University Of California, San Francisco

Department of Pediatrics

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Hematology/Oncology Fellowship Training Program

UCSF Children's Hospital
at UCSF Medical Center

PROGRAM GOALS AND OBJECTIVES

The Department of Pediatrics at UCSF is committed to excellence in research, education and the clinical care of infants, children, and young adults. The Division of Pediatric Hematology-Oncology shares this commitment. Our Pediatric Hematology-Oncology Training Program takes full advantage of the diversity of San Francisco's community and combines this rich patient population with the extraordinary clinical, educational, and research resources of the University of California. The result is a unique and exceptional training program that readies our graduates for a significant contribution to the health of children.

The Pediatric Hematology-Oncology Fellowship Program at UCSF is committed to the unique, individual career plans and training needs of each trainee. We strive to create an exciting, dynamic training program for each fellow. At the end of the training years, each fellow will be board eligible and have developed the skills necessary to take excellent, compassionate care of children with malignancies or diseases of the blood and blood forming organs. In addition, each fellow will have a solid foundation in basic and/or clinical research that will enable him/her to make significant contributions to the field of Pediatric Hematology/Oncology.

The overall goal of our program is to prepare our fellows to be knowledgeable, compassionate, and competent in the care of children with malignancies or diseases of the blood and blood forming organs. A meaningful accomplishment in research, either clinical or laboratory, is a required part of the fellowship experience in order to encourage later contributions to the advancement of the field, whether the fellow pursues a career in an academic medical center or in clinical practice. Evidence of intellectual independence in carrying out the research project selected is a requirement, as detailed in the subspecialty board requirements.

The scope of training is that described in the General and Special Requirements for Programs in Pediatric Hematology/Oncology promulgated by the ACGME. In brief, the trainee will come to understand the pathophysiology, clinical diagnosis, and management of pediatric hematologic and oncologic disorders as well as the selection, performance, and evaluation of procedures used in the assessment of these disorders. The trainee must acquire clinical experience with both common and unusual problems that occur in patients falling into the following categories of disease:

- Leukemias, both acute and chronic
- Solid tumors of organs, soft tissue, bone, and central nervous system
- Lymphomas
- Bone marrow failure/myelodysplasia
- Hemoglobinopathies, including the thalassemia syndromes
- Inherited and acquired disorders of the RBC membrane and RBC metabolism
- Autoimmune hemolytic anemia
- Nutritional anemia
- Inherited and acquired WBC disorders
- Platelet disorders, including ITP and acquired/inherited platelet function defects.
- Hemophilia, von Willebrand's disease, and other acquired/inherited coagulopathies
- Hematologic disorders of the newborn
- Transfusion medicine and use of blood products.
- Congenital and acquired immunodeficiences.

Experience with bone marrow transplantation and its complications, experience in working with a multidisciplinary team that deals with cancer and chronic life-threatening hematologic disorders, experience in supportive care of seriously ill children, and in providing assistance to terminally ill children and their families are all emphasized in our training program. Participation in Tumor Board and other clinical management conferences is required during the first year and encouraged in years 2 and 3. The program also provides experience in hematopathology and in the interpretation of laboratory results (i.e. coagulopathies, hemoglobinopathies, etc). First year fellows supervise and teach the inpatient pediatric residents about the diagnosis and management of hematologic and oncologic cases under the overall direction of the attending hematologist/oncologist. The fellows do most of the procedures (bone marrow biopsies, intrathecal chemotherapy, etc), under supervision. Fellows regularly attend pediatric hematology/oncology outpatient clinics. They assume primary responsibility for the long term management of a representative group of hematologic/oncologic cases and will follow these patients for up to 3 years By the third year of training, fellows are ready to serve as junior attendings and have the opportunity to attend on the hematology/oncology ward for 4 weeks.

Shared management of complex hematologic/oncologic cases requires considerable interaction with other subspecialty services on the ward, in the clinic and, most particularly in the pediatric intensive care unit. Conferences such as Tumor Board or Chief of Service Rounds foster interaction with members of other departments (surgery, radiation therapy, pathology, etc). A daily teaching conference for residents is held on the hematology/oncology ward service. Responsibility for this conference is divided between the attending physician and the fellow. Fellows also participate in Chief of Service Rounds, a weekly teaching exercise for residents, when the topic touches on a hematologic or oncologic subject. Medical students attend these weekly conferences and serve electives on the hematology consultation and/or ward hematology/oncology service. In these settings, they are also exposed to education by fellows..

Didactic teaching opportunities are available throughout the three-year fellowship. Fellows attend a multidisciplinary Pediatric Tumor Board weekly. There is also a weekly conference in the division of pediatric hematology-oncology where faculty members and fellows share in presenting research findings, journal club articles, and interesting clinical cases. A teaching conference for pediatric fellows is held weekly in order to present the scientific background and basis for the practice of pediatric hematology/oncology. In addition to these conferences, there are weekly didactic conferences in radiation oncology and neuro-oncology that the pediatric fellows are welcome to attend

Clinical Year (Year 1)

This year is divided into thirteen 4-week rotations, as described below.

Inpatient Hematology/Oncology service *20 weeks*

Moffitt/Long Hospitals

The fellow is integrated into a team of health care professionals (hematology/ oncology nurse, social worker, clinical pharmacist, pediatric resident physicians (PL 2), attending physician) who regularly care for pediatric hematology and oncology patients. He/she rounds with the

team 1½ hours 5-7 days/week. Experience in the clinical care of children with anemias, white cell and other immunologic disorders, bleeding, disorders, solid tumors or hematologic malignancies is provided and the importance of the team concept in management of these patients is emphasized. All diagnostic and therapeutic procedures (such as bone marrow aspiration and biopsy, administration of intrathecal chemotherapy, etc.) are carried out by the fellow under supervision as required.. The fellow is also responsible for presenting a 30-minute talk on a key topic in clinical hematology/oncology (e.g. management of the febrile and neutropenic patient, transfusion therapy) once or twice per week

UCSF is a member of the Children's Oncology Group and the majority of our oncology patients are treated according to COG Protocols. Through contact with the senior faculty, several of whom are very active in COG, the fellow will become familiar with how such protocols are developed, with data collection for the various studies, and with the evaluation of the results of clinical trials. Protocol therapy sponsored by the Children's Oncology Group has served as a paradigm for successful clinical research and the fellow will gain extensive experience with the use of these protocols in the treatment of patients.

All consults from other hospital services are handled by the Consult service (see below).

Hematology/Oncology Consultation Service *12 weeks*

This clinical rotation is intended to expose the trainee to patients with a variety of bleeding disorders, anemias, and other hematologic or oncologic problems that arise in patients not currently hospitalized on the inpatient hematology-oncology service. This rotation allows the fellow to see new outpatient and inpatient consult patients, some of whom will have newly diagnosed hematologic or oncologic diseases.

Time is also spent at the Northern California Comprehensive Sickle Cell Center at UCSF, where over 100 adults and children with sickle hemoglobinopathies are treated, and at the North Coast Hemophilia Center at UCSF, where approximately 200 hemophilia patients receive comprehensive care. One of the 3 blocks is spent at Children's Hospital of Oakland, where a large cohort of hemoglobinopathy patients are cared for.

The fellow attends hematology outpatient clinics 2-3 times per week and leads at least 2 teaching sessions per month for residents and medical students on the service. Fellows receive instruction from the faculty about laboratory diagnostic tests in the context of diagnostic evaluation of inpatients and outpatients seen by them. Many of the laboratory tests utilized are also described in the didactic curriculum for fellows presented weekly throughout the 3 years of fellowship. In addition, direct experience is provided in the performance and interpretation of coagulation tests in the coagulation laboratory. The College of American Pathologists quarterly hemoglobinopathy quality assurance sample analysis is used to train fellows in analysis of hemoglobin thin layer isoelectric focussing, cellulose acetate and citrate agar gel electrophoresis, sickledex confirmatory testing, and other approaches to the diagnosis of hemoglobinopathies.

Bone Marrow Transplantation Service *8 weeks*

The fellow is integrated into a team of health care professionals consisting of a nurse specialist, a social worker, a clinical pharmacist, a nutritionist, pediatric resident physicians (PL2

and 3), and an attending physician. Up to seven patients are hospitalized in the transplantation unit at any given time. These include patients with malignancies, aplastic anemia, or a variety of genetic diseases with a special emphasis on storage diseases, hemoglobinopathies, and congenital immunodeficiencies (severe combined immunodeficiency syndrome, Wiscott Aldrich syndrome, Chediak Higashi Syndrome, etc). Other pre- and post-transplant patients are seen as outpatients or may be admitted to the general wards or the Pediatric Clinical Research Center. The fellow assists in their evaluation and management as well as participating in rounds and in conferences. This includes a weekly patient management conference where issues of reimbursement, scheduling, psychosocial problems, and special needs of new and existing patients are reviewed. In addition, the fellow participates in the weekly bone marrow transplant clinical conference, where problems of patients currently hospitalized on the BMT Unit or recently discharged are reviewed by all transplant attending physicians and other team members. Immediately following this meeting is a bone marrow transplantation research meeting where specific areas of transplantation biology are reviewed. Finally, the fellow also attends weekly bone marrow transplant clinic and assists in all bone marrow harvests.

Radiation Therapy/Neuro-oncology *4 weeks*

During this rotation, the fellow works with Dr. Daphne Haas-Kogan and other pediatric radiation oncologists in the Department of Radiation Therapy. Both physicians have a major interest in pediatric oncology and treat children with a variety of malignancies. Time is also spent in the brain tumor program under the supervision of Anu Banerjee, a pediatric neuro-oncologist. The Pediatric Brain Tumor Program at UCSF sees approximately 40 new patients a year, and has an active clinical research program. In addition to ongoing participation in COG clinical trials, UCSF is a founding member of the 9 institution, Pediatric Brain Tumor Clinical Trials consortium, which is led by Dr. Michael Prados at UCSF. This consortium is dedicated to implementing novel therapeutic strategies for high-risk brain tumor patients as well as incorporating innovative biological and neuro-radiographical questions into clinical trial design. The fellow attends brain tumor clinics and the weekly neuro-onccology tumor board, as well as conferences in pediatric neuroradiology and brain tumor neuropathology. Opportunities to attend conferences on brain tumor translational and biological research (through the UCSF Brain Tumor Research Center) also exist. The fellow participates in the diagnosis and evaluation of new brain tumor patients, as well as therapeutic decision-making, working with a multi-disciplinary team of neurosurgeons, radiation oncologists, neuroradiologists neuropathologists and nurse specialists. Many patients in the pediatric brain tumor clinic come for second opinions regarding clinical trials; thus, fellows become familiar with principles of patient evaluation for clinical trial participation, as well as counseling techniques for patients interested in clinical trials. Finally, In addition, he/she plays an active role in the management of all pediatric inpatients with neurological malignancies. Finally, as many pediatric brain tumors have a very poor prognosis, this rotation frequently addresses clinical principles in end of life management.

Hematopathology/ Blood Bank *2 weeks*

During this rotation, the trainee works with senior hematopathologists in the Department of Laboratory Medicine. He/she assists in the interpretation of all bone marrow aspirates and biopsies processed by the department (approximately 80 specimens/month). This includes experience with special fixation techniques, stains, cell marker studies, electron microscopy, and other procedures as appropriate. Throughout this rotation, he/she attends the

weekly hematopathology teaching conferences and spends several days in the coagulation laboratory. Time is available for acquiring additional experience in surgical pathology, cytology, etc. as desired. Experience in the Blood Bank is also obtained during this rotation, specifically, in the donor procurement area, reference lab, HLA typing lab, and special processing department. Here the fellow becomes familiar with the evaluation of suspected RBC, WBC, and platelet antibodies as well as with the procurement of blood, screening procedures, and the preparation of special blood products (WBC, platelets, cryoprecipitate, etc.).

Vacation ***4 weeks***

RESEARCH YEARS (YEARS 2,3)

The focus of the second and third years is to develop the clinical and/or basic science research skills that will enable the fellow to make significant contributions to the field. During the second and third fellowship year, trainees work nearly full-time (except for their weekly continuity clinic) on a research project. The specific project will be chosen during the first fellowship year by mutual agreement between the trainee, the research preceptor, and the program director (Kate Matthay, M.D.) A variety of research opportunities, both clinical and laboratory based, are available within the Division in the areas of hereditary hemolytic anemias, molecular biology of cancer, and bone marrow transplantation. Collaborative research is also encouraged, utilizing the resources of other scientific investigative groups located at UCSF.

Specific details of the research program will be individualized for each trainee and can only be described in general terms here. The goals of the program will be to enable the trainee to become a member of a pediatric faculty and able to pursue an independent research career of sufficient merit to attract extramural grant support. It is recognized that two years is often not long enough to achieve this goal and additional training beyond the fellowship years may be desirable for some individuals. The trainee will work independently on his/her research project with frequent evaluations and consultations by her preceptor. The trainee will also assist in the critique of the research work of others in the Division in order to sharpen his/her abilities to analyze the strengths and weaknesses of scientific studies. S/he will present the published research of others at Journal Club, and as the opportunity allows, help critique manuscripts sent to faculty members by journal editorial boards to be evaluated for possible publication.

Clinical research is facilitated by the availability of a NIH funded pediatric clinical research center and through the support of the Glaser Foundation. Those interested in clinical research may enroll in the Outcomes Research and Clinical Epidemiology clinical research workshop at UCSF in the summer/fall period and thereafter in the Advanced Training in Clinical Research program. Both are sponsored by the Department of Epidemiology and Biostatistics, the Department of Medicine, the General and Pediatric Research Centers, and Genentech.

At the beginning of the research experience, those who plan to work in a molecular biology laboratory are encouraged to apply to attend the weeklong Workshop in Molecular Biology in Clinical Oncology sponsored by the American Association for Cancer Research and held at the Given Institute of the University of Colorado in July. This workshop consists of lectures by leading experts on molecular biology concepts and the latest developments in

molecular oncology, small group laboratory sessions to demonstrate important experimental techniques, and a workshop syllabus. Four of our past or current fellows have attended since 1994. The UCSF Department of Pediatrics is committed to the training of physician-scientists and has several departmental activities focused on their development. These include a series of monthly research talks by Faculty and a monthly fellow and resident-run Bench-to-Bedside journal club. In addition, trainees are encouraged to take advantage of the numerous scientific seminars and journal clubs taking place throughout the campus.

Fellows are required to prepare at least one manuscript describing their research that will be suitable for publication in a peer reviewed scientific journal. They are assisted and guided in this venture by their research mentor and by other faculty on an as needed basis. In addition to presenting their work at the weekly meeting of their laboratory group and annually to the hematology/oncology division, they participate in the annual UCSF Department of Pediatrics Fellows Retreat, where they present their work orally or in poster format. Beyond this, they are encouraged to present the results of their research to national meetings such as ASH or ASCO. Through these experiences and with the guidance of their mentor, they learn how to convey to others the results and conclusions of their research.

CONTINUITY CLINIC AND NIGHT CALL

Fellows attend one-half day clinic weekly throughout their 3 years of fellowship, in order to see their own continuity patients and participate in the care of other hematology/oncology patients. During the first year, a cohort of 20-30 patients with a variety of diagnoses is acquired by the fellow, usually because he/she has been directly involved in their initial admission for a hematologic or oncologic disease. With the support of faculty mentors and advanced practice nurses, he/she will be primarily responsible for the management of these patients throughout the fellowship.

One fellow and an attending physician are on call at all times. During the first two years, each fellow is responsible for night call one weeknight per week, and for weekend call on a rotation schedule. In the third year, it is typical for weeknight call to be greatly reduced, depending on the total number of fellows. Call is taken from home, although the physicians will come to the hospital for new diagnoses, to assist residents when necessary with the care of critically ill patients, and to provide support and comfort to families upon the death of a child. The fellow fields calls from patients, community physicians, referring hospitals, and residents on the inpatient service. On weekends, the on call team also rounds in the hospital with the covering residents.

WORKING ENVIRONMENT

The UCSF Pediatric Hematology-Oncology Division is comprised of a close-knit team of physicians, nurse practitioners, clinical nurse specialists, social workers, and support staff. We are committed to excellence in patient care, clinical and basic scientific research, and the continuing education of our trainees and ourselves. The UCSF Children's Hospital was recently identified as the best Children's Hospital in Northern California and one of the best Pediatric programs in the country. State-of-the-art resources are readily available. Institutional support services, designed to emphasize the educational aspects of the training experience and maximize

patient care, range from pediatric IV and sedation teams to an outstanding Child Life program as well as an up-to-date pediatric library. Computers with access for electronic mail, medical records, medical literature searches, and internet access are readily available on the ward and in the clinic. UCSF also has a superb library at the main campus, which exemplifies the institution's commitment to education and provides remote access to a wide array of journal content. More information on the UCSF Children's Hospital and the UCSF Department of Pediatrics can be found at http://pediatrics.medschool.ucsf.edu/.

Life in the Bay Area

San Francisco, the Bay Area, and northern California are an added benefit of training in the Pediatric Hematology/Oncology Division at UCSF. Cultural and recreational opportunities abound. Surrounded on three sides by water, San Francisco is 49 square miles of as varied an urban milieu as can be found anywhere in the United States. Because of her Victorian and contemporary beauty, spirit, and reputation for individual tolerance, San Francisco has always attracted an eclectic and colorful population. This has result in a community living and working together with a deep appreciation and respect for cultural diversity.

The Golden Gate Bridge, Bay Bridge, and excellent public transportation systems connect the city with neighboring Marin County, East Bay communities, and the Peninsula. Within a few scenic hours are Lake Tahoe, the Sierras, the Redwoods, the Wine Country, Monterey and Big Sur, to name just a few attractions. In addition to easy access to spectacular outdoor experiences, San Francisco boasts an active performing arts community, numerous museums and galleries, great shopping, an array of professional sports teams, and restaurants to fit every taste and budget.

In addition to the programs, faculty, staff, and facilities already described, UCSF has many resources and informal mechanisms that promote a sense of personal well-being and team spirit. For instance, a wide range of extracurricular classes is available, covering everything from Spanish to wind-surfing to wine tasting. Please refer to the UCSF Pediatrics web site (http://pediatrics.medschool.ucsf.edu/) for a number of useful links to sites discussing life, housing, and fun in San Francisco.

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