years of training in general internal medicine, preferably prior to beginning training in the subspecialty. Throughout the clinical experience, learning in internal medicine should be continued. During the two years of training in medical oncology, at least one year should be an intensive clinical experience. Follow-up of patients throughout the two-year program is necessary to enable the trainee to mature in the responsibilities of a consultant in medical oncology.

Program Director and Faculty

The program director should be certified in medical oncology or have the equivalent qualifications to provide adequate supervision of the trainees. Program directors are responsible for the adequacy of all facilities, including support facilities, requisite to the provision of an education of high quality for the trainees. There should be sufficient individuals to constitute a training faculty. All members of the faculty are to be aware of the responsibilities of the program and accept the requirement for close, critical evaluation of the trainees’ progress and competence.

Environment

Since the trainee in medical oncology must learn to integrate many scientific skills to prevent, detect, and manage neoplastic diseases, there must be, in the environment of the training program, broad support from other clinical specialties, especially diagnostic and therapeutic radiology, gynecology, pediatrics, nuclear medicine, pathology, and surgical subspecialties. In addition, it is desirable to have the support of oncologic nursing, rehabilitation, and social work. Medical oncology sections with responsibility for outpatient and inpatient care are essential for providing an appropriate training environment.

Specific aspects of allied specialties in which the trainee should develop a working knowledge include the following:

1. **Diagnostic Radiology and Nuclear Medicine**: contrast studies and diagnostic techniques with radioactive isotopes; the reading of films with the radiologist in order to provide better feedback on clinical problems.
2. **Pathology**: the importance of an integrative role in the evaluation of biopsy material between the pathologist and the needs of the patient; the various techniques for obtaining...
tissue for morphological study; identification of neoplasms, recognition of abnormal cytology, and interpretation of morphological findings.

3. Pediatric Oncology: therapy for children with oncologic problems in cooperation with a pediatrician and/or cancer center.

4. Psychosocial: the psychologic, sociologic, and spiritual needs of the patient.

5. Radiation Medicine: the principles of radiobiology, types of equipment and indications for their use, and the results and limitations of radiotherapy.

6. Rehabilitation: techniques designed to facilitate recovery and return to normal activity, including stomal care, physical therapy, laryngectomy voice training, prosthetics, and Reach to Recovery programs.

7. Surgery: indications for surgery and decisions over major operative procedures in all major classes of tumors; familiarity with the results of surgical treatment and problems encountered during and following surgery.

Educational Program

The program must provide and the program director must document the presence of a sufficient number of new and follow-up patients to assure appropriate inpatient and outpatient experience with clinical neoplastic problems for each trainee. The principle of continuity of doctor-patient relationships during the period of training should be followed to the greatest possible extent, and a specific outpatient clinic should be designated for follow-up care of medical oncology patients. The clinical experience should emphasize improvement in the history and physical examination. The learning process should assure skills in proctoscopy, pelvic examination, and head and neck examination.

The trainees should develop skill in functioning as primary care physicians. They should be able to establish a relationship with the individual or family and provide continuing surveillance of health needs, comprehensive care for the acute and chronic disorders for which they are qualified, and access to the health delivery system for disorders requiring the services of other specialists.

Conferences should augment learning by including clinical seminars conducted by the faculty, seminars reviewing subjects by the trainees, journal club meetings, and research conferences. Since the medical oncologist interacts with others to control or cure neoplastic diseases, interdisciplinary tumor conferences effectively demonstrate coordination of the best diagnostic and therapeutic methods. Attendance at pathology conferences, radiology conferences, and general medical conferences is encouraged, with particular attention to those presenting problems relating to the diagnosis and management of neoplastic diseases.

To prepare for their role as consultants to other specialists, trainees should have the opportunity to participate in consultation teams supervised by faculty members. They should become experienced in teaching; specifically, the teaching should include medical students, house staff, and allied health personnel. The goal of these experiences should be an ability to correlate basic biomedical knowledge with clinical aspects of cancer and to integrate clinical management and teaching of cancer by all specialists at all stages of the disease.

The trainee should have an awareness of the importance of participation in postgraduate and/or continuing education and learn to provide public education in matters pertaining to cancer. The trainee should participate in the community system of health care relating to neoplastic diseases and work with all individuals in the health system.

The training program should have an investigational component. The trainees must develop a posture of alertness to the constant development of scientific progress and should be prepared to contribute to this aspect of the program. They should learn the design and interpretation of research studies, evaluation of investigative methods, and interpretation of data, and develop competence in critical assessment of new therapies and the medical literature. An understanding of variations attributed to a disease, bias, criteria of measurement of tumor response, use of controls, factors in patient selection in clinical studies, and biostatistical techniques is essential. The research experience should include a clinical study in which the trainee reviews case records and assembles clinical data. The trainee should learn the method of deriving a clinical protocol for research, develop one individually, and participate in research utilizing established protocols.
The organization of each program must include a mechanism for ongoing evaluation of the competence and progress of each trainee. Records of such evaluation should be maintained with appropriate counseling of each trainee.

Specific Knowledge and Skills

The principal skill of the medical oncologist is clinical judgment in matters relating to neoplastic diseases. The trainees should learn to quantify, measure, and define tumor growth. They will repeatedly apply skills from their general medical training, including bone marrow aspiration/biopsy, thoracentesis, paracentesis, lumbar puncture, proctoscopy, and the use of laryngeal mirrors. They must learn the indications for such procedures, how to interpret materials from such sources, and how to evaluate the results. Knowledge of basic science information is necessary for optimal management of the patient with cancer. Trainees must be well educated in the following subject matters and become accomplished in the procedures:

1. **Biochemistry**: the basic concepts of molecular biology and cellular metabolism; specific metabolic pathways affected by drugs; the use of biochemical and immunochemical markers; the role of biochemical studies of serum, urine, and other fluids to evaluate the extent of the disease; biochemical alterations during progression of the disease and therapy; and the role of quantitative measurement of tumor cell products.

2. **Biostatistics**: principles of biometry.

3. **Cell Kinetics**: growth characteristics of normal and neoplastic cells, including components of the cell cycle and mechanisms of cell division; concepts of growth fraction and cell loss; factors regulating cell growth; the concept of stem cells; characteristics of cell membranes; maturation and repair in normal and neoplastic cells; and the principles of chronology.

4. **Chemotherapy**: the available drugs for treatment of neoplastic diseases and indications for their use in specific neoplasms; dosage schedules; techniques for drug administration; duration of therapy and the results of therapy alone, in sequence, or in combination with other drugs, and in combination with surgery and/or radiotherapy.

5. **Clinical Pharmacology**: the locus, mechanisms of action, distribution, metabolism, cytokinetics, toxicity, and limitations of drugs used in cancer chemotherapy, including interaction with other drugs, clinical pharmacologic studies; therapeutic trials of new agents; broader trials of new agents demonstrated to be effective therapeutically; and the principles of study protocols and their use.

6. **Cytogenetics**: karyotypic abnormalities in neoplastic diseases; methods and results of such chromosome analysis; effects of treatments with drugs and x-rays on chromosome morphology; and genetic factors in the development of neoplasia.

7. **Endocrinology and Metabolism**: the endocrine manifestations of certain cancers; ectopic hormones; indications for hormonal therapy; management of patients following ablative endocrine procedures; the etiologies of weight loss, protein abnormalities, fever, and electrolyte disturbances.

8. **Epidemiology**: the incidence of cancer with respect to race, sex, age, occupation, habits, and geography; the role of public health in community efforts for controlling cancer; and socioeconomic factors.

9. **Etiology**: the predisposing and causal factors leading to neoplasia, including chemical carcinogens, viral oncogenesis, occupational and environmental factors; and congenital and acquired diseases predisposing to neoplasia.

10. **Hematology**: coagulation factors; diagnosis of the cause of bleeding, manifestations and specific therapeutic indications; hematologic alterations from disease or cytotoxic drugs; metabolism, function, and fate of leukocytes; familiarity of treatment with blood products, including red blood cells, platelets, and granulocytes.

11. **Hematopathology and Pathology**: details of peripheral blood and bone marrow examination; and ability to recognize the fundamental features of the histology of lymph node neoplasms and common cancers.

12. **Immunology**: tumor immunology; preexistent, coexistent, and resultant immunologic characteristics of host reactions in patients with neoplasms, including cellular and humoral factors; immunologic tests used in diagnosis and the current status of immunotherapy.
13. **Microbiology**: the epidemiology, diagnosis, prevention, and treatment of infections, the use of prophylactic antibiotic therapy; and the role of protected environment techniques.

14. **Natural History of Cancer**: the pattern of growth and spread of specific cancers in man; the expected duration of survival of the untreated patient; and the variabilities in the natural process of growth.

**ACKNOWLEDGMENT**

Although these guidelines were developed with input from the American Board of Internal Medicine, the guidelines for hematology and medical oncology were initially drawn up by the respective Subspeciality Committees whose memberships are listed below.

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