



The Pharmacy Department
Warren Grant Magnuson
Clinical Center

The National Institutes of Health

The National Institutes of Health (NIH) is located on a 300-acre campus in Bethesda, Maryland about 12 miles from Washington, D.C. The NIH is one of the largest research centers in the world. As the principal medical research arm of the U.S. Department of Health and Human Services, NIH conducts clinical and applied research related to a broad spectrum of disease and health problems.

There are 14* Institutes of the NIH, and the National Library of Medicine. The Warren Grant Magnuson Clinical Center is a modern 500 bed research hospital and laboratory complex.

Of the 14,000 NIH employees there are 2,300 with doctoral degrees; more than 1,000 of these specialists are physicians, dentists, and veterinarians. The scientific staff also includes skilled technologists of many kinds. The Clinical Center staff includes nurses, pharmacists, therapists, nutritionists and social workers.

Research programs of the Institutes are designed to gain new knowledge and combat the diseases that kill and disable, to study human development, the aging process, and the relationship of the environment to human health.

In addition to the research conducted in the Bethesda laboratories and clinics, NIH supports the work of investigators at universities, medical and research centers, and other institutions across the country and abroad. NIH trains new research scientists, and speeds the flow of medical knowledge to health practitioners and the public.

*National Institute on Aging

National Institute of Allergy and
Infectious Diseases

National Institute of Arthritis and
Musculoskeletal and Skin Diseases

National Cancer Institute

National Institute of Child Health
and Human Development

National Institute of Dental
Research

National Institute of Diabetes and
Digestive and Kidney Diseases

National Institute of Environmental
Health Sciences

National Eye Institute

National Institute of General
Medical Sciences

National Heart, Lung and Blood
Institute

National Institute of Neurological
and Communicative Disorders and
Stroke

National Institute of Mental Health

National Institute on Alcohol Abuse
and Alcoholism

The Warren Grant Magnuson Clinical Center provides the facilities and support services for the NIH clinical research programs. It also provides training in research for physicians, scientists, and other health professionals.

The Clinical Center is designed to bring patient care facilities close to research laboratories. New findings of basic and clinical scientists are moved quickly from the laboratories to patients.

Upon referral by their physicians, patients are admitted to clinical studies conducted by the Institutes investigating cancer, infectious diseases, child health, human development, dental disorders, diseases of the eye, heart, and lung, neurological diseases and stroke, mental and emotional illnesses, arthritis, diabetes, digestive and kidney diseases, and aging.

About ten percent of the patients are normal volunteers, healthy persons who provide scientists with a baseline of body functions against which to measure.

Physicians from each of the Institutes provide medical care. Nursing, pharmacy, and other support hospital services are provided by the Clinical Center. The quality of medical care required for clinical research has led to innovations that have influenced patient care throughout the nation.

The Clinical Center is a 14-story research hospital. Most floors have two nursing units of 13 rooms each. The service units are in the main portion of the building between two wide corridors. Patient rooms are along the south corridor, and laboratories on the north. Each floor houses about 100 laboratories.

A 13-story outpatient clinic and laboratory facility was built adjacent to the Clinical Center in 1983 and provides modern surroundings in which to conduct clinical research on an outpatient basis.

Mission and Core Programs

The Pharmacy Department of the Clinical Center provides cost effective and comprehensive pharmaceutical services to patients and staff of the Clinical Center. There are six core program areas:

1. distribution services—provides intravenous admixture and drug distribution systems for patients.
2. investigational drug services—provides registration, development, formulations, analysis and quality control of investigational drugs.
3. clinical services—provides clinical pharmacy programs to patients and staff.
4. research services and scientific activities—provides applied pharmaceutical and pharmacokinetic research in support of patient care and Institute programs.
5. drug information services—conducts drug information and pharmacy education programs.
6. residency training—provides training and experience in research, institutional, and specialized pharmacy practices.



Pharmacy Department Activities Inpatient Services

The Pharmacy Department provides a unit dose distribution and intravenous admixture service to all nursing units. These activities are enhanced by a computerized medical information system. The physician orders medication for inpatients that are immediately transmitted to the pharmacy by a high speed printer. The orders are filled and recorded in the patient's individual medication profile. An initial supply of medication is delivered by messenger, pneumatic tube or dumbwaiter. A 24-hour supply is placed in the patient's drawer of a pharmacy cassette transfer cart.

The centralized intravenous admixture unit supplies intravenous fluids with additives, and reconstitutes drug vials. The orders and labels are generated by computer. A pharmacist compares the order against the patient's drug profile for incompatibilities, interactions, and dosage, as it relates to the protocol. The IV solutions are mixed by pharmacists and technicians; the finished products are checked for accuracy by another pharmacist; and a 24-hour supply is stored on the

nursing unit. Quality control requires monthly bacteriological testing of the laminar flow hood, and periodic culturing of samples of the prepared intravenous solutions. The intravenous admixture unit is located in a controlled area where employees use protective clothing to insure safety for themselves and patients. Each day the IV admixture unit mixes about 750 intravenous solutions, and reconstitutes 275 drug vials.

Ambulatory Care

The outpatient pharmacy unit dispenses about 350 prescriptions each day. It is sometimes necessary to dispense large quantities of drugs to outpatients because many of them live far from the NIH campus. This is also the case if the drug is investigational, or required under a specific research protocol. The pharmacy dispenses a 3-month supply of medication initially and mails a 3-month supply later. Patients complete a questionnaire that helps the pharmacist assess the patient's use of the medication before an additional supply is provided.

Satellite Services

Two satellite units serve oncology patients by preparing intravenous drugs on site, and providing drug protocol monitoring. Primary functions include clinical services, research support, and liaison activities with the central pharmacy. Satellites enable the pharmacists to become involved in direct patient care, and improves pharmacy participation in collaborative clinical research with physicians.

The satellite programs also dispense drugs to outpatients. Thus, while patients are being treated in the clinic, their prescriptions are filled and dispensed from the nearby satellite pharmacy. Patients receive complete pharmacy services including drug counseling and education.

Drug Information Service

Information resources include the Pharmacy Department library, the Clinical Center's extensive scientific library, and the nearby National Library of Medicine. In addition to responding to requests for drug information, the drug information services unit is responsible for the monthly Pharmacy Bulletin, continuing education programs for pharmacists, inservice training programs for physicians and nurses, journal club meetings, drug information residency programs, exhibits, publications and professional relations.

Clinical Services

Clinical pharmacy services are directed by pharmacists with advanced training. Pharmacists are assigned on a full time basis to the nursing units for mental health, cardiology, arthritis, neurology, infectious diseases, and oncology. These pharmacists assist physicians in designing and evaluating drug regimens for patients, and routinely monitor and assess other patient parameters to assure appropriate drug therapy. Many collaborative research projects are underway with various Institute scientists. Pharmacy residents participate in clinical programs through six-week rotations. Under the direction and supervision of the clinical staff, residents are assigned to specific nursing units and provide such established clinical services as discharge counseling, drug therapy consultation, and inservice education; they also participate in clinical trials.

Pharmaceutical Development Services

The Pharmacy Department has one section entirely dedicated to the support of clinical research. This unit sets up blinded studies; formulates, develops and assays investigational drugs; performs analyses and stability studies; and is an investigational drug information resource. Staff members prepare customized investigational drug products for Clinical Center patients, and meet FDA requirements for the manufacture of drug products.

The unit has the capability of manufacturing tablets, capsules, and injections, and has the sophisticated equipment necessary to perform chemical analysis and applied research. It is this capability that differentiates the Clinical Center pharmacy program from others, and establishes the Pharmacy Department as a vital resource at the NIH. Over the years, the Pharmacy Department has developed many unique dosage forms for investigational drugs, and has contributed to many significant advances in the treatment of disease.

Pharmacokinetics

The clinical pharmacokinetic research laboratory performs drug analysis and monitoring. This laboratory assists physicians in their clinical research studies by developing analytical methods for determining drug levels, performing studies for understanding the response of a patient to a specific drug regimen, and collaborating in drug therapy plans. The clinical pharmacokinetic research lab has the capability of developing drug assays when none exist, and provides consultation necessary to conduct therapeutic drug monitoring.

Residency

The Pharmacy Department offers a one-year postgraduate residency program of training and experience in institutional pharmacy practice. The program is accredited by the American Society of Hospital Pharmacists. Residents develop special skills, competency, and professional expertise in hospital pharmacy, utilizing the unique facilities of the Clinical Center. Initially, residents are oriented to unit dose drug distribution, ambulatory patient services, intravenous admixture services, the formulation and preparation of investigational drugs, and procurement. The remainder of the year is divided into six rotations: 1) registration, control, formulation and analysis of investigational drugs; 2) formulary research, drug inquiries, procurement and departmental management; 3) experience in the treatment of malignancies in children and adults; 4) experience in the treatment of psychiatric conditions; 5) experience in the treatment of arthritis and infectious disease; and 6) an elective in neurology, cardiology, or pharmacokinetics.

Opportunities

The Pharmacy Department is staffed by clinical and hospital pharmacists, residents, technicians, and students. There are somewhat limited opportunities for research pharmacists, analytical chemists, and laboratory assistants. The Department hires full and part time employees. Positions are available through Federal Civil Service and the Public Health Service Commissioned Corps. Pharmacist positions require a minimum of one year hospital experience; clinical pharmacist positions require a postgraduate degree, and a minimum of one year clinical experience in a specialty area.

Candidates for the residency program are selected on the basis of their scholastic record, experience, and a personal interview. Applicants must be participants in the American Society of Hospital Pharmacists Resident Matching Program. The NIH application deadline is the first of February each year.

For further information about employment opportunities or the pharmacy residency program at the Warren Grant Magnuson Clinical Center, NIH, telephone 301-496-4363, or write to: Chief, Pharmacy Department, Clinical Center, National Institutes of Health, 9000 Rockville Pike, Building 10, Room 1N-257, Bethesda, Maryland 20892.



