

The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins

**Medical Oncology Fellowship Training Program
Description of Facilities and Curriculum**

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INTRODUCTION

The professional education of a new generation of physicians is undoubtedly one of the most important activities of an academic institution such as Johns Hopkins. This is a process that starts anew every July 1 when a new group of Fellows joins the Hematology/Medical Oncology Fellowship Training Program in the Department of Oncology at The Sidney Kimmel Comprehensive Cancer Center (SKCCC) at Johns Hopkins. By the time they join our Program, most will have completed two or more years of postgraduate training in Internal Medicine and many will have also have taken early steps to acquire research experience, the latter which sometimes might include a formal graduate degree. Consequently, our group of Fellows is usually composed of highly qualified and motivated individuals who have made the conscious decision to further expand their training aiming at a successful career in cancer research. Our goal in these three years of subspecialty training at the SKCCC is to provide these professionals the skills beyond what simply be required to fulfill the minimum requirements for subspecialty certification by the American Board of Internal Medicine (ABIM-www.abim.org/subspec/medonc.htm#2).

In addition to becoming proficient as clinicians and consultants, a stated goal of our program is to train a new generation of researchers and leaders in our specialty, and who will eventually assume leadership roles whether at Johns Hopkins or elsewhere and further the continued development of our specialty. Their ultimate professional accomplishments are in great part a reflection of the success (or not) of our Medical Oncology Fellowship Training Program.

We view professional education is a lifelong process. While learning skills can be passed on through mentoring and formal instruction, the acquisition and refining of knowledge requires a great deal of individual motivation, persistence, and discipline. This also requires a great deal of personal commitment and self-awareness to allow trainees to develop a balanced approach between the demands of their profession and their personal and family needs. We expect our Fellows to acquire the necessary humanistic qualities and interpersonal skills, cognitive knowledge, clinical experience and procedure skills, and professional tools that will make them effective cancer specialists and researchers. This is a life-long process and the main objective of our Fellowship Training Program is to facilitate this process.

1. GENERAL ORGANIZATION OF THE FELLOWSHIP TRAINING PROGRAM

The Hematology/Medical Oncology Fellowship Training Program is a three-year program. Its first-year is an all clinical year with both outpatient and inpatient rotations. All Fellows maintain their own supervised outpatient continuity clinic for at least two (if not three) years of training. All Fellows have an uninterrupted two-year block of research time in years 2 and 3. Their training takes place primarily within the academic unit of the Department of Oncology (a separate Department within the School of Medicine) and the Division of Hematology in the Department of Medicine, and utilizes the resources from several hospital and academic units that comprise the SKCCC.

The Training Program has a three-year curriculum. The first 12 months are fully devoted to clinical rotations in our inpatient and outpatient units, such as: Solid Tumor Services, Leukemia/Lymphoma Service, Bone Marrow Transplant Service, Inpatient-Outpatient Transplant Service (IPOP), and Outpatient Department (OPD), Inpatient Consult Service, and Hematology Consult Service. If the Fellow is planning to take the Hematology Boards, they will do rotations in the following areas as well: transfusion medicine, Hem Pathology, and Lab Medicine. All Fellows maintain their own individual outpatient long-term continuity clinic one afternoon each week for a minimum of two years of training. If the emphasis is on Hematology or double-boarding in Hematology and Medical Oncology, the fellow will need to conduct a continuity clinic in Hematology during one of the three years in the Program (more detail about this can be found in the second paragraph below. Fellows often opt to continue with their outpatient clinic into their 3rd year, especially those in patient-oriented research.

At the end of three years of training, the Medical Oncology Fellows will have been exposed to a wide variety of diseases and cancer-related complications, encountering most (if not all) of the clinical problems faced by medical oncologists in their daily practices. Learning opportunities are both formal (lectures and seminars) and informal (work rounds and inpatient/outpatient setting). The ABIM require Fellows to demonstrate proficiency in bone marrow aspiration and biopsy, administration of chemotherapeutic agents and biological products through all therapeutic routes, and management and care of indwelling venous access catheters.

According to ABIM rules, Fellows interested in dual certification in Hematology and Medical Oncology will require “... *three years of full-time combined fellowship training which must include (a) a minimum of 18 months of prospectively designed full-time clinical training with patient care responsibility, (b) a minimum of 12 months in the diagnosis and management of a broad spectrum of neoplastic diseases including hematological malignancies, and (c) a minimum of six months of training in the diagnosis and management of a broad spectrum of non-neoplastic hematological disorders.*” In addition, “*During the entire three years the candidate must attend at least one outpatient clinic for a minimum of one half-day per week and have the responsibility for providing continuous care to a defined cohort of patients being managed for neoplastic and hematological disorders.*” This combined training is coordinated with the Division of Hematology in the Department of Medicine.

The structure of our Training Program is in accord with the program requirements mandated by the Residency Review Committee (RRC) of the Accreditation Council for Graduate Medical Education (ACGME - www.acgme.org/downloads/RRC_progReq/147pr799.pdf) and the curriculum recommendations from an Ad Hoc Committee on Curriculum Guidelines of the American Society of Clinical Oncology (ASCO) (www.asco.org/ac/1,1003,_12-002084-00_18-0012477,00.asp).

We also strongly encourage all Hematology/Medical Oncology Fellows to start developing long-term professional relationships with other cancer specialists and with the societies that represent us. Fellows are immediately eligible for Associate Membership with both ASCO (www.asco.org/ac/1,1003,_12-002017,00.asp) and with the American Society of Hematology (ASH) (www.hematology.org/membership). Among other benefits, Associate Members pay reduced subscription costs for the society journals, gain access to members only sections of their web site, and can serve as sponsors of their own abstract submitted to the society's annual meeting.

1.1. Training Setting

The Medical Oncology Fellows learn and hone their newly acquired skills through a variety of settings, both formal and informal. All clinical activities are contained within the Weinberg Cancer Clinical Building, with the exception of the hospital consult service and benign hematology rotations. Fellows in the inpatient services are required to attend rounds six days a week limited by the 80-hour rule mandated by the ACGME. Attendings in the inpatient service come in seven days a week. Fellows are encouraged by the Faculty to take center roles in the daily rounds and in the decision-making process. Fellows also have an important role in the teaching of Internal Medicine Residents and medical students. In the outpatient unit, Fellows are considered the primary oncologists of their respective patients, under direct on-site supervision by specific Faculty members at all times. Fellows and Attending Physicians see patients side-by-side in the same outpatient setting in the OPD, which enhances communication and the teaching experience. Fellows consistently describe the OPD longitudinal experience and the opportunity to serve as the primary oncologist (with on-site supervision) of a cohort of patients as an influential factor in their decision to do their training at Johns Hopkins.

Examples of formal teaching activities such as Grand Rounds (weekly), Basic and Clinical Research Conferences (weekly), Journal Club (weekly), M&M Conferences (monthly), and Disease-Specific Multidisciplinary Conferences (weekly), such as thoracic oncology, breast cancer, and myelodysplastic conferences. Other important formal teaching opportunities include the weekly Translational Research Conference, the annual course on Pathophysiology of Cancer, and annual disease-specific Conferences, such as Cancer Genetics, Hematologic Malignancies, Pancreatic Cancer, Breast Cancer, and Lung Cancer, among others.

During the first three months of fellowship training, daily noon lectures cover the basic principles of the diagnosis and management of neoplastic disorders. Early on, these lectures are designed to give the new trainees working knowledge on the most common clinical

problems they will face from day one, and help them form an initial layer of knowledge. Research oriented noon lectures (given in a “Board-review” format) introduce the research that can be found in the Center. This also provides 1st-year Fellows an opportunity to identify potential research projects for their subsequent years of training. Second and third year fellows are invited to attend the research lectures. A very important set of skills to hone during the Fellowship Training is the ability to prepare and give scientific presentations to peers. During an average academic year, 1st-year Medical Oncology Fellows will prepare the introductory material for two to four Grand Rounds, and be the primary reviewer of two Journal Club articles. Senior Fellows also participate in Journal Club and organize the Morbidity & Mortality Conference.

Greater emphasis is increasingly being placed on two major areas that are of prime importance in the care of patients with a diagnosis of cancer: pain management and palliative care. Daily pain rounds take place in the inpatient setting, involving pain experts from oncology and anesthesiology. Pain score is considered another vital sign, and e-mail warnings are sent to the provider(s) when unacceptable scores are detected in the outpatient setting. Fellows in the inpatient unit participate in weekly psychosocial rounds. Multidisciplinary conferences on palliative care take place throughout the year and every fall. These activities serve to reinforce on all health care professionals (including Fellows) the need to properly integrate the patients’ health problems with other dimensions affecting their lives and their disease status, such as cultural, behavioral, socio-economical, and ethical values. The development of humanistic qualities is among the most important skills to be developed throughout fellowship training.

1.2. Support Systems and Evaluations

Throughout their training, Fellows have formal meetings with the leaders of the Training Program, both in group and in individual sessions. These meetings serve to both guide individual Fellows through their training experience and help them identify research opportunities, but also to provide feedback to the Training Program on the effectiveness of the training experience. Fellows are evaluated at the end of each rotation using the E*Value electronic system, and in turn evaluate their Attending Physicians. Formal evaluations also take place at the end of each academic year. Once a year, Fellows are asked to provide written feedback on their training experience and the effectiveness of the curriculum. Fellows in their 2nd and 3rd years submit annual reports on their progress and are evaluated by their research mentors. The 2nd and 3rd year Fellows are also expected to participate in the Fellows Research Exchange, held annually. The Fellow presents his/her research progress in a 10-minute talk and then answers questions. This Exchange involves faculty reviewers and the feedback from the reviews is distributed to the fellow and his/her research mentor.

Another important support system is mentoring. Fellows join the Training Program with a diverse background and research interests, and have, throughout their early career stages, identified one or more individuals to help fine-tune their professional development - either as a formal mentor or through informal systems. The importance of proper mentoring cannot be underestimated and is a life-long process. Therefore, in 2001 the Training Program took this informal experience one step further, establishing a formal Fellowship Mentoring Program

where each Fellow is assigned a formal Advisor from day 1. As the most immediate challenges faced by fellows are likely to be influenced by their clinical exposure in the first year, each 1st-year Fellow is matched with an Advisor who has gone through similar experience. There are specific "rules of engagement" for this experience discussed in an annual dinner meeting hosting Fellows and Advisors, and this relationship is private. As Fellows progress through their training, they will gravitate toward research-specific mentors. This relationship through the Fellowship Mentoring Program could become a useful resource, should a Fellow feel the need to have discussions regarding career development or personal/professional issues that she/he would prefer to discuss with someone other than the research mentor. In 2006 the Program instituted a "mentoring committee" policy for 2nd year fellows that would carry on through their 3rd year as well. Ideally, this committee would meet with the fellow and his/her research mentor 4 times a year.

The leadership of the Department of Oncology views the Medical Oncology Training Program as the first step in one's professional career as a subspecialist and researcher. In other words, our goal is to train future professional colleagues and collaborators. Therefore, our most important job is to provide trainees with the tools they need not only to survive during the Fellowship Training but, more specifically, to thrive throughout their career development, both at Johns Hopkins and beyond training.

1.3. History of the Cancer Center

1.3.1. Origins of the Center

In 1968, Dr. Albert H. Owens, Jr. organized the first formal cancer program in The Johns Hopkins University School of Medicine. Initially, the clinical inpatient unit and the majority of research laboratories were located seven miles east of the Medical School campus at the Baltimore City Hospital (now the Johns Hopkins Bayview Medical Center). Consultation and ambulatory activities were largely provided on the Medical School campus. An outstanding group of scientists and clinicians was rapidly assembled, and in 1973, the Johns Hopkins Oncology Center was authorized by the Trustees of the University and Hospital as an *academic department* and *functional unit*, respectively. Thus, the Oncology Center has from its inception maintained the full authorities and responsibilities assigned to other major departments, such as those of Medicine, Surgery, and Pediatrics. Furthermore, from the outset, it was recognized that the programs of the Center would cut across traditional disciplinary lines and that the Oncology Center would have the major responsibility for the planning and operation of the institutional Cancer Center at Johns Hopkins.

In 1977, the Johns Hopkins Oncology Center facility was formally opened and included inpatient and outpatient units for the care of patients with solid tumors and hematologic malignancies, radiation oncology services, research laboratories, and administrative and teaching space. The programs of the Center quickly outgrew the existing space, and in 1987, Brown's Supermarket (one block east of the facility) was renovated to accommodate 26,000 net square feet of research space, subsequently referred to as the Bond Street Laboratories. In 1992, the School of Medicine added 10,000 net

square feet of additional research space to the Center's laboratory investigators across the campus in the new Ross Research Building.

In 1992, Dr. Martin D. Abeloff was appointed as the second Director of the Johns Hopkins Comprehensive Cancer Center and as part of the appointment agreement, the Institution made a commitment to the planning and building of new clinical and research facilities. In 2000, investigators and programs from the various parts of the Hopkins campus moved into the 350,000 net square-foot Weinberg Comprehensive Cancer Center clinical facility and the 122,000 net square-foot Bunting-Blaustein Cancer Research Laboratories. Thus, at the start of the new millennium, the expanded program and faculty of the Johns Hopkins Comprehensive Cancer Center had new state-of-the-art clinical and laboratory facilities. Our multidisciplinary cross-departmental center has recently been renamed The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins. Dr. Abeloff is also Director of the Department of Oncology.

1.3.2. History of Cancer Center Support Grant

In 1976, the Johns Hopkins Oncology Center was one of the first to be designated as a NCI-Comprehensive Cancer Center. The Center successfully competed for its first Cancer Center Support Grant (CCSG) in 1978 and earned renewals in 1981, 1986, 1991, 1996, 2001, and 2006. During this time, the Center has also continuously maintained its NCI comprehensive status. Funding provided by the CCSG has been critical to the Cancer Center's ability to expand its basic, clinical, and translational research programs.

Evolution of the Center has been marked by a notable increase in cancer research and training programs with participation by departments within Schools throughout the University, in particular, the School of Medicine, the Bloomberg School of Public Health, and School of Nursing. Currently, the Cancer Center has close to 200 members from more than 20 different departments in the University. The CCSG was the catalyst for this program expansion. As a result of this support and increasing institutional commitment, the Center has been able to secure a Brain Tumor Consortium grant, the Mid-Atlantic Cancer Genetic Network contract, several Program Project Grants, and SPORÉ grants in Breast, Cervical, GI, Head & Neck, Lung, Prostate Cancer, and Lymphoma, among other grant awards.

1.4. Fellowship Support Infrastructure

The Johns Hopkins Medical Institutions, located on the East Baltimore Campus of The Johns Hopkins University, provide outstanding clinical and scientific resources and a rich environment for the training of Medical Oncology Fellows. Resources of The Johns Hopkins Hospital, The Johns Hopkins University School of Medicine, and The Johns Hopkins University Bloomberg School of Public Health are all employed for the execution of this training curriculum.

1.4.1 Fellowship Administration

The administrative offices for Dr. Ross Donehower (Director, Fellowship Program and Director, Division of Medical Oncology), Dr. Antonio Wolff (Co-Director, Fellowship

Program), Ms. Daphne Blow (Coordinator, Fellowship Program), and Ms. Gail Jackson (Administrator, Division of Medical Oncology) are within the same office area in the Cancer Research Building, each fewer than 20 yards from the designated office space for the 1st-year Fellows. The offices of Dr. Richard Ambinder (Director, Division of Hematologic Malignancies) and Dr. Robert Brodsky (Director of the Division of Hematology in the Department of Medicine) are also nearby.

1.4.2 Policies and Procedures

Graduate programs of the School of Medicine are overseen by the Associate Dean for Postdoctoral Affairs and the Graduate Medical Education Committee. Detailed information on specific policy and procedures is available at www.hopkinsmedicine.org/som/Audience/fellows.html. The Johns Hopkins Compliance Line (www.jhu.edu/news_info/comply/) is also available to postdoctoral fellows for anonymous reporting of concerns about duty hours and any other issues. Questions concerning these items can also be addressed by the individual program director (Dr. Ross Donehower). Information about the Johns Hopkins University Policies is available at www.jhu.edu/news_info/policy/. The Office of Postdoctoral Programs is available as an additional resource.

1.4.3 Office Space

Ample office space is available to all Medical Oncology Fellows. They are assigned individual desk space and desktop computer resources throughout their three years of training. These spaces are located in the Cancer Research Building, across from the Cancer Clinical Building. In addition, secured access office space for all the 1st-year Fellows is available in the 5th floor of the Cancer Clinical Building, adjacent to all the inpatient units. Aside from several desktop computers and printers, a special desktop computer has direct access to the Radiology film library for immediate review of CT scans and x-rays. Each inpatient unit, all Outpatient Department (OPD) offices and exam rooms, and the provider common area in the OPD are equipped with public computer stations with access to all the resources described above. During the research years, Fellows are assigned office space with their specific research group.

1.4.4 Information Technology

All sites supporting the cancer programs are connected to a campus-wide network. Most areas have 100 Mb capabilities. Over 1,000 users and 900 workstations are centrally maintained within Oncology. This includes network services, hardware maintenance, general office automation services (email, word processing, graphics, etc.), research specific applications, and access to a variety of patient information and research databases. World Wide Web (WWW) access is provided through the campus-wide network and T3 links. An internal communication network updates faculty and staff on research and clinical issues and related conferences via email, printed posters, employee newsletters, and an intranet site (www.insidehopkinsmedicine.org/oncology). Our external website is www.hopkinskimmeltcancercenter.org/.

The Oncology Clinical Information System at The Johns Hopkins Hospital is a

computer-based decision support system designed to help manage the large volume of clinical data used in the care of cancer patients. The goal of OCIS is to provide the appropriate information required for clinical management, research, and education. The database contains on-line information on over 80,000 individual cancer patients seen throughout Johns Hopkins Hospital, of which more than 32,000 were seen at the Oncology Center. For example, complete microbiology data are available for oncology center patients since 1984. The OCIS is operated in a client/server network environment. There are important interfaces with other Johns Hopkins Medical Institutions data systems, including the pharmacy, clinical laboratories, diagnostic radiology, and pathology. These clinical and research services have oversight by the Director for Oncology Information Management & Technology.

Direct access to the Oncology Center network including access to the hospital Electronic Patient Record, the Oncology Center Information System, Internet access, e-mail, word processing (WordPerfect and Word), spreadsheet (Quattro Pro and Excel) graphic programs (Corel Presentations, Power Point) and data base development (Paradox, Access, and Oracle platforms). In addition, all Fellows have direct access to Medline searches, online references, and an extensive electronic full-text journal collection available through the Welch Medical Library web site (www.welch.jhu.edu).

1.5. Clinical Environment

1.5.1. Clinical Facilities

The clinical facilities are key elements of the Medical Oncology Fellowship. Facilities within the Johns Hopkins Medical Institutions (JHMI) include The Johns Hopkins University School of Medicine, The Johns Hopkins Hospital, and The Johns Hopkins University Bloomberg School of Public Health. The Johns Hopkins Hospital is a 1,000 bed general hospital with more than 30,000 patients discharged from the therapeutic services annually. A full range of diagnostic and therapeutic services are available.

The Harry and Jeanette Weinberg Building opened in September 2000. It is a state-of-the-art patient care facility for The Johns Hopkins Comprehensive Cancer Center encompassing 350,000 net square feet that includes ambulatory services, 16 operating suites, 62 medical oncology beds, 72 surgical beds, 20 intensive care and intermediate care beds, as well as a radiation oncology area, support services such as anesthesiology, pathology, radiology, rehabilitation medicine, nutrition, and patient education areas supervised by oncology social workers. The floor plan is carefully divided into easy-to-navigate, color-coded segments. There is natural lighting throughout with wide, airy windows in patient rooms. To reduce unsettling noise for patients and visitors, there is no overhead paging system. Instead, nurses wear infrared badges for easy communication with the unit clerk. In addition, the new beepers transmit specific messages, silently letting nurses know the individual patient needs.

In addition to ambulatory services on the first floor, patients and visitors have access to valet parking, a luggage service, a healthy snack bar service called “Juice and Java,” a

meditation room and chaplain's office, counseling services and an image recovery salon for patients needing wigs or prostheses. There are nearly 300 underground parking spaces designated exclusively for patients, their families and visitors. Patients can walk right from their vehicles to the basement of the Weinberg Building for radiation therapy. Finally, the Weinberg Building is connected to the main Hopkins Hospital complex by way of a covered bridge and underground tunnels.

1.5.2 Outpatient Department

The Oncology Center Outpatient Department is located within the Weinberg Clinical Cancer Building (opened in 2000), with 34 consultation and examining rooms. These facilities provide a well-equipped, efficient setting for patient care, drug administration and monitoring, and medical training. More than 865 outpatient visits are made each week in Medical Oncology. Full time staff includes the clinical administrator, 12 registered nurses, nurse practitioners, nursing assistants, social worker, clinical psychologist, registrars and receptionists. The Cancer Center also has a regional program that involves several affiliates with community-based oncology practices or hospitals. This program is designed to provide patients in surrounding communities with increased access to the specialized care of Johns Hopkins without eliminating ties to the patient's community physician. It also increases our referral network for our clinical trials.

All Medical Oncology Fellows maintain a ½ day weekly continuity clinic sharing clinic space with all the Attending Physicians. In other words, there is no separate facility or patient population assigned exclusively to either Fellows or Faculty. Fellows have their continuity clinic in the afternoon, and a Faculty member is present in all sessions to ensure adequate supervision, quality medical care, and fellow education. All 1st- and 2nd-year Fellows attend the General Medical Oncology New Patient Clinic several times a year seeing an average of two new patients per session. Fellows rotating in the Inpatient Hematological Malignancy Services also attend disease-specific New Patient Clinics, such as MDS and Lymphoma Clinics. In addition, the Outpatient Clinical rotation is designed to allow the Medical Oncology Fellow exposure to a variety of other clinical problems. During that time, the Fellow will see an average of two or three new patients per day with direct supervision by the appropriate Oncology subspecialist, such as breast cancer, lung cancer, GU malignancies, head and neck cancer, neuro-oncology, and GI malignancies. Fellows will often become the primary oncology provider in the care of these patients, under direct supervision by an Attending Physician.

1.5.3 Inpatient Services

Inpatient services at The Kimmel Cancer Center consist of four units with a total of 62 single occupancy rooms. The solid tumor units have 30 beds divided in two units. The remaining beds (two units) are designated for the hematologic malignancy and the BMT programs. Each occupies a 20-bed unit. The remaining 30 beds, divided between two nursing units, are designated as solid tumor units. Medical personnel assigned to each of these units each month are led by attending physician, who is a full time faculty member of The Johns Hopkins University School of Medicine, and the Medical Oncology Fellow. In the Inpatient Units, there are two or three house officers from the Department of

Medicine, affiliated hospitals, or the National Institutes of Health. The physician group for each unit makes rounds on all patients on a daily basis. The Attending Physician makes rounds seven days a week, and is available in person or by pager around the clock. Teaching/patient care rounds last 2-3 hours in the morning, plus additional time during the day and at the end of the day as needed. The Medical Oncology Fellow has a mandatory weekend day off every weekend while rotating in the inpatient unit. This model allows for both high quality of medical care and optimal teaching environment.

There are approximately 26 nurses staffing each of the units. This staffing allows a nurse to patient ratio of 3 patients per nurse during the day, and 4 per nurse during the night shift. Nursing aides are also assigned to each shift. The cooperation, assistance, and support of this excellent nursing staff are also an important component of the training of the Medical Oncology Fellows. In addition, rounds include representatives from key services such as Pharmacy, Social Work, Nutrition, and Physical/Occupational Therapy. The Pain Team consists of an Attending, Nurse Specialist, and a Senior Fellow with specific interest in the area. The team rounds daily on all patients identified by the nursing staff with active pain issues. This is a proactive resource available for both patient care and education of the medical team. This approach has resulted in a well informed and highly motivated nursing staff caring for our patients. Full-time data coordinators assigned to each unit enter inpatient data into the clinical information system, facilitate patient entry into protocol studies, and assist clinicians with awareness of and adherence to protocol requirements.

The inpatient units are also a key component of clinical research projects. Resources available include excellent research-oriented nursing staff capable of carrying out complex observations and sampling schedules, and administration of novel chemotherapy strategies, in collaboration with protocol-specific research nurses, principal investigators, and data managers.

1.5.4 Pharmacy Services

The Oncology and Pediatric Pharmacies are committed to the specialized pharmaceutical and research needs of cancer and BMT patients. The pharmacists and support personnel provide such functions as computer-supported inpatient unit dose medication dispensing, ambulatory clinic pharmacy services, intravenous drug preparation, drug utilization review, drug information, drug therapy monitoring, and discharge medicine counseling. Specialized research support services include patient randomization, placebo formulation, protocol assurance and surveillance, and record and inventory maintenance. The Oncology Pharmacy is computerized and links to the Oncology Clinical Information System, in addition to the Johns Hopkins Medicine Center for Information Services network. These computerized links allow for current and historical information to be readily accessible. Pharmacists are assigned to a particular medical service and assist in monitoring all drug therapies, including investigational therapies. The pharmacy monitors all investigational studies that involve drugs (both before and after marketing). All investigational drugs, acquisition records, and dispensing logs are maintained by the pharmacy.

The Weinberg Building has two other pharmacies, one of which is a retail pharmacy for the convenience of patients and families. A swift pneumatic tube system transports blood, blood products, specimens and pharmaceuticals to each patient station and ancillary service throughout the building.

1.5.5 Laboratory Support

The support available from the clinical laboratories, pathology and radiology are superb. Their capabilities allow patients to be evaluated efficiently in both the inpatient and outpatient settings. Specialized tests, which are occasionally required for the optimal performance of an investigational drug study or clinical care, are available with minimal lag time (e.g., EEG, MUGA scans, Holter monitors, PFT, neuro-muscular testing, etc.).

1.5.6 Radiology

Annually the Radiology staff performs over 60,000 portable chest radiographs, 36,000 CT scans; 13,000 MRI's; 13,000 nuclear medicine procedures; 9,000 mammograms; 20,000 sonograms and 24,000 cardiovascular procedures. The Department of Radiology and Radiological Science is staffed with sub-specialists in all conventional areas, including over 72 full time M.D. faculty, 24 Ph.D. faculty, 3 clinical and research Fellows, and 26 residents. There is a full range of equipment, including computed tomography, positron emission tomography, and magnetic resonance imaging and spectroscopy. Sub-specialty areas include vascular radiology, neuro radiology, orthopedic radiology, ultrasound, nuclear medicine, chest radiology, breast imaging, and gastrointestinal radiology. Approximately 300,000 imaging exams are performed annually. Reports are available immediately by telephone and on a hospital-wide data base immediately upon transcription. Also, many of these imaging studies can now be reviewed on standard office desktop computers or designated workstations in the Weinberg Building.

1.5.7 Surgical Pathology and Cytopathology

Among 40,000 (annually) specimens, there were over 5,000 cancer cases that represent a broad spectrum of tumors occurring in virtually all organs of the body. There are 5 full-time surgical pathologists and 13 technicians, including 6 technicians who are devoted full time to immunoperoxidase staining. Six pathology residents rotate through surgical pathology at a time. In addition to routine stains and immunoperoxidase preparation, electron microscopy can be performed. In 1998 there were 29,248 cytopathology specimens processed. There are 5 full time M.D. cytopathologists, as well as two cytopathology Fellows. All Medical Oncology Fellows are instructed to personally review slides and reports with the pathologist assigned to their cases. In addition, a staff pathologist is available at every weekly disease-specific multidisciplinary conference.

Resources from the Immunogenetics Laboratory are available for specific tests such as serologic identification of HLA class I; sequence based typing of allele level HLA class II genes; cytotoxicity testing for the detection and characterization of HLA-specific antibodies; ELISA testing for the detection, characterization, and determination of the

isotype of HLA-specific antibodies; flow cytometric crossmatch testing with isotype identification; chimerism testing; tests of microsatellite markers for various purposes including evaluation of bone marrow engraftment, zygosity determination, and specimen identification; cell transformation; cell freezing and storage; and aseptic isolation of lymphocytes.

1.6 Research Environment

Fellows will identify their 2nd- and 3rd-year research projects during their first year of training. Noon presentations by various researchers in the Center occur in the fall and winter during their 1st-year of training. An annual two-day Fellowship Research Retreat was started in January 2003. This event gives 1st-year Fellows protected off campus (pagers off) time for in-depth discussions with potential research mentors. A large infrastructure is available for the successful execution of their research plans.

1.6.1 Patient Availability and Recruitment

The Kimmel Cancer Center and Johns Hopkins Hospital are major local, regional, and national referral centers for the treatment of malignant diseases. Over 4,600 new patients are seen annually. The majority of these patients are seen as new patients on the oncology service. A significant percentage of these patients are referred for consideration of therapy and follow-up care. Approximately 500 patients are seen each year in consultation after primary referral to a surgical sub-specialty clinic.

1.6.2 Oncology Biostatistics

Oncology Biostatistics has as its primary function to provide expertise and consultation in the design, and analysis of biomedical studies and the quality control of research data. Oncology Biostatistics staff (which includes several M.D./Ph.D. and Ph.D. biostatisticians) also provide consultation and expertise for the design and implementation of computerized database systems for use by researchers in the Oncology Center. Fellows are exposed to these resources during their research years in the design and implementation of clinical and basic research projects. In addition, several of the Journal Club sessions are designed to specifically address a biostatistics topic, with journal articles specifically chosen to illustrate issues of clinical trial design and data analysis that will be addressed in a formal lecture presentation.

1.6.3 Clinical Research Office of The Kimmel Cancer Center

The Clinical Research Office is responsible for vital aspects of clinical research in the Oncology Center. The staff of the clinical research office is expert in all aspect of protocol development, designs, and tracking. This office developed The Kimmel Cancer Center Clinical Research manual to standardize protocol and research protocol notification procedures. This includes guidance in the following areas: protocol structure and content, informed consent, studies sponsored by pharmaceutical companies, research involving children, non therapeutic and ancillary protocols, adverse drug reactions, protocol priorities, working with the Oncology Clinical Research Committee and The Johns Hopkins IRB, drug development, pharmacy requirements, and audits. A standardized protocol outline has been adopted to facilitate full access to the full, up-to-date text of all

active protocols via a web-based server throughout the Oncology Center. The Clinical Research Office provides centralized oversight of all data management, including central registration. They maintain priority lists for each disease category and publish them in a protocol report semiannually to assure appropriate patient eligibility, facilitate patient accrual, and review the impact of protocols on Center resources such as pharmacy, nursing and bed space.

All Medical Oncology Fellows actively participate in the recruitment and supervision of patients enrolled in clinical trials. Therefore, all must complete a mandatory web-based course on the Protection of Human Research Subjects. Fellows who decide to pursue patient-oriented research during their 2nd and 3rd years will have hands-on experience on all issues discussed above.

1.6.4 Laboratory

There are approximately 122,000 square feet of laboratory space assigned to over 70 faculty investigators with primary appointments in the Department of Oncology, chaired by Dr. Martin D. Abeloff. In addition, The Comprehensive Cancer Center, as defined by the National Institutes of Health (NIH) Cancer Center Support Grant (CA 06973-35), includes over 150 investigators in various clinical and basic science departments in the School of Medicine and the Bloomberg School of Public Health, with laboratory space and resources that far exceed this figure. There are translational NCI program project grants on hematopoietic stem cells, bone marrow transplantation, and herpesviruses in cancer, as well as seven SPORE grants in Breast, Cervical, GI, Head & Neck, Lung, Prostate Cancer, and Lymphoma.

Across the street from the new Weinberg Comprehensive Cancer Center is a companion structure called, ***The Bunting Family & The Family of Jacob and Hilda Blaustein Building*** (CRB [Cancer Research Building]) which houses the Cancer Center's research programs. It is a 10-story structure with 122,000 net square feet that houses more than 400 cancer researchers and staff. Engineering support areas separate each of the five laboratory floors. The interstitial design allows building services to be installed and/or modified without interruption of research activities on floors above and below. Additional faculty and graduate student offices also are located on these interstitial or intermediate levels. They connect to the main lab floors by stairs located in interaction areas of each floor.

In 2006, the CRB II (Cancer Research Building II) opened. This is a "twin" building to The Bunting Family & the Family of Jacob and Hilda Blaustein Building. Cancer Center Members from departments other than Oncology occupy this building (the Department of Oncology has the equivalent of approximately ½ floor of this building). This building has further enhanced the interaction in a multidisciplinary fashion in the research and care of cancer.

There is a connector building between the CRB and the CRB II buildings which houses the Albert Owens Auditorium, a lecture hall that seats approximately 250 people

with state-of-the-art audio visual capabilities. There is an area outside of the auditorium which is called the “pre-function area” that can be used for meetings, luncheons, receptions, etc.

Four thousand square feet of research space have been retained at the Bond Street Laboratories for the Genomics core, Molecular Pathology Core, and Radiobiology Lab. Other activities of the cancer program take place in the Bloomberg School of Public Health, and other departments in the School of Medicine. Other facilities of the Cancer Center include the 550 Building (which is located adjacent to the Cancer Research Building) houses several shared resource offices (Biostatistics and the Clinical Research Office), as well as the offices of Development, Public Affairs, and Administration.

1.6.5 Animal

The Cancer Center contains 6,000 square feet of special animal facilities operated under the aegis of the Department of Comparative Medicine. The facility is fully accredited and funded by AAALAC and meets Federal guidelines and regulations for the humane use and care of laboratory animals. Other support services include a BL-3 lab, glass wash, irradiators, and laboratory services. Additional facilities are available throughout the institution.

1.6.6 Hematologic Support and Graft Engineering Laboratory

The Hematopoietic and Therapeutic Support Services are operated jointly by the Oncology Center and Pathology. This team provides leukopheresis for stem cell collection, as well as therapeutic plasmapheresis and leukopheresis. In addition, they assist with acquisition of HLA type-specific platelet and HLA matched leukocytes for patient requiring these products beyond the capacity of the Red Cross. The Graft Engineering Laboratory provides clinical stem cell processing and developmental expertise for novel methods of graft engineering. The Medical Oncology Fellow rotating in the Inpatient-Outpatient (IPOP) Transplant Service participates in bone marrow harvesting procedures.

1.6.7 The Johns Hopkins University Bloomberg School of Public Health

The Bloomberg School of Public Health (www.jhsph.edu) offers the Graduate Training Program in Clinical Investigation (GTPCI - www.jhsph.edu/gtpci/programs.html), developed in conjunction with the School of Medicine that leads to a Master or Ph.D. degree (see section 1.7.1).

1.7 Research Environment

1.7.1 Graduate Training Program in Clinical Investigation

There are inadequate numbers of cancer clinical investigators to translate basic science advances to patient care. One reason for this shortage is inadequate clinical investigator training. In 1992 we established a training program for clinical investigators through the School of Medicine and Bloomberg School of Public Health, known as the Graduate Training Program in Clinical Investigation (GTPCI- www.jhsph.edu/gtpci/programs.html).

The Cancer Center was a leader in the development of this program. As a Comprehensive Cancer Center, there are abundant opportunities for clinical research in established programs at the lab/clinic interface. The oncology portion of the GTPCI is directed by Ross C. Donehower, M.D. We have trained oncologists to translate basic science advances into improved cancer prevention, detection, diagnosis, and treatment. This program was specifically designed for Clinical Fellows in subspecialty training and junior faculty seeking specialized training in Clinical Investigation. Each year, up to two Fellows apply and are accepted in the GTPCI program, which consist of a full year of classroom teaching in their 2nd-year followed by an additional two years of protected research time for the execution of their projects. During their additional year of training beyond year 3, these trainees have a junior faculty appointment.

1.7.2 Molecular Targets for Cancer Detection and Treatment

This training grant was established in the early 1980's to provide opportunities for trainees to apply fundamental scientific methods to the study of the cellular and molecular biology of cancer, tumor and transplant immunology, molecular virology, and the translation of the basic science discoveries to more effective cancer prevention, diagnosis, and treatment. This program is co-directed by Paula Pitha-Rowe, M.D. and William G. Nelson, M.D., Ph.D. and its primary purpose is to train physician scientists in medical oncology in basic and translational research in molecular targets for cancer detection and treatment. Fellows apply during their first-year and this grant will help support their subsequent research years.

2 CURRICULUM

Medical Oncology is a rapidly developing and changing specialty. Therefore, standards have been developed by the ACGME (www.acgme.org/downloads/RRC_progReq/147pr799.pdf) and ASCO (www.asco.org/ac/1,1003,_12-002084-00_18-0012477,00.asp). These minimum standards help ensure the quality training required to acquire the necessary expertise to handle complex clinical problems. These guidelines focus on the multidisciplinary approach to the treatment of individual malignancies, patient management both in the outpatient and inpatient setting, procedural skills, and essential knowledge of basic science concepts necessary for effective clinical management.

ASCO has also organized an extensive list of classic oncology references (www.asco.org/ac/1,1003,_12-002126-00_18-0012400,00.asp) selected by leaders within their specific subspecialty fields of interest. Many of these references are available electronically either in abstract form or as full-text articles through the Welch Medical Library (www.welch.jhu.edu). The Welch Library is accessible through every public computer station on campus and remotely via a Virtual Private Network set-up. The Department of Oncology also pays the registration costs for one of the Medical Oncology board review courses to help fellows in preparing for the ABIM certification exam.

2.1 Technical and Other Skills

Our program provides Fellows with the opportunity to develop the competence needed to work effectively as part of a multidisciplinary team. There is also opportunity to gain competence and expertise in the performance and interpretation of the following:

- 2.1.1 Serial measurement of palpable tumor masses
Fellows will learn from attending physicians proper measurement techniques of abnormalities detected by physical examination.
- 2.1.2 Assessment of tumor imaging by computed tomography, magnetic resonance and nuclear imaging techniques
Fellows are expected to review imaging studies with the radiologists and attending physicians.
- 2.1.3 Bone marrow aspiration and biopsy and their interpretation .
Fellows will learn the proper indication, and perform and interpret bone marrow biopsies/aspirates during their hematologic malignancies and benign hematology rotations under Faculty supervision.
- 2.1.4 Use of chemotherapeutic agents and biological products through all therapeutic routes .
Fellows will learn to use preprinted orders and write full orders with direct guidance from the attending physician. All orders written by Fellows must be signed by the attending physician.
- 2.1.5 Correlation of clinical information with the findings of cytology, histology, and immunodiagnostic techniques.
Fellows are expected to review pathology findings and proper role of immunodiagnostic techniques with the pathologist assigned to each specific case.

2.2 Specific Program Content

- 2.2.1 Etiology of cancer, including predisposing causal factors leading to neoplasia; fundamental concepts of cellular and molecular biology, cytogenetics, immunology, basic and clinical pharmacology, pharmacokinetics, toxicity, and tumor immunology; etiology, epidemiology, and natural history of cancer; molecular mechanisms of neoplasia, including the nature of oncogenes and their products; pathophysiology and patterns of tumor metastases.
A course on “Cancer Pathophysiology” is offered every Spring twice a week over an eight-week period. In addition, research lectures are held in the Cancer Center throughout the year. A series of noon lectures on “Basic Principles of Clinical Pharmacology and Drug Development” is offered once a year by the Drug Development Group. Topics in Immunology and Cancer Genetic are covered in the above seminars and in teaching lectures organized during multidisciplinary conferences.
- 2.2.2 Diagnosis pathology, staging, and management of neoplastic disorders; immune markers, immunophenotyping, cytochemical studies, and cytogenetic and DNA analysis of neoplastic disorders; principles of multidisciplinary management of organ-specific cancers, in particular, gynecologic malignancy; indications and application of imaging techniques in patients with neoplastic disorders; chemotherapeutic drugs, biologic products, and growth factors and their mechanisms of action, pharmacokinetics, clinical indications, and limitations, including their effects, toxicity, and interactions; multiagent chemotherapeutic protocols and combined modality therapy of neoplastic disorders; principles of, indications for, and limitations of surgery and radiation therapy in the treatment of cancer; participation in a tumor board.
- 2.2.3 Measurement of the complete blood count, including platelets and white cell differential, by means of automated or manual techniques with appropriate quality control.
Monitoring of blood counts are basic tools in the management of patients with neoplastic disorders. Technical issues are covered during the clinical rotation in benign hematology. Fellows are expected to review the basic literature regarding all new patients seen in clinic and consult service. A special series of noon lectures during the first three months of fellowship is specifically designed to cover the basic principles of diagnosis and treatment of common malignancies. Fellows are also encouraged to attend and present their respective cases in the many disease-specific multidisciplinary conferences. Weekly Grand Rounds are designed to cover the major topics throughout the year; presentations are often designed as point-counterpoint sessions covering common and controversial topics. Senior fellows organize the multidisciplinary monthly Morbidity & Mortality Conference.
- 2.2.4 Management and care of indwelling access catheters.
Fellows will gain hands-on experience on the proper management of indwelling access catheters. They are also required to complete a web-based training session during their first year as part of their hospital accreditation.
- 2.2.5 Principles, indications, and complications of transplants, i.e., autologous and

allogeneic bone marrow or peripheral blood stem cell transplantation and peripheral stem cell harvests, including the management of posttransplant complications.

Fellows rotate through the inpatient and ambulatory BMT units. This allows them to gain experience and perspective on the longitudinal care of these patients, from their initial visit, through their hospitalization, and short/long-term complications.

2.2.6 Fine needle aspiration (FNA) biopsy.

Fellows have the opportunity of acquiring hands-on experience with fine needle aspiration of lymph nodes and soft tissue masses. Expertise is also available through the Cytopathology FNA Consult Service.

2.2.7 Concepts of supportive care, including hematologic, infectious disease, and nutritional; management of the neutropenic and the immunocompromised patient; management of the critically-ill patient.

Fellows rotate through the inpatient/outpatient Benign Hematology Consult Service. Concepts of infectious disease, including management of neutropenic and/or immunocompromised patients are taught during inpatient rotations in the Solid Tumor, BMT, Leukemia, and Outpatient Services, through consultation services provided by Infectious Disease, and through lectures/seminars. All private inpatient rooms can be converted to critical care beds, and nurses have critical-care certification. A full time, dedicated Pulmonary/Critical Care Consult Service Team (Attending and Fellow) rounds seven days a week in the Oncology Center. All such patients are jointly co-attended by the Oncology and Critical Care Teams. This system allows the best possible medical care of these often complicated patients.

2.2.8 Pain management in the cancer patient.

Pain is considered another vital sign, and pain scores are collected together with other standard data (blood pressure, pulse, temperature, and respiratory rate). The Oncology Center has a full-time Pain Consultation Service with daily assessment of patients identified for being at-risk based on their pain scores. Rounds are held every morning at 11:00 A.M., and Fellows are instructed to present all patients with a potential pain control issue. Senior Fellows may elect to rotate through the Pain Service. Lectures and seminars are given throughout the year.

2.2.9 Rehabilitation, psychosocial aspects, and palliative and hospice care.

Social workers and physical therapists are part of the inpatient team, and available for outpatient evaluation. Fellows present all hospitalized patients during weekly group meetings. Fellows are active participants with attending physicians on discussions with patients and family members regarding palliative care measures. Special lectures are held throughout the year, including an annual seminar on Palliative Care. Group sessions targeting 1st-year Fellows are held early in the academic year.

2.2.10 Recognition and management of paraneoplastic disorders.

Fellows will have the clinical experience of handling the most frequent paraneoplastic disorders, including SIADH, neuropathies, Lambert-Eaton

myasthenia syndrome, neuromuscular disorders, etc . . . These clinical problems are frequent topics of Grand Rounds presentations.

- 2.2.11. Cancer prevention and screening, including competency in genetic testing and for high-risk individuals

The Oncology Center has a Cancer Risk Assessment Service staffed by epidemiologists, genetic counselors, and medical oncologists. Fellows are encouraged to present their cases. Lectures are held throughout the year, including an annual course on Clinical Cancer Genetics.

- 2.2.12. Clinical epidemiology and medical statistics, including clinical study and experimental protocol design, data collection, and analysis.

Topics on biostatistics, epidemiology, and clinical trial design are covered during Journal Club. The Biostatistics Core of the Oncology Center has put together a curriculum of topics to be covered throughout the year, and several Journal Club dates are set aside exclusively for this exercise. In addition, the School of Medicine and the Bloomberg School of Hygiene and Public Health offer a joint three-year Graduate Training Program in Clinic Investigation (GTPCI - www.jhsph.edu/gtpci/programs.html) leading to a Ph.D. program. First-year Fellows considering a career in Clinical Research are encouraged to apply to this NIH-funded program, which offers a full year of formal classroom courses followed by protected research time.

- 2.2.13. Personal development, attitudes, and coping skills of physicians and other healthcare professionals who care for critically ill patients.

Certainly one of the most challenging issues for any health professional. Fellows gain hands-on experience throughout their rotations. Social Services are available full-time in all units. Several lectures and seminars are held throughout the year, including an annual seminar on Palliative Care.

- 2.2.14. Human immunodeficiency virus-related malignancies.

Fellows gain experience throughout their rotations on the management of AIDS-related malignancies and on the management of common malignancies occurring in this patient population. This topic is also covered in lectures and Grand Rounds.

- 2.2.15. Care and management of the geriatric patient with malignancy.

Fellows gain hands-on experience on the management of the geriatric patient with malignancy. A joint program consisting of outpatient rotations, specifically-designed lectures, and seminars covering varied issues (such as cancer pharmacology in the elderly, psychosocial and cognitive issues, etc . . .) is under joint-development with the Geriatric Program at Johns Hopkins.

3. STRUCTURE AND OBJECTIVES OF CLINICAL ROTATIONS

A set of goals, expectations, and delineation of responsibilities has been created for each of the rotations described below, and is distributed to the Fellows in the beginning of the year during orientation. Attendings and Fellows are expected to discuss them at the beginning of each rotation and conduct a performance review at the end of the rotation. Both are expected to provide a written evaluation using the E*Value system. Among other goals, Fellows will gain valuable experience (with attending supervision) in communicating with patients and families, discussion of palliative measures, and participate in end-of-life discussions with patients and families.

3.1 Leukemia/Lymphoma Inpatient Service (Burke Service)

The team usually consists of a Faculty Attending, two Medical Oncology Fellows, and two Internal Medicine Residents. The service is split among the Fellows and Residents with an average census of 16-25 patients, mostly in the same unit. Critical care patients stay in the unit and are followed by the Pulmonary/Critical Care and Oncology teams. In-house night coverage provided by residents and moonlighters.

3.1.1 Objectives:

- To learn how to diagnose and treat patients with leukemia and other hematologic malignancies;
- To understand the biology, natural history, and work-up of leukemia, myelodysplastic disorders, lymphomas and plasma cell dyscrasias;
- To gain valuable experience (with attending supervision) in communicating with patients and families. Participation in end-of-life discussions with patients and families;
- To acquire expertise in performing and interpreting bone marrow biopsies and aspirates.

3.2 Bone Marrow Transplant Service (Santos Service)

The team usually consists of a Faculty Attending, one or two Medical Oncology Fellows, and two Internal Medicine Residents. The service is split among the Fellows and Residents with an average census of 16-25 patients, mostly in the same unit. Critical care patients stay in the unit and are followed by the Pulmonary/Critical Care and Oncology teams. In-house night coverage provided by residents and moonlighters. One Fellow carries the code beeper for the Weinberg building during the day (moonlighter or Resident at night).

3.2.1 Objectives:

- To learn how to acutely manage patients undergoing blood and marrow transplantation;
- To understand the biology, natural history, and work-up of hematologic malignancies and bone marrow failure disorders including acute leukemias (AML and ALL), chronic leukemias (CML and CLL), Non-Hodgkin's lymphomas, Hodgkin's lymphomas, myelodysplastic syndromes, multiple myeloma / plasma cell dyscrasias, and aplastic anemia / paroxysmal nocturnal hemoglobinuria;
- To acquire expertise in performing and interpreting bone marrow biopsies and aspirate.

3.3 Solid Tumor Service

The majority of the care and treatment of patients with solid tumors is delivered in the outpatient setting. The group of patients admitted to an inpatient solid tumor service presents special problems and have special needs. Typically patients are admitted for management of severe complications of the disease or therapy, or are admitted for intensive, highly technical therapies which can not be given safely to outpatients. A final category of patient is represented by the terminally ill patient where end of life issues must be addressed. This rotation puts a premium on both clinical skills and interpersonal and communication skills.

Two teams consisting each of a Faculty Attending, a Medical Oncology Fellow, and two Internal Medicine Residents. The Fellow functions in a supervisory capacity, most of the time. Each team admits every other night with an average census of 10-20 patients. Fellow is on pager back-up from home when team admitting, rarely having to come in after hours. Critical care patients stay in the unit and are followed by the Pulmonary/Critical Care and Oncology teams. In-house night coverage provided by the Internal Medicine housestaff.

3.3.1 Objectives:

- To develop skill and acquire experience in the management of acutely ill patients with adult solid tumors;
- To learn about internal medicine complications affecting cancer patients and common complications of therapy;
- To recognize and treat common cancer related complications and oncologic emergencies (pain, DVT, PE, SVC syndrome, obstructive uropathy, hypercalcemia, etc ...);
- To recognize and treat common treatment related sequelae (febrile neutropenia, diarrhea, mucositis, pneumonitis, etc.);
- To develop skill in administration of intensive therapies (biochemotherapy of melanoma, solid tumor BMT);
- To acquire experience in multidisciplinary discharge planning including home hospice;
- To gain experience in dealing with patients near the end of life and their families;
- To gain experience as a clinical team leader;
- To gain insight into the natural history of the common adult solid tumors.

3.4 Inpatient/Outpatient Transplant Service (IPOP)

The team consists of a Faculty Attending, a Medical Oncology Fellow, and physician assistants and nurse practitioners. Follow patients receiving mini transplants, high dose cyclophosphamide, and some lower risk bone marrow transplants. The Fellows participate in bone marrow harvest procedures and in the new patient evaluation/consenting of new BMT candidates. Outpatient clinic activities also include Myelodysplastic Clinic and Lymphoma Clinic.

3.4.1 Objectives:

- To teach fellows how to care for patients undergoing both myeloablative and nonmyeloablative blood and marrow transplantation;
- To understand the indications and contraindications of blood and marrow transplantation;
- To educate fellows in the diagnosis and care of patients with graft-versus-host

- disease;
- To educate fellows in the procurement of stem cells for blood and marrow transplantation;
 - To understand the indications and potential complications of donor lymphocyte infusions and to understand the concept of the graft versus tumor effect;
 - To gain experience in the use of high dose therapy for aplastic anemia and other autoimmune diseases;
 - To become proficient in the interpretation of bone marrow aspirates and biopsies;
 - To gain experience (under attending supervision) in consenting patients for blood and marrow transplantation, and to inform patients of the potential risks and benefits of the procedure;
 - To gain insight into the ethics and execution of clinical trials;
 - To learn the outpatient management of patients with leukemia.

3.5. Hematology Consultation Service (Classic Hematology)

During the first year, Oncology fellows spend several weeks on the Hematology Consultation Service where they are exposed to a wide variety of non-malignant hematological disorders including hypoproliferative and hyper proliferative anemias, thrombocytopenias (particularly ITP and TTP), leukopenias and bleeding (hemophilia A and B, von Willebrand's disease, etc.) and thrombotic disorders (DIC, venous thromboembolism, Trousseau's syndrome, etc ...).

During their rotation, fellows also work in the Hematology outpatient clinic where they see inpatients in follow up and gain experience in the outpatient management of non-malignant hematological disorders. Each clinic is supported by a post-clinic conference during the same week in which interesting new or return patients are discussed. While the discussion focuses mainly upon the medical aspects of their illness, dilemmas in other aspects of patients care are also discussed including societal, economic and cultural; influences upon the patient and their treatment. This conference offers the opportunity of fellows and attendings to discuss pertinent advances in the hematology literature, which influence patient care. Details regarding conference times and general and specific information regarding the hematology rotation may be found at the hematology web site (www.blooddiseasehopkins.org), and in the fellow's manual.

The team consists of a Faculty Attending from the Division of Hematology, a Medical Oncology Fellow, and often an Internal Medicine Resident. A nurse practitioner is available to instruct on bone marrow procedures. Responsible for consults, inpatient bone marrow procedures and interpretation with the Attending Physician, and participates in weekly hematology clinic. The Fellow follows Hematology admissions to the Medicine Service in the main hospital, and participates in weekly Coagulation Rounds and Hematology Grand Rounds. Hematopathology teaching sessions occur three mornings a week.

3.5.1. Objectives:

- To develop an understanding of the common pre, peri, and post-operative coagulation issues in patients with hypercoagulable, or bleeding disorders, and provide guidance on anticoagulant therapy;
- To develop a logical and efficient route to diagnostic and clinical evaluation of patients with cytopenias;

- To understand the indications and contraindications of blood product support;
- To understand diagnostic/therapy of autoimmune hematological diseases;
- To gain proficiency in the general evaluation and management of anemias and erythrocytosis, thrombocytopenia and thrombocytosis, leukopenias and leukemias, bleeding and thrombotic disorders, and sickle cell anemia and thalassemia;
- To gain expertise in performing/interpreting peripheral blood smears and bone marrow exam;
- To gain expertise in interpreting prothrombin times and activated partial thromboplastin times, platelet aggregation, platelet function analysis, and other coagulation tests interpretation, including thrombophilia testing;
- To understand the therapeutic role of apheresis;
- To understand principles of transfusion medicine, selection of appropriate blood products, interpretation of serologic tests in patients with auto and alloantibodies to blood products.

3.6. Consult Service

The consultation service is the mechanism by which other clinical services request and receive advice and recommendations regarding the diagnosis, evaluation, and treatment of cancer for hospitalized patients under their care. As such, it is an extremely important contact point for referring physician and patients who are requesting an opinion regarding cancer management. Learning the role and acquiring the skills of the consultant is an important aspect of oncologic training and requires a somewhat different approach than managing one's own patients.

The team consists of a Faculty Attending, a Medical Oncology Fellow, and often an Internal Medicine Resident. Rounds occur five days a week (weekend coverage by the Fellow in the solid tumor service).

3.6.1. Objectives:

- To acquire the set of skills necessary to be an effective oncology consultant. These include the generation of a relevant base of information to the specific question asked and conveying information in a timely fashion to patient and referring physician;
- To develop an organized approach to acquiring relevant clinical, laboratory, radiologic, and pathologic data necessary to render an informed opinion;
- To acquire the ability to convey information to the patient in the appropriate context as a consultant;
- To develop the ability to recognize what the relevant questions are from the referring physician and initiate a dialogue regarding patient care in addition to providing an opinion;
- To develop an understanding of the common post-operative or post-diagnostic issues in patients with newly diagnosed cancer and the logical and most efficient route to staging and clinical evaluation.

3.7. Outpatient Department (OPD)

The initial contact that patients have with an oncologist in the outpatient setting, whether an initial or second opinion, is often the main opportunity they have to learn about their

disease and its management. This places a premium on the importance of being able to collect and synthesize information from multiple sources, generate a relevant clinical history and database, and provide the needed information to patients which informs and educates them. Oncology, particularly for the solid tumors, is principally an outpatient specialty and the OPD is the principal arena in which care is given.

The team consists of the disease-specific Faculty Attending, a Medical Oncology Fellow, and often an Internal Medicine Resident. The Fellow sees 1-3 new patients a day (five days a week) and provides medical coverage for the Infusion Area.

3.7.1. Objectives:

- To acquire the ability to assemble data from diverse sources and formulate an accurate clinical database and to present a clinically sound plan for diagnosis and treatment in the outpatient setting;
- To use the outpatient setting to expand clinical experience in the management of a wide range of solid tumors;
- To expand clinical knowledge base of the common adult solid tumors by discussion with faculty, presentation at multidisciplinary conferences, and focused review of the relevant clinical literature;
- To expand experience in evaluation of cancer therapy including measurement of palpable tumors, review of imaging studies, and other clinical information;
- To gain experience in common outpatient procedures relevant to the specialty;
- To gain experience in the evaluation of oncology outpatients seen for new symptoms, signs, or complications of their diseases and to gain experience in outpatient management of common complications including acute chemotherapy toxicities.

4. MEDICAL EDUCATION AND PATIENT CARE IN THE DEPARTMENT OF ONCOLOGY

Health care professionals working at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins strive to fulfill our mission to: (1) provide excellent multidisciplinary care to patients affected by many different forms of cancer; (2) advance research to improve preventive, diagnostic, treatment, and rehabilitation strategies, and; (3) train future generations of cancer experts. Several Departments in the Johns Hopkins University School of Medicine utilize the facilities of the Center as training site for both physicians and medical students. The training and education of a new generation of physicians with expertise in cancer care is one of the key missions of our Center.

This document describes the philosophy of the Department of Oncology regarding the two training programs primarily under its responsibility: the adult Medical Oncology Fellowship Training Program and the Hopkins based portion of Pediatric Oncology training within the joint Johns Hopkins University/National Cancer Institute Fellowship Training Program in Pediatric Hematology/Oncology.

Both programs are accredited by the American Council for Graduate Medical Education (ACGME). Prior to joining our fellowship programs, all Fellows will have completed training in Internal Medicine, Pediatrics, or combined Medicine/Pediatric training in an ACGME-accredited institution leading to board certification, or equivalent training for those coming from overseas. Therefore, our programs are designed to provide clinical expertise and research training to Internal Medicine and Pediatric specialists who decided to obtain subspecialty training and pursue a research-oriented career.

The system of training described below has been one of the highlights of the Medical Oncology Training Program. The same approach is employed by the Pediatric Oncology Program. Most patients express satisfaction with the quality of care and attention provided in this supervised environment by our Medical Oncology and Pediatric Oncology trainees, who are a group of highly qualified Internal Medicine or Pediatric specialists who are undergoing intensive subspecialty training.

4.1. Adult Medical Oncology

After two or three years of oncology training, most Fellows will pursue subspecialty certification according to established requirements by the American Board of Internal Medicine (ABIM) Training leading to adult Hematology ABIM certification is offered to Medical Oncology trainees in coordination with the Hematology Training Program in the Department of Medicine.

Our Fellows receive intensive, hands-on clinical training under the direct supervision of a faculty member. Training in Medical Oncology consists of a minimum of 12 months of full time rotations in the different inpatient and outpatient units of the Center. They also maintain their own outpatient clinic caring for new and established patients for a minimum 24 months.

4.1.1 Inpatient Setting

Patients admitted to one of the adult oncology inpatient units in the Weinberg building (solid tumors, leukemia, and bone marrow transplant services) will be cared for

by one of the inpatient teams. Those being followed by a specific Hopkins oncologist or oncologists in the outpatient setting may not necessarily see these same doctors during his or her hospitalization. However, the outpatient physicians will often provide input in any or all aspects of the inpatient care of their patients. Inpatient teams are set up so that each patient will have a dedicated group of doctors making rounds every morning seven days a week, and available on site throughout the hospitalization. This system ensures timely decisions and coordination of care. Each team is led by an Attending Physician (a faculty member from the Department of Oncology), and includes at least one Medical Oncology Fellow, one or more Internal Medicine residents, and often a medical student. Team members are assigned to the inpatient unit for a few weeks at a time. The Medical Oncology Fellow works alongside the Attending Physician and oversees the actions of all other team members. The Fellow ensures that all necessary information is obtained from those caring for the patient prior to the admission, oversees the execution of the plan of action devised for each patient, and assures that proper steps are followed to ensure a smooth transfer of care back to the patient's physicians in the outpatient setting.

4.1.2 Outpatient Setting

A unique feature in the Medical Oncology Training Program is the opportunity for each Fellow to assume a supervised primary role in the care of a group of patients throughout their fellowship training. Fellows see both new patients and established patients in our outpatient department in the Weinberg Building. All new patients are scheduled to be seen by an Attending Physician specialized in their specific diagnosis in a disease-oriented outpatient clinic. Quite frequently, this will be a joint consultation conducted by both an Attending Physician and a Medical Oncology Fellow. In such cases, the Attending Physician and Fellow will jointly develop diagnostic and treatment recommendations and discuss them with the patient. A consultation note will be generated and sent to referring physicians, and in most cases a phone call will be initiated by the Fellow to the referring physicians to discuss preliminary findings. If the patient decides to be treated in our Department, the patient will be given the opportunity to accept the Fellow as their primary treating physician. The patient will then be primarily followed by the Fellow according to the initial plans devised with the Attending Physician. Subsequent visits will occur during clinic sessions where Fellows have on site supervision by an Attending Physician. The Fellow is expected to also discuss the patient's progress with the initial Attending Physician as the need arises. The Medical Oncology Fellow will consult with other Hopkins specialists, the inpatient unit, and outside physicians as needed. Diagnostic and therapeutic interventions will be discussed with and approved by an Attending Physician. All chemotherapy treatment orders must be co-signed by an Attending Physician before any such instructions are carried out by the Cancer Center pharmacy or the treatment nurse. Once Medical Oncology Fellows have completed two years of directly supervised outpatient clinic, they begin to see patients without on site supervision. However, they are expected to discuss their clinical concerns with Attending Physicians and other members of our multidisciplinary team.