Hematology-Oncology Fellowship Program

Mayo Graduate School of Medicine

Mayo Clinic Rochester
Rochester, Minnesota
Hematology-Oncology Fellowship Program

The four-year Hematology-Oncology Fellowship Program at Mayo Clinic Rochester offers:

• Preparation for a career in a group practice or academic medicine
• Multidisciplinary approaches to patients with hematologic and oncologic disorders
• Research options in hematology, oncology or basic science
• Opportunities to teach Mayo Medical School students, visiting students from other medical schools and internal medicine residents

Mayo’s favorable faculty ratio, large patient population and state-of-the-art diagnostic, therapeutic and research facilities combine to create a truly integrated educational experience. The “Mayo way” of graduate medical education ensures you will have the finest teaching and the broadest patient care experience possible during a busy, hands-on fellowship.

Training at Mayo

Mayo has a long-standing tradition of practicing both the art and science of medicine. As one of the country’s largest and best-known private group practices of academic medicine, Mayo was founded on the belief that physicians need to work together, teach and learn from others, and conduct research to provide sustained, excellent patient care.

Physicians, scientists, residents, students, nurses and allied health staff members work as a team at Mayo. Our staff clinicians and scientists are called consultants in recognition of their teaching and mentoring role in the team.
**Program Description**

As a Mayo Fellow, you will have access to a training experience that is both broad and highly specialized.

All programs are designed to effectively prepare you for a career in Hematology-Oncology.

Many staff hematologists and oncologists serve as tutors, and their various backgrounds offer a rich diversity of clinical expertise.

Mayo’s Hematology-Oncology Fellowship Program consists of 18 months of clinical hematology, 18 months of clinical oncology and 12 months of research.

Mayo Clinic Jacksonville offers a separate, three-year Hematology-Oncology Fellowship.

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**Mayo teamwork spans many locations**

**In Jacksonville, Florida**
- Mayo Clinic Jacksonville
- St. Luke’s Hospital

**In Rochester, Minnesota**
- Mayo Clinic Rochester
- Saint Marys Hospital
- Rochester Methodist Hospital
- Charter House

**In Scottsdale, Arizona**
- Mayo Clinic Scottsdale
- Mayo Hospital Arizona

**Mayo Health System**
Clinical Training

The following is a typical rotation schedule for hematology-oncology fellows.

Clinical Hematology (18 months)

- Clinical Laboratory Rotations
  - Hematology Morphology Laboratory .................. 1 month
  - Transfusion Medicine Laboratory .................. 1 month
  - Coagulation Laboratory .................. 1 month
  - Special Protein Laboratory .................. 1 month
- Special Hematology Clinics .................. 1 month
- Pediatric Hematology-Oncology .................. 1 month
- Electives .................. 1 month
- Bone Marrow Transplantation ................. 1-3 months
- Consultation Service .................. 1-3 months
- Outpatient (Hematology) .................. 3 months
- Hospital Hematology Service .................. 4-5 months
- Continuity Clinic .................. 18 months

Clinical Oncology (18 months)

- Organ Systems
  - General Oncology .................. 1 month
  - Pulmonary Oncology .................. 1 month*
  - Gastrointestinal Oncology .................. 1 month*
  - Genitourinary Oncology .................. 1 month*
  - Gynecologic Oncology .................. 1 month*
  - Neuro-Oncology .................. 1 month*
- Surgical Pathology .................. 1 month*
- Radiation Oncology .................. 1 month
- Outpatient (Oncology) .................. 6 months
- Hospital General Oncology .................. 2-3 months
- Hospital Consulting Services .................. 4-6 months
- Continuity Clinic .................. 18 months

* These rotations require only one-half day of training each day.
Clinical Laboratory Rotations

Early in the program, you will spend four months gaining hands-on bench research experience.
• In the Hematology Morphology Laboratory, your training will emphasize the basic morphology of peripheral blood smears and bone marrow aspirations. You will gain experience in cytochemistry, automated hematology, red cell enzymology and hemoglobinopathies.
• In the Transfusion Medicine Laboratory, you will gain experience in apheresis; the complications, work-ups and management of transfusions; HLA typing; crossmatching; blood components; immunohematology; and other aspects of transfusion medicine.
• In the Coagulation Laboratory, you will learn about coagulation theory and testing and will have an opportunity to gain experience in factor assays.
• In the Special Protein Laboratory, you will focus on serum protein electrophoresis, immunodiffusion, immunoelectrophoresis, immunofixation, cryoglobulins and serum viscosity.

Special Hematology Clinics

Assignments to the special hematology clinics will give you experience in treating new and follow-up patients with various hematologic diseases such as lymphoma, anemia, myeloproliferative diseases, chronic leukemias and benign hematologic diseases such as cytopenias.
Pediatric Hematology-Oncology

During the one-month pediatric hematology-oncology rotation, you will be involved in the management of patients 16 years old or younger who have either benign or malignant hematologic diseases. You will learn the differences in the manifestations and management of hematologic disease in children versus adults.

Electives

With the program director’s approval, you can spend a month during your second or third year gaining additional experience in clinical hematology research.

Bone Marrow Transplantation

During your rotation at the Bone Marrow Transplantation Service, you will manage patients undergoing allogeneic, autologous or peripheral blood stem cell transplants. You also will evaluate, select and schedule new patients for transplantation. You will gain experience harvesting bone marrow transplants, infusing peripheral stem and cell bone marrow, and managing graft-versus-host diseases. You will be responsible for outpatient evaluations and the care of hospitalized patients.

Consultation Service

Your consultation service rotation will give you experience treating a broad range of benign and malignant hematologic and oncologic disorders. These patients are referred from the general and subspecialty services at Saint Marys and Rochester Methodist hospitals.
The divisions of hematology and medical oncology maintain:
• Two general hematology inpatient services
• One general oncology inpatient service
• One bone marrow transplantation inpatient service for allogeneic, syngeneic and autologous transplantation
• Three consultation services

Each of the four inpatient services has an average of 15 patients each day. Each of the three consulting services has approximately 900 patient visits per year.

**Outpatient (Hematology)**

In the outpatient clinic, you will have considerable autonomy as you evaluate new patients and provide longitudinal care for others. You will treat patients who have solid tumors, hematologic malignancies or nonmalignant hematologic disorders. You also will treat their general internal medicine problems. Your responsibilities will include correspondence with referring physicians.

**Hospital Hematology Service**

You will serve as the first assistant on all hospital services and work closely with the attending consultant. Together, you will be responsible for supervising patient care and for teaching medical students and internal medicine residents taking rotations on these services. In addition, you will have ample time to provide outpatient longitudinal care.
During this rotation, you will gain:
• An appreciation of the biological variability of different diseases
• An understanding of drug pharmacokinetics, drug toxicities and complications of therapy
• An understanding of the natural history and complications of treated and untreated disorders

Organ Systems
At the beginning of your oncology training, you will complete rotations in general oncology, pulmonary oncology, gastrointestinal oncology, genitourinary oncology, gynecologic oncology and neuro-oncology. You will gain experience managing the treatment of malignancies in these specific organ systems while working directly with a staff member who has special expertise in one of these areas.

Surgical Pathology
During this rotation, you will gain experience in gross pathology, frozen section appearance, permanent pathological sections and immunostaining. You will work full time with staff pathologists and surgical pathology fellows in the pathology laboratory.

Radiation Oncology
While working with staff radiation oncologists, you will learn about the fundamental principles of radiation therapy, treatment planning and the organ-specific toxicities of radiotherapy.
**Outpatient (Oncology)**
In the outpatient setting, you will serve as the primary oncologist for patients with all types of solid tumors.

**Hospital General Oncology**
During this rotation, you will supervise internal medicine residents, conduct teaching sessions, organize the inpatient service, and communicate with referring physicians when necessary. You also will write inpatient chemotherapy orders and supervise chemotherapy administration.

**Hospital Consulting Services**
You will provide oncologic consultation at various stages, from diagnosis to palliative care, for hospitalized patients receiving surgical or medical services.

**Research Training**
You will spend the last 12 months of your fellowship conducting clinical or laboratory research. You may develop projects in cooperation with clinical and laboratory investigators in hematology, oncology or both. You also can develop a basic science project in cooperation with investigators in:
- Biochemistry
- Experimental Pathology
- Immunology
- Molecular Biology
- Molecular Genetics
- Pharmacology
It is anticipated that you will write clinical and/or laboratory research abstracts and papers for submission, presentation and publication.

**Bench to bedside**
Mayo is committed to basic and clinical research that leads to better patient care.

**Mayo’s hallmark is teamwork —**
- Among basic and clinical investigators
- Among investigators and clinical practitioners
- Across Mayo sites
- Between Mayo and other institutions

**Mayo people in research —**
- 160+ full-time physicians and scientists
- 260+ associates and fellows
- 930+ administrative and allied health staff

**Research funding sources —**
- Extramural funds = $81 million+
- Mayo funds/other revenue = $54 million+

**Didactic Training**
Throughout your fellowship, you will attend clinical pathology conferences, death conferences, seminars and other didactic sessions devoted to understanding pathophysiological relationships in hematology and oncology. You also will attend the following weekly conferences:
Monday
• Hematology Clinical Pathologic Conference

Tuesday
• Hematology Core Curriculum Lecture
• Oncology Clinical and Pathologic Updates and Tumor Board

Wednesday
• Oncology Core Curriculum Lecture
• Internal Medicine Grand Rounds

Thursday
• Hematology Clinical Conference

Friday
• Oncology Interesting Patient Conference
• Oncology Research Conference

Your didactic training will include programs hosted by visiting faculty, conferences sponsored by the Department of Laboratory Medicine and Pathology, monthly hematology and oncology dinner meetings, and a monthly journal club.

Case Studies
During your Hematology-Oncology Fellowship, you will prepare case study presentations. You will present the pertinent information of an interesting case, conduct an in-depth discussion of that case, and create a current bibliography.

Teaching Opportunities
You will have the opportunity to teach Mayo Medical School students and visiting students from other medical schools through bedside instruction and formal didactic lectures.
Cardiac Life Support Certification

Certification in Basic Cardiac Life Support and Advanced Cardiac Life Support (ACLS) is required for all Mayo residents and fellows. ACLS courses are held during the last week of June, just before the start of the academic year. The ACLS course also is offered evenings every three months during the year to facilitate recertification.

General Program Information

Patient and Service Mix

As a regional medical center for the Midwest, Mayo Clinic Rochester registers more than 320,000 patients each year. Eighty percent of the clinic’s patients are self-referred and come from within a day’s drive. Although Mayo has a reputation for successfully handling the most obscure and difficult medical problems for people from around the world, common medical concerns are actually the norm. This allows you to see and treat an exceptional variety of illnesses during your clinical training.

Mayo operates one of the largest cancer centers in the United States. Each year, Mayo evaluates more than 25,000 patients with diverse solid tumors and hematological disorders. In addition, Mayo evaluates a significant number of patients with nonmalignant hematologic disorders, including thrombocytosis, thrombocytopenia, neutropenia and anemia. You will play an important role in the care of these patients.
Mayo actively participates in clinical trials of newer therapies for malignant disorders, including many Phase I and Phase II trials. In addition to intramural protocols, other trials involve cooperative efforts with a variety of groups including:

• The Children’s Cancer Study Group
• The Eastern Cooperative Oncology Group
• The Gynecologic Oncologic Group
• The North Central Cancer Treatment Group
• The Radiation Therapy Oncology Group

Mayo also operates a regional hemophilia center with a coagulation laboratory that has very diverse clinical and research pursuits.

Call Frequency

Your call schedule will vary by individual rotation. Mayo follows the recommendations of the Accreditation Council for Graduate Medical Education.

Rotations to Other Mayo Sites

During your second or third year in the program, fellows may spend one or two months working in the integrated hematology-oncology practice at either Mayo Clinic Jacksonville or Mayo Clinic Scottsdale. Mayo funds the authorized additional costs of travel, housing, car rental and licensure fees. Our fellows consistently rate these rotations very highly.
Moonlighting

Moonlighting is permitted for licensed fellows.

Evaluation

To ensure that you acquire adequate knowledge and develop your technical skills, your performance will be monitored carefully during the course of your hematology-oncology fellowship. You will be evaluated formally by your supervising faculty member after each clinical rotation. In addition, you will regularly evaluate the faculty to ensure that your educational needs are being met.

Career Development

You will meet periodically with various faculty members, administrators and the training program director to discuss your individual career goals. Mayo recruits many of its staff physicians from its own training programs. Thus, when you successfully complete the Hematology-Oncology Fellowship Program, job opportunities may be available at one of Mayo’s group practices.
Faculty

In addition to caring for patients in their clinical practices, Mayo’s faculty members are committed to teaching and facilitating the growth of medical knowledge. Many of our faculty have published and lectured extensively and are well-regarded in their field. You will have direct access to these individuals throughout your training program.

Advisers

You will be assigned a faculty adviser who can provide comprehensive educational advice and personal support. Your adviser also will serve as a contact point, introducing you and your family to (Rochester or Scottsdale or Jacksonville) and the Mayo system.

Visiting Professors

Many prominent professors visit Mayo each year. They present their work during noon and/or morning lectures and participate in hospital rounds. You will be encouraged to take full advantage of these opportunities.
Facilities and Resources

Facilities

The Mayo campus in Rochester, Minnesota, includes two hospitals with nearly 1,300 beds, a Level One Trauma Center, a comprehensive outpatient medical complex, a variety of research facilities, and several full-service laboratories and on-site pharmacies. More than 800 staff physicians represent virtually all clinical specialties.

Mayo also features a 12-bed bone marrow transplant unit and a hematology-oncology clinical research unit at Saint Marys Hospital. More than 800 staff physicians represent virtually all clinical specialties.

Libraries

Mayo’s library system in Rochester has one of the largest medical collections in the world — more than 4,300 journal subscriptions, nearly 353,000 bound volumes, and several medical databases and search engines. The main library provides study space, computers, microfilm readers and reader-printers, translations, duplicating machines, and book ordering and audiovisual services.

Reference librarians can arrange interlibrary loans, perform literature searches, and teach you how to use the computer database services that link Mayo to a global network of scientific information. More than 625 clinical conferences are preserved on videotape each year. You can view these tapes at the library or check them out for use at home.
Branch libraries include a health-related sciences library, two hospital libraries and the Learning Resource Center (LRC). The LRC, devoted mainly to the Mayo Medical School curriculum, offers special collections emphasizing women’s issues in medicine and health, medical education, and ethics.

Computer Services

Macintosh and IBM personal computers and software are available for residents and fellows to use. In addition, Mayo’s Microcomputer Education Center provides training in the use of computers for word processing, data collection and analysis.

Telecommunications System

Mayo’s clinics in Rochester, Scottsdale and Jacksonville are linked via a sophisticated telecommunications system, which provides video teleconferencing and data transmission. Staff can have live, interactive consultations with physicians and their patients at the other sites via TV monitors. In addition, X-rays, laboratory test results, CT scans, ECG tests, angiograms and pathology slides can be transmitted between sites.

An advanced telecommunications system also is the foundation for Mayo’s unique five-digit telephone dialing and pager system. Physicians can be easily accessed for consultations or updates, strengthening the teamwork among consultants, fellows, residents and allied healthcare staff at all three practice sites.
Compensation and Benefits

Vacation and Trip Policy
You may take up to 15 working days (three weeks) each year for vacation.

You are encouraged to present your research at regional and national meetings. If you are selected to make a presentation, Mayo will pay the authorized expenses for you to attend that meeting (within the United States).

Stipends and Other Benefits
Mayo has highly competitive stipends and a benefits package that includes:
- A comprehensive medical care plan
- Short-term disability insurance
- Voluntary basic life insurance, disability insurance, and family life insurance
- Voluntary additional life insurance
- Voluntary accidental death and dismemberment insurance
- A dental assistance plan
- Excess personal liability insurance
- Professional liability coverage

Additional information about stipends and benefits will be provided during personal interviews.
The Rochester Community

Home of the original Mayo Clinic and the largest IBM manufacturing plant under one roof, Rochester, Minnesota, welcomes thousands of visitors from around the world each year. Rochester, with a population of over 75,000, has the amiable qualities of many small Midwestern towns while offering big-city amenities.

If you’re interested in the fine arts, you’ll find an active network of enthusiasts who support a symphony orchestra and chorale, four theaters, a community art center, and several choruses and bands.

Rochester has much to offer in sports and physical fitness also. Within the city limits are several golf courses; tennis and health clubs; an extensive network of walking, biking and in-line skating trails; nearly 2,000 acres of city parks; and a community recreation center. Several state parks are nearby, and it’s a very short drive to fishing, hunting, hiking, camping, boating, skiing or skating.

The Twin Cities of Minneapolis and St. Paul are only 80 miles north of Rochester. Among many attractions are the nationally famous Guthrie Theatre, the Minnesota Orchestra and the Walker Art Center. Both professional and Big Ten baseball, football and basketball teams are based there. The Twin Cities also have world-class shopping and restaurants, including the Mall of America.

Good, moderately priced housing is relatively easy to find in Rochester. The public school system is one of the best in the state.
Appointments and Applications

There are five positions available in Mayo Clinic Rochester’s Hematology-Oncology Fellowship Program each year on a competitive basis. Qualified applicants must have completed three years of an accredited postgraduate training program in internal medicine in the United States or Canada.

To apply, you need to submit:

- A completed Mayo Graduate School of Medicine application form
- Official college, graduate school and medical school transcripts
- An official record of board scores (NBME, FLEX, USMLE, LMCC, VQE or FMGEMS)
- A dean’s letter and two other letters of recommendation
- A curriculum vitae
- A statement of your career goals
- A valid ECFMG certificate (if you graduated from medical school outside of the U.S. or Canada)

The academic year begins at the end of June. Applications should be completed by December 31, 18 months before you wish to begin your fellowship. If you are considered for an appointment, you will be contacted to visit Mayo Clinic Rochester for a personal interview with the program director and selected faculty. Interviews are conducted from October through January each year.
Inquiries

For applications for fellowships beginning on even years, contact:

Martha Q. Lacy, M.D.
Director, Hematology Fellowship

or

For applications for fellowships beginning on odd years, contact:

Joseph Rubin, M.D.
Director, Medical Oncology Fellowship

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If you would like to discuss the Hematology-Oncology Fellowship Program with Mayo alumni living in your area, please write to the Mayo Alumni Association in Rochester for a list of their names.