

Pediatric Hematology/Oncology/Stem Cell Transplantation

Fellowship in Pediatric Hem/Onc/SCT

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TRAINING PROGRAM IN PEDIATRIC HEM/ONC/SCT

Program Eligibility

Applicants are eligible for the program if they meet the following requirements:

- Have completed (or will complete by July 1st of expected start year) an ACGME-accredited residency program
- Have passed all components of the U.S. Medical Licensure Examination, including:
 - Step 1
 - Step 2 (Clinical Knowledge)
 - Step 2 (Clinical Skills)
 - Step 3

International applicants must also provide evidence of the following:

- Certification by the Educational Commission of Foreign Medical Graduates (ECFMG). Information on ECFMG Certification may be obtained at <http://www.ecfmq.org>
- Successful completion of the ECFMG English Examination

Application Process and Requirements

To apply to our fellowship program, please complete an application through the ERAS, the electronic residency application service offered by AAMC. Their website is:

<http://www.aamc.org/programs/eras/applicants/start.htm>

We accept two new fellows each year. Applications are required to be submitted 18 months prior to the start of training.

Please be sure to include the following items in your application:

- ERAS Common Application Form
- Current Curriculum Vitae
- At least three letters of recommendation, including one from your pediatric residency program director (More than 3 letters are encouraged.)
 - Medical School Dean's letter (same as required for residency)
 - USMLE Scores Step 1, 2, 3
 - Board scores
 - Personal statement
 - We would appreciate a description of your clinical and research experience, your reason for an interest in Pediatric Hematology/Oncology/Stem Cell Transplantation, and your career goals.
- Recent photo

A personal interview is required and will be granted to the most qualified applicants (special exceptions can be made). We expect each applicant invited to interview to devote an entire day with us. Interviews are conducted January – March.

Application Timeline and Selection Procedure

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| November | ERAS opens for applications. |
| December | Programs download applications and determine interview invitations. |
| Dec-April | Selected applicants will be invited to interview. |
| January | Applicants and program register with NRMP. |
| April-May | Applicants are ranked on basis of prior performance, letters of recommendations, personal interviews, and academic promise. |
| June | Match Day |
| July 1 | Fellowship start date one year after match |

Duration Of Training

A minimum of three years is required. It is expected that there will be a progressive development of clinical, educational, administrative, and research skills during the program.

Overview of Year 1:

The first year of training is devoted primarily to the diagnosis and management of inpatients and outpatients with Pediatric Hematologic and Oncologic disorders. Specifically, the Fellows are primarily responsible for all inpatients on the Pediatric Hematology, Oncology, and BMT services. During this first year, the Fellows supervise the initial history and physical examination of patients admitted to these respective areas and the diagnosis and management of their specific disorders. The Fellows spend a minimum of two hours per day in rounds supervised by the Attending Faculty. At all times, the Fellows are supervised by an attending faculty member from the Division of Pediatric Hematology, Oncology, and SCT. Competencies in patient care, medical knowledge, practice based learning, systems based practices, interpersonal and communication skills, and professionalism are assessed.

On the inpatient service, the Fellow has the responsibility of supervising the multidisciplinary team that participates in the care of the child with both acute and/or chronic disorders who are admitted to the Hematology, Oncology, or SCT inpatient service. The Fellow is only assigned to one of the three independent services at any time. The Fellow is responsible for the clinical assessment of each patient and the development of a treatment program for each individual patient. The multidisciplinary team on the inpatient service consists of medical students, Pediatric residents, nurse practitioners, clinical research nurses, nurse coordinators, dietitians, physical and occupational therapists, psychologists, social workers, and bedside nursing staff. These team members interact with each Fellow to formulate a diagnosis and treatment plan for each individual patient. The Fellow interfaces with consultants in a variety of Pediatric subspecialties for coordination of care, facilitating the development of an accurate diagnosis and follow-up and, in conjunction with the attending physician, devises a specific treatment plan. Additionally, the Fellow supervises the teaching of the Pediatric residents and other allied health professionals participating in the care of these patients. It is the responsibility of the Fellow to conduct and participate in specialty conferences that are designed to develop a treatment program for each patient.

The first year Fellow is always supervised by the respective Hematology/Oncology/BMT faculty member who is rounding on that specific inpatient service. Additional consultations done by other physicians within the Division of Pediatric Hematology, Oncology, and BMT in other parts of the hospital are also carried out by the first year Fellow and supervised by the consulting Pediatric Hematologist/Oncologist/BMT physician of the day.

Fellows rotating on the inpatient service conduct rounds in the am with other members of the respective Pediatric Hematology/Oncology/BMT team and the attending faculty. After teaching rounds, the Fellows spend the remainder of their day following up on patient care needs, obtaining results, performing diagnostic procedures, supervising the admission of new patients, attending conferences and seminars, and participating in clinical research. At the end of the day the faculty physician usually makes additional teaching rounds with the Fellows on selected patients who require additional diagnostic and management decisions or require patient/family discussions.

The first year provides the Fellow with the foundation of knowledge and practical experience in the sub-specialty. The Fellow builds on the basis of knowledge that he or she has acquired during the general pediatric residency. The emphasis is on the basic evaluation, diagnosis and day-to-day management of the child with an acute or chronic blood disease, or a child with cancer. Existing skills are focused on the sub-specialty and are refined with a specific emphasis in the sub-specialty. The Fellow should be intellectually curious, sensitive, and caring in the management of patients, while at the same time developing a more organized approach towards the field. The entire year is spent on the clinical service in order to facilitate the acquisition of these skills.

Continuity Clinic

The Fellows are assigned one day a week in the outpatient clinic. Patients of Hematology, Oncology, and BMT services are seen in the same outpatient facility. On average, they are assigned a total of 10-20 patients from the Hematology, Oncology, and BMT services to follow as outpatients during their three years of fellowship training. The Fellows provide continuity of care to a selected group of active patients to maintain a smooth inpatient and outpatient experience for the patient and their families. Assignment of patients to Fellows is prioritized to those patients they have been involved with since diagnosis. The Fellows are encouraged to develop and maintain long term professional relationships with the children and their families they follow on a regular basis, to be involved in the day-to-day care of patients, and to be a part of the decision-making team. The Fellows are supervised by both the outpatient attending physician and the clinical directors for the three specialty services. The Fellows are responsible for establishing the diagnosis, developing a treatment plan, performing diagnostic procedures, interpreting results, and providing short and long term follow up. While the Fellows are in their outpatient rotations, they will perform diagnostic procedures (LP and BM) and admit patients to the observation unit for various therapeutic procedures. The Fellows gain additional experience in managing patients in an outpatient/day hospital environment and learn about new aspects of cost-effective medical care and managed care clinical pathways. It is expected that for the patients they are following, the Fellows will also inform the referring physician of the patient's status and provide regular updates (in the form of regular letters), prepare and update a medical summary for the medical record, write chemotherapy orders in conjunction with the attending physician and advanced practice nurse, etc. The Fellows are supervised by the Hematology/Oncology/BMT faculty who are actively involved in the clinical management of these patients. Fellows, however, also interact with other health care providers, including Pediatric nurse practitioners and physician assistants, who are working in similar areas. The Fellows spend time in the infusion center, where outpatient day care is delivered (outpatient chemotherapy, transfusion therapy, stem cell collection and therapeutic pheresis, fluid therapy, nausea, and pain control). Fellows are also involved with and gain experience in the management of hospice patients both in the hospital and at home.

Specific Goals for Year 1:

- 1) The ability to accept referrals from the general pediatrician and evaluate the child for the specific symptoms or signs that would suggest a hematologic or malignant disorder. The trainee will receive guidance from the attending faculty regarding the differential diagnosis and the appropriate work-up of the various conditions that form part of the service. The Fellow will learn about the broad categories of malignant conditions, including the leukemias, lymphomas, brain tumors, and solid tumors including those of the bones, soft tissues, and solid organs, as well as the various hematologic disorders of hemostasis and thrombosis as well as disorders of the red blood cells, white blood cells, and platelets. In addition, they will learn about the indication for stem cell transplant for

a number of these diseases, as well as others such as immunodeficiencies and metabolic disorders.

- 2) Once the Fellow has begun to follow a specific patient with a specific appropriate diagnosis, he or she will become the primary care provider for that patient and carry out all the required follow-up and management under the direct supervision of the attending physician of record. This includes learning the various treatment protocols on which the child may be registered, including appropriate and timely follow-up scans etc. It will also be the responsibility of the Fellow to learn the writing of chemotherapy orders and to review them with the clinical nurse specialists, nurse practitioners, and attending physicians. All orders for that patient must be signed by the Fellow and the supervising attending physician.
- 3) For all chronically ill children followed by the Fellow, he or she will be responsible for all routine health care matters including immunizations, dental care, development, nutrition etc. He/she will also be responsible for filling out various forms including school physicals etc.
- 4) Refining skills involved in performing procedures, including spinal taps, bone marrow aspirates and biopsies. The ability to read bone marrow and peripheral smears with a degree of proficiency and confidence. Besides the morphology instruction series, this will mean interpreting slides of patients on the active clinical service.
- 5) Skills of communication with families with special emphasis in the delivery of diagnostic and prognostic information; thinking ahead and planning treatment particularly for the Oncology patient; discussing protocols with the attending physicians as well as with specific study chairs in order to decide therapy in atypical or difficult cases.
- 6) Making independent presentations at tumor boards; completely assessing and discussing important clinical decisions at these meetings which are multidisciplinary in nature and being able to hold ones' own with back up from the attending physicians as appropriate.
- 7) Demonstrating good organizational skills in presentation during rounds, as well as clear and concise charting; providing organized and detailed sign-outs and completing daily work in a timely fashion.
- 8) The ability to access resources in Hematology, Oncology and Stem Cell Transplant on the Internet. This includes on-line publications, data banks, and resources available from specific foundations, both patient support and physician education and support. This may be useful to the Fellow in terms of patient referral as well as for his or her own education.
- 9) Competence at delivering high quality patient care, acquiring a state of the art medical knowledge base, developing excellent interpersonal and communication skills, utilizing practice based learning and improvement systems, participating in systems based practice, and conducting themselves with a high degree of professionalism.

Evaluation:

Fellows will be evaluated quarterly by the faculty on service, as well as the outpatient faculty member for the Fellow's designated outpatient clinic day. The Program Director meets individually with each Fellow quarterly to provide an overview of the evaluations that were submitted and to allow the Fellow to provide feedback on the program. In addition, Fellows will be asked to evaluate the attending physicians he/she was on service with, as well as every 12 months to provide a written evaluation of the program as a whole.

Overview of Year 2:

During the second year, Fellows consolidate the knowledge that they acquired in the first year. The second year is primarily devoted to laboratory or clinical research. They will also assume greater responsibility in the management of their patients as well as the other patients on the service. This will mean some independence in making management decisions depending on their individual progress over the year. At all times supervision from the attending physicians will remain in effect. The initial 8 weeks of the second year consist of one-two week selectives in radiation oncology, neuro-oncology, hematopathology, immunogenetics, apheresis & stem cell laboratory, and blood banking that are protected time for the Fellow to spend with each of these subspecialists.

During the second half of year one, the Fellow will meet with the Program Director to identify a research project and research mentor. The Fellow is encouraged to speak with the heads of various laboratories and/or clinical research programs in order to explore the possibility of working with that research team. These research mentors may be within the division of Pediatric Hematology, Oncology, and/or BMT or in another related division at New York Medical College or within the NYC/Westchester county area. The research mentors will provide reading materials specific/relevant to the project/laboratory. Once the research laboratory or clinical research team has been specified, the Fellow will begin the research project in the third month of the second academic year. A Scholarly Oversight Committee (SOC) is established for each Fellow after finalization of the research project. The Fellow, research mentor, program director, and SOC meet every six months or more often as needed to review the progress of the Fellow in their research project.

Specific Goals for Year 2:

- 1) The Fellow will refine his or her clinical proficiency skills attained in Year 1. This includes the evaluation, diagnosis, and management of patients. During this year the Fellow must build confidence in his or her decision making in order to achieve more independence. All management decisions regarding their own patients should be made by the Fellow after appropriate consultation with the supervising attending physician. He or she should assume a more responsible role, being the primary physician to communicate with not only the family but also the primary Pediatrician if there is one. The Fellow continues with his/her outpatient continuity clinic once a week during the second and third years of training.
- 2) The Fellow should be able to make thorough and complete consultations, on the general floor as well as in the Pediatric and Neonatal ICUs. He or she should be able to communicate any necessary treatment recommendations directly to the staff responsible for the management of the patient. At all times the case must be presented to the supervising attending physician, but the Fellow should be able to do the consult fairly independently.
- 3) The Fellow will participate in six required subspecialty selectives in the fields of radiation oncology, neuro-oncology, hematopathology, immunogenetics, apheresis & stem cell laboratory, and blood banking. These selectives are designed so that the Fellow will have the opportunity to expand their knowledge of these important subspecialty areas. The selectives are meant to give the Fellow a broad sense of the logistics of these specialty practices so that they may better appreciate the systems in place in the multidisciplinary care of pediatric hematology/oncology patients (Appendices D-I).
- 4) The Fellow must also assume some teaching responsibilities. He or she must make presentations to the house-staff, as well as to the members of both divisions. These should include didactic presentations on some of the more basic topics that are in the basic curriculum of the house-staff, as well as more complex presentations such as journal reviews and reviews of the literature on specific subjects.
- 5) The Fellow will attain some of the basic administrative responsibilities using system based practices that he or she may be faced with in the future. This includes some knowledge of the working of the billing system of the hospital or division and the documentation required. He or she must also keep abreast of the changing spectrum of health care "management", including policy issues and regulatory requirements. He or she must be able to go through the process of getting approval for a procedure from an insurance company.
- 6) The Fellow must begin to become familiar with the workings of an Institutional Review Board (IRB) and learn about the responsible conduct of research. He or she will be asked to take the basic course in study design and biostatistics which is conducted by the Medical School. This will provide some training on how to write a research proposal as well as how to get approval from the IRB.
- 7) The Fellow must also acquire some initial knowledge about sources of funding and grant writing techniques for the future. This will be developed further during the third year of training.
- 8) During the second year the Fellow will begin to develop research skills. For those pursuing laboratory research this involves learning basic laboratory research techniques in the laboratory that he or she has chosen and then beginning earnest work on his or

her research project. One of the most important skills that the Fellow will acquire during this year is the training to write an independent research proposal. This may be a basic research project or a clinical trial, and will include (for clinical trials) writing a research protocol for the Institutional Review Board, including the consent forms if necessary. The Fellow must also demonstrate some knowledge of budgets and the administrative aspects of a grant. The basic techniques learned will include molecular biology, genetic, or biochemical methodologies as applicable to their specific research project. For those pursuing clinical research this may entail taking classes at the School of Public Health with the possibility of obtaining an MS degree in biostatistics or policy. This will involve working under direct supervision of the research mentor and reporting to a Scholarly Oversight Committee.

Evaluation:

Fellows will be evaluated quarterly by the research mentor/laboratory supervisor as well as the outpatient faculty member for the Fellow's designated outpatient clinic day. The Program Director will meet individually with the Fellow quarterly to provide an overview of the evaluations that were submitted and to allow the Fellow to provide feedback on the program. In addition, Fellows will be asked to evaluate his/her outpatient faculty and his/her research mentor/laboratory supervisor, as well as every 12 months to provide a written evaluation of the program as a whole.

Overview of Year 3:

The third year of training is devoted almost completely to research. The Fellow continues with their once a week outpatient continuity clinic and attends important divisional conferences. The Fellow should generally be able to complete the board requirements at the end of the year. This includes having their research project completed and preparing it for publication. During this time, the Fellows should be planning for the future in terms of job opportunities and career development either in clinical service and/or in basic research.

Specific Goals of Year 3:

- 1) In the final year of training Fellows must have acquired adequate skills and confidence to function independently once they have graduated from the training program. Therefore, on the clinical side, they should have acquired a broad fund of medical knowledge in the subspecialty as well as familiarized themselves with the evolving trends in the literature. A critical part of this competence is the ability to make appropriate and balanced decisions with regard to the management of patients. The Fellow should be competent in all aspects of patient care.
- 2) Fellows should be able to run a service independently and display competency to manage all of the aspects of running a service, from the management of patients to communicating with families and other physicians, as well as the administration and billing side of the service. The Fellow should be competent at practice based learning and improvement and systems based practices.
- 3) Fellows should demonstrate skills in teaching, both didactic for the house-staff and medical students, as well as making presentations with audio-visual aids to the members of the faculty. At some point in the year they will be asked to present their research project to the group. If appropriate, they must learn how to make a presentation (oral or poster) before an audience at a conference or seminar.
- 4) The Fellow should be completing their proposed research project begun in Year 2, or if they wish to continue beyond a third year will be required to apply for and secure grant funding for continued research. Fellows are encouraged to submit their work for presentation at national or international educational conferences. They are also required to begin and complete if possible a manuscript of their research findings for peer review and publication. At the very minimum, Fellows will be required to present a completed written work product detailing their research for approval by their scholarly oversight committee.

Evaluation:

Fellows will be evaluated quarterly during the third year of training with respect to their research project. Research evaluations will be provided by the mentor/laboratory supervisor and the Program Director will present these to the Fellow as well

Description of Training

The training of Pediatric Hematology/Oncology/Blood and Marrow Transplantation (BMT) fellows is coordinated through the division of Pediatric Hematology, Oncology and Stem Cell Transplantation in the Department of Pediatrics. The overall objectives of the Pediatric Hematology/Oncology/BMT Fellowship Program are to insure that the trainees will be 1) competent in all clinical aspects of Pediatric Hematology/Oncology/BMT and 2) acquire the academic skills to continue in a tertiary Pediatric Hematology/Oncology/BMT environment. Primary goals include 1) the development of a thorough understanding of the pathophysiology of disorders related to Pediatric Hematology/Oncology/BMT and 2) the development of the skills necessary in the diagnosis, treatment, and management of these disorders. Additional primary goals include attaining competencies in 3) medical knowledge, 4) professionalism, 5) patient care, 6) practiced based learning, 7) interpersonal and communication skills and 8) system based practices.

Overview:

Specifically, the trainee should attain clinical skills in the area of Pediatric Hematology/Oncology/BMT, including sickle cell disease, hemophilia, acute and chronic hematological problems, coagulopathies, thrombocytopenias, platelet disorders (both acquired and inherited), hemoglobinopathies including thalassemias, disorders of red cell membrane metabolism, immune and non-immune hemolytic anemias, nutritional anemias, and quantitative and qualitative abnormalities of white blood cells. Additionally, the trainee will become acquainted with and attain skills in the management and diagnosis of specific hematological disorders of the newborn, congenital and acquired immunodeficiencies, bone marrow failure syndromes, and develop expertise in the use of blood products and transfusion medicine. Lastly, the trainee will become competent in all aspects of the diagnosis and management of Pediatric Oncology patients. This includes but is not limited to the development of skills related to the diagnosis of leukemias, including acute lymphoblastic and acute and chronic myeloid leukemias, solid tumors, soft tissue tumors, central nervous system tumors, and lymphomas (Hodgkin's and Non-Hodgkin's).

During the three-year Pediatric Hematology/Oncology/BMT Fellowship program, the trainee will become experienced in a number of aspects of therapeutic modalities including, but not limited to, the appropriate use of chemotherapy, biological therapy, surgical therapy, radiotherapy, immunotherapy, and blood and marrow transplantation, including allogeneic and umbilical cord blood transplantation. The trainee will participate in clinical research protocols utilized in the management of childhood malignancies, benign hematological disorders and stem cell transplantation including the initiation of and development of new protocols and the ongoing participation in cooperative group protocols. Patients with a primary immunodeficiency and/or undergoing blood or marrow transplantation will provide the trainee an opportunity to develop skills in the management associated with a severely immunocompromised host. At all times, the trainee will be required to participate as a member representing Pediatric Hematology/Oncology/BMT in the multi-disciplinary setting.

Additional educational objectives of the program include developing an experience in other aspects of a Pediatric Hematology/Oncology program, including the management of acute and chronic pain, long term transfusion therapy, acute and chronic complications of blood disorders, management of graft versus host disease, sepsis in immunocompromised patients, enteral and parenteral nutrition, multidisciplinary psychosocial diagnosis and treatment, management of nausea and vomiting, the epidemiology and etiology of childhood cancer, genetic testing and counseling, survivorship and late effects, and the development of a database collection system to monitor responses in clinical and/or basic research studies. The training program also has a structured experience in stem cell transplantation including acquiring the skills in determining the clinical indications for stem cell transplantation, donor

selection and processing, stem cell collection and infusion, choosing and administering conditioning regimens, and management of stem cell transplantation complications.

Core Competencies:

The training program also has a structured program for the six core competencies including: 1) quality patient care, 2) medical knowledge in this specialty, 3) practiced based learning, 4) interpersonal communication and skills, 5) professionalism, and 6) system based practices.

Quality Patient Care

During the Fellow's training there is an emphasis on developing skills needed to deliver high quality patient care. The Fellows attain skills in performing history and physical examinations, diagnostic testing, therapeutic decisions, counseling of patients and their families, and the use of information technology. Measures to assess competence in patient care include direct observation by faculty, inpatient and outpatient attending rounds, clinical discipline rounds, case presentations, on call decision making, and faculty evaluations.

Medical Knowledge

During the three years of training, the Fellows are required to attain a high degree of medical knowledge in all aspects of Pediatric Hematology/Oncology/BMT. There is a well structured curriculum including didactic sessions, special seminars, clinical and laboratory conferences, journal club, and M & M conferences that incorporate basic, clinical, and patient oriented education in this sub-specialty. Specific areas of emphasis include molecular genetics, immunology, biochemistry, pathophysiology, nutrition/metabolism, microbiology, pharmacology, psychology, ethics, biostatistics, epidemiology, and others. Measures to assess the Fellow's medical knowledge skills include direct faculty observations, clinical performance, peer review, patient/family assessments, in training examinations, and board examinations.

Practice Based Learning

Another major aspect of the program includes the attainment of skills in practice based learning and improvement. The Fellows lead a journal club twice yearly and critique and appraise scientific evidence in peer review publications. The Fellows participate in several quality improvement projects each year and in teaching programs for medical students and faculty. In Years 2 and 3, the Fellows lead chief of service rounds for faculty, residents, and students. The Fellows provide noon lecture and other didactic teaching to students, residents, and faculty. Measuring skills in practice based learning and improvement include resident and student evaluation, direct faculty observation, chief of service rounds, journal club, tumor board presentations, and associated faculty observations.

Interpersonal Skills

The trainee will also develop skills in interpersonal communication and skills with patients, families, staff, and faculty. Fellows meet frequently with faculty and families and preside over clinical rounds and patient program sessions. Measures of assessment of competency in interpersonal and communication skills include inpatient and outpatient rounds, case presentations, clinical discipline rounds, psychosocial rounds, patient satisfaction surveys, team and divisional meetings, and 360° evaluations.

Professionalism

The trainee also develops and attains skills in professionalism. Fellows are mentored by faculty in professional behavior and gain experience in physician-physician interactions, physician-patient/family relationships, physician and team member collaboration and interaction, and physician and community/social interaction. Professional competence is assessed by 360° evaluations by faculty, allied health professionals, patient/families, and peer Fellows. There is further direct observation on rounds, training conferences, family meetings, team program conferences, etc.

System Based Practice

The Fellows also gain experience and skills in system based practice. The Fellows participate in cooperative group clinical research in all three subspecialty areas (Oncology, Hematology, and BMT). The Fellows participate in quality and safety initiatives and utilize hospital data systems

for analysis and review. Experience in quality improvement includes clinical outcome, resource usage, medical errors, cost effective care, preventive care, and health management systems. Measures of competence in this area include direct faculty observation, peer review, formal publications, analysis of data, and regional publications

Laboratory Training and Procedures

The comprehensive training program will consist of but is not limited to the interpretation of laboratory results including immunology, cytology, microbiology, and pathology. The trainee will be able to perform several procedures including bone marrow harvests, bone marrow aspiration and biopsies, lumbar punctures, reading and interpretation of bone marrow aspirates and peripheral blood smears, and experiences in blood banking and tissue pathology. Additional diagnostic modalities including genetics, nuclear medicine, and radiology are important components of the training during the three-year fellowship.

Bone Marrow Aspiration, Biopsy and Harvesting

Pediatric Hematology/Oncology/BMT Fellows perform bone marrow aspirations biopsies and bone marrow harvesting when clinically indicated on patients they are following on both the inpatient and/or outpatient service. These procedures are closely supervised by Pediatric Hematology/Oncology/BMT physicians and the results are reviewed with a faculty member from the Pediatric Hematology/Oncology/BMT division and/or the Hematopathology department.

Lumbar Punctures and Intrathecal Chemotherapy

Lumbar punctures and intrathecal chemotherapy administration, with evaluation of cerebrospinal fluid, are performed routinely by Pediatric Hematology/Oncology/BMT Fellows on patients whose care they are overseeing on both the inpatient and outpatient services. These procedures are directly supervised by attending physicians from the Divisions of Pediatric Hematology, Oncology, and BMT. The results of these procedures are discussed during formal rounds and patient care discussion sessions.

Interpretation of Peripheral Blood Smear

When clinically indicated, relevant peripheral blood smears are reviewed on a daily basis with the attending physician during the Fellow's rotation on a particular service. Additionally, Fellows spend time in the Hematology laboratory under the direct supervision of faculty in the Pathology department reviewing peripheral blood smears and other pertinent laboratory specimens.

Interpretation of Specialize Laboratory Diagnostic Tests

Interpretations of hematologic laboratory diagnostic tests are reviewed on a daily basis by the Hematology/Oncology/BMT Fellows with the attending physician and other relevant medical personnel during patient and teaching discussions. Tumor Board, patient care team meetings, as well as other formal and informal sessions are routinely conducted to provide accurate interpretation of the diagnostic tests which are performed on patients being followed by the division of Pediatric Hematology, Oncology, and Stem Cell Transplant.

Familiarization with Therapy/Treatment Modalities:

The trainees become familiar with all aspects of chemotherapy during the first year of training. This process involves the development of treatment plans for patients with newly diagnosed or recurrent diseases. The Fellows participate in clinical research protocols, both Investigator derived and/or multi-center trials through cooperative groups such as the Children's Oncology Group or limited institutional trials. They become familiar with the use of outpatient chemotherapy through their rotations in the outpatient oncology clinics. They additionally consult with the surgeons, including Pediatric Surgery, Urologic surgery, Orthopedic surgery, ENT surgery, Neurosurgery, and Plastic surgery in the daily management of patients and learn about the diagnostic and therapeutic uses of Radiation Oncology including local radiotherapy and total body radiotherapy. Lastly, both Radiation Oncology and Pediatric surgical physicians actively participate in multi-disciplinary teaching and patient care conferences, including Tumor Board, Pediatric Oncology and BMT team meetings, and Morbidity and Mortality rounds.

The trainees gain experience in the diagnosis and treatment of patients with congenital and/or acquired immunodeficiencies and the diagnosis and treatment of infections associated with those disorders. Additionally, while spending time on the inpatient Hematology, Oncology and Stem Cell Transplant unit, they become familiar with the diagnosis and treatment of immunocompromised patients undergoing chemotherapy and/or blood and marrow transplantation and the development of diagnostic and treatment plans for infections in these patients. In patients with hematologic and/or oncologic disorders, the Fellows become familiar with the use of transfusion of various blood components, including packed red blood cells, whole blood, mobilized granulocyte transfusions, platelet transfusions, specific factor transfusions, cryoprecipitate, fresh frozen plasma, and the management of a variety of hematological disorders. The trainees spend one to two weeks in the Blood Bank learning the discipline of blood typing, blood component isolation and separation, infectious precautions, transfusion complications, etc. The trainees also spend one week in the Apheresis Department and Stem Cell Laboratory developing an understanding of therapeutic apheresis as well as the use of apheresis to isolate single blood components, including stem cell collection, granulocyte collection, platelet pheresis, colony assays, purging, depletions, ex vivo manipulation, and techniques in bone marrow stem cell isolation. Lastly, the Fellow spends one week in Hematopathology reviewing blood and marrow smears.

The Fellows actively participate in the Blood and Marrow Transplant Program where they gain experience with patients undergoing autologous bone marrow and peripheral BMT, purged bone marrow transplantation, matched related allogeneic peripheral blood and marrow BMT, related and unrelated cord blood BMT, and unrelated blood and marrow transplantation. The trainees additionally develop an expertise in various purging regimens for autologous transplantation and positive stem cell collection for transplantation and gene therapy. The Stem Cell Transplant Program is a FACT accredited program that participates in the Children's Oncology Group, the Center for International Bone Marrow Transplant Registry (CIBMTR), and is an approved National Marrow Donor Program (NMDP) unrelated marrow transplant program.

Other Aspects of Training:

The Pediatric Hematology/Oncology/BMT fellowship program emphasizes the integration of clinical case presentations and didactic lectures to provide a scientific foundation in the phagocytic system, splenic function, cell kinetics, immunology, coagulation, genetics, hemoglobinopathies, nutritional and aplastic anemias, and hematologic manifestations of chronic disease. Specifically, trainees attend a series of lectures where key articles and a bibliography of support literature are provided. This series covers these topics and is repeated throughout the year. In addition, there are weekly clinical patient care rounds where patients are presented that have been seen and evaluated in both the inpatient and outpatient setting the week before. These weekly meetings are multidisciplinary and address in general the differential diagnoses as well as the work-up for anemia, leukopenia, etc. Additionally, a journal review is held every other month for the trainees to update all physicians in the group and provide a format to teach the basics of critical review of the literature with an emphasis on statistical analysis.

Each academic year a new lecture series is initiated in the Division of Pediatric Hematology, Oncology, and BMT. These lectures are geared primarily to the Fellows but are also of interest to rotating residents and Hematology/Oncology/BMT nursing personnel. Hematology/Oncology/BMT lectures are held once a week and are frequently given by noted specialists in their fields who come as guest lecturers. The Fellows are also encouraged to participate in all Research Seminars at the medical center. In addition, they also participate in research staff meetings with their respective laboratories or clinical research teams.

Fellows are exposed to a multidisciplinary environment in the management of new and ongoing Hematology, Oncology and SCT patients. Our hospital provides care to a broad socio-cultural base with large populations of patients from minority groups including Hispanic, African American, Asian, and other ethnic origins from around the New York metropolitan and Westchester County areas. The Fellows are encouraged to assume primary responsibility for new patients under the supervision of the faculty. They are involved in the initial evaluation and discussion with the family regarding diagnosis and projected management. They also

coordinate the team, including Social Services and Psychology, to assess the family and provide support, both emotional and logistical. Due to the large multi-ethnic community served by our hospital, the interpreter services provide not only translation but cultural support as well for patients and their families. They provide a cultural link that allows the physician and staff to interact successfully with the patient and their family. Interpretive services are available on call 24 hours a day, seven days a week.

Ongoing contact with primary care physicians is required, by telephone and by letter, providing updates in the management of patients. In the field of Pediatric Hematology/Oncology/BMT, the care of these patients can involve high technology, high-cost care and be a forum for difficult ethical decisions in medicine. The Fellows are encouraged to use the Bioethics Committee as a resource throughout the continuum of providing comprehensive patient care to Hematology/Oncology/BMT patients and their families.

The Pediatric Hematology/Oncology/BMT Fellow participates in the administration of the program by direct participation and presentation at staff meetings, which are organized for the purpose of program definition, development of goals, program planning, and implementation. The Fellows work with the Division Chief to assist in the recruitment process of both faculty and allied health personnel and work within the realm of program development with new personnel. The Fellows are part of the process relative to the quality management of the division and participate with the teams that carry out total quality management and continuous quality improvement.

Instruction in Related Basic and Clinical Sciences:

The trainees have an opportunity to attend lectures and courses in a variety of venues within the Pediatric Hematology/Oncology/BMT training program. The curriculum offered in this clinical oncology research training program allows Pediatric Hematology/Oncology/BMT Fellows to receive education in a variety of areas including cellular and molecular biology, pharmacology and therapeutics, pathology, virology, infectious diseases, immunology, physiology, epidemiology, and behavioral biology. Instruction and experience in other areas, including structure and function of hemoglobin, hemoglobinopathies, iron metabolism and iron-associated diseases, and splenic function are coordinated through the Pediatric and Adult Hematology programs. Didactic lectures, ward rounds, and invited speakers are additionally utilized to train Pediatric Hematology/Oncology/BMT Fellows in the above-mentioned areas. Lastly, topics of a nutritional nature in Pediatric Hematology/Oncology/BMT are discussed and presented by the Pediatric Hematology/Oncology/BMT faculty and the dietary and nutrition department.

Supervised Research Experience:

This training program is designed to encourage trainees to develop an interest in clinical and/or basic research during the first year of training. The first year is almost exclusively devoted to clinical inpatient responsibilities. The second and third years are subsequently devoted to the Fellow's scholarly research experience. The Fellows are anticipated to be a first author on a presentation of his/her research project at a national or international peer-review meeting and first author peer reviewed publication before they finish their third year of training.

With the exception of their outpatient continuity clinic one day a week and teaching conferences, Fellows concentrate almost all of their training time during the second and third years on laboratory or clinical research. With additional post-doctoral supervision, the Fellow develops his or her own basic laboratory or clinical research project under the direct supervision of the Program Director or his or her faculty designee. The trainee develops the capability of drafting the concept of their project, learns to develop a hypothesis, set of objectives, the background and significance, the development of an experimental design, and to participate in data collection and final analysis. The Fellows attend a research meeting every week at which they are responsible for presenting their research projects to the entire research team and observe additional projects that are ongoing within the department. Once a quarter, the Fellow meets with the Program Director to review the progress of their specific research projects. The Fellow develops abstracts and manuscripts that are completely

supervised by either the Program Director or a senior faculty mentor. There is a presentation every six months by the fellow to a Scholarly Oversight Committee (SOC) during their last two research years. The SOC reviews the fellows research proposal, progress and advises the fellow and/or his/her mentor on the progress of the research and any suggestions for improvement, collaboration and educational needs.

Evaluation of the fellow, faculty and program:

There are several mechanisms by which the goals and objectives of the Pediatric Hematology/Oncology/BMT fellowship program and the progress of the Fellows are evaluated.

- 1) The NYMC/Westchester Medical Center Graduate Medical Education Committee conducts an internal review of the program every two to three years.
 - 2) An internal review of the training program is conducted by the Program Director, Program Coordinator, internal group of faculty, and all Fellows every year.
 - 3) The Fellows meet quarterly with the Program Director to discuss issues relevant to the Fellows' progress and the training program.
 - 4) The Fellows undergo a 360° evaluation every quarter and the evaluations are reviewed with each Fellow confidentially by the Program Director.
 - 5) The faculty are evaluated by the Fellows every six months. Each year the faculty is provided a confidential summary of the Fellow's evaluation of their teaching and mentoring skills.
 - 6) Each year the Fellows and Faculty evaluate the entire program confidentially and anonymously.
 - 7) Each month the divisions review the status of the fellowship program and relevant ongoing fellowship issues.
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Facilities And Resources

The Pediatric Hematology/Oncology/Stem Cell Transplantation division has a 5 physician faculty with a very wide range of clinical and research interests. Additionally, fellows will be provided with a list of several faculty outside the division that will serve as mentors for the fellows' research. This assures each trainee of the opportunity to be exposed to all facets of our field. Our faculty is currently involved in dozens of research projects, ranging from cell and molecular biology, clinical trials, and epidemiological research. Fellows may choose any of the faculty as mentors in research.

There are numerous clinical and educational resources available to the fellow during training. Clinical resources include exposure to approximately 20 inpatients on a daily basis with primary diagnoses of Pediatric Hematology or Oncology or Stem Cell Transplantation. Additionally, each day the fellow participates in 1-3 consults within the inpatient hospital. The outpatient program has an ambulatory clinic and infusion center with an average daily visit of 20 patients in total for the fellows to participate in their care. Educational resources include a fellow's library with availability of common Pediatric, Pediatric Hematology, Oncology, and Stem Cell textbooks. Additionally New York Medical College has an outstanding Health Sciences Library consisting of 20,000 square feet, room for 225 seats, two computer labs, 4 multipurpose conference rooms, and a 20 person classroom. The library has access to 16,543 journal titles and participates in NNLM and OCLC. The fellow also has their own PC and internet access to all search engines to obtain educational material. Lastly, all related policies and procedures and research protocols are available on the hospital intranet site.

New York Medical College, which has been training physicians since 1860, is one of the largest medical schools in the United States. The main campus moved to Westchester from New York City over 15 years ago, and this move has sparked an extraordinary growth in both the research and patient care roles of the medical school. The Department of Pediatrics has likewise grown at a fantastic rate, with all subspecialists very well represented. There are huge opportunities for each fellow to interact with basic scientists and clinical scientists in all fields of medicine.

The Graduate School of Basic Medical Sciences at New York Medical College offers a unique opportunity for trainees in this program to obtain a Ph.D degree in one of six basic medical sciences programs – biochemistry & molecular biology, cell biology, microbiology & immunology, experimental pathology, pharmacology, or physiology.

The School of Health Sciences and Practice (School of Public Health) of New York Medical College is another vital resource for our training program. In addition to strong statistical and epidemiological support, the faculty of the Institute for Public Health Health and our division faculty collaborate closely in our newly developed Children's Environmental Health Center of the Hudson Valley. Trainees are strongly urged to consider obtaining either a Master's or Ph.D degree in Public Health while they are completing their fellowship in pediatric Hematology/Oncology/Stem Cell Transplantation.

The Maria Fareri Children's Hospital at Westchester Medical Center is a major teaching hospital of New York Medical College. It serves as the only major referral center for the seven counties in the lower Hudson Valley, and has the highest "case-mix index," which is a measure of acuity, in the state. Our helicopters bring children in daily from a very expansive geographic region. The focus is on tertiary and critical care. We are always at or above 100% census with transports of critically ill children occurring daily. In 2004, the magnificent Maria Fareri Children's Hospital at Westchester Medical Center opened, and continues to expand in size and scope of programs offered. MFCH is dedicated to family-centered care and is a truly beautiful facility. All patients have private rooms and parents are encouraged to stay 24 hours a day. More information about our new Children's Hospital can be obtained by visiting our web site: http://www.worldclassmedicine.com/home_mfch.cfm?id=65.

Summary

The Fellowship Training Program in Pediatric Hematology/Oncology/Stem Cell Transplantation is a highly selective, rigorous and state of the art 3-year program designed to prepare pediatricians for an academic and clinical career in Pediatric Hematology/Oncology/Stem Cell Transplantation. As a result, our fellows are very well prepared for the entire spectrum of professional positions available for board certified Pediatric hematologists/oncologist/stem cell transplant physician specialists.