ANNUAL REPORT OF PROGRAM ACTIVITIES CLINICAL CENTER FISCAL YEAR 1974

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service National Institutes of Health

U.S. National Institute of Health. Clinical Center

ANNUAL REPORT

OF

PROGRAM ACTIVITIES

CLINICAL CENTER

Fiscal Year 1974

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

OFFICE OF THE DIRECTOR

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PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

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CLINICAL CENTER

OFFICE OF THE DIRECTOR

General

The Clinical Center provided facilities, patient care, and support services for NIH physicians who conduct clinical research in eight of the 10 Institutes and the National Institute of Mental Health during FY 1974. With the exception of direct physician care, all hospital services were provided by the Clinical Center. In addition, department members conducted research in their own specialties to provide the advanced services required for medical research. Opportunities for advanced training were provided to young physicians, medical students, and nursing students. Exchange of information between investigators at NIH and biomedical personnel elsewhere was encouraged.

Program Highlights

In January 1974 Dr. Robert S. Gordon, Jr. was appointed NIH Associate Director for Clinical Care and Director of the Clinical Center, succeeding Dr. Thomas C. Chalmers who accepted a position as President of the Mount Sinai Medical Center and Dean of the Mount Sinai School of Medicine of the City University of New York. During the 3-month interim Clinical Center Associate Director Dr. Roger L. Black served as Acting Director. Dr. Gordon had previously been Clinical Director, National Institute of Arthritis, Metabolism, and Digestive Diseases for 10 years and has been with NIH since 1951.

In addition to his responsibilities as Clinical Center Associate Director, Dr. Black served as acting chief of the Rehabilitation Department following the retirement of former chief Dr. David M. Fried in January 1974.

In May, HEW Secretary Caspar W. Weinberger approved $4 million in funds to plan a Clinical Center ambulatory care center. Design of the proposed $66 million facility will begin in FY 1975. When completed, it will provide clinic space for 150,000 annual ambulatory patient visits as well as laboratories and offices for clinical personnel.

Construction of the 3-story perinatal addition to the Clinical Center continued throughout the year. Staff and resources for operating the unit were provided and the Clinical Center entered the final stages of preparation for the scheduled January 1975 opening.

A $344,000 renovation of the outpatient area was completed during the year. The number of examining rooms was increased from 20 to 29, and four special procedure rooms were added. Utility rooms in each wing of the facility were redesigned to improve storage and preparation of nursing supplies.

The facility will make possible an estimated 48,000-50,000 outpatient visits in FY 1975 as opposed to 37,000 in FY 1973 and 40,000 in FY 1974.

The Clinical Center celebrated its 20th anniversary July 6, 1973, with a day-long scientific seminar on the impact of basic science on clinical research and practice. Highlights of the program were presentations by HEW Assistant Secretary for Health Dr. Charles C. Edwards and NIH Director Dr. Robert S. Stone. Leading medical researchers, all NIH alumni, reported on recent advancements in cancer chemotherapy, the treatment of hormone related tumors, allergy and infectious diseases, heart disease, and inherited disorders such as gouty arthritis and lipid storage diseases.

A center to collect platelets for Clinical Center patients with blood diseases such as leukemia and aplastic anemia was established under contract. The center, located in a trailer near the Blood Bank, remained open evenings and weekends as well as weekdays to facilitate collection of the required large quantity of matched platelets. Formerly, platelets were collected in the NIH plasmapheresis laboratory which is also responsible for collecting white blood cells. A citizen advisory committee headed by Mrs. Stewart Alsop directed donor recruitment in the Washington Metropolitan area.

After careful evaluation of both human and economic issues involved in contracting out a variety of hospital services, it was decided to proceed with contracts for NIH employee health services and medical record transcription. Housekeeping and laundry services, however, will continue to be provided by NIH employees.

An impact study on the feasibility of installing a hospital-wide computer information system was completed in FY 1974 and a decision was made to proceed with the project. The Office of Clinical and Management Systems began developing requirement documentation for the project and anticipate that a contract will be issued in FY 1975.

A resources monitoring system was developed to evaluate utilization of personnel. Studies of each department's activities were conducted and the system will enable workload goals to be set and monitored.

The Medical Board established a joint physician-nurse committee to study the role and function of nurses and physicians at the Clinical Center. The board also reviewed 110 protocols and amendments, approved implementation of a problem oriented medical record, and increased its membership to include three non-physicians.

An in-depth study of the Clinical Pathology Department's laboratory data handling computer system was completed and a contract was awarded to completely replace the 1963 system.

A significantly reduced number of applications for the NIH Associate Training Programs in the Medical and Biological Sciences was received this year as a result of legislation which ended the physician draft. Consequently Scientific Directors and Clinical Directors committees initiated steps to

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assure a continued supply of young physicians for NIH. For example, Institute and Clinical Center laboratory and department personnel began realigning programs to provide fellowships and residencies as alternative sources of young physicians.

The Clinical Electives Program for Medical Students offered courses in Endocrinology-Metabolism, Oncology-Hematology, Immunology, and Clinical Computers. Fifty-seven students participated in the program during FY 1974. (A list of states and universities represented by these students is provided in Table 2).

The Special Events staff planned, coordinated, and directed specific programs for 50,565 visitors to NIH in FY 1974. Included were 2,232 domestic visitors and 529 from 50 foreign countries. The section consulted, planned, and provided staff assistance for 194 scientific and administrative meetings attended by 47,804 visitors in the Jack Masur Auditorium. (For additional statistics, see Tables 3-10.

Patient Care

1. Admissions[1] -- The number of inpatients admitted in FY 1974 was 4,460; 3,537 new outpatients registered for the first time.

The average length of time each inpatient remained at the 511-bed Clinical Center was 24 days, as compared to 26 days in FY 1973.

Number of discharges (includes 170 deaths)	4,375
Total hospital days	106,324
Total inpatient days	110,163
Average daily census	312
Total patients admitted to Clinical Center from July 6, 1953, through June 30, 1974	76,143

Outpatient clinic visits climbed to 40,811, an increase of 900 over the previous fiscal year.

2. Normal Volunteer Patient Program -- Requirements of NIH clinicians for normal volunteers increased during the fiscal year, and for the first time there were more eligible volunteer candidates than the number who could be placed. This made it possible to be selective of those admitted to the program, with the result that most of those chosen were students in the biomedical field. There was a substantial increase in the number of inpatient volunteers this year over the previous year.

Year	No. of volunteers	No. volunteer days	Differential increase
1972-73	290	16,234	140
1973-74	430	19,455	3,221

1 See Medical Record Department report for additional data on patient admissions.

There are two primary reasons for this increase: first, those volunteers admitted to the NIAMDD Phoenix Indian research group were included in the total, and second, there was a carry-over of 63 volunteers admitted in June 1973. Although the total count of volunteers went up, the average length of stay was reduced from 54.07 days per volunteer last year to 45.24 this year.

In FY 1973 the total number of volunteer days was 4,668, and clinic hours totaled 7,297 as opposed to 4,270 volunteer days and 6,461 clinic hours in FY 1974. This was a drop of 398 volunteer days and 836 clinic hours.

This year's average age range for volunteers increased from 23.02 last year to 24.06 for the past reporting period. The age span ranged from 18 to 72 with the largest number falling in the 19-year-old group (82). Of the 430 total number of volunteers admitted to the program, 309 (or 71.09%) fell in the 19-to-23 age group. There were fewer 18 year olds and many more 22-to-23-year old volunteers.

During FY 1974, 41.16 percent of volunteers or 177 males were admitted. The female count was 58.84 percent or 253.

Volunteer Resources -- With few exceptions volunteers were college students. It was necessary to terminate affiliations with University of West Florida (Penascola), Goddard College (Plainfield, Vermont), and the Mormon Church of Frederick, Maryland, because these groups have not provided volunteers for three or more years. New contracts were negotiated with the University of California, Davis; California State University, Chico; Green Acres School, Rockville, Maryland; and the Mormon Church, Rock Creek Park, Wheaton, Md.

The overall expense of the Clinical Center Normal Volunteer Program as measured by the per diem, per capita, and the hourly visit rate paid to the sponsors (contractors) was considerably more this year than last. This increase is accounted for in the increase of in-patient volunteers plus the increase in cost of the OPD-off-site program.

1973-1974	$256,200.18
1972-1973	$208,809.02
	$ 47,391.06 increase over last year

The Normal Volunteer Program was given approximately two minutes of a one-hour NBC national broadcast program on the use of normal controls in medical research in the United States. An article on the Clinical Center program was published by the "Aller Press" of Denmark. Appropriate photographs of Clinical Center volunteers were provided to the Danish writer and appeared with the article.

Red Cross Hospital Volunteer Services -- Red Cross Hospital Volunteers continued to provide a valuable service to Clinical Center patients and nursing personnel. Volunteer morale and enthusiasm remained high and individuals were alert to providing any new or additional services. Regular meetings were instituted between the chief of the Nursing Department and the Red Cross chairman to review existing services and explore new ones to provide better

patient services. Two groups of volunteers received special training in direct patient care, particularly for the follow-up clinics. These services include taking blood pressures, temperatures, weight, etc.

The Junior Red Cross Volunteer program became well established. A small cadre gave regular service during the school year, in addition to a large summer group who received special orientation and training.

The summer volunteers were particularly important as members took over many of the services usually performed by the senior volunteers who could not serve during the summer months because of domestic responsibilities.

3. Patient Activity Section[1] -- A diversified, patient-centered program of therapeutic recreation activities (social, music, arts and crafts, adapted sports, and dramatics), active and passive, on and off the reservation, was offered to both adult and child patients of the Clinical Center. The programs utilized the various 14th floor recreation facilities of the Clinical Center, outdoor areas on the reservation, and selected community resources.

Patients' interest in the program continued to grow and their recognition of the value of recreation as a vital part of "daily living" helped them make better use of their leisure.

Adult Program -- Social activities included dances, theme events, musical programs, feature films, off-reservation trips, bingos, and seasonal programs. Adult recreation referral program featured crafts and creative arts, as well as adapted sports activities for patients with written physician referrals.

NIMH -- Therapeutic recreation specialists organized, executed, and evaluated a daily program of adapted sports, crafts, and social activities geared to meet the leisure needs of the various mental health groups. Also, each therapeutic recreation specialist who worked with these groups met with the Unit rehabilitative team to garner treatment information and to give leisure activity guidance when necessary.

NINDS (Nursing Units 5E&W) -- As patients in this program were relatively confined to their units, a complete and varied program of recreation activities was brought to their rooms on a one-to-one basis, or to their solarium for small group activities.

Children's Recreation Program -- Participation doubled this year.

Playroom: Opened for supervised activity Monday through Saturday, 9:00 - 5:00 P.M., this area continued to be the focal point of our children's program. Available to inpatients, outpatients, and siblings of both groups, the playroom was especially meaningful to those mothers who brought a child into the clinic for treatment, yet had no one to care for the siblings at home. It was also important to the wife or husband of a patient who could drop off a "young one" and freely visit with each other. Again, as in past years, the

1 For statistics on Patient Activity Section, see Table 11.

playroom was used for planned evening activities (6:30 - 8:30 P.M.) five nights a week (Monday - Friday).

OPD: Using the waiting room, outdoor playground, the hall, and IV rooms, the therapeutic recreation specialist kept the children and parents who came to the West Wing Clinic occupied with constructive recreation activities. The therapist was able to alleviate boredom and divert not only the patient and parent, but siblings and friends as well. This program has continued to bring a more relaxed atmosphere to the clinic.

Bedside: Child patients unable to come to the playroom were visited on their units a minimum of three times per week by a therapeutic recreation specialist.

Community Resources-- Individuals and groups in the community provided tremendous support for patient activities. Free tickets to theatres and concerts, complimentary entry into historic areas, and overwhelming response to CC patient's special recreation needs at holiday time were just some of the ways the community responded. Some of these resources were: Shady Grove Music Fair, Wolf Trap Farm Park, D. C. Shakespeare Festival, U. S. Service Bands, JFK Center for the Performing Arts, Church Women United, Bishop Ireton Folk Singers, local Girl and Boy Scout Troops, and many, many, more.

Student Internship Program-- In cooperation with several local colleges and universities (Montgomery College, Washington Technical Institute, University of Maryland, and Federal City College), ten students majoring in recreation or some related field worked part-time as recreation assistants or aides. The creativity and strong leadership abilities of these students helped meet the recreation needs of a great many patients and strengthened the program tenfold. Also, three college-age normal volunteer patients were given 3-month career opportunity assignments in the Patients' Library.

Friendly Visitation Program, new this year, was coordinated by the Patient Activity Section and executed by the American Red Cross Hospital Volunteers. Every evening, volunteers visited confined and/or bedridden patients in order to bring them much needed diversion and social interaction. The warmth, personal contact, rapport, and friendship of these volunteers brought instant success to the program. In addition, seven American Red Cross Hospital Volunteers assisted in the Patients' Library.

Student Visitors again had an extremely high interest in the program. Individual students, both graduate and undergraduate, from the University of Maryland, University of Connecticut, George Washington University, and Montgomery and Prince Georges Community Colleges visited the Patient Activity Section to observe, be oriented, and learn.

Office of Clinical Program Reports and Public Inquiries

In accord with the HEW-wide reorganization of the public information activities of the various agencies, the Clinical Center Information Services Section was abolished. The technical reports, public inquiries, publications, and Freedom of Information Law compliance responsibilities of the section were assigned to a newly organized Office of Clinical Program Reports and Public

Inquiries. Medical Board and preadmissions services were also transferred to the new office. Thus the expanded unit became responsible for (1) developing educational materials to describe Clinical Center programs for physicians, medical and nursing students, potential patients, current patients, and staff members; (2) responding to general public and congressional inquiries; (3) policy review of professional papers prepared by the Clinical Center staff; (4) processing physician referrals of patients for NIH clinical research programs; (5) preparing and maintaining records of the Medical Board and its various committees and all actions that fall within the authority of the board; (6) assuring Clinical Center compliance with the spirit and all aspects of the Freedom of Information Law, keeping abreast of new provisions as they occur; and administering the Patient Press Code regulations.

During FY 1974 activities centered on preparing recruitment and staff education materials for the Nursing Department and the NIH Associate Training Programs in the Medical and Biological Sciences. Advertisements for nursing magazines, a 30-second television public service announcement, an exhibit, a full-color poster, and a laminar air flow intensive care recruitment flyer were prepared for the Nursing Department in addition to several programs for special events sponsored by nurses. A photo feature on nurses in research was distributed nationwide through the NIH News and Features service.

An exhibit describing the Associate Program was prepared for display at major medical meetings, and a member of the staff attended two national meetings to man the exhibit and provide additional information to physicians and medical students. The Associate Program catalog was updated and printed, and initial preparations began for the production and broad distribution of a color brochure describing opportunities for young physicians at NIH.

Assistance was provided to members of the Clinical Center staff who had committee and program responsibilities for the annual meeting of the PHS Professional Associations meeting in May. Arrangements were also made for photographic coverage of the meeting.

Photo features on the normal volunteer program were distributed through the News and Features service and presented in the NIH Record. Plans were made for a color flyer to be used in volunteer recruitment with additional materials to be produced for college and university officials and interested parents of potential volunteers.

Assistance was given to the patient activity program in publicizing special events for the patients, particularly those involving support from civic, church, and school groups and individuals in the community. The office also provided assistance for the NIH Davis Plan campaign that helped stimulate interest and financial support for the Patient Emergency Fund.

An outgrowth of preparations for a proposed Presidential visit in April 1974 was a fact sheet on the Nuclear Medicine Department, a collection of photographs, and an updated Clinical Center fact sheet. Originally intended for media representatives to describe what the President would see at NIH, these materials became useful for visitors and for answering public inquiries.

Twelve editions of Closeup, the Clinical Center employee newsletter, were published and distributed. To enhance employee morale and facilitate rapport between departments and services, a new feature was initiated -- a monthly photo essay about each department, including data about the freetime activities of employees as well as their role in patient care programs.

Proceedings of the Combined Clinical Staff Conferences were edited by this office and four were published in the Annals of Internal Medicine. In addition, reprints were ordered, availability announcements issued, and requests for copies filled.

Staff members recorded the minutes of 24 Medical Board meetings and 24 clinical research committee meetings; informed the NIH Deputy Director for Science of the Board's recommendations; maintained an up-to-date computerized listing of the functions, institute affiliation, and location of all NIH physicians and dentists with patient care responsibilities, and prepared two editions of a handbook containing this information; prepared current listings of consultants to the Clinical Center and distributed copies to appropriate individuals. The staff also answered numerous inquiries concerning these activities.

Television Engineering Section

In collaboration with Dr. David R. Redwood, NHLI, ventricular volume determinations were made on a daily basis using a modified abreviated silhouette method[1] to increase the number of cases on which analysis could be performed. Previously, one fourth of the cases could be analysed using automatic profile determination.

A second method of determining the New Forward Ejection Fraction was developed from the premise that the roentgen density of both the right and left ventricle, when measured by a logarithmic videodensitometer, yields analog data that is linearly related to the concentration of contrast material in the ventricle.

This latter technique[1] is now standard procedure in most catheterizations and yields additional important data, at no increased risk to the patient. This data may be more definitive in cases in which it is difficult to obtain accurate ejection fractions from the plainmetric method of silhouette profiles.

Careful analysis of the videotape data has yielded new and more significant data on the patient's condition at no additional risk to the patient and has broadened the data on which the physician can base his diagnosis.

In collaborative work with Dr. Darrell V. Lewis, NINDS, a videodensitometric technique of monitoring the oxidation-reduction state of intramitochondrial nicotinamide adenine dinucleotide (NAD+) in vivo, is used to correlate changes in energy metabolism with simultaneously measured electrographic changes in epileptogenic foci. By this means, the locus of epileptic seizures can be visualized and quantitated.

1 Citation listed in Table 1.

The technique is safe in that analysis can be made at several feet from the operative field and the procedure stored on videotape for detailed analysis.

A second technique[1] of analysis of cortical metabolism utilizing intracortical potassium electrode implantation has been combined, in animal research, with the NAD^+ fluorescence studies to establish a correlation of intraceullular to extracellular potassium ion transport during seizure activity and the interrelationship of the potassium pump mechanism with the reduction of the NAD^+ radical.

In collaboration with Dr. Andrew G. Morrow, NHLI, a three camera television system was designed and installed in the 2-R recording room to provide visual coverage of the OR-1 viewing gallery and direct overhead observation of the surgical field.

This can be used to provide the surgeon with a playback in the operating room of pertinent heart catheterization procedures for a refresh of cardiac dynamics immediately prior to the start of surgery or even during surgery.

To date, collaborative research with Dr. James A. Dvorak, NIAID, has resulted in the generation of a video system utilizing components from both NIAID and the Clinical Center and significantly improved in both speed and accuracy determination of the mean projected area profile distribution in vertebrate cells. This data can then be analyzed for area, volume, density, or rate changes as a function of time with a reasonable degree of long-term time-base stability.

The significance of the new video techniques as applied to the parasitology programs is in elucidating the interactions of medically important parasites with their host at the cellular and subcellular levels. The techniques[1] being developed with this program allow analysis of the interaction at a level of precision previously unobtainable.

New techniques of television image enhancement, notably aperture equilization, were applied to the camera signals before videotaping to obtain the ultimate resolution from the signal. By applying these techniques to television microscopy it became possible to perceive and record detail previously unattainable with the unenhanced image. This led to the first documentation of the invasion of erythrocytes by a malaria parasite, the merozoite stage of Plasmodium Knowlesi.

Observation of the invasion process has led to a new hypothesis of ion exchange during penetration, notably the role of the so-called "sodium pump" during the encapsulation stage of penetration. It is hoped that further refinements in the television image, since the light microscope is already near its theoretical limits, will enable additional detail to be recorded in real time.

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1 Citation listed in Table 1.

With Dr. Ayub K. Ommaya, NINDS, a system for signal processing through the Analog Console was developed so that the console could serve the dual function of simultaneous analysis of material from videotape for heart catheterization, and of recording a procedure from the neurosurgical operating rooms. The four camera signals available from neurosurgery are a wide overview from the recording room, an extreme closeup of the surgical field from the overhead camera, the output of the portable Philips X-Ray Image Intensifier camera, and the output of a camera located on the Zeiss surgical microscope. Several videotapes have been made for teaching purposes of the transphenoidal hypophysectomy technique. It is possible to record three channels of analog information simultaneously with the video for future analysis and review.

In collaboration with Dr. Richard L. Webber, NIDR, diagnostic errors in the interpretation of dental radiographs were reduced substantially by video preprocessing via a mixture of intensity-deflection modulation and anisomorphic magnification techniques.

Members of the section designed a five camera monitoring system for installation in the new obstetric delivery rooms and intensive care rooms to monitor patient progress and to record split-screen the patient view with the multichannel vital signs readout. This work was carried out with Dr. Ronald A. Chez, NICHD. Television Engineering will provide back-up recording facilities and calibration and setup signals when this facility opens.

A collaborative effort with the NIH Library was undertaken to design a system for viewing and editing videotapes. This will provide a reference bank of videocassettes for library use from the existing videotape in various departments and will extend the dissemination of appropriate videotapes.

Recent experiments by Dr. Boris Vern, NINDS, have indicated that significant changes in cortical metabolism are induced as a result of high frequency electrical stimulation of the brain stem reticular formation in cats.

It is proposed to employ the television fluorometer system to obtain more comprehensive information from the cortex, through cooperation of the TV Engineering staff. First, it would be possible to more accurately asses the nature and variability of the reflectance signal over the entire cortical field and to visualize a spreading depression as well as changes in superficial vasculature. Secondly, this system would also permit analyses of regional differences in NADH oxidation, as well as possible differences among patterns of activation resulting from stimulation of various brain stem sites.

TV section staff also trained the CC Nursing Department's audiovisual technician in operation and maintenance of nursing service videotape equipment.

A classroom in the CC Educational Services Section was equipped with a remotely operated television camera, and videotapes can now be made from this room on a request basis. Sixteen videotapes were made on a Hematology series for the Clinical Pathology Department at a minimum of expense and effort solely due to the ready availability of videotaping from this room.

Table 1

Contributions to Professional Literature

Block, J. B.: Lactic acidosis in malignancy with observations on its possible pathogenesis. Ann. N.Y. Acad. Sci. 230: 94-102, 1974.

Block, J. B. and Chalmers, T. C.: The treatment of Hodgkin's disease. Comment in Controversy in Internal Medicine II. Ingelfinger, F., et al. (Eds.) Philadelphia, W. B. Saunders Co., 1974, p. 748.

Block, J. B. and Zubrod, C. G.: Adjuvant temperature effects in cancer therapy. Cancer Chemother. Rep. 57: 373-382, 1973.

Block, J. B., Serpick, A. H., Miller, W., and Wiernick, P. W.: Early clinical studies with lapachol. Cancer Chemother. Rep. 1974. In press.

Chalmers, T. C., Larson, S. M., Milder, M. S., Green, M. V., Herson, J. H., Gelrud, L. G., and Johnston, G. S.: Clinical estimation of liver and spleen size. In Paumgartner, G. and Preisig, R. (Berne) Eds.): The Liver: Quantitative Aspects of Structure and Function. Basel, S. Karger, 1973, pp. 76-86.

Dvorak, J. A., Miller, L. H., Whitehouse, W. C., and Shiroishi, T.: Invasion of erythrocytes by malaria merozoites. Presentation and film at 480th Meeting of the Helminthological Society of Washington. NIH, Bethesda, Md., Jan. 18, 1974.

Dvorak, J. A.. Schuette, W. H., and Whitehouse, W. C.: A simple video method for the quantification of microscopic objects. J. Microsc. 1974. In press.

Lewis, T. L., Alter, H. J., Chalmers, T. C., Holland, P. V., Purcell, R. H., Alling, D. W., Young, D., Frenkel, L. D., Lee, S. L., and Lamson, M. E.: A comparison of the frequency of hepatitis-B antigen and antibody in hospital and nonhospital personnel. N. Engl. J. Med. 289: 647-651, 1973.

Marcus, M. L., Schuette, W. H., Whitehouse, W. C., Bailey, J. J., Douglas, M. A., Glancy, D. L.: Use of a video system in the study of ventricular function in man. Am. J. Cardiol. 32: 175-179, 1973.

Schuette, W. H., Lewis, D., Whitehouse, W. C., Walbridge, S., and Van Buren, J.: A television fluorometer. In preparation.

Schuette, W. H. and Whitehouse, W. C.: A television fluorometer for monitoring oxidative metabolism. J. Assoc. Adv. Med. Instrum. 1974.In press.

Webber, R. Schuette, W. H., and Whitehouse, W. C.: An alternative approach to dose reduction in dental radiography. J. Am. Dent. Assoc. 1974 In press.

Combined Clinical Staff Conferences published in ANNUALS OF INTERNAL MEDICINE:

Islet Cell Tumors: Current Concepts and Management. 79: 239-257, 1973
Hyperparathyroidism: Recent Studies. 79: 566-581, 1973
Xeroderma Pigmentosum--An Inherited Disease with Sun Sensitivity, Multiple Cutaneous Neoplasms, and Abnormal DNA Repair. 80: 221-248, 1974
Myasthenia Gravis (Scheduled for publication August 1974. (This is now in press.) Was originally scheduled for publication June 1974, but came incomplete and missed the deadline for that issue.)

Table 2

States and Universities Represented in the Clinical Electives Program

ARIZONA

University of Arizona

CALIFORNIA

Loma Linda University
University of California at San Francisco
University of California Los Angeles

CONNECTICUT

Yale University

DISTRICT OF COLUMBIA

Howard University
George Washington University

FLORIDA

University of Miami

ILLINOIS

University of Illinois
University of Chicago

LOUISIANA

Tulane University

NEW YORK

State University of New York Downstate Medical Center
State University of New York Upstate Medical Center
Mount Sinai School of Medicine
New York University
Albany Medical College of Union University
Columbia University
Albert Einstein College
Cornell University

NORTH CAROLINA

Duke University
Wake Forest University
University of North Carolina at Chapel Hill

OHIO

Case Western Reserve University

PENNSYLVANIA

Medical College of Pennsylvania
Thomas Jefferson University
Pennsylvania State University
Temple University
University of Pennsylvania
University of Pittsburgh

TEXAS

Baylor College of Medicine
University of Texas

MASSACHUSETTS

Tufts University

MINNESOTA

University of Minnesota

NEBRASKA

University of Nebraska

NEW MEXICO

University of New Mexico

VIRGINIA

University of Virginia

WEST VIRGINIA

West Virginia University

PUERTO RICO

University of Puerto Rico

Table 3

NIH LECTURE SERIES
Fiscal 1974

NIH Lectures:

October 17, 1973 Attendance: 942
Margaret Mead, Ph.D.
American Museum of Natural History
New York, New York
Title: "The Changing Significance of Territoriality in Human Societies"

December 12, 1973 Attendance: 492
Michael Sela, Ph.D.
Dean, Faculty of Biology
The Weizmann Institute of Science
Rehovot, Israel
Title: "Probing into Immunological Phenomena: From Molecule to Cell"

March 20, 1974 Attendance: 100
Percy L. Julian, Ph.D., D.Sc., LL.D.
Director, Julian Research Institute
Franklin Park, Illinois
Title: "Some Phases of Oxidative Hydroxylation of Steroids in the Animal Organism"

April 24, 1974 Attendance: 492
Sune Bergstrom, M.D.
Professor of Biochemistry
Karolinska Institute
Stockholm, Sweden
Title: "The Prostaglandins - Bioregulators with Clinical Implications"

G. Burroughs Mider Lecture: November 7, 1973 Attendance: 490
Ira H. Pastan, M.D.
Chief, Laboratory of Molecular Biology
National Cancer Institute
Title: "Cyclic AMP and the Transformation of Cells"

R. E. Dyer Lecture: February 6, 1974 Attendance: 540
Howard M. Temin, Ph.D.
Professor of Oncology
McArdle Laboratory for Cancer Research
University of Wisconsin
Madison, Wisconsin
Title: "The Replication and Possible Origin of RNA Viruses with a DNA Polymerase"

Table 4
SPECIAL EVENTS SECTION ACTIVITIES

MONTH	VISITORS			MEETINGS		TOURS		NIH MOVIE SHOWINGS		APPOINTMENTS WITH STAFF	REQUESTS FOR SPEAKERS	PUBS. DISTRIBUTED	INQUIRIES	
	For.	Dom.	Total	No.	Attendance	No.	Attendance	No.	Attendance				PUB.	CONG.
July	20	205	225	19	4,617	20	75	30	158	117	2	847	135	0
Aug.	55	369	424	14	4,087	20	48	30	106	92	2	2,404	130	0
Sept.	127	82	209	24	4,062	17	80	30	18	68	4	2,270	150	1
Oct.	57	131	188	11	4,729	16	94	16	94	45	4	1,646	145	0
Nov.	88	137	225	9	2,162	9	42	27	117	100	5	2,242	100	0
Dec.	8	55	63	13	2,041	6	14	6	14	43	2	312	75	0
Jan.	13	202	215	18	3,621	15	142	17	142	67	3	1,169	170	0
Feb.	23	59	82	18	5,801	5	16	7	14	32	6	578	125	0
Mar.	14	169	183	15	2,755	12	45	14	73	85	1	892	130	0
Apr.	25	350	375	17	4,999	21	150	21	370	75	3	4,525	150	0
May	65	270	335	23	6,395	16	120	12	125	52	3	2,928	135	0
June	34	203	237	13	2,535	18	109	18	109	28	2	2,170	175	0
TOTAL	529	2,232	2,761	194	47,804	175	932	228	1,340	804	37	21,983	1,620	1

Table 5

NIH LECTURE SERIES
Fiscal 1974

The Special Events Section is responsible for administrative arrangements for the NIH Lecture Series.

NIH Lecture:	October 17, 1973 Attendance: 942 Margaret Mead, Ph.D. American Museum of Natural History New York, New York Title: "The Changing Significance of Territoriality in Human Societies"
G. Burroughs Mider Lecture:	November 7, 1973 Attendance: 490 Ira H. Pastan, M.D. Chief, Laboratory of Molecular Biology National Cancer Institute Title: "Cyclic AMP and the Transformation of Cells"
NIH Lecture:	December 12, 1973 Attendance: 492 Michael Sela, Ph.D. Dean, Faculty of Biology The Weizmann Institute of Science Rehovot, Israel Title: "Probing into Immunological Phenomena: From Molecule to Cell"
R. E. Dyer Lecture:	February 6, 1974 Attendance: 540 Howard M. Temin, Ph.D. Professor of Oncology McArdle Laboratory for Cancer Research University of Wisconsin Madison, Wisconsin Title: "The Replication and Possible Origin of RNA Viruses with a DNA Polymerase"
NIH Lecture:	March 20, 1974 Attendance: 100 Percy L. Julian, Ph.D., D.Sc., LL.D. Director, Julian Research Institute Franklin Park, Illinois Title: "Some Phases of Oxidative Hydroxylation of Steroids in the Animal Organism"
NIH Lecture:	April 24, 1974 Attendance: 492 Sune Bergstrom, M.D. Professor of Biochemistry Karolinska Institute Stockholm, Sweden Title: "The Prostaglandins - Bioregulators with Clinical Implications"

Table 6

SPECIAL EVENTS SECTION ACTIVITIES

Comparison-Fiscal Years 1967-1974

YEAR	VISITORS			MEETINGS		TOURS		MOVIE SHOWINGS		APPOINTMENTS WITH STAFF	REQUESTS FOR SPEAKERS	PUBS. DISTRIBUTED	INQUIRIES	
	For.	Dom.	Total	No.	Attendance	No.	Attendance	No.	Attendance				PUB.	CONG.
1967	1,302	2,861	4,163	121	24,200	375	1,986	574	3,597	1,088	23	31,446	2,260	7
1968	925	2,667	3,592	122	19,589	297	1,464	460	3,558	654	39	21,722	2,425	5
1969	1,242	3,149	4,391	129	29,194	302	1,311	475	4,023	725	44	23,541	2,170	23
1970	1,070	2,590	3,660	197	45,944	290	1,302	495	2,744	1,019	61	33,387	1,724	13
1971	629	2,533	3,162	215	48,156	241	1,210	388	2,605	583	44	23,663	1,792	2
1972	900	2,846	3,746	231	40,785	211	1,172	330	2,760	610	23	32,521	1,875	4
1973	1,010	2,489	3,499	241	48,648	179	852	343	2,315	651	56	31,237	1,660	6
1974	529	2,232	2,761	194	47,804	175	932	228	1,340	804	37	21,983	1,620	1

Table 7

DISTRIBUTION OF VISITORS BY CONTINENTS

Fiscal Years 1969-1974

CONTINENT	FY-1969	FY-1970	FY-1971	FY-1972	FY-1973	FY-1974
AFRICA	7	19	15	84	7	9
ASIA	522	459	129	136	180	266
AUSTRALIA	18	5	7	1	6	12
EUROPE	605	480	424	404	554	142
NORTH AMERICA	3,182	2,674	2,548	2,538	2,743	2,312
SOUTH AMERICA	57	23	39	659	9	20
TOTALS:	4,391	3,660	3,162	3,822	3,499	2,761

Foreign Visitors by Country of Origin - Fiscal Year 1974

Table 8

Australia	10
Belgium	1
Brazil	10
Canada	17
Ceylon	2
Chile	1
China (Republic of)	5
Czechoslovakia	1
Egypt	1
Finland	1
France	13
Germany	83
Greece	3
Guatemala	3
Hungary	2
India	9
Iran	8
Ivory Coast	1
Italy	11
Jamaica	1
Japan	211
Kenya	1
Malaysia	2
Mexico	2
Netherlands	5
New Zealand	2
Nigeria	1
Norway	1
Pakistan	1
Peru	1
Poland	2
Rumania	2
Scotland	1
Sierra Leone	1
Singapore	1
South Africa	3
Sweden	3
Switzerland	2
Syria	1
Thailand	7
Togo	1
Trinidad	1
Turkey	4
United Kingdom	10
Uruguay	2
USSR	13
Venezuela	1
Viet Nam	1
Yugoslavia	1
Zambia	2
Unidentified Countries	60

Table 9

Visitors During Fiscal Year 1974 - by Discipline

A. Domestic - Total: 2,232

Laboratory Science	27	Employees	350
Medical	194	Clergy	12
Paramedical	569	Graduate School	97
Administrators	143	Science Writers	1
Hospital Administrators	57	Architects	1
Teachers	5	Hospital Volunteers	26
College	611	Medical Educators	2
High School	36	Engineers	5
Laymen	71	Statesmen	25

B. Foreign - Total: 529

Laboratory Science	20	College	29
Medical	316	High School	1
Paramedical	36	Laymen	38
Administrators	8	Medical Educators	3
Hospital Administrators	5	Engineers	2
Teachers	2	Clergy	20
Graduate School	37	Science Writers	12

Table 10

THE NIH VISITORS PROGRAM

1958-1974

Calendar Year	Total Visitors*	Domestic Visitors	Foreign Visitors	Number of Countries
1958	7,917	7,036	881	64
1959	7,937	6,881	1,056	58
1960	9,151	7,900	1,251	76
1961	5,328	3,976	1,352	74
1962	5,337	4,252	1,085	80
1963	4,563	3,351	1,212	74
1964	4,817	3,563	1,254	70
1965	3,918	2,939	979	69
1966	3,955	2,708	1,247	87
1967 (Jan.-June)	1,867	1,559	308	64
Fiscal Year				
1968	3,592	2,667	925	67
1969	4,391	3,149	1,242	63
1970	3,660	2,590	1,070	58
1971	3,162	2,533	629	59
1972	3,746	2,846	900	61
1973	3,499	2,489	1,010	45
1974	2,761	2,232	529	50

*In 1961, visits of high school students and laymen were discontinued in order to give more service to professional and pre-professional visitors.

Table 11

PATIENT ACTIVITIES FY 1974

Patients' Library

	Total	Monthly average
Books circulated	15,728	1,311
Patients visiting the library	6,311	526
Books on hand	5,651	
New books acquired this year	283	
Books not returned by readers	60	
Magazines circulated	10,500	
Paperback books* circulated	780	

Recreation Programs

Adults

Yearly total	2,774
Average number of programs per day	9
Average daily patient participation	145
Average participation per programmed activity	17

Children

Yearly total	3,365
Average number of programs per day	11
Average daily patient participation	55
Average participation per programmed activity	5

*Donated by interested friends.

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ANESTHESIOLOGY DEPARTMENT

CC-
Serial No.

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PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ANESTHESIOLOGY DEPARTMENT CC-

Serial No.

GENERAL

The Anesthesiology Department is a professional service department with the primary mission of providing anesthesia, inhalation therapy, and related services for patients hospitalized at the Clinical Center. Our relatively small staff, made up of qualified anesthesiologists, nurse anesthetists, medical technicians, and secretarial personnel, averaged 18 persons during the year. Physician and nurse anesthetists administered anesthesia and gave related supportive treatment for patients having major surgery or diagnostic studies that required general anesthesia. Inhalation therapy technicians were responsible for providing equipment and technical assistance for all forms of respiratory therapy utilizing medical gases, nebulized medications, and mechanical measures for respiratory support. Four clinical associates carried out research studies in connection with their clinical work.

The number of Anesthesiology Department personnel on duty was classified as follows, based on the yearly average:

Staff Anesthesiologists	2
Clinical Associates	5
Nurse Anesthetists	2
Inhalation Therapy Technicians	5.3
Anesthesia Technicians	2
Secretarial Personnel[1]	2

1. One secretary part time

ANESTHESIOLOGICAL PROCEDURES PERFORMED

Anesthesia and related supportive treatment were provided for patients in 1362 instances of which surgical operations accounted for 1193 and diagnostic procedures 169. Miscellaneous services, consisting of nerve blocks, consultations, and resuscitation treatments totaled 41. Surgical and diagnostic procedures were, for the most part, extensive and prolonged. Many of the patients were seriously ill with life-threatening conditions, and their health and continued survival were dependent on the success of the surgery. Anesthesia time exceeded 3 hours in 558 instances (41 percent), 5 hours in 311 procedures (24 percent) and 6 hours in 202 operations (15 percent).

Surgical procedures classified according to type of surgery and the use of special adjunctive techniques were as follows:

1.	Thoracic (cardiac, pulmonary, great vessels, superficial chest)	
	a. with extracorporeal circulation technique	184
	b. closed technique	138
2.	Neurological	
	a. craniotomy	97
	b. sterotaxic procedures, including thalamotomies	16
	c. spinal cord operations	13
3.	General surgical (abdominal, pelvic and inguinal)	261
4.	Kidney operations, including bladder and adrenal gland	21
5.	Perineal (gyn-33, genito-urinary-33, others-11)	77
6.	Face, head, and neck	177
7.	Eye, ear, nose, and throat	93
8.	Dental	5
9.	Orthopedic	14
10.	Miscellaneous procedures	97
	TOTAL	1193

Procedures performed by the surgical branches of NCI, NHLI, NINDS AND NEI were of the following types.

1. NCI - extensive excision procedures for treatment of cancer, of the head, neck, and pelvic regions.

2. NHLI - operations on the heart and great vessels to correct congenital and acquired defects; 184 of these procedures were done with the aid of extracorporeal circulation technique. An additional 25 cardiac and great vessel procedures were done by closed methods.

3. NINDS- neurosurgical procedures to localize and remove the epileptogenic foci and neoplastic tumors, sterotaxic techniques for treatment of abnormal movement and tonus syndromes; and surgery for vascular malformations of the spinal cord. There was a 30% increase in neurosurgical operations.

4. NEI - anesthesia for eye surgery increased significantly from the previous year. (58 procedures for 1974 as compared to 27 in 1973) The demand for anesthesia standby service for vitrectomy procedures, which average four hours in duration, rose abruptly after the installation of special facilities for eye surgery was completed in December 1973.

The complexity and duration of approximately one half of the surgical operations required the presence of more than one anesthetist during critical phases of the operation. The operation of anesthetic equipment, physiological monitoring apparatus, thermal devices, blood transfusion apparatus, etc., made it necessary to have the services of a second professional anesthetist assistant available, at least some of the time.

Diagnostic studies done with the aid of general anesthesia totaled 169. Sixty-eight of these procedures consisted of cardiac catheterization procedures on small children. Heavy or "controlled sedation" rather than full general

anesthesia was utilized in the management of children.

Patients with incapacitating illnesses potentially capable of causing serious circulatory and respiratory derangements underwent diagnostic studies under the care of anesthesiologists who maintained surveillance for vital signs and gave supportive treatment as needed.

Diagnostic tests done under general anesthsia included:

Pneumoencephalograms	5
Cerebral arteriography	5
Special eye examinations	4
Cardiac catheterization procedures	68
Cystoscopy	14
Miscellaneous, including cardioversions	73
Total	169

The Institutes who sponsored the admission of patients who received anesthesia are listed below. (the first six Institutes have surgical services)

Institute	Procedures	Percent
NCI	627	46
NHLI	370	27
NINDS	172	13
NINDR	0	0
NEI	58	4
NICHD	10	.8
NIAMD	57	4
NIAID	43	4
NIMH	20	2

Surgical and diagnostic procedures on the above patients were carried out by the six surgical services as follows:

Institute	Procedures	Percent
NCI	699	51
NHLI	390	29
NINDS	186	14
NINDR	4	.3
NEI	59	4
NICHD	4	.3

INHALATION THERAPY ACTIVITIES

The Inhalation Therapy Section, Anesthesiology Department, CC, was staffed with an average of five inhalation therapy technicians. This small staff was responsible for overseeing all inhalation therapy in the the Clinical Center during FY 1974. The procurement and maintenance of adequate supplies of inhalation therapy equipment and its cleaning, processing, repair, and sterilization occupied a large proportion of personnel time. During the first part of the year the patient care duties performed by inhalation therapists were limited to the initiation of new treatments, making routine inspections of patients receiving respiratory care and answering requests for specific services. Staff additions during the latter part of the year allowed inhalation therapists to assume responsibility for routine treatments that had formerly been handled by nursing personnel.

Continued use was made of disposable inhalation equipment in lieu of the time consuming processing of reuseable apparatus. Technical improvements in manufacturing have resulted in the availability of disposable nebulizers, humidifiers, and respiratory breathing systems. During FY 1974 an excess of $30,000 was expended for disposable equipment.

Staff anesthesiologists served as medical consultants for the inhalation therapy technicians and provided advice for attending physicians who requested assistance.

The types of respiratory care carried out by inhalation therapists have been classified in a number of categories. It must be pointed out that the life support services provided by our inhalation therapists were difficult to tabulate for statistical purposes, even if extra clerical personnel had been available. The following figures present only a rough

indication of the workload, and do not indicate the amount of specialized respiratory care required by some of the more seriously ill patients.

Oxygen therapy (tent, mask, catheter)	24,760 hours
Humid atmosphere therapy	23,431 hours
Aerosol therapy	6,430 hours
Intermittent positive pressure breathing with aerosols	36,015 treatments
Long-term respiratory assistance	12,575 hours
Short-term resuscitation and assisted respiration	2,462 hours

Educational Activities

Regularly scheduled training in cardiopulmonary resuscitation and inhalation therapy techniques were held as follows:

1. Eleven sessions for teaching of cardiopulmonary resuscitation were conducted by anesthesiologists for professional nurses newly employed by the Clinical Center.

2. Seventeen sessions for orientation of new nursing personnel and special instruction in the use of positive pressure breathing equipment was given to a total of 232 nurses by senior inhalation therapists.

Inhalation Therapy Coverage

The relatively small staff of inhalation therapists, which averaged only five, provided regularly scheduled services during two shifts on working days and one shift on weekends and holidays. At other times, calls for assistance were answered by a technician on call to provide 24 hour coverage. While a large proportion of such calls could be classified as emergency, many were of a routine nature. An average of over six calls per month, doubled that of the previous year, were answered.

MAJOR PROBLEMS ENCOUNTERED

Personnel shortages contined to be a predominant problem. As in the previous year nurse anesthetists and anesthesia technicians, for the support of seven anesthesiologists, working in widely separated areas, were limited to a total of four employees.

Difficulties in recruiting and retaining inhalation therapy technicians persisted to the point that we had two vacancies during most of the year.

Another major problem involved coordinating surgical schedules, from the seven or more groups that require anesthesia service. The establishment of a priority system designed by the Chief, Surgical Nursing Service, resulted in some improvement. However, the numbers of last minute cancellations, substitutions, change in the type of surgical procedures proposed, type of anesthesia, type of operation and the identity of surgeons performing the surgery, remained at an unreasonable level and required an inoordinate amount of work on our part. Careful planning and bargaining between surgical services was necessary in order to prevent peaking of the workload to the point beyond the capabilities of available anesthesia personnel.

Closure of the entire 10th Floor Surgical Suite for several weeks and one half of the operating rooms for a period of three months further complicated the picture.

The end of the Selective Service Draft System one year ago has produced a new situation which threatens the very existence of a viable clinical anesthesia service at the Clinical Center. A Search Committee appointed by the Director, CC, has addressed itself to this problem in addition to seeking a replacement for the Department Chief, who plans to retire during the coming year.

Changes and Improvements

There were little or no changes and improvements to report. Essentially, we continued to provide the best available anesthesia professional care with the limited personnel available. A step in the right direction occurred when the Inhalation Therapy Section was able to assume more direct responsibilities for the administration of respiratory care than they had in the past. The allocation of two positions made this possible even though difficulties continue to be encountered in keeping the slots filled.

Future Objectives

Future objectives will be concentrated in obtaining and recruiting sufficient numbers of qualified personnel to provide essential anesthesia and respiratory care services for the Clinical Center. Research objectives will be concerned with providing increased opportunities for our staff to engage in investigational work. Administrative encouragemnt has been forthcoming for the past three years but personnel, facilities and space have been so severly limited that research projects have been few and far between. Research accomplishments in the past year are mentioned below and described the the attached projects.

Research Activities

Two related studies dealing with (1) the effect of the rate of administration of citrated whole blood on serum ionized calcium of patients undergoing extensive general surgery and (2) the effect of the administration of heparin and protamine on the serum ionized calcium of patients during cardiac surgery, were carried out by four of our clinical associates. The significance of their findings upon hemodynamics of anesthetized man awaits further investigation. Project reports attached.

Publications:

Denlinger, J.K., Lecky, J.H., and Nahrwold, M.L.: Hepatocellular dysfunction without jaundice following enflurane anesthesia. Anesthesiology 40: 1974.

Longnecker, D.E., Stoelting, R.K. and Morrow, A.G.: Cardiac and peripheral vascular effects of gallamine in man. Anesthesia and Analgesia 52: 931-935, 1973.

Serial No. _____
1. Anesthesiology Dept., CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Effect of Citrated Whole Blood Infusion Rate on Serum Ionized Calcium in Anesthetized Man

Previous Serial Number: None

Principal Investigator: J. Kenneth Denlinger, M.D.

Other Investigators: Michael L. Nahrwold, M.D.
John H. Lecky, M.D.
Phillip S. Gibbs, M.D.

Cooperating Units: Anesthesiology Department, Clinical Center

Man Years:

Total: ½
Professional: ½
Others: None

Project Description:

Objective: To quantitate the changes in serum ionized calcium which accompany rapid administration of citrated whole blood, plasma protein fraction and saline.

Methods: Twenty-six patients anesthetized for major cancer surgery involving "massive" blood loss were studied. Serum ionized calcium was measured at 1-minute intervals during and following administration of citrated whole blood, plasma protein fraction, and saline at controlled rates of 50 ml/70 kg/min, 100 ml/70 kg/min and 150 ml/70 kg/min.

Major Findings:

Infusion of saline at a rate of 100 ml/70 kg/min for 5 minutes produced no significant changes in serum ionized

calcium. Plasma protein fraction administered at this flow rate resulted in an 18% decrease in serum ionized calcium with prompt recovery to control levels within 10 minutes following infusion. Transfusion of citrated whole blood was accompanied by 14%, 31% and 41% decreases in serum ionized calcium during infusion rates of 50, 100 and 150 ml/70 kg/min respectively.

Significance to Biomedical Research and Clinical Practice:

It is concluded that hypocalcemia accompanying cittated whole blood transfusion is rate dependent and extremely transient under the conditions of this study. The magnitude of this decrease in serum ionized calcium may be greater in patients with liver dysfunction and in hypothermic patients because of reduced citrate clearance.

Proposed Course:

Whether the decreases in serum ionized calcium documented in this study are of hemodynamic significance awaits further investigation.

Publication:

Submitted for presentation at the 1974 annual meeting of the American Society of Anesthesiologists in Washington, D.C. Also to be considered for publication in ANESTHESIOLOGY.

Serial No. _____
1. Anesthesiology Dept.,CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: The Effect of Heparin and Protamine Administration on Serum Ionized Calcium in Anesthetized Man During Cardiac Surgery

Previous Serial Number: None

Principal Investigator: Michael L. Nahrwold, M.D.

Other Investigators: J. Kenneth Denlinger, M.D.

Cooperating Units: None

Man Years:

Total:	0.05
Professional:	0.05
Others:	0.05

Project Description:

Objective: Preliminary *in vitro* studies disclosed that concentrations of heparin or protamine estimated to be present in blood after administration of 1.5 mg/kg heparin or 4.5 mg/kg protamine to a 70 kg man significantly depressed serum ionized calcium (Ca++). This study was designed to determine if a similar situation exists *in vivo*.

Methods: Patients undergoing general anesthesia for cardiac surgery were divided into two groups. Group I received 1.5 mg/kg heparin intracardiac. Arterial samples were then drawn at 0, 1, 2, and 5 minutes after heparin administration for Ca++ determination

(Orion flow through Ca++ electrode). Group II patients received 4.5 mg/kg protamine IV to reverse a previous dose of heparin. Arterial samples were drawn at 0, 5, and 10 minutes for Ca++ analysis. Protamine was infused over a period of 5 minutes beginning at 0 minute. The greatest fall in systolic pressure during infusion was 11 torr.

Major Findings: Arterial pH values at the time of heparin or protamine administration were within the range of normal. Group I patients (heparin) did not exhibit a change in Ca++ at 1, 2, or 5 minutes when compared with the 0 minute sample. Group II patients (protamine) demonstrated a small but statistically significant decrease in Ca++ at 5 and 10 minutes when compared to the 0 minute sample.

Significance to Biomedical Research and Clinical Practice:

Proposed Course: There is little point in pursuing the heparin portion of this study. However, the protamine study leaves two unanswered questions: (1) would there have been a larger magnitude of depression of Ca++ if the patients had had a greater decrease in systolic pressure during infusion, and (2) is the small but significant decrease in Ca++ hemodynamically significant?

Publication; Submitted to the Scientific Session of the American Society of Anesthesiologists for consideration for presentation at the 1974 meeting of the Society.

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY OF ANNUAL REPORT OF PROGRAM ACTIVITIES
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BLOOD BANK DEPARTMENT

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July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY OF ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

BLOOD BANK DEPARTMENT

SUMMARY OF SERVICE RESPONSIBILITIES

This year saw a responsive alteration in our service activities which mirrored changes in one of our largest users, the NCI. Their platelet support program undertook a radical change with the use of fewer random donors in favor of more preselected donors. Current research has demonstrated that platelet donors can be typed for a family of white cell (HL-A) groups which are different from the red cell groups. Some patients are more responsive to platelets from donors of the same type, and more patients respond better to platelets from donors who are of the same type and who are also blood relatives. In order to test these findings the NCI increased its own platelet procurement program, and reduced use of our platelets and of Red Cross platelets.

Much of the past efficiency of our operation was due to the multiple use concept. We had been separating whole blood into platelets for use by the NCI, red cells for use by the NHLI, and plasma coagulation factors for use by the NIAMDD. In FY 1974, since there were separate platelet donors and red cell donors, two donors were needed where before one might do. At the request of NCI a contract was negotiated for a plateletpheresis unit. An agreement was made for a platelet supply contract to be paid for by NCI and a platelet research contract to be paid for by CC; both to be managed by this Department. No acceptable proposal was received for the research portion and only the supply contract was awarded.

The successful bidder was Community Blood and Plasma Service, a division of IPCO Hospital Supply Corporation, and the contract was awarded to begin November 30, 1973. The contractor set up trailers outside the CCBB, obtained and trained staff, started collecting blood samples on April 8, 1974 and platelets on April 15, 1974.

The use of 6600 (pint) units of whole blood and red cells was similar to that of last year. The total of 3500 units of antihemophilic cryoprecipitate prepared and issued was almost the same as last year, despite the fact that additional

coagulation factor concentrates were obtained from contractors in exchange for surplus plasma. With the phase out of the commercial supply of Platelet Rich Plasma from the Baltimore contractor in favor of Platelet Concentrates collected in the on site trailers, the plasma source for Antihemophilic Factor was eliminated. NIAMDD was contacted and stated a desire for us to buy a dried, standardized, licensed product with their funds.

DEPARTMENT ORGANIZATION

The formal reorganization of the Department which went into effect in March of 1973 to better permit use of available resources was implemented.

The Office of the Chief, is directly responsible to Dr. Paul J. Schmidt, and is concerned with overall direction of the blood service effort in support of clinical research. It supplies secretarial and computer services to the department and in addition is engaged in research on computer applications.

The Blood Services Section under Dr. Paul V. Holland as Chief, began to acquire, process, and dispense all perishable blood and blood products for transfusion at the Clinical Center. This included selection and bleeding of donors, grouping and typing of blood, processing of blood into components, compatibility testing, and followup of transfusion in recipients.

The Immunology Section under Dr. Harvey J. Alter as Chief, was formed to develop clinical applications of research procedures to increase the safety and effectiveness of blood transfusion. This has included development of tests to prevent parenteral transmission of hepatitis, as well as study of immunity in relation to transfusion and transplantation.

We continued our registration with the Food and Drug Administration. That organization is registering all blood banks in the country. Although there might be some question as to the necessity for a part of DHEW to register with another, we undertook the step at the request of the FDA. In return they promised to make every attempt to coordinate and use our knowledge of clinical applications in their regulatory program.

DONOR PROGRAM

The Resource Monitoring System for recording our workload was evolved with the OD,CC. Weighted workload records were designed and monthly submission began in July of 1973.

In accord with the DHEW proposal for an all voluntary blood donor program, we phased out our system of paying NIH employees

for every other donation. Only follow up donors were paid between October 1 and December 31. After January 1, 1974 no more donors were paid. Before the changeover, the donor program stayed at the same collection figure for the last two years, about 5,000. With our present nursing and recruitment staff that is the most efficient number. An analysis was made of the efficiency of the donor contact system. In a situation in which we wished to obtain 16 donors of a certain type for projected surgery we would start with 100 known employee donors listed as eligible in our file:

	No. of donors	
Start eligible		100
Phone contact not possible	33	
Contacted but not scheduled	42	
Scheduled		25
Cancelled or no show	6	
Medical rejection	3	
Bled		16

Since our contacts are made by phone, that meant six phone calls per donation. With the new all voluntary system now in effect, no large differences have been noted in donor willingness. However, the above contact study will be repeated and other comparative studies will be made when the voluntary system has been in effect for a longer period.

Some of the whole blood collected at the Clinical Center continued to be taken into special platelet collecting bags. While many of these platelets were not used, they have been available without attempting to bleed donors at night or on weekends. This supply has enabled us to meet unexpected needs at the Clinical Center as well as to provide some to the community on occasion.

The donor service continued to provide many services to non-clinical parts of the NIH, including provision of blood and components for research, plasmapheresis, and phlebotomies.

LABORATORY SERVICES

The determination of *in vivo* red cell compatibility in the face of *in vitro* incompatibility is a difficult and recurrent blood bank problem. In the past we have had some limited success with the use of radiolabelled donor cells. The procedure was modified this year by addition of plasma counting to standard red cell counting to look for immediate hemolytic destruction as well as splenic sequestration. As an example, in a patient with Hodgkin's disease, the major site of red blood cell sequestration was found to be in the spleen. The study was instrumental in the decision to perform a splenectomy on the patient.

A continuous inventory of blood, plasma and platelets available for patient use was instituted. One blackboard lists units not already committed to a specific patient. Special notes on serological reagents and special problems are also displayed on this board so that all technologists can see them for quick reference. Another blackboard was placed for the current inventory of frozen red cells, both rare cells for special use and regular units for routine use.

A review and consolidation of laboratory procedures was conducted. Weekly sessions were held to review carefully each page of the procedures manual. The process allowed all technologists to express their thoughts and impressions (some erroneous) and proved to be a general teaching experience.

A daily log book was started which has proved invaluable to keeping abreast of happenings especially in the evenings and on weekends. On-call personnel and daytime laboratory staff can find out immediately important developments on Clinical Center patients.

Through the American Association of Blood Banks Reference Laboratory Program, the rare reagent red cell inventory here has been augmented. We had over the years acquired an excellent library of frozen rare and valuable reagent red cells. Through the "cell of the month club", we have added 17 rare cells and at least 14 more should arrive before the year is out. These cells add to our capacity to resolve difficult antibody problems as a prelude to proper transfusion. This service is available to our patients and in demand by other hospitals which send us an average of five such problems per month.

FROZEN RED CELLS

Transfusions of frozen red cells have been given at the Clinical Center since 1954 but have now become a regular service item. We transfused 40 to 50 units per month and had an inventory of 150 units of frozen cells for transfusion on hand at all times.

Patients selected as recipients of frozen red cells were of three types:

a) those with frequent, severe, febrile non-hemolytic transfusion reactions who required red cells as free of other blood components as possible,
b) prospective transplant recipients for whom there was a wish to decrease the risk of sensitization to white cell and platelet (HL-A) antigens,
c) patients with antibodies to high incidence blood antigens whose own red cells are saved for their own potential use.

A bonus of the use of frozen cells has been our ability to use donors with antibody in their serum since the plasma is so completely removed from cells in the freezing and thawing process.

TEACHING

The department continued to be involved in many intramural teaching activities. The programs included:

a) Clinical Associate program (two staff physicians preparing for subspecialty boards)
b) NIH Clinical Pathology residency program (four physicians from that department)
c) STRIDE trainees (two college students)
d) Technologist training (three technologists for advanced training on an ongoing basis)
e) Georgetown Clinical Pathology residents (three physicians for four months each)
f) George Washington University and American National Red Cross hematology fellows (three physicians for one month each).
g) Medical elective students (two for one to two months)
h) Visitors who spend days to weeks to learn our procedures and techniques (10 this year).

For medical staff teaching, there are weekly residents' rounds as well as teaching rounds in the schedule of the Clinical Pathology Department once a month. There are also two weekly sessions for the blood bank staff. The staff education program was divided this year into two sections: (1) The regular Friday meeting which is for the entire blood bank staff and, (2) regular Tuesday meetings which alternate as a journal club for interested members of the staff, and teaching sessions for the technologists. Mrs. Mary McGinniss who has been teaching supervisor for the past 8 years relinquished that assignment in order to devote more time to new applications in immunology. Mrs. Mary Ann Gralnick assumed the teaching role.

The Friday meetings were scheduled into teaching blocks designed to establish continuity of the topics presented. Speakers were selected from within the Blood Bank Department, from the NIH, and occasionally from outside NIH. The topics chosen related to the interests of the staff, problems encountered in blood banking, and fields which the blood bank students are required to cover. Since a large proportion of our blood goes to cardiac surgery patients, a teaching block on the pathology, physiology, and operative procedures relating to heart disease approachable by surgery was presented. Blood bank and hematological coagulation problems relating to our cardiac surgery program were discussed. Sessions were held on platelet function, physiology, and transfusion, as well as

white cell function, morphology, disease, and transfusion. The coagulation system was presented. A block was designed to update everyone's knowledge of posttransfusion hepatitis. At the end of each block a meeting was held where individual staff members asked about aspects which remained unclear and discussed problems which arise on a day-to-day basis relating to the general topic.

The journal club reviewed the current literature from selected specialty and general medical journals. At each session a "classical" article was also presented by one of the technologists and discussed by the group. We created training positions for three STRIDE students, one in administration, one in technology and one in nursing. The program under which we train graduate medical technologists for the specialization in blood banking was recertified by the American Association of Blood Banks. That agency performs regular inspections under its authority to recognize programs for the Council on Medical Education of the American Medical Association.

There is also an active extramural program in which the professional staff have major academic responsibilities. We continued offering our education program to the Food and Drug Administration. Twenty five more inspectors received their only exposure to actual blood banking in this Department before going on official field visits.

Dr. Holland has been an attending physician at George Washington University Hospital and also the Veterans Administration Hospital. Dr. Alter taught in the course in laboratory diagnosis at Georgetown. Drs. Lundberg and Rothman served as attending physicians at Suburban Hospital.

DEVELOPMENTAL RESEARCH

The major research thrust which is the responsibility of the Immunology Section was again in the area of posttransfusion hepatitis (PTH). Despite our earlier efforts which had resulted in a reduction in its frequency, hepatitis continues to be the major deleterious effect of transfusion therapy.

HEPATITIS

Prospective Clinical Studies

This year saw the completion and publication of the fourth phase of our ongoing prospective studies on posttransfusion hepatitis (PTH). The findings of this study were quite definitive and clearly outline the directions for future research in this area. They can be summarized as follows: 1) The combined exclusion of commercial and Hepatitis B Antigen (HBAg) positive donors will greatly decrease the frequency of

PTH, the decrease being primarily dependent on exclusion of the commercial donor; 2) HBAg+ PTH continues to occur despite screening of donors for HBAg by counterelectrophoresis (CEP) and in some cases even by the most sensitive test now available, radioimmunoassay (RIA); and 3) a significant proportion of PTH is unrelated to Hepatitis Virus B. In the continuation of this work, we have applied major effort to pursue those leads. We have worked extensively on improvement of the radioimmunoassay tests for hepatitis B and we also worked with Dr. R. Purcell of NIAID to try to develop an assay for hepatitis A. In addition, we have initiated a new prospective study to evaluate the infectivity of blood found to be positive for HBAg only by the sensitive radioimmunoassay.

Although our prospective studies have always had excellent followup of blood recipients, they have had two defects: (1) not all of the donor sera have been salvaged for retrospective comparative testing, and (2) recipient sera were only available from patients who lived locally (other patients had liver function tests performed in laboratories near their home). We have now initiated a fifth phase of our PTH studies and have set up mechanisms such that 100% of donor sera are saved and such that we receive serum specimens on multitransfused recipients no matter where they reside in the country. Our aim in this study is to evaluate the infectivity of blood which is positive only by the radioimmunoassay (RIA) and also to establish a complete donor and patient serum collection in each case of hepatitis to use for retrospective testing should a still more sensitive assay for HBAg and tests for other hepatitis agents be developed. Thus far in the study there have been four patients who developed HBAg+ hepatitis. Retrospective analysis of the donors to those four patients showed that for three of the four, one donor was specifically positive by the RIA, but negative by the CEP test. Hence, three out of four cases of HBAg+ hepatitis could have been prevented had we been screening donors by RIA rather than CEP. Conversely, all three RIA-positive, CEP negative blood units transfused in the past year resulted in clinical hepatitis. On the basis of these findings, we have adopted RIA testing as our routine procedure for donor screening.

Testing for Hepatitis B Antigen

As indicated above, we have done extensive evaluation of the commercially available RIA test for HBAg (AusRIA:Abbott Laboratories). This has included testing of over 4000 coded samples obtained in a surveillance study of 2000 NIH employees, and also samples on almost 2500 donors. In addition we have tested pedigree panels, rhesus monkey sera, and hepatitis patient sera.

Three major aspects of the RIA tests were evaluated: sensitivity; specificity; and infectivity. We have clearly documented by defined panels, comparative titers, serial followup of hepatitis cases, and serial transmission studies in rhesus monkeys that the RIA test is 50 to 75 times more sensitive than CEP. This marked increase in sensitivity is not, however, reflected in a commensurate increase in the number of HBAg+ donors that will be detected. Our best current estimate is that RIA will detect two to three times as many HBAg+ donors as will CEP in a blood bank such as ours, which uses a high proportion of repeat, voluntary donors and which is experienced in reading CEP plates. In laboratories which use commercial donors or poor CEP technique, RIA will be of even greater advantage. It has been shown by proficiency panels, that CEP is a subjective test subject to considerable interpretative error. One of the major advantages of RIA is its inherent objectivity allowing even inexperienced personnel to correctly identify the presence of HBAg.

In the course of performing the RIA test, it was noted that a large number of reproducible false positives occurred. It is thus essential that every RIA+CEP- serum be tested for specificity. We have developed a simple neutralization method for doing this, using antibody to HBAg which is not radiolabelled. Control neutralization is done with normal human serum and guinea pig serum. At least half of the false positives are due to the presence of antibodies in human serum which are either specific for, or cross react with, guinea pig serum (the reagents in the AusRIA test are derived from guinea pigs). The cause of the remaining false positives has not been identified. Over the past year modifications in the Ausria system have greatly reduced the degree of nonspecificity and the manufacturer is changing one of the reagents to eliminate the guinea pig problem.

We have also worked with NIAID in the development of a microtiter solid phase radioimmunoassay. This has comparable sensitivity to the commercial (AusRIA) test and has the advantage of requiring one fourth the amount of test serum and of being easier to use on large numbers of sera. It is also less expensive and allows use of a greater variety of reagents.

Dr. Holland investigated the use of latex fixation and Dr. Alter the use of reversed passive hemagglutination. These tests although promising, do not seem as sensitive as radioimmunoassay.

Epidemiologic Studies

This department has been involved extensively in epidemiologic studies concerning transmission of HBAg. The first of these studies compared the frequency of Hepatitis B antigen and

antibody and chemical tests of liver function in health care personnel with a matched control population that had never had patient care responsibilities. There was no statistical difference in the frequency of HBAg between the two groups but there was a suggestion that the source of HBAg was different. Health care personnel may have been occupationally exposed, and the controls exposed by previous transfusion. The frequency of antibody was twice as high in health care workers. There was no correlation in either group between a history of hepatitis and the presence of HBAg. In the course of this study, three HBAg+ health care workers who still had patient contact were identified and a study initiated to follow their patient contacts along with suitable controls. The patient contacts of the health care personnel did not develop HBAg, nor antibody to it, nor clinical hepatitis. Similar negative results were previously found in following the contacts of an HBAg+ food handler.

For the past year, we have been involved in a hepatitis surveillance program initiated in the leukemia out-patient department. HBAg is endemic in that clinic setting and 1973 saw the occurrences of a superimposed epidemic of mild proportion. Eighteen patients developed HBAg for the first time in 1973. All but two of these patients became chronic carriers of the antigen, but none had serious hepatitis. In addition, five of 20 physicians attending that clinic developed overt HBAg+ hepatitis as did one of two nurse therapists. In about half of these cases, the hepatitis could be traced to an incident in which the employee was stuck with a needle which had been in an antigen positive patient. Although we expended considerable effort, we have not been able to document the cause of spread in that clinic setting. We have excluded transfusion as a primary source and the two main possibilities seem to be cyclic transmision from patient to staff back to patient, or transmission on instruments inadequately sterilized after patient use. An example of the latter would be the "gun" used to administer BCG vaccine. An epidemiologic investigation of this high risk area by the Center for Disease Control might be helpful.

We have had the opportunity to follow the patient contacts of two of the physicians who had acute hepatitis while working on the leukemia service. Eight "susceptible" contacts of one physician have been followed for six months who have not developed HBAg or hepatitis. Sixteen contacts of the other physician and appropriate controls have now been followed from eight to 12 weeks. Thus far no patients have developed the antigen or clinical hepatitis.

Other epidemiologic studies include the following:

(1) As a continuation of the initial surveillance study, we have recalled physicians, nurses and technicians working on wards where patients have a high frequency of HBAg. We wish to see if the workers developed HBAg or HBAb in the one to two years since they were first sampled. These results have not yet been tabulated.

(2) Because the initial surveillance study indicated that persons with a history of having been transfused have a high frequency of HBAg and hence might be a dangerous donor source, we undertook a study with the Washington Red Cross to estimate the frequency of HBAg in their previously transfused and non-transfused donors. Sixteen hundred donors have been followed and CEP testing has not confirmed the higher prevalence of HBAg in the transfused donor. RIA testing is now being done.

(3) We have a continuing monitoring program for the Washington Metropolitan Renal Dialysis Unit, in which patients and staff are tested for hepatitis antigen and antibody and for changes in chemical tests of liver function. We have followed this dialysis unit almost since its inception. There have been no hepatitis epidemics, but of the approximately 100 patients, five are chronic carriers of HBAg and three to five others seroconverted each year for this antigen. There has been one case of HBAg+ hepatitis and one case of HBAg alone among the staff.

(4) We have performed epidemiologic studies in the Panama Canal Zone with Dr. C.J. Peters, a USPHS Fellow assigned to that area.

HBAg Subtypes

There are serologic subtypes of HBAg which are important indices of disease, and perhaps of infectivity. This year saw completion of a collaborative study with the National Red Cross comparing subtype distribution throughout the United States. A similar study is now in progress on a world wide scale. Dr. Holland is responsible for the first detection of the ayr subtype, a subtype which had been predicted, but until recently, not found. This completes all possible combinations of the common antigenic determinant "a", and the two "allelic" subtypes d, y and w, r. Studies are now in progress with NIAID, AEC and NINDS to prepare antibodies to the various subtypes in guinea pigs. These will be used as reference reagents. Reference anti-a and anti-y are already available. A study is also in progress to decide whether persons who have the "ady" subtype have a mutant "ady" antigen (not previously described), or rather have simultaneous infection with both

"ad" and the "ay" subtypes. In collaboration with NIAID, we have developed a hemagglutination technique for determining the subtype specificity of antibody to HBAg.

We have attempted to make purified antibody for subtyping HBAg by RIA techniques. The technique uses solid immunoabsorbants, but we have had difficulty in preparing a purified, effective reagent.

Studies in Rhesus Monkeys

In collaboration with Dr. R. Purcell of NIAID and Dr. W. London of NINDS we have previously shown that the rhesus monkey can be infected with human HBAg. The antigen could be serially transmitted through five passages. Since the rhesus monkey does not develop clinical hepatitis, a search was made this year for other practical study models that would develop liver function abnormalities as well as HBAg. It appears that the wooly monkey may fulfill the need. Other studies completed or in progress include: establishment of an infectious pool of HBAg+ rhesus monkey serum and determination of its infectivity titer; determination of changes in infectivity pattern with serial passages; attempts to attenuate the infectious pool with human and guinea pig convalescent sera, standard human immune serum globulin, high titer HBAb, and various physical and chemical manipulations; attempts to assess the infectivity of the various morphologic forms of HBAg and of peptides derived therefrom; and attempts to determine the relationship of immune suppression to the development of the persistent carrier state.

Miscellaneous Projects

A study was completed with Dr. J. Whitaker of NINDS showing that there is no association of HBAg with inflammatory myopathies other than polyarteritis nodosa.

In a collaborative study with Suburban Hospital, we showed that the presence of antibody to HBAg in hemophiliac patients prevented overt HBAg+ hepatitis despite multiple exposures to HBAg.

Hepatitis Advisory

Dr. Alter and Dr. Holland served as advisors to the Blood Resources Branch of NHLI and to the hepatitis program of NIAID. Dr. Holland has also been advisor to the Veterans Administration on their cooperative studies on hepatitis; Dr. Alter has advised the Bureau of Biologics, FDA, on radioimmunoassay testing and Dr. Schmidt has served on the NIH Hepatitis Task Force.

Drs. Alter and Holland spoke on hepatitis to the Ontario Antibody Club, the Ontario Society of Medical Technologists, The Maryland and DC Societies of Medical Technologists, the DC Department of Human Resources, and the California Blood Bank Association. In addition they conducted a 3-day workshop for the American Society of Clinical Pathologists on hepatitis testing. Dr. Holland participated in a seminar on HBAg subtypes at Walter Reed and Dr. Alter in a symposium on HBAg testing by RIA sponsored by the Maryland State Department of Health and a symposium conducted by Searle Laboratories.

IMMUNOHEMATOLOGY AND TRANSFUSION

We began an evaluation of the effectiveness of newer blood preservatives on blood component preparation. A study of use of the CPD anticoagulant in platelet preparation was a first step. In our hands, use of the CPD anticoagulant results in a lower platelet yield than the standard ACD anticoagulant. A new antigen in the Lutherean blood group system was identified in cooperation with the New York Blood Center. In accordance with new conventions on nomenclature it was called Lu 11.

A problem referred from the operating room (a possible hemolytic transfusion reaction) was traced to excessive heating by a microwave blood warmer.

The specific problems of bone marrow transplantation in relation to red cell groups have led to a continuing research effort with NCI. Tests have repeatedly proved that 100% of one transplant patient's population of red cells was derived from his donor brother's bone marrow.

The immune reactions on red cells connected with antibiotic therapy have been further explored in patients and animal models. We received a report that one monkey being used in marrow transplant work had hemolytic anemia. Our tests showed that the monkey had anti-cephalothin (Keflin) antibodies which were reacting with its drug-coated cells. This ill effect was so severe as to cause death in the animal. Mrs. McGinniss of this department in colloboration with Dr. H. Grainick of the Clinical Pathology Department, had previously reported that this occurred in a patient at another hospital. The existence of an animal model will increase the possibility of productive studies. We have also reported immune reactions due to the antibodies to antibiotics reacting in platelet antigen systems. The antibodies to penicillin have been found to be one cause of non-responsiveness to platelet therapy.

A study has been made with Dr. C. Lingeman, NCI, on the genetic characteristics of patients with ovarian tumors. In a related area, studies are being done with Drs. E. Brand and R. Belmaker of NIMH on the genetics of manic-depressive diseases and sex-linked factors on chromosomes.

The clinical significance of the albumin agglutinating phenomenon continued to be studied. An *in vitro* mechanism for this phenomenon was previously reported by this department. The phenomenon is rare but could theoretically cause serious problems in affected patients transfused with protein fractions or therapeutic albumin.

By adapting solid phase radioimmunoassay (a technique first employed for HBAg), we, in collaboration with Dr. H. Grainick, developed a microtiter radioimmunoassay for determining the presence of antigenic Factor VIII (anti-hemophilic factor). It has been shown that there is a dissociation between antigenic and functional activity of Factor VIII and this dissociation is helpful in making clinical distinctions between classic hemophilia A and Von Willebrand's disease.

PROFESSIONAL ACTIVITIES

Many members of the department staff performed significant activities in the scientific community.

Dr. Paul Schmidt, who was appointed Chairman of the Scientific Program Committee of the American Association of Blood Banks in order to serve for the International Transfusion Congress held in Washington in 1972, was reappointed to that post.

Dr. Schmidt continued on the Task Force on a National Blood Policy for the Office of the Assistant Secretary for Health as well as in a Task Group to prepare the National Heart, Lung, Blood Vessel and Blood Plan for NHLI. He was also part of the working committee of the American Board of Pathology which prepared the examination given to over 100 applicants for certification in the new subspecialty of Blood Banking.

Dr. Harvey Alter was reappointed at the rank of Clinical Associate Professor of Medicine at Georgetown University; Dr. Schmidt at the rank of Clinical Professor of Pathology. Dr. Schmidt, Dr. Paul Holland, and Dr. Walter B. Lundberg were certified by examination by the American Board of Pathology in the subspecialty of Blood Banking.

Dr. Holland and Mrs. Mary Ann Grainick served on the Committee for the Technical Seminar of the International Transfusion Congress. Mrs. Mary McGinniss and Mrs. Grainick presented papers on their experience in difficult pretransfusion tests.

Dr. Walter B. Lundberg who had joined the staff in July of 1972, assumed major responsibilities in the program and deserves continuing credit for clinical applications of the use of frozen red cells in our program this year. He completed his tour of duty in June of 1974 and went to Yale-New Haven Medical Center as a Fellow in Oncology.

Dr. Ivan Rothman was appointed Clinical Associate in July of 1973 to replace Dr. Robert E. Moncrieff who had accepted the position of Assistant Professor of Pathology at Loma Linda University.

Mr. Allen Lewis received his Masters' Degree in Biology from American University August 1973. The research was done in the Blood Bank on Microtiter Radioimmunoassay for Hepatitis B Antigen.

Ms. Patricia Hatfield, Ms. Helen Burgess, and Ms. Irana Hoyer who had been trained in our program for certification in blood bank technology passed the written and practical examinations of the Technologist Registry and the American Association of Blood Banks.

FUTURE COURSE

A specific realignment of transfusion therapy must be evaluated. Our present program is built on the base that blood is collected from donors because of their red cell type depending on the current patient needs. A number of byproducts can be made from that blood for use by other patients, i.e. platelets, clotting factor concentrates, and plasma. This has been called blood component therapy. The current NCI platelet operation is based on findings that certain patients may require platelets from donors selected because of their HL-A types. The hypothesis is not adequately proved. The complexity of donor selection and blood collection when both red cell and platelet types must be considered is not doubled but rather squared.

Two approaches will begin to resolve competition between the red cell and platelet programs. The contract for platelet collection with Dr. Schmidt as Project Officer has been initiated for local collection from relatives and friends of patients and community donors. It should be possible to solidify what is known on the practical application of platelet typing to transfusion practice. We wish to proceed with a program with DCRT to commit our records on components and their usage to computer systems. We expect to create data flows which will permit the prediction and collection of data on specific patients and specific usages. This should allow for not only the interpretation of the complex transfusion data to prove or disprove the HL-A hypothesis, but also integration of donor needs according to both red cell and platelet types. There is no effective computerized hospital blood bank data system working in the country today. A model system can be developed to handle the size of operation that we typify.

In the area of hepatitis, future benefits will accrue from increased sensitivity of tests for Hepatitis B virus, the development of markers for Hepatitis A and other hepatitis agents, and the development of practical methods of virus inactivation, either physical or immunologic. Current leads on the prospect of the wooly monkey as a model system for the study of hepatitis will be pursued. Once the model is established it will be possible to make animal trials with standardized infectious material with a view to attenuation of infectivity. Such work is required in early steps of vaccine production.

The many and detailed techniques developed to study immunologic relationships in hepatitis research will be ready for application to other transfusion problems. A superior laboratory team has been assembled for practical application of the hepatitis research knowledge. Many of the research techniques may be applicable to red cell, platelet and plasma protein interactions.

HONORS AND AWARDS

The entire staff of the Blood Bank Department received a cash Clinical Center Superior Performance Award in 1973 for their collective effort in planning and implementing the highly effective hepatitis reduction program. The program was a model which was rapidly adopted in blood banks and hospitals all over the country.

Dr. Paul Schmidt was selected to give the Emily Cooley Award Lecture for 1974 by the American Association of Blood Banks. This award lecture is one of only two annual research honor awards made by that organization. It carries a stipend of $750.

Dr. Harvey J. Alter was awarded the DHEW Superior Service Honor Award at the Jack Masur Auditorium on May 20, 1974 "In recognition of his investigations into viral hepatitis and particularly for his clinical studies which have served to markedly reduce the risk of post-transfusion hepatitis."

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July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

CLINICAL PATHOLOGY DEPARTMENT

CONTENTS

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH
CLINICAL CENTER

CLINICAL PATHOLOGY DEPARTMENT

SUMMARY OF ACHIEVEMENTS

Clinical Chemistry Service

Recent Progress

The continued growth in workload has necessitated a reduction in new developments within the Clinical Chemistry Service. Indeed, with a workload that is now fifteen percent greater than at the corresponding time last year, the Clinical Chemistry Service has had to decrease some of its previous activities in order to cope with the demands placed on it. We have unfortunately observed a reduction in quality of data, yet this was predictable with the inadequate manpower available to perform the tests.

After several months of repeated and often serious breakdowns of the laboratory data handling system, a PDP-11 computing system was substituted for the previous PDP-8 system. Cathode ray tube terminals were introduced for the transmission of data to the data-processor. After a very short period with minor teething problems, the system began to function efficiently and well. Other benefits accruing to the Clinical Chemistry Service from improved operations within the data-processing section included many of the quality assurance print-outs previously available for monitoring abnormal results. These include lists of patients with results outside present limits for each test, means and medians of all results within predetermined limits, and cumulative graphical displays of the various samples used for quality assurance on a day-to-day basis. The CLAUDE computer-listing of abnormal and usual effects of drugs on laboratory tests is now capable of being interrogated by any of the senior laboratory staff, or the secretarial staff, to determine possible drug induced abnormalities of laboratory tests. This has proved a very useful adjunct for the interpretation of laboratory data.

At a considerable cost in time of the senior professional staff, a determined effort has been made to reduce the number of requests for special handling of specimens, e.g., "stats", or with special restrictions in processing, e.g., pediatric "micro" samples. This has resulted in a great reduction in the workload for this manpower intensive area, enabling redeployment of the technical staff to process the routine workload. Imposition of consultation requirements has greatly reduced the number of requests for immunoelectrophoresis with a considerable saving in manpower. Other situations in which possible abuse of the clinical laboratory occurs are under constant review.

A microfiche system was introduced to facilitate review of past data obtained on patients. This reduces the problems of storage of large computer print-outs while at the same time enabling rapid scanning of information within a narrow time-framework.

Resin T_3 uptake analyses are no longer performed "IN HOUSE" and a further increase in tests shipped to outside laboratories became essential.

Considerable development work was entailed in introducing plasma lactate analyses into routine service on the DuPont ACA. Our experience indicated, as often is the case, that many tests released to the general market do not have the complete work-up and debugging that we regard as essential before they can be used for patient-care. Other test procedures brought to a level satisfactory for performing routine analyses on the ACA, include total and direct-bilirubin, calcium, and uric acid by uricase. The creatine component of the urine creatine-creatinine analyses was automated on the AutoAnalyzer which enabled a considerable reduction in our backlog of tests and also permitted more efficient batch-handling of specimens.

A system has been developed for computer-to-computer transmission of request and result information between the Clinical Chemistry Service and our major contractor (in California) for outside laboratory work. This has enabled a reduction in the number of transcription errors made in both laboratories and has permitted a more expeditious identification and solution of problems.

Training

The Clinical Chemiatry Service continues to participate actively in the training of resident physicians. Weekly conferences are held for the technical staff and daily meetings of the senior technican and professional staff are held to review current laboratory and medical problems. Several visitors from overseas have visited the laboratory and as far as possible we try to use these occasions for the visitor to make scientific presentation to the staff.

The professional staff and the senior technical staff actively participated in the educational activities of the American Association of Clinical Chemists and the American Society for Medical Technology, respectively. The senior staff also has actively participated in lectures to students at various local universities.

The senior technical staff continue to participate actively in the instruction of stay-in-school students and other students employed by the service during their summer vacations. This program has proved mutually rewarding to the students and to the staff of the Clinical Chemistry Service.

Research and Development

Dr. D. S. Young, in conjunction with Dr. Gordon Avery of Children's Hospital, Washington, D. C., continued his application of high-resolution analytical techniques to the study of several problems, particularly in attempts to

elucidate the cause of several unusual metabolic errors. Mass Spectrometric analyses required by this work have been provided by Dr. Robert Rowe in NHLI. The same apparatus is also being used to study the metabolic consequences of mega doses of ascorbic acid in healthy individuals. Assay of various enzymes involved in catecholamine metabolism is being performed at the same time. In collaboration with Dr. J. E. Seegmiller (University of California, San Diego) Dr. Young is investigating metabolic differences in South American Indians from families that have an unusual longevity in comparison with a control group from the same villages.

With Dr. R. L. Berger (NHLI) Dr. Young is exploring the application of microcalorimetry to clinical chemical analyses. Initially measurements of cholesterol and uric acid in serum are being performed using specific enzymes. The early results are promising. With Mrs. L. C. Pestaner, Dr. Young is continuing to develop and expand data banks for the automatic interpretation of laboratory data. Dr. Young has also collaborated with Dr. Scott Allen (DCRT) in the development of a telephone audio-response system for the automatic conversion of laboratory data from traditional into SI units.

Dr. Young and Dr. R. B. Friedman (University of Wisconsin) have continued their collaboration on the automatic interpretation of laboratory data (with especial reference to the modification of data by therapeutic drugs). This program has been enthusiastically received and even in a pilot stage demonstrates the potential for computer interpretation of data.

Dr. Young has worked with Dr. J. E. Mrochek (Oak Ridge National Laboratories) in a study of the effect of large doses of nicotinic acid on metabolic processes.

Dr. Maurice Green has studied the measurement of serum immunoglobulins by continuous flow techniques. He has studied the components of instrumental variability of a centrifugal analyzer and developed several computer programs for the analysis of data derived by the instrument. He has evaluated several of the analytical methods available with the DuPont ACA analyzer. He has worked on the application of the Abbott ABA to study the feasibility of its interfacing with a computer as well as adapting the aldolase measurement technique to the instrument. He studied the measurement of calcium by chelation-titration.

Mr. H. H. Nishi continued his development of a micro analytical system and has used it for the kinetic analysis of serum immunoglobulins. The resident physicians and many of the senior technical staff have worked on the evaluation of new analytical procedures with the various analytical systems in use in the laboratory. This is constantly required as new systems and methods become available and is needed with our continuing objective of reducing analytical variability while increasing the specificity and accuracy of the analyses. For instance, because of its potential for improved specificity we are currently studying the measurement of cholesterol by a specific enzymatic procedure.

Future Plans

Given additional personnel resources we will endeavor to reintroduce those tests that have been curtailed through lack of manpower and then gradually introduce those tests that are performed in outside laboratories, many of which are not performed at the same level of quality that we like or would expect to perform ourselves.

A large multichannel analytical system is scheduled for delivery in early FY 1975. A prolonged evaluation period is envisaged even though this will absorb vital space and personnel but our hope is that this will enable many of the most commonly requested tests to be performed simultaneously on this single instrument. It is necessary to compare the specificity, accuracy, and precision of each of the analytical methods on the new system with those now in daily use to ensure comparability of data, and to guarantee that data produced at night or on weekends on different equipment will be interconvertible. It is anticipated that this first phase of the evaluation will not be complete until the beginning of 1975. Assuming that the new system meets our basic requirements, work will proceed on the monitoring of changes in data that can be correlated with factors such as the administration of drugs and this information will be used to assist in the interpretation of data. This system, potentially, provides a uniques opportunity for studying trends in laboratory data that is not available when assays are performed on many different analyzers.

Many of the complex sophisticated tests now performed in outside laboratories will be studied with the intent of providing them in-house. Over the past few years most of the new tests that have become available have had to be performed elsewhere.

In conjunction with the laboratory computer service we will continue to study improved specimen accessioning systems and the upgrading of the laboratory data processing. We hope to improve the speed with which previous data on patients may be obtained by interrogation of the central DCRT computer system.

Work with the centrifugal analyzer developed at Oak Ridge National Laboratory will be continued. On the larger model we will continue to explore the measurement by differential inhibition of the isoenzymes of enzymes such as lactate dehydrogenase and creatine phosphokinase. This work additionally involves the preparation of purified human enzymes. On the smaller model we will attempt to measure several specific proteins immunologically and also study the feasibility of performing analyses in situations such as the outpatient clinic if the components are made available for the dynamic loading of specimens.

Calorimetric studies will continue with attempts made to examine the kinetics of enzyme reactions thermometrically and to explore microcalorimetry as a reference technique for creatinine, cholesterol, glucose, and uric acid by coupling the specific chemical enzymatic analytical procedure with the continuous monitoring available in the system. This same concept will be

applied to the measurement of other constituents where specific enzymes are available as measuring tools.

The re-evaluation of existing analytical procedures will be continued.

Work will be continued on the development use of computerized data bases for the interpretation of laboratory data.

Hematology Service

During the last year the Auto-Counter, a new automated platelet counter, was installed in the hematology laboratory and used to perform all platelet counts on patients in AFU. This resulted in prompt and accurate platelet counts in all platelet count ranges and allowed physicians to make therapeutic decisions much more rapidly.

The PDP-11 computers with the software format and the cathode-ray tubes devised by DCRT were implemented in the laboratory in the last year with a large increase in personnel acceptance of the data processing equipment, a much decreased down time, and the expectations of success that were voiced last year have been realized in part this year in a workable data processing system.

During this year a new format and console for performing differentials was introduced in the laboratory and hopefully will be available for routine use in the near future and also expanded for the introduction of bone marrow results.

During the year the senior professional staff consultations have expanded over 25% as have bone marrow interpretations and general guidance to clinicians in the Clinical Center regarding laboratory problems and patient diagnostic assistance.

During this year we were also able to develop a technique for the detection of platelet antibodies which can be performed with very simplified equipment (a Fibrometer platelet rich plasma and heated serum). This technique has allowed us to quickly, simply, and accurately identify individuals who have anti-platelet antibodies or anti-platelet factors and to specifically identify those factors as far as specificity in trying to obtain matched platelet donors for these patients.

During the last year the laboratory has also introduced a check system for all platelet counts. The peripheral blood smears are scanned to insure that the platelet counts from the automated platelet counting machines are accurate and no platelet count is sent out unless the peripheral blood has been checked and a gross estimate made of the platelet count. If there are discrepancies the peripheral smear and the platelet count are repeated and, if necessary, a second blood sample is obtained.

With renewed interest at the Clinical Center in genetics, hemoglobin abnormalities, and enzyme deficiencies involving red cells and white cells,

the laboratory has introduced the use of acid citrate agar for hemoglobin electrophoresis, a sophisticated technique to separate hemoglobin D and S. The solubility test for hemoglobin S was introduced which also allows for separation of hemoglobin S and other hemoglobins which migrate in the same general area. A technique for detection of red blood cell inclusion bodies (Heinz bodies) was implemented and recently a technique introduced for the quantitative determination of glucose-6 phosphate dehydrogenase (G6PD). This will allow for a more direct quantitation of red cell enzyme levels and will replace the semi-quantitative technique previously used.

With the increased interest in blood coagulation thrombosis in the Clinical Center we have introduced as a routine test in our laboratory the platelet retention to glass bead test which has been useful in detecting a variety of abnormal platelet disorders including von Willebrand's disease, platelet storage pool disease, and aspirin induced thrombocytopathy.

Training

The Hematology Service continued to play a paramount role in the Clinical Hematology-Oncology elective. During the last year over 70% of the medical students spent some of their time on the Clinical Hematology Service. These students were all introduced to bone marrow interpretation, coagulation procedures and interpretation, radioisotope procedures, and the laboratory interpretation and clinical care of hematologic diseases.

In addition, we have continued our relationship with Georgetown University and this year we received one hematology resident who spent two months in the Hematology Service and participated in all group activities.

During this year we introduced a weekly Journal Club to discuss pertinent articles related to hematology and laboratory medicine. We continued to pre-read marrows at the designated times with any clinical associate or any staff member of any institute interested in an early interpretation of bone marrow aspirate. This does not supersede but is in addition to the final bone marrow interpretation which is out 2 or 3 days later.

The Hematology Service continued to present weekly conferences to the NCI Medicine Branch. These morphology pathology conferences were instrumental in elucidating patient problems in teaching clinical associates of the Cancer Institute bone marrow morphology and in influencing physician decisions about further appropriate diagnostic and therapeutic modalities. In addition to the above teaching and training exercises, this year the hematology senior staff presented a 26-lecture course on Laboratory, Diagnostic, and Clinical Hematology to all the hematology technicians and technologists from the Hematology Service, as well as technologists from Clinical Chemistry, Microbiology, Blood Bank, and other Institutes from within the National Institutes of Health. These lectures were accompanied with slides, illustrative cases, peripheral blood morphology, bone marrow morphology, and open discussion at the end of each lecture. The response from both technologists within the department and the rest of the NIH was excellent. They felt that the lectures were meaningful and that it increased their knowledge

of hematology, patient problems, and the value of various laboratory procedures. All of these lectures have been put on video tape, and we are now in the process of editing these in preparation for use by any organization within or outside the NIH concerned with hematologic education of medical and paramedical personnel.

Dr. Harvey Gralnick and Dr. Barry Coller have been appointed as staff physicians in the National Heart and Lung Institute. This allowed us to admit patients to NHLI wards and to consult on their patients. As a result, there is a general feeling of mutual cooperation which has resulted in better patient care, better planned diagnostic procedures, and increased good will between NHLI and the Clinical Center.

Research and Development

Dr. Coller worked on the immunologic recognition of Factor VIII/von Willebrand factor on the platelet surface. By multiple techniques an antibody produced against a Factor VIII/von Willebrand factor complex recognized a tightly bound antigen on the surface of human platelets. These studies establish this factor in a strategic position to function as a platelet cofactor. Future work will seek to establish the relationship between plasma and platelet Factor VIII/von Willebrand factor (using radio-labelled material) in patients with hemophilia and von Willebrand's activity.

Ristocetin aggregation of platelet rich plasma was set up as a diagnostic tool. In addition a von Willebrand factor activity assay was established using washed and/or gel filtered platelets. The ability of plasma or purified material to correct the ristocetin aggregation of the isolated platelets is quantitatively determined. This allows for (1) testing of patients' plasmas as a diagnostic tool, (2) testing of commercially available material to determine the most effective replacement therapy, (3) testing of purified material as a research tool, and (4) investigating the nature of the factor (activation, decay, etc.).

Dr. Richard Hirschman in collaboration with investigators at the National Cancer Institute developed a simplified technique for the measurement of platelet antibodies using the PF-3 platelet release phenomenon. Dr. Hirschman also investigated the storage and stability of platelets so that they may be used over a period of time as a panel of cells for platelet cross-matching. This work has allowed platelets to be stored for over one month and still be usable in a platelet antibody technique involving either PF-3 or serotonin release.

Dr. Joseph Fratantoni continued his studies on the hemolysis in patients with cystic fibrosis related to vitamin E deficiency. Dr. Fratantoni and Dr. Robert Kagan initiated a study of the fibrinogen survival and localization in patients with indwelling venous catheters.

Dr. Fratantoni investigated the mechanism of heparin induced thrombocytopenia.

Dr. Gralnick, in cooperation with Dr. Jacqueline Whang-Peng of the National Cancer Institute, have been investigating the syndrome of lymphosarcoma cell leukemia in relation to cytogenetic abnormalities and possible relationship to other forms of acute leukemia.

The entire Hematology Service continued its cooperation with the National Cancer Institute in anticoagulating patients for sarcoma prior to surgical removal of the affected limb.

Dr. Gralnick, in cooperation with Dr. Harvey Alter of the Blood Bank, has completed work on a solid phase radioimmunoassay for Factor VIII/von Willebrand's factor utilizing purified Factor VIII/von Willebrand antigen and antibodies prepared in goats.

Dr. Laurence Corash and Dr. Gralnick began collaboration with the National Heart and Lung Institute to do complete hematologic and kinetic evaluations of patients with traumatic cardiac hemolysis in an effort to delineate exact mechanisms of uncompensated hemolytic anemia, and be able to forecast those individuals who respond to various therapeutic modalities.

Because of the immense and intense amount of work done on blood coagulation and thrombosis in the laboratory, particularly on hemophilia, von Willebrand's disease, and other abnormal coagulation proteins, the Hematology Service has had a very large outpatient referral from physicians in the immediate area as well as plasma and patient referrals from as far away as Miami, Florida, Nashville, Tennessee, San Francisco, California, and Paris, France.

Dr. Gralnick and Dr. Coller are cooperating with Dr. Yvette Sultan of the Hospital Saint-Louis, Paris, France in the investigation of the coagulation and platelet defects in von Willebrand's disease.

Dr. Gralnick and Dr. Coller investigated anti-factor VIII antibodies of human and animal origin for their ability to (1) neutralize Factor VIII activity, (2) decrease platelet retention, and (3) block ristocetin aggregation of normal platelet rich plasma. From these studies, antibodies specific for the Factor VIII coagulant activity and the von Willebrand factor activity were identified.

Dr. Gralnick and Dr. Coller continued their investigation of a new abnormal fibrinogen notable for reduced fibrin monomer aggregation and decreased rate of plasmin digestion. It is planned to follow the patient with the abnormal fibrinogen through pregnancy.

Dr. Coller examined in collaboration with Dr. Bruce Chabner (NCI) approximately 100 bone marrow specimens from patients with non-Hodgkin's lymphoma. Goals of the study are (1) definition of bone marrow involvement, (2) correlation with clinical course and response to therapy, and (3) correlation with histology in other tissues.

Dr. Coller investigated the effects of vancomycin on plasma proteins, platelets, and HBAg. These studies resulted from the studies on ristocetin.

Dr. Coller investigated a patient with an autoimmune hemolytic state receiving active immunotherapy. A child with glioblastoma multiforme treated with active immunotherapy including injection of his own tumor cells developed a positive Coombs test. The anti red cell antibody could be absorbed out by incubation with the tumor cells. As a result, routine Coombs testing will be included in all future protocols under Dr. William Terry's (NCI) direction.

The isolation, purification and quantification of fibrinogen from small plasma samples is being undertaken by the use of an immuno-affinity chromatographic column technique by Dr. Richard McGee. It is hoped that when developed, these techniques may aid in the identification and study of patients with acquired or congenital abnormal fibrinogens. Dr. McGee is also investigating the identification, separation, and quantification of fibrinogen split products from plasma samples by an immuno-affinity chromatographic column technique. When developed this will permit the more rapid identification of patients with ongoing fibrinolysis and possibly increase the sensitivity of detecting ongoing fibrinolysis. In addition, the process may allow actual quantitation of fibrinogen degradation products in plasma.

Dr. McGee investigated artefactual prolongation of the PTT by failure to store the sample on ice and improper collection technique. These studies were undertaken to better define some of the variables involved in spuriously prolonged PTT's in otherwise normal patients and to prevent needless repetitive testing unless proper methods were employed.

Dr. McGee evaluated therapy for a patient with von Willebrand's disease who was to undergo cardiac surgery. In addition to family studies of coagulation and platelet factors, the patient was serially evaluated after an infusion of normal pedigreed donor cryoprecipitate for coagulation factor and platelet function normalization.

Dr. Corash initiated studies on platelet separation. The purpose of this project is to develop a system to isolate platelet sub-population according to age. Platelets of differing "in vivo" ages may be isolated using buoyant density ultracentrifugation with isosmotic arabino-galactan (Stractan-II) gradients. Using this system, it will be possible to study changes in platelet biologic functions as a correlate of cell aging. These techniques will be applied to pathologic processes in which there are alterations in platelet behavior and survival to further elucidate mechanisms of platelet function.

Dr. Spellman investigated the anticoagulant activity of tetraethylammonium chloride (TEA Cl), a quantitary ammonium salt with ganglionic blocking activity. TEA Cl was found to inhibit fibrin monomer aggregation. In the course of investigating the mechanism of action of TEA Cl, Dr. Spellman devised methods to purify fibrin monomers made with thrombin or anchrod. The effect of ionic strength, pH, and fibrin monomer concentration or fibrin monomer aggregation was investigated. Dr. Spellman and Dr. Gralnick have extensively investigated a possible abnormal fibrinogen in a patient with CLL.

Since Dr. Henry Tan obtained a freeze-etch apparatus, he has investigated plasma membrane surface of platelet by freeze-etch technique for possible localization of site of collagen-platelet interaction. This work is in progress with Dr. Russell Jaffe (CC:CP).

He also investigated T and B guinea pig lymphocytes, attempting to localize different patterns of antigen distribution on cell surface of lymphocyte. Other studies began on the differences in cells of thymus, lymph node, and induced leukemic origin. This work is in progress with Dr. Ira Green (NIAMD).

Dr. Tan continued his investigation of Blastocystis hominis. Previous re-delineated normal ultrastructures, and subsequently, the inner and outer cell membranes have been characterized using the freeze fracture technique. Current investigation involves the nature of endosymbiant organisms found in B. hominis. Whether these are rickettsiae, bacteria, or Kappa-like organisms is being determined. Work is in progress with Dr. Charles Zierdt (CC:CP).

Dr. Tan continued investigation of techniques to expose the true cell surface of granulocytes, lymphocytes, and platelets using freeze-etch technique. Current results include successful exposure of erythrocyte and platelet membraneous surface using hypotonic tris-phosphate buffer at pH 7.4 and 2.5% glycerol solution at pH 7.4.

Ultrastructural investigations continued on the morphology of the nuclei of the abnormal cell of Sézary's syndrome and the changes in the distribution of intramembraneous particles in platelets from patients with chronic myelogenous leukemia and thrombocytosis have been completed.

Dr. Corash in investigating a system for the separation of whole blood into pure cell components. Preliminary experiments have shown that platelets, leukocytes, and red cells may be separated from each other to yield "pure specific cell" preparations using buoyant density ultracentrifugation in isosmotic arabino-galactan gradients. This technique also permits the separation of red cells into young and old cell populations. The potential usefulness of this system to prepare platelet concentrates, leukocytes free red cells, and selective "young" red cell populations will be explored with a view toward developing improved therapeutic uses of whole blood components. This is a collaborative effort with Dr. Sergio Piomelli, New York University School of Medicine.

Staff Appointments and Changes

Senior Staff Fellow, Dr. Richard Hirschman left the Hematology Service in March, 1974 to pursue a career in Hematology-Oncology at Beth Israel Hospital in New York City.

In June, 1974, Dr. Joseph Fratantoni left the Hematology Service to become affiliated with the National Heart and Lung Institute.

In July, 1973, Dr. Richard McGee Joined the Hematology Service as a Clinical Associate.

In February, 1974, Dr. Laurence Corash joined the Hematology Service as a Staff Associate.

In July, 1973, Dr. George Spellman joined the Hematology Service as a Clinical Associate.

In October, 1973, Dr. Gralnick and Dr. Coller were appointed as staff physicians in the National Heart and Lung Institute.

Future Plans

The Hematology Service plans for the next year to continue its progress in three fields:

1) patient care

2) education

3) development

In respect to patient care we hope to be able to offer a routine laboratory procedure tne detection of venous occlusive disease by non-intrusive laboratory procedures. This will include the use of ^{125}I and ^{131}I fibrinogen injections as well as physmography and, hopefully in cooperation with the Clinical Center diagnostic radiology group, venography.

We will continue to offer patient consultations in any aspect of hematology or laboratory medicine in which the Institutes deem our services to be of value. We will attempt to implement new procedures and revise standard procedures to allow for greater precision and accuracy in the determination of hematologic values.

The Hematology Service will continue its dedication to physician and staff education through lectures, demonstrations and participation in national meetings. We will attempt to increase awareness of our hematology staff, as well as the staff of the various Institutes to the improvements in laboratory diagnosis of a variety of hematologic disorders.

Our developmental efforts will be primarily directed into two major categories:

1) The first will be morphologic diagnosis and improved methods for the morphologic diagnosis of malignant disease in patients at the Clinical Center. This will include review of large amounts of patient material for reclassification of disease, use of electron microscopy and freeze-fracture techniques, plus participation in International meetings to bring about new classifications of hematologic diseases.

2) The second major area of development will be in coagulation and thrombosis. It is hoped that during this year we will be able to pursue our goal of defining the defect in hemophilia and von Willebrand's disease. Recent progress has been made in the biochemical characterization of the abnormal proteins.

We hope to be able to offer techniques to detect venous occlusive disease as well as possible localization of tumor metastasis by the use of ^{125}I fibrinogen. The assay for specific fibrinogen degradation products in serum, plasma, and urine will allow greater specificity of therapy and conceivably could be of tremendous importance in the early detection of renal disease or of renal allograph rejection.

Board Certification and Other Honors

Barry Coller - Diplomate - American Board of Internal Medicine, October 1973.

Joseph Fratantoni - Elected Fellow of American College of Physicians.

Harvey R. Gralnick - Board Certified in Medical Oncology, October 1973.

Richard J. Hirschman - Board Certified in Medical Oncology, October 1973.

Laboratory Computer Service

Recent Progress

1) Beta system operation

The Laboratory Computer Service continued to struggle with the problem of an incomplete system, a result of the default by the prime contractor, Berkeley Scientific Laboratories, in 1972. The laboratory staff, together with the Division of Computer Research and Technology, is cooperating in an effort to provide stable, reliable service at an acceptable level while a search is made for a replacement system to meet departmental and hospital requirements. Several significant interim improvements include the following:

a) The PDP-11 based data collection systems for the hematology and chemistry services have been completed. All data from test procedures can now be entered and displayed by cathode ray tube for visual verification before transmission to the main laboratory computer.

b) The two Coulter-S blood analyzers in hematology now transmit data directly to the computers, reducing the time technologists must spend transcribing data.

c) A quality control program has been written for the chemistry service, including statistical, tabular, and graphical reports.

d) A computer program to generate requisitions for tests performed by the BioScience Corporation has been written. We expect to conserve personnel time and reduce transcription errors through the daily production of this list.

2) Research Retrieval System

A research retrieval system containing approximately 4 million hematology and chemistry results from June, 1973, to the present has been developed at DCRT. We are currently encouraging the use of these files and undertaking to convert the remainder of the laboratory data, which goes back to 1967.

3) Microbiology System

In conjunction with DCRT, a computer system has been written to log and retrieve all microbiology test requests. At the present time the system is used to generate various workload reports and departmental statistics and to assist in infection control. Work is continuing to allow for entry of result data as well.

Evaluation of New Laboratory Computer Systems

For the past year a committee from the Clinical Pathology Department and DCRT has been reviewing available laboratory systems in order to select a replacement for the current computer system. The committee has reviewed both commercial and private systems in hospitals throughout the country and is now completing the evaluation. We hope to announce the final decision and begin implementation plans by the end of this fiscal year. This new system will be significantly different from the present one in terms of design philosophy as well as being more reliable, more flexible, and available 24 hours a day, seven days a week instead of the Monday through Friday system now used. The new system will be under control of the technologist for most aspects of laboratory operation. In particular, the technologist can accession specimens, enter test requests, run automated instruments, enter results, and look-up present and past results on patients using laboratory display terminals, without the need for computer operators or programmers on the spot. We expect this to lead to considerable improvement in laboratory data handling. Improved reporting - routine, stat, outpatient, and patient searches - for Institute research, physicians, and patient care reports should also be available with the new system.

Future Plans

The most important new area for laboratory data processing is the development of a positive specimen identification scheme to eliminate the possible mismatching of specimens during transit to the laboratories and during work within the laboratory. Several schemes have been tried in the past but found to be inadequate. One or two additional schemes are now available which show some promise.

Staff Appointments and Changes

The Research, Development, and Laboratory Automation Section was renamed the Laboratory Computer Service on January 14, 1974, to better reflect the current role of the section within the department.

Dr. Thomas L. Lewis was appointed Chief, and
Dr. E. Arthur Robertson was appointed Assistant Chief.

Microbiology Service

Specimen admission procedures and policies were updated in December 1973 in continuing attempts to streamline and improve quality of laboratory procedures. Similarly, technical modifications have been made throughout the year on various diagnostic procedures; for example, speciation of Group D Streptococci isolated from normally sterile body fluids is now routine, and a new screening technique for Haemophilus isolates is useful for detecting type b H. influenzae.

In November, 1973, the laboratory acquired an anaerobic glove box. This gives the Anaerobe Laboratory the capability of processing and incubating appropriate specimens under anaerobic conditions and thereby improves the isolation of anaerobes. In addition, cultures can be examined at any time and as often as desired without deleterious exposure to air. Specimens with requests for special attention to anaerobes continued to increase. The isolation of anaerobes from routine specimens also showed increases as a result of specific training for recognition and isolation of anaerobes that was provided to the technologists by the Anaerobe Laboratory.

In January 1974, a new blood culture system was instituted. Two major factors made the change necessary: 1) a more rigidly anaerobic system was needed to ensure the detection of fastidious anaerobes, and 2) a closed bottle system was desirable to decrease contamination rates. For three months prior to the change, the new system was tested in parallel with the old system, using one ward of the hospital. During this time, performance of the new system was excellent, and technical procedures for handling the new bottles were worked out. The new blood culture bottles also contain sodium polyanethole sulfonate which not only acts as an anticoagulant but has the advantages of being relatively non-inhibitory to bacteria and neutralizes blood antibacterial effects.

Drs. Arthur Robertson and James MacLowry made available to the laboratory a computer oriented diagnostic method for the identification of certain groups of medically significant bacteria. A large data base is stored in the central computer at DCRT and the technologists are able to query this data base at will from terminals in the laboratory. The biochemical test results are fed in the program and the computer then will make diagnostic suggestions, give them scores as to their relative likelihood, list tests against the best diagnostic possibility and suggest additional tests that will differentiate the possibilities listed if this is necessary. This is an extremely powerful and exciting new aide to the laboratory which the technologists are using and it has the built-in capability of being easily expandable to other groups of organisms.

A new commercially available set of biochemical tests for the diagnosis of one group of organisms was introduced into the laboratory. This method

provides much more information for the diagnosis of each isolate and there is the suggestion that the biochemical patterns may provide epidemiologic data as well.

The laboratory is able to query the Patient Admission File in the DCRT computer due to some modifications in existing programs made by Dr. Thomas Lewis. This new capability makes it possible to more rapidly correct administrative data problems without having to make numerous time consuming phone calls.

All of the administrative data on each of the test requests is being stored on the DCRT computer and monthly administrative reports are being generated. This has replaced the cumbersome manual counting which was previously performed and also allows for more detailed reporting data. This work was accomplished by a continuing collaborative project with the Computer Systems Laboratory of DCRT.

In March 1974, computer-generated seven day listings of all specimens received on individual patients was made available to the admitting laboratory. The laboratory can thus screen specimens to prevent unnecessary repetitive culturing.

The Mycology Laboratory performs 5-fluorocytosine sensitivity testing of yeast isolates from Clinical Center patients. Because this test is not routinely available in most hospitals, the laboratory also serves as a reference center for checking sensitivity of yeasts sent from outside hospitals.

The laboratory specimen admission area was completely remodeled to provide a more usable area for this very important laboratory function.

Dr. Charles Zierdt continued phage typing on Staphylococcus aureus cultures received from many areas of the country for epidemiology and research purposes. Serologic typing procedures for Psuedomonas aeruginosa are now also available in his laboratory.

The Microbiology Service identified vaccine contaminants for the Food and Drug Administration laboratories at the National Institutes of Health.

The stock culture collection of the laboratory continued to be expanded, and on request, cultures are supplied to investigators throughout the country.

We continued to serve as a reference center for antibiotic susceptibility testing, antibiotic serum levels, and identification of unusual bacteria from area hospitals, including the National Naval Medical Center, Bethesda, Maryland, Walter Reed Medical Center, Washington, D. C., and George Washington University Medical Center, Washington, D. C. In addition, the Microbiology Service staff often served as consultants on problems related to infectious diseases.

Research, Development, and Future Plans

Dr. Vee Brenner continued development of the Anaerobe Laboratory. In November 1973, an anaerobic glovebox was obtained and plans began for the Anaerobe Laboratory to take over cultural work on certain specimens now being handled by the main diagnostic laboratory. These would include wounds, abscess material, pleural and peritoneal fluids, and tissue specimens. Use of the glove box will result in significant improvement for anaerobic isolations. Such an undertaking requires a second technologist for the Anaerobe Laboratory, and as soon as this is possible, the transfer of work will be made. Coincident with this will be routine availability to the wards of a more suitable anaerobic transport media.

In March 1974, Dr. Brenner started a joint project with Drs. James B. Sweet and Dr. Stephen R. Fred of the NIH Dental Institute. The primary microbiology project is an evaluation of five blood culture systems for their ability to recover anaerobes. Blood drawn from patients immediately after dental surgery is being provided by the Dental Clinic. The primary Dental Institute project is a comparison of different pre-operative procedures as to their effect in reducing post-surgical bacteremia. The project is expected to continue until at least 50 patients have been evaluated.

Also in March 1974, the Anaerobe Laboratory started evaluation of a commercial kit (API) for identification of anaerobes. The kit is in evaluatory stages, not yet available for general use. It is hoped that the kit will provide reliable results as compared to conventional methods and thereby greatly simplify the now laborious procedures involved in biochemical characterization of anaerobes.

Dr. Fred Gill, in collatoration with Dr. MacLowry, studied severe infections and the use of antimicrobial therapy in the compromised host receiving treatment for leukemia or lymphoma. The use and duration of antimicrobial therapy in these patients in the absence of documented infections have remained difficult and unanswered clinical question. Consecutive cases of septicemia occurring at the Clinical Center between March 1973 and September 1973 were reviewed and the relationship of sepsis to fever, granulocyte count, and antimicrobial therapy was determined. The data showed that sepsis occurred in these patients almost always at a time when they were febrile, with granulocyte counts below 500, and not receiving antibiotics. There was strong documentation of the fact that continued antimicrobial therapy in the presence of granulocytopenia prevented sepsis and that discontinuing antibiotics before granulocyte counts reached levels of 500 or greater resulted in a high degree of risk of often fatal septicemia. Future studies of this data are planned to examine the antibiotic sensitivity pattern of bacteria causing sepsis in these patients and the predictive effect of determining the bacterial and fungal flora in the respiratory and gastrointestinal tracts of patients at a high degree of risk of sepsis. This information would be of great value in recommending antimicrobial agents for prophylaxis in this group of patients.

Published information regarding the synergistic effect of combinations of antibiotics against bacteria was reviewed. The present state of evaluating synergy in vitro is highly variable among different workers and there is no universally acceptable method for performing such studies or adequately interpreting results. The laboratory had been performing synergy studies using the "checkerboard method", one of the more widely used and accepted techniques. Using this method in a preliminary study of antibiotic combinations against strains of Group D streptococci, E. coli, and Salmonella, it was found that minimal or no synergy could be documented. Further studies, using a "time killing curve" method, yielded data that clearly showed a greater effect of two antibiotics than another against the strain of enterococcus studied. The method was markedly more sensitive in revealing synergistic effects of minor changes of concentrations of antibiotics. A major obstacle to using this technique for routine determinations of synergy in the Microbiology Service is the time and expense required for counting live bacteria with presently available methods. Future objectives in this area include the application of automated bacterial counting methods to make this technique more available for routine study selected clinical isolates, and correlations of the presence or absence of in vitro synergy with the effectiveness of antibiotic combinations in eradicating infection in vivo.

Drs. Arthur Robertson and James MacLowry continued to work on methods to incorporate useful computer techniques into the laboratory. Some that are completed are mentioned in the Recent Progres section. In addition, studies proceeded on techniques to reduce the number of biochemical tests necessary for a diagnosis to a minimum without sacrificing accuracy. Work progressed on adding the large data base of antibiotic sensitivity results so that it can be manipulated and queried easily.

Dr. MacLowry collaborated with Dr. John Robbins, NICHD, in the study of a group of ampicillin resistant Haemophilus influenzae, type b. This unusual isolate was only recently discovered by this laboratory and simultaneously by two others and has caused much concern mainly in the pediatric community. If isolations of this organism increase, there may well have to be revisions in the concepts of the treatment of H. flu type b infections.

Dr. MacLowry, working in collaboration with the Computer Systems Laboratory of DCRT, continued attempts to put more of the microbiology data into a computer retrievable form. This has been a long term goal but many constraints have made it difficult to reach. It is hoped that a significant amount of the data can start to be accumulated over the course of the next year.

Drs. Charles Zierdt and James MacLowry continued to try to solve the problems inherent in a radioactive technique for rapid identification of bacteriologically positive blood cultures. There were a variety of problems which arose to prevent the technique from being feasible, but modifications made by Dr. Zierdt recently showed considerable promise. If these changes result in solving the filtration problems in the technique, then this procedure might be adequately evaluated during the coming year.

Dr. Charles Zierdt continued work on Blastocystis hominis. Contracts with Bionetics for transmission electron microscopy of fixed specimens produced additional knowledge of the ultrastructure of the organism. Freeze fracture electron microscopy by Dr. Henry Tan of the Hematology Service revealed a cytoplasmic bacterial endosymbiont and a central body endosymbiont. This is the only example of an endosymbiont infected protozoan in man. B. hominis was finally grown free of bacteria (axenic growth).

Cases of human diarrhea in which B. hominis may be a cause were studied. This organism, long regarded as a harmless intestinal yeast, was reexamined as a possible intestinal protozoan parasite of man. Studies on the pathogenesis of B. hominis infection in germ-free guinea pigs with Dr. Bruce Phillips of the Laboratory of Molecular Immunology, NIAID, began.

Dr. Zierdt collaborated with investigators from NCI, NIAID, NIAMDD in an immunization study of cystic fibrosis and leukemia patients, using lipopolysaccharide vaccine against Pseudomonas aeruginosa developed by Parke-Davis. Four main observations resulted. (1) Although toxic, the vaccine markedly raised antibody levels in these patients. (2) There is evident benefit to leukemia patients from the vaccine treatment by reduction of Pseudomonas infections, and further use is warranted. (3) There is no evident benefit to cystic fibrosis patients. (4) This study confirmed and extended an observation first made by Dr. Zierdt years ago, that C. F. patients are usually infected with a single strain of P. aeruginosa, which is also characterized by the slime capsule it produces, the so-called mucoid strain.

Dr. Zierdt worked with Dr. MacLowry on the intracellular action of antibiotics. The model studied was S. aureus and human polymorphonuclear leucocytes. We were unable to confirm Dr. G. L. Mandell's conclusion that rifampin is the only antibiotic acting on bacteria within leucocytes.

Dr. Zierdt completed a long term definitive study of Corynebacterium acnes bacteriophages and submitted the report for publication.

Because of continual biologic variation of Pseudomonas aeruginosa, typing for epidemiologic purposes is very difficult. By combining three available serologic systems, Dr. Zierdt began to offer typing for research and patient service in the Clinical Center that should be much more reliable and provide a much needed handle for studying nosocomial infections.

In collaboration with the Clinical Mycology Section, LCI, NIAID, Ms. Anne Jennings was involved in a number of studies. Through studies of a series of isolates obtained from an outside patient, it was shown that despite administration of combined Amphotericin B and 5-fluorocytosine, a 5-FC resistant mutant could replace the patient's sensitive strain of Cryptococcus. The mechanism of resistance was loss of the enzyme cytosine deaminase.

Miconazole, a new antifungal agent, was evaluated for efficacy in experimental murine sporotrichosis. This study was undertaken in search of therapy for a Clinical Center patient with refractory sporotrichosis. Miconazole was ineffective with the patient's isolate.

A microtiter "checkerboard" technique was used to detect synergism between Amphotericin B and 5-fluorocytosine or rifampin. Both combinations showed synergistic inhibition of Cryptococcus neoformans. Synergism between Amphotericin B and 5-fluorocystosine was also found using several isolates of Candida. With C. neoformans, synergism between Amphotericin B and 5-fluorocytosine was detectable only when the isolate was susceptible to both drugs alone.

Studies on future promising antifungal agents will be pursued to provide alternatives to the limited current therapeutic modalities. Miconazole will be studied in other experimental mouse infections to learn more of its efficacy. Sensitivity testing of antifungal agents will be provided on a continuing service basis.

Drs. Bernard Kasten and Robert Kagan, working with Dr. MacLowry, combined evaluation of the feasibility of instituting a radioactive assay for Gentamicin. The procedure has been worked out in other laboratories, but the questions regarding its usefulness for small numbers of specimens remains to be solved.

Dr. Gerald Lidell started investigations on the effect of different incubation environments on antibiotic sensitivity testing with an aim toward standardizing procedures for testing anaerobic bacteria.

Training

Drs. Russell Jaffe, Ronald Elin, Arthur Robertson, and Robert Kagan, Clinical Pathology residents, each spent eight weeks rotating through the Service.

Dr. Bernard Kasten, Clinical Pathology resident, returned to the Microbiology Service for an additional six month training period. During this time he worked on a joint project with Dr. Kagan on radioassay of serum Gentamicin.

Dr. Robert Kagan, Clinical Pathology resident, returned for an additional six month training period.

Dr. George Schoenholtz, Assistant Clinical Professor of Orthopedic Surgery, George Washington University, became a Guest Worker to learn diagnostic microbiology and its interpretation. He is concerned about the problems of nosocomial infections in orthopedic surgery.

Dr. Gerald Lidell, Microbiologist, Bureau of Drugs of the FDA, joined the Service as a Guest Worker and has been studying the effect of different incubation environments on antimicrobial sensitivity testing with an aim toward standardization of techniques for anaerobic bacteria.

Mrs. Leona Cooper, Microbiology Supervisor, Veterans Administration Hospital, Miami, Florida, spent four days in the Anaerobic Laboratory to observe and learn our methodology in handling anaerobes.

Ms. Ludi San Miguel, Microbiology Technologist, George Washington University Microbiology Laboratory, spent five days training in the Anaerobic Laboratory.

Visitors to the laboratory to discuss or consult on diagnostic microbiology included:

Ms. Gail Bosley, Laboratory Training Division, Center for Disease Control, Atlanta, Georgia. (Diagnostic Bacteriology Methodology)

Dr. John C. Sherris, Chairman, Department of Microbiology, University of Washington in Seattle, Washington.

Ms. Naomi Harris, Howard University, Washington, D. C. (Phage typing).

Dr. James Farmer, Chief of Laboratory for Enteric Phage Typing, CDC, Atlanta. (Pseudomonas typing and computerization).

Dr. Elizabeth Reiss-Levy, Clinical Pathology, St. George Hospital, Sydney, Australia.

Dr. Konrad Wicher, Director, Microbiology, Erie County Laboratories, Buffalo, N. Y. (Microtiter Antibiotic Sensitivity Testing).

Commander Patricia Robinson, Chief, Microbiology Service, National Naval Medical Center, Bethesda. (Phage typing).

Dr. Bjorne Bjorvatin, Karolinska Institute, Sweden (Axenic Culture Technique).

Drs. James MacLowry and Vee Brenner started a series of microbiology lectures in August 1973. These were designed to cover pertinent aspects of diagnostic microbiology and antibiotic sensitivities for the major groups of pathogenic organisms. The lectures were given once every two weeks and have been attended by both Clinical Pathology residents and clinical associates of the LCI, NIAID. In addition, a laboratory practical exam was given to the residents to test their ability to diagnose a wide variety of pathogens.

Drs. MacLowry, Brenner, and Gill attended and participated in the weekly Infectious Disease Consultation Rounds for both NIAID and Bethesda National Naval Hospital.

Conferences were held once a week for all Microbiology Technologists to discuss departmental policies, methodology, or specific cases of interest. Guest speakers were also brought in to discuss topics of relevance to microbiology.

Office of the Chief

Service Productivity

The total Clinical Pathology Department workload in terms of tests performed, increased by 8% or 82,968 tests over the previous year. With an average patient census increase of 2% for the year the department showed a 5% increase in work units processed/patient/day.

Table 1 lists the workload statistics for FY 1974 for the Clinical Pathology Department.

Training

The residency training program in Clinical Pathology admitted four first year residents: Drs. Ronald J. Elin; Russell M. Jaffe; Robert L. Kagan; and E. Arthur Robertson. Dr. Bernard L. Kasten was the only second year resident in the program.

The senior staff and residents continued to have weekly Clinical Pathology Rounds at which interesting patients and/or laboratory problems were presented and discussed. The Chiefs, along with the senior staff and residents were able to conduct weekly conferences with the technical staff in each of the service areas. Each of the services also participated in clinical rounds with several of the clinical branches of the Institutes.

The professional and technical staff were encouraged to continue their formal training through the NIH Graduate Program and other institutions. A summary of courses completed by the staff in FY 1974 is included in table 2.

PRESENTATIONS

Brenner, V. C.: Non-Fermenting Gram Negative Rods and Bacteria of Medical Importance. Faculty member of a Five-Day American Association of Clinical Pathologists Workshop, held in Chicago, Illinois, April 22-26, 1974.

Coller, B. S., Hirschman, R. J., Kasten, B. L., and Gralnick, H. R.: Immunologic recognition of the Factor VIII/von Willebrand Factor (F. VIII/vWf) on the platelet surface. Presented to the American Society of Hematology, Chicago, Illinois, December, 1973.

Coller, B. S., Lundberg, W. B., Gralnick, H. R.: Effects of vancomycin (V) on plasma proteins, platelets (Plts) and hepatitis B antigen (HBAg). Presented at meetings of American Federation for Clinical Research, Atlantic City, New Jersey, May 1974.

Corash, L., Piomelli, S., Seaman, C. and Camisa, C.: High resolution separation of blood cell types by density gradient centrifugation. Presented at the American Society of Hematology, December 1973.

Gralnick, H. R.: Theoretical approach to molecular biology of Factor VIII: Heterogeneity of the molecule. Presented at the New York Academy of Sciences Symposium, January 1974.

Green, M., Soodale, C. and Cullis, H.: Direct internal temperature control in the rotochem system. Presented at the 75th National Meeting, AICHE, Detroit, Michigan, June 1973.

Green, M.: Current developments in Clinical Chemistry. Seminar at Drew University, November 1973.

Green, M.: Centrifugal Chemistry. Postgraduate course lecture on Advances in Clinical Chemistry. Walter Reed Army Institute of Research, Washington, D. C., February 1974.

Hirschman, R. J., and Gralnick, H. R.: A simplified platelet factor (PF-3) assay for the rapid detection of platelet isoantibodies and an antiplatelet factor in ATP and SLE. Presented at the American Society of Hematology, Chicago, Illinois, December 1973.

MacLowry, J. D.: Antimicrobial Sysceptibility Testing and Drug Resistance; Anaerobic Bacterial Infections; Non-Fermentative Gram Negative Rods and their Clinical Significance; Principles of Diagnostic Medical Microbiology. Series of lectures to the first year medical students at George Washington University Medical School.

MacLowry, J.D.: The Use of Quantitative Antimicrobial Susceptibility Data and the Monitoring of Antibiotic Levels in a Clinical Situation. Talk presented to the Division of Laboratory Medicine, George Washington Medical Center.

MacLowry, J. D.: The Use of the Computer in Diagnostic Microbiology with Special Reference to Antimicrobial Susceptibility Testing. Talk presented at the Laboratory of Clinical Investigation, NIAID, Grand Rounds.

MacLowry, J.D.: A review of Normal Bacteriology and The Pharmacology and Use of Antibiotics. Invited lecturer to the Otolaryngology Basic Science Course, Armed Forces Institute of Pathology, Washington, D. C.

MacLowry, J. D.: Bacterial and Fungal Infections, Laboratory Problems in Diagnosis. Invited speaker to the Seminar on Institutionally Associated Infections and Environmental Control, sponsored by the District of Columbia Department of Environmental Services and Department of Human Resources, Washington, D. C.

MacLowry, J.D.: Identification of Streptococci and Diagnosis of Non-Fermentative Bacteria. Lecture to the Bacteriology Section, Clinical Pathology Department, Walter Reed Army Medical Center, Washington, D. C.

MacLowry, J.D.: Computer Assisted Identification of Bacteria. Invited speaker to the Symposium on Laboratory Data Handling, sponsored by the New York State Department of Health, New York City.

MacLowry, M. D.: Computer Assisted Diagnosis in Clinical Microbiology. Invited lecturer to the Annual Academic Clinical Laboratory Physicians and Scientists meeting in Atlanta, Georgia, May 10, 1974.

MacLowry, J. D.: The Computer Identification of Bacteria. Invited lecturer at the William Pepper Laboratory, Hospital of the University of Pennsylvania, Philadelphia, Pa.

MacLowry, J. D.: Non-Fermenting Gram Negative Rods and Bacteria of Medical Importance. Course Director of a Five-Day American Association of Clinical Pathologists Workshop, held in Chicago, Illinois, April 22-26, 1974.

Robertson, E. A.: On-line data handling in a clinical laboratory. Research conference on instrumentation science by the Instrument Society of America, Geneva, New York.

Young, D. S.: Therapeutic Drug responses and their influence on normal values. Presented at the American Association of Clinical Chemists 25th National Meeting, New York, N. Y., July 1973.

Young, D. S.: Normal range information system. Presented at the American Association of Clinical Chemists 25th National Meeting, New York, N. Y., July 1973.

Young, D. S.: Automatic monitoring and drug/laboratory test interactions. Presented at the International Symposium on Drug Interactions, Instituto di Ricerche Mario Negri, Milan, Italy, September 1973.

Young, D. S.: Computer retrieval of laboratory test/drug interactions. Presented at the Working Group on Automation of NATO Committee on the Challenges of Modern Society, Bethesda, Maryland, November 1973.

Young, D. S.: Laboratory uses of a computer. Presented at the Center for Preventive Medicine, Nancy, France, November 1973.

Young, D. S.: Drug interferences. Presented at the Conference on "Pharmacocinetique et interference des medicaments chez l'homme sain et malade," Pont-a-Mousson, France, November 1973.

Young, D. S.: Transformation of laboratory results into useful information. Presented at the New Jersey Section of the American Association of Clinical Chemists, Nutley, New Jersey, December 1973.

Young, D. S.: The S. I. system of units. Presented at the Capital Section of the American Association of Clinical Chemists, Bethesda, Maryland, March 1974.

Young, D. S.: Drug interference in laboratory analyses. Presented at the New York State Department of Health, New York, N. Y., March 1974.

Zierdt, C. H.: Confusion of Typing of Pseudomonas Aeruginosa. Invited participant in a Combined Clinical Staff Conference, Clinical Center, NIH.

OTHER ACTIVITIES

Dr. D. S. Young served as Chairman of the Board of Editors of Clinical Chemistry. He also serves on the Board of Analytical Letters. He is chairman of a Committee on Normal Ranges and Analytical Variations of the National Committee for Clinical Laboratory Standards. Dr. Young is a member of the Automation Commission of the International Union of Pure and Applied Chemistry, and was DHEW representative on Ancillary Services Panel, National Commission on Productivity.

PUBLICATIONS

Albright, L., Toczek, S., Brenner, V. J., and Ommaya, A. K.: Osteomyelitis and epidural abscess caused by Arachnia propionica. J. Neurosurg. 40: 115-119, 1974.

Bennett, S. H., Geelhoed, G. W., Gralnick, H. R. and Hoye, R. C.: Effects of autotransfusion on blood elements. Am. J. Surg. 125: 273-279, 1973.

Block, R. R., Jennings, A. E., and Bennett, J. E.: Variables influencing susceptibility testing of Cryptococcus neoformans to 5-fluorocytosine. Antimicrob. Agents Chemother. 4: 392-395, 1973.

Boime, I., Corash, L. and Gross, E.: Protein synthesis in cell-free extracts derived from first and third trimester human placenta. Pediatr. Res. In press.

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Corash, L. and Gross, E.: Subcellullar constituents of human placenta. II. Isolation and density distribution of lysosomes from first trimester tissue. Pediatr. Res. In press.

Corash, L., Piomelli, S., Chen, H., Seaman, C. and Gross, E.: Separation of erythrocytes according to age in a simplified density gradient. J. Lab. Clin. Med. In press.

Friedman, R. B., Bruce, D., MacLowry, J., and Brenner, V.: Computer-assisted identification of bacteria. Am. J. Clin. Pathol. 60: 395-403, 1973.

Friedman, R., and MacLowry, J.: Computer identification of bacteria on the basis of their antibiotic susceptibility patterns. Appl. Microbiol. 26: 314-317, 1973.

Gochman, N., and Young, D. S.: Clinical Chemistry. Anal. Chem. 45: 11R-38R, 1973.

Gralnick, H. R., Coller, B. and Marchesi, S. L.: Immunological studies of Factor VIII in haemophilia and von Willebrand's disease. Nature (New Biol.) 244: 281-282, 1973.

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Gralnick, H. R., and Tan, H. K.: Acute promyelocytic leukemia: A model for the understanding of the role of the malignant cell in hemostasis. J. Human Pathol. In press.

Hirschman, R. J. and Shulman, N. R.: The use of platelet serotonin release as a sensitive method for detecting anti-platelet antibodies and a plasma anti-platelet factor in patients with idiopathic thrombocytopenic purpura. Br. J. Haematol. 24: 793-802, 1973.

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Marchesi, S., Aptekar, R. G., Steinberg, A. D., Gralnick, H. R., and Decker, J. L.: Urinary fibrin split products and lupus nephritis: Correlation with other parameters of renal disease. Arthritis Rheum. In press.

Myers, C. E., Chabner, B. A., De Vita, V. T. and Gralnick, H. R.: Bone marrow involvement in Hodgkin's disease: Pathology and response to MOPP Chemotherapy. Blood. In press.

Noble, R. C., Reeves, S., Goodwin, S., Cox, S., Hernandez, C., Bahn, A., and MacLowry, J. Contamination of blood culture medium. Morbidity and Mortality 23:12, 1974.

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Tan, H. K. and Zierdt, C. H.: Freeze fracture studies of the granular and vacuolated forms of Blastocystis hominis. Z. Parasitenkd. In press.

Vollman, J. H., McKeynolds, J., Tomek, M., Nahmias, A., Shulman, J., Bahn, A. McCroan, J., and MacLowry, J.: Ampicillin-resistant Hemophilus influenzae meningitis. Morbidity and Mortality 23:9, 1974.

Young, D. S.: Modification of serum enzyme activity by therapeutic drugs In Siest, G. (ed.): Reference Values in Human Chemistry. Basel, Karger, 1973, pp 284-291.

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Young, D. S.: The origin of serum enzymes and the basis for their variation. In Blume, P. F. and Frier, E. F. (eds.): Enzymology in the Practice of Laboratory Medicine. New York, Academic Press, 1974, pp. 253-269.

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Table 1

Workload Statistics for Clinical Pathology Department, FY 1974

	Chemistry	Hematology	Microbiology	Department Totals FY-74	Department Totals FY-73
Average Patient Census				319	313
Total Tests Performed	566,905	346,093	176,308	1,089,334	1,006,366
Available Tech. Days	5,777	5,429	4,644	15,850	15,494
Total Work Units	635,238	583,430	388,022	1,606,694	1,508,992
Work Units/Tech/Day (Monthly Average)	110.0	108.0	83.8	101.1	97.1
Work Units/Patient/Day (Monthly Average)	8.2	7.5	5.0	20.7	19.3

Table 2

List of Formal Training Courses Completed by Staff FY 1974

Commissioned Officers			
Coller, B. S., M.D.	Reading Improvement	Fall 73	FAES
Coller, S. S., M.D.	Immunohematology and Blood Transfusion	Spring 74	"
Elin, R. J., M.D.	Ultrastructural Pathology	Fall 73	"
Elin, R. J., M.D.	Hematology	Fall 73	"
Elin, R. J., M.D.	Introduction to Virology	Spring 74	"
Elin, R. J., M.D.	Practical and Theoretical Aspects of Human Blood Group Serology	Spring 74	"
Elin, R. J., M.D.	Application of Histochemistry to Pathology	1/7-11, 1974	AFIP
Elin, R. J., M.D.	Orthopedic Pathology	2/9-16, 1974	"
Elin, R. J., M.D.	Oral Pathology	3/4-8, 1974	"
Elin, R. J., M.D.	14th Annual AFIP Lectures	3/25-29, 1974	"
Jaffe, R. M., M.D.	Hematology	Fall 73	FAES
Jaffe, R. M., M.D.	Molecular & Cellular Aspects of Immunology	Fall 73	"
Jaffe, R. M., M.D.	Physical Chemistry of Proteins	Spring 74	"
Jaffe, R. M., M.D.	Genetics, Pathology and Diseases	2/4-7, 1974	AFIP
Jaffe, R. M., M.D.	14th Annual AFIP Lectures	3/25-29, 1974	"
Kagan, R. L., M.D.	Ultrastructural Pathology	Fall 73	FAES
Kagan, R. L., M.D.	Correlation between Internal Medicine and Basic Sciences	Fall 73	"
Kasten, B. L., M.D.	Hematology	Fall 73	"
Kasten, B. L., M.D.	Gynecological Pathology	11/5-9, 1973	AFIP
Kasten, B. L., M.D.	Genitourinary Pathology	1/14-18, 1974	"
Kasten, B. L., M.D.	14th Annual AFIP Lectures	3/25-29, 1974	"
Kasten, B. L., M.D.	Orthopedic Pathology	2/9-16, 1974	"
McGee, R. A., M.D.	Reading Improvement	Fall 73	FAES
Rosenbaum, R. B., M.D.	Encounter I - Privacy and the Computer	10/11/73	U.S. Civ.Serv.Com.
Rosenbaum, R. B., M.D.	Security of Computer Systems	10/12/73	"
Rosenbaum, R. B., M.D.	Second National Conference on On-Line Biomedical Computing	11/29/73	Assoc. for Advancement of Med. Instr.
Rosenbaum, R. B., M.D.	Neurochemistry	Spring 74	FAES
Spellman, G. G., M.D.	Introductory Biochemistry	Fall 73	"

Table 2 (cont)

List of Formal Training Courses Completed by Staff FY 1974

Commissioned Officers			
Zweig, M. H., M.D.	Hematology	Fall 73	FAES
Zweig, M. H., M.D.	14th Annual AFIP Lectures	3/25-29, 1974	AFIP
Civil Service			
Bowman, M. B.	Organization Behavior and Change	6/19-21, 1974	ASMT
Byrd, L. T.	Management for Clinical Laboratories	6/19-21, 1974	ASMT
Cunningham, C. R.	Operation of Automatic Clinical Analyzer	3/24-30, 1974	DuPont
Feld, M.	Organization Behavior and Change	6/19-21, 1974	ASMT
Gersch, S. M.	Gas Chromatography Workshop	5/19-24, 1974	Applied Science Lab., Inc.
Gray, B. L.	Radioimmunoassay Workshop	3/5/74	Beckman Instruments
Gray, B. L.	Supervisory Management Course II	Oct. 1973	CC Personnel
Hansen, S. E.	Operation of Blood Gas Analyzer	3/18-22, 1974	Inst. Lab. Inc.
Herz, J. L.	Radioimmunoassay Workshop	3/5/74	Beckman Instruments
Hill, H. H.	Protein Binding Workshop	3/4/74	" "
Hofberg, R. N.	Toxicology Workshop	4/26-27, 1974	Perkin-Elmer Corp.
Huber, C. D.	Radioimmunoassay Workshop	3/5/74	Beckman Instruments
Huber, C. D.	Operation of Automatic Clinical Analyzer	3/24-30, 1974	DuPont
Jackson, A. J.	Toxicology Workshop	4/26-27, 1974	Perkin-Elmer Corp.
Lawrence, L. C.	Virology Workshop	3/18-19, 1974	D.C. Soc. of Med. Technologists
Lundwall, K.	Atomic Absorption Workshop	August 1973	Inst. Lab., Inc.
Lundwall, K.	Operation of AutoAnalyzer, II	September 1973	Technicon Inst. Co.
May, D. B.	Various Hematology Workshops	November 1973	ASMT
Olson, D. R.	Immuno-Fluorescent Antibody Workshop	4/18/74	D.C. Soc. of Med. Technologists
Olson, D. R.	Atomic Absorption Workshop	April 1974	Inst. Lab., Inc.
Pestaner, L. C.	Real Time Systems	Fall 1973	American University
Pestaner, L. C.	Systems Analysis for Business & Gov't.	Spring 1974	American University
Pestaner, L. C.	Nature and Functions of Record Systems	Spring 1974	American University
Pestaner, L. C.	Workshop in Telecommunications and MIS	Spring 1974	American University
Pestaner, L. C.	Programming Systems and Languages	Spring 1974	American University
Poturica, L.	Electrophoresis Workshop	October 1973	Behring Diagnostic
Poturica, L.	Protein Binding Workshop	3/4/74	Beckman Instruments
Poturica, L.	Atomic Absorption Workshop	April 1974	Inst. Lab., Inc.

Table 2 (cont)

List of Formal Training Courses Completed by Staff FY 1974

Civil Service			
Ramseur, R. M.	Kinetic Enzyme Methods	3/6/74	Beckman Instruments
Ramseur, R. M.	Operation of Blood Gas Analyzer	3/18-22, 1974	Inst. Lab., Inc.
Shearon, M. P.	Protein Binding Workshop	3/4/74	Beckman Instruments
Shearon, M. P.	Operation of AutoAnalyzer for specific protein determinations	5/13/74	Technicon Corp.
Siegel, S.	Operation of AutoAnalyzer, II	Sept. 1973	Technicon Inst. Co.
Silchenko, N.	Various Hematology Workshops	November 1973	ASMT
Sillcox, G. H.	Radioimmunoassay Workshop	4/25-26, 1974	NNMC
Skramstad, K. S.	Metabolic Screening in Urines	10/5/73	ASCP
Skramstad, K. S.	Urinary Sediments - Lectures	4/18/74	D.C. Soc. of Med. Technologists
Skramstad, K. S.	Operation of AutoAnalyzer Systems	May 1974	Technicon Corp.
Sliva, C. A.	Mycology Workshop	4/18-19, 1974	D.C. Soc. of Med. Technologists
Sliva, C. A.	Kinetic Enzyme Methods	4/6/74	Beckman Instruments
Turner, P. E.	Serological Typing and Ent. E. Coli	6/20/74	ASMT
Turner, P. E.	Identification of Non-Fermentative Gram Negative Rods	6/22/74	ASMT
Turner, P. E.	Quality Control in Microbiology	6/26/74	ASMT
Whalen, G.	Basic Principles of Immunology & Hypersensitivity	Fall 1973	FAES
Whalen, G.	Various Hematology Workshops	November 1973	ASMT
Williams, R. L.	Introductory Biochemistry	Fall 1973	FAES
Wilson, T.	Supervisory Management Course, II	Oct. 1973	CC Personnel
Wood, E.	Workshop on Automated Clinical Analyzer	7/15/73	DuPont
Wood, E.	Kinetic Enzyme Methods	3/6/74	Beckman Instruments
Wood, E.	Supervisory Management Course, II	July 1973	CC Personnel
Ziff, J.	Electrophoresis Workshop	October 1973	Behring Diagnostics
Ziff, J.	Radioimmunoassay Workshop	4/25-26, 1974	NNMC

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SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
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DEPARTMENT OF DIAGNOSTIC RADIOLOGY

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DEPARTMENT OF DIAGNOSTIC RADIOLOGY

INTRODUCTION

The primary goal of the Department of Diagnostic Radiology remains the providing of radiological services to the Institutes. Achievement of this goal was facilitated by several major departmental changes during the current year.

1. New fluoroscopic and angiographic equipment was installed in two rooms, resulting in improved diagnostic service and a wider range of offered examinations.

2. Our record keeping operation (requisitions, typed reports, etc.) was completely re-organized to utilize computer facilities and to assure more expeditious reporting.

3. A completely new imaging modality was introduced (ultrasound) and provision for a second (computerized trans-axial tomography) is in the works.

4. Weekly film reviews with almost every major clinical service have been instituted and enthusiastically received by the clinicians.

In addition to our service responsibilities, a small but active research program has been initiated with the availability of animal angiographic facilities. Both interdepartmental and collaborative projects are underway at a level of activity far exceeding any previous year in the history of our department. Both permanent staff and the clinical associates are enthused about the opportunity for independent radiological research.

A vigorous teaching program remains a major attraction for clinical associates. During the past year, our consultant staff has been enlarged and consultants visit the department on a routine monthly schedule. More active affiliation with the local medical schools, the Armed Forces Institute of Pathology and military hospitals has been sought to strengthen our teaching program.

ACCOMPLISHMENTS

A total of 48,858 X-ray studies was performed on 29,800 patients during the past year. This did not represent a significant variation from the preceding year and was in keeping with the relatively stable hospital census. The number of special procedures also remained stable, a trend evident nationally

as the recent precipitous growth of angiographic studies began to level off and appropriate indications for these studies were determined.

Extensive equipment acquisitions were accomplished during the past year. A new Siemens fluoroscopic-radiographic unit for barium studies and a CGR special procedure room were installed. Installation involved considerable rescheduling of patient activities due to the shortage of fluoroscopic facilities. Starting times of 7:30 A.M. were routine for half our staff but hopefully can be abandoned when equipment installations are complete.

The new special procedure room contains the latest angiographic equipment, including an ultrafine focal spot tube which will permit direct magnification studies to be performed during angiography. Such techniques are enabling radiologists to visualize smaller vessels and to more precisely define the characteristics of tumor vascularity. Glomeruli counts are now being done on 4 times magnified selective renal arteriograms with considerable accuracy. This trend towards magnification studies promises much, particularly in the field of early tumor diagnoses and organs such as the pancreas are being re-evaluated now that magnification techniques are available.

Our experience with Xeroradiographic mammography has been extensive during the past year and we have acquired the expertise to support a major breast study whenever it is implemented.

The Diagnostic Radiology Department is now performing B-scan Ultrasound examinations and the request for such studies is growing rapidly. This new imaging modality presents information about normal organs and masses in a transverse or horizontal plane not available on conventional X-ray examinations and is an ideal supplement to the diagnosis of abdominal masses. Purchase of this equipment was initiated at the request of Dr. Ronald Chez when an active Obstetrics Service was being planned. Placental localization and cephalometry for fetal maturity are already being performed. But in addition to obstetric uses, ultrasonic studies in cases of abdominal masses are providing abundant and unique information. This service currently requires one full time clinical associate and further expansion seems inevitable.

An animal radiographic facility was finally installed adjacent to the Diagnostic Radiology Department and is being heavily utilized. Collaborative projects with NHLI, NINDS, and NCI are already underway. In addition, our own clinical associates are, for the first time, conducting independent studies on new contrast agents, innovative angiographic or embolizing techniques, etc. The facility has proven immensely popular and may be responsible for retaining some of our clinical associates as staff members. This represents, in my opinion, the major accomplishment of this department during this fiscal year and the first step in the right direction if radiology is to prosper at the Clinical Center.

The development of computerized trans-axial tomography has undermined all long-range planning for radiology departments. By this technique, horizontal tomograms of body parts are constructed by computer from large numbers of transmission scans. Already, in the skull, phenomenal results have been

reported. The technique is non-invasive, precise, and may even allow identification of histology as well as detection of the presence of mass lesions. In the field of intracranial diagnoses, its only current clinical application, it has almost eliminated the need for pneumoencephalography and greatly reduced the number of carotid arteriograms. Its application to other body compartments (chest, abdomen and extremities) will soon be available and, as it functions without film, darkrooms, contrast media, etc., major changes in departmental equipment and design can be anticipated. We had been negotiating to purchase such a scanner with funds jointly contributed by the Clinical Center, National Cancer Institute, and the National Institute of Neurological Diseases and Stroke. However, the rapid development of improved models is so inevitable that purchase has been delayed in anticipation of a vastly improved scanner in the very near future.

EDUCATION AND TRAINING

Weekly film review sessions of current cases continue to be popular among the various clinical services. Our daily noon conference now features regular visits from Dr. William McSweeny, Chief of Radiology at the D. C. Children's Hospital, and Dr. Elias Theros, Chief of Radiologic Pathology, Armed Forces Institute of Pathology. In addition, the Department has subscribed to taped neuroradiological conferences from the University of California, San Francisco, and taped conferences on general radiologic subjects from the American College of Radiology. Both programs supplement our own teaching material and provide radiologic pathology not routinely seen at the Clinical Center. Members of the staff continue to conduct teaching sessions at some of the local hospitals - D. C. General Hospital (Dr. Michael Vermess), National Naval Medical Center (Dr. Ronald Seningen), George Washington University Medical School (Drs. John Doppman, Jean Herdt), and Johns Hopkins Medical School (Dr. John Doppman). In addition, we are very active in the Washington Angiographic Society and the Baltimore-Washington Pediatric Radiology Club.

Clinical associates Keith Johnson, John Copenhaver, Philip Brodey, and Ronald Seningen were certified by the American Board of Radiology in July 1973.

PROPOSED FUTURE OBJECTIVES

Major equipment purchases in the past 2 years have resulted in a well equipped department capable of performing the most complicated modern procedures. Innovative techniques are being evaluated in the animal room facility and hopefully will be soon applied to improve patient care. One remaining radiographic fluoroscopic room, with 8 year old equipment, will be replaced in the next fiscal year, completing the modernization commenced 2 years ago. One of the major problems confronting future departmental planning involves forecasting the rate at which computer generated imaging systems will replace conventional film installations. Certainly the original departmental plans for a proposed new facility in the Outpatient Building will have to be totally revised in view of this recent development.

The ability to recruit and retain a first-class staff remains our major challenge. The disparity between university and NIH salaries in the radiology field has grown so great that even our well-equipped "plant" and research opportunities may not bridge it.

PUBLICATIONS

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EXHIBITS

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Seningen, R. P., and Scherer, J. L.: Quantitative analysis and classification of human coronary artery collaterals. Scientific Exhibit at 59th Scientific Assembly and Annual Meeting of The Radiological Society of North America. November 24-30, 1973, Chicago.

Table 1

Number of X-ray Examinations

Fiscal Year 1974

	Patients	X-ray Examinations	Examinations per patient
Inpatients	17,285	28,082	1.62
Outpatients	9,637	17,692	1.83
EHS	2,878	3,084	1.07
	29,800	48,858	1.63

Table 2

Comparison of Activity

Fiscal Years 1973 and 1974

	1973	1974	Change
Total number of patients examined	26,117	29,800	+3683
Total number of X-ray examinations	46,904	48,858	+1954
Number of X-ray examinations per patient	1.79	1.63	- .16
Total special procedures	1,935	1,791	- 144

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Studies on spinal cord blood flow

Principal Investigator: John L. Doppman, M.D.

Other Investigators: None

Cooperating Units: None

Man Years:

Total: 1.3
Professional: 0.3
Other: 1.0

Project Description: Using a technique for percutaneously introducing masses into the spinal canal, the effect of such "tumors" on spinal cord arterial and venous flow was studied. Initially, anterior epidural masses simulating spondylotic spurs were noted to obstruct the sulcal (central) arteries resulting in a focal lesion of the central gray matter similar to the myelopathy of spondylosis. Additional studies have been performed comparing the effects of anterior with lateral and posterior epidural masses. A series of 8 monkeys in each category have been prepared and microangiograms of the spinal cord studied. It appears that epidural masses directly behind the cord have an effect very similar to anterior masses. This suggests that the mechanism of the myelopathy may be related more to flattening of the cord in a sagittal plane rather than contiguity of the mass to the anterior spinal artery. The basis for this theory exists in the anatomical distribution of the smaller arterioles of the central gray matter. Lateral epidural masses, on the other hand, must be of a much larger size before producing cord damage. A paper on the results of these studies is in preparation.

The effect of acutely inflated masses within the spinal canal on epidural venous flow has also been evaluated to determine the usefulness of this diagnostic radiographic procedure for detecting cord pathology or trauma. Epidural masses were produced and the effects on epidural venography compared with the control studies. Masses within

the spinal canal tend to prevent epidural venous filling, alternate routes of craniad venous flow (e.g., the IVC) being so readily available. Even when satisfactory epidural venous filling can be obtained, the localization predicted on the venogram is often one or two vertebral bodies away from the lesion. Anatomy of the interconnecting veins between epidural and caval systems offer the best explanation for this phenomenon. The results of this study have been published.

The effects of acute trauma on spinal cord arteriography and venography are being investigated. Myelography in patients with acute spinal cord injury is a hazardous procedure. Yet the decision to decompress the cord is a difficult one unless some objective evidence of cord compression can be demonstrated. Acute cord injury has been simulated by abruptly distending a large balloon within the spinal canal at the level of the lumbar enlargement. This method of cord injury is superior to the classic Allen technique in which weights are dropped a fixed distance through a vented tube to impound the cord. The latter technique necessitates a laminectomy prior to injury and the model is therefore unrealistic from the clinical viewpoint. We are performing serial arteriographic and venographic studies following cord injuries to see whether either technique can furnish information about cord compression without the necessity of tapping the subarachnoid space. Serial arteriograms show no change following a paraplegia-producing injury. Serial venograms, however, demonstrate obstruction of the epidural plexus at an early stage and at the level of the cord injury. Since the epidural venous plexus throughout the spinal canal can be opacified, this technique may offer an alternate method of evaluating the cord and the need for decompression in cases of acute spinal injury. A paper and a presentation are being prepared on this subject.

Publications: Doppman, J. L.: The effect of intraspinal masses on flow in the epidural venous system: An angiographic study in monkeys. Invest. Radiol. 9: 74-81,1974.

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Intravenous hepato-splenography with a new lipoid soluble contrast agent (AG 60-99)

Principal Investigator: Michael Vermess, M.D.

Other Investigators: Richard H. Adamson, Ph.D.* Alan Rabson, M.D.**

Cooperating Units: *Pharmacology and Experimental Therapeutic Section, ET, LCP, DCT, NCI
**Section on Anatomic Pathology, NCI

Man Years:

Total: 1.5
Professional: 0.5
Other: 1.0

Project Description: This project initially investigated the intra-arterial injection of a lipoid soluble contrast media (AG 60-99) developed by Guebert Laboratories. A dense hepatogram persisting for 7 to 10 days can be obtained by selective injection of this new contrast agent into the hepatic artery and with but mild alterations in liver function tests. Tomography demonstrated the ability to detect small avascular filling defects on the dense hepatogram. More recent developments have provided a similar compound for intravenous administration. Dense hepatograms and splenograms can be obtained in monkeys with an intravenous infusion of this new opaque material. Studies have been performed to determine optimum dose and method of infusion, persistance of the hepatogram and factors that influence its density. Serial hepatic biopsies to determine the toxic effects of the opaque media on the liver have been performed. A contract has been negotiated with the Hazelton Laboratories to evaluate the effect of this opaque on liver function and other hematologic parameters. In addition, several monkeys with carcinogen-induced hepatic tumors have been studied but the cirrhosis that precedes development of tumor reduces uptake of the opaque material by the liver. Since this should not constitute a problem in looking for early hepatic metastases, as opposed to primary hepatomas, considerable optimism exists concerning this drug's potential clinical usefulness and a clinical trial is anticipated as soon as toxicity studies are completed.

Publications: Vermess, M., Adamson, R. H., Doppman, J. L., Rabson, A. S., Herdt, J. R., and McIntosh, C. L.: Intra-arterial hepatography: Experimental evaluation of a new contrast agent. Radiology 110: 705-707, 1974.

Vermess, M., Adamson, R. H., and Rabson, A. S.: Intra-arterial splenography with oil-based contrast material. Invest. Radiol. In press.

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Determination of tumor marker gradients and selective venous samples

Principal Investigator: John L. Doppman, M.D.

Other Investigators: Philip T. Waalkes, M.D.* Douglass C. Tormey, M.D.**

Cooperating Units: *Laboratory of Chemical Pharmacology, ET, DCT, NCI
**Medical Breast Cancer Service, Medical Oncology, Division of Cancer Treatment, NCI

Man Years:

Total: 1.5
Professional: 0.5
Other: 1.0

Project Description: The recent development of tumor markers (CEA, alpha-fetaprotein, etc.) has stimulated the hope that blood tests for the early detection of cancer may soon be available. Positive blood tests at an early and presumably asymptomatic state of disease will pose an immense logistical problem for radiology. Current localization techniques (metastatic series, chest tomography, barium studies, pyelography) would probably be unsuccessful in small asymptomatic tumors. For this reason, we are investigating the possibility of marker gradients in selectively sampled veins as a means of localizing early tumor.

Patients with known primary and metastatic disease will be studied. Elevated peripheral CEA or other marker levels are a requirement for admission to the study. Selective samples were obtained from veins draining the tumor and the marker levels compared with peripheral values. Venous sampling is performed in the Diagnostic Radiology Department. Measurement of a number of tumor markers will be the responsibility of Dr. Waalkes. If marker levels do increase as the tumor is approached, the test may be useful as a staging tool, e.g., elevated hepatic vein levels indicating liver metastases before they are clinically or chemically detectable.

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Arteriographic changes in experimentally induced radiation myelopathy

Principal Investigator: Giovanni Di Chiro, M.D.*

Other Investigators: Jean R. Herdt, M.D. Jack Fein, M.D.**

Cooperating Units: *Section on Neuroradiology, National Institute of Neurological Diseases and Stroke
**Department of Neurobiology, Armed Forces Radiobiology Research Institute (AFFRT)

Man Years:

Total: (For Radiology Department only) 0.3
Professional: 0.1
Other: 0.2

Project Description: This study of the effects of high radiation dosage on the vasculature of the spinal cord is now in its second year. Following control spinal cord arteriography in a group of 15 Rhesus monkeys, myelopathic doses of Cobalt 60 radiation were administered. The radiotherapy is being performed by the Radiobiology Research Branch at the National Naval Medical Center in Bethesda. These preliminary studies were accomplished late in 1972 and the animals have been held to observe the development of paraplegia. Such signs of cord damage are now appearing in some of the irradiated monkeys and repeat arteriographic studies are being performed to see whether the vascular changes in radiation myelopathy can be identified on selective spinal cord arteriograms. The technical aspects of this project have been aided by the opening of the new animal radiographic facility which allows 3 to 4 times direct magnification studies to be performed. This greatly improves the visualization of small intramedullary arteries. Perfusion studies for microradiography are being performed when the animals are sacrificed and will be compared with the arteriographic studies. This project should be completed by December 1974.

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Correlation of clinical changes with vascular spasm following intracisternal instillation of blood

Principal Investigator: Ayub K. Ommaya, M.D.*

Other Investigators: Norman D. Peters, M.D.** William C. Doebler, M.D.

Cooperating Units: *Surgical Neurology Branch and Section on Applied Research, NINDS
**Surgical Neurology Branch, NINDS

Man Years:

Total: 1.0
Professional: 0.5
Other: 0.5

Project Description: The nature and significance of cerebral vascular spasm following subarachnoid hemorrhage has never been precisely defined. Through a cisternal shunt and Ommaya reservoir operatively placed, fresh blood is instilled into the basal cisterns of monkeys and serial internal carotid arteriograms are performed. Correlation is sought between the neurological status of the animal and the presence of angiographically visualized spasm. Three animals have been studied but no conclusions can yet be drawn from this preliminary data.

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Prospective clinical trial of intestinal lavage for barium enema preparation

Principal Investigator: Robert S. Gordon, Jr., M.D.*

Other Investigators: Jean R. Herdt, M.D.

Cooperating Units: *Digestive Diseases Branch, NIAMDD

Man Years:

Total: 0.2
Professional: 0.2
Other: 0

Project Description: Preparation of the bowel for barium enema studies was performed by drinking 3 to 4 liters of an electrolytic solution within 2 hours, thereby inducing a mechanical washing out of bowel content. Suitable candidates for barium enemas were prepared with this technique and the adequacy of their preparation, as demonstrated on the barium enema films, was compared with more conventional methods of bowel prep. The study is doubly blind, patient selection and preparation being the responsibility of Dr. Gordon and his associates while evaluation of the X-rays was performed by the Department of Diagnostic Radiology. Initial impressions suggest that this bowel prep is as effective as the more classic laxative/enema approach and has better patient tolerance.

PHS-NIH
Individual Project Report
July 1, 1973, through June 30, 1974

Project Title: Study of angiographic and radioisotopic changes following middle cerebral artery occlusion in monkeys

Principal Investigator: Mary K. Hammock, M.D.* Giovanni Di Chiro, M.D.**

Other Investigators: George S. Flinn, Jr., M.D.

Cooperating Units: *Branch of Neurosurgery, Section of Neuroradiology, NINDS
**Section on Neuroradiology, NINDS

Man Years:

Total: 1.0
Professional: 0.5
Other: 0.5

Project Description: A technique was developed for surgically occluding the middle cerebral artery in monkeys through a transorbital approach. The purpose of the study is to serially investigate the evolution of angiographic and isotopic changes following acute occlusion of a major cerebral artery. Selective internal carotid arteriograms are performed unilaterally prior to middle cerebral occlusion and then compared with serial studies performed following the surgical intervention. Pathways, rate of development and angiographic appearances of collateral flow have been defined with some clinical pertinence since the intracranial circulation of primates is practically identical to human. Serial isotopic studies are also defining the natural history of acute major vessel occlusions. The combination of (1) a reliable surgical technique for consistingly occluding a major vessel and (2) three times magnified selective internal carotid arteriography are permitting a thorough study of cerebral embolism in an appropriate animal model.

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

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PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

EMPLOYEE HEALTH SERVICE BRANCH

The Employee Health Service provided during the uear comprehensive occupational health services for the approximately 12,000 Government employees who work on the NIH Bethesda reservation and in rental buildings in the immediate vicinity. In spite of distractions created by the decision to determine the feasibility of contracting the EHS program, intensive efforts were expended to maintain high quality services in all the essential services.

1. Medical Care

Working in conjunction with the NIH Fire Department to provide emergency rescue and ambulance services, a full range of emergency medical care was provided. Collaborative arrangements with Suburban Hospital were established, which eleminated the need for Clinical Center Medical Officers of the Day to respond to routine medical emergencies on nights and weekends. Although relatively minor administrative problems occurred, the quality of emergency medical care was not compromised.

Because of the many and varied toxicological and biological hazards in the working environment, every member of our staff remained alert to early signs and symptoms of relatively rare diseases and intoxications to which employees may be exposed in their work. Suspected occupational diseases were treated expeditiously and referred to consultants both within and outside of NIH.

2. Pre-employment and Other Examinations

Particular attention was directed to those new employees who might be working under hazardous conditions, and approximately 750 complete physical examinations were conducted to insure that these new employees were medically capable of performing their assigned duties. In addition, approximately 1200 "light duty" examinations were performed which included laboratory work, immunizations, medical history, and nurse's interview to determine whether or not a physician's examination was indicated. More than 200 periodic examinations were conducted for special groups of employees exposed to occupational disease hazards, including Primate Quarantine employees, Insect and Rodent Control staff, radiation waste handlers, autopsy service supporting personnel, and Fire Department and Guard Force. In addition, approximately 80 NCI employees working in the Emergency Virus Isolation facility (Bldg. 41) were given extremely comprehensive examinations.

Approximately 65 fitness for duty examinations were performed, many of which were involved and time consuming. Disability retirement examinations

numbered approximately 80 and special parking permit examinations accounted for approximately 90 examinations. Other examinations included approximately 200 summer employees, most of whom were disadvantaged youth from the inner city.

3. Preventive Programs

Periodic health screening procedures were performed for a wide variety of conditions, with increased emphasis in particular being placed on periodic tuberculin skin tests as the trend to de-emphasize the periodic chest X-ray became more widely accepted. A carefully controlled retrospective study was conducted on 17,000 pre-employment chest X-rays performed over the past 20 years. Findings indicated that very little substantive medical information for diagnostic purposes was acquired, and that the routine pre-employment chest X-ray may be unnecessary. This study has been submitted to the New England Journal of Medicine for publication.

Additional screening procedures included testing for hepatitus B antigen and liver enzyme determinations for those exposed to hepatitis B virus through patient and other laboratory contact. Extensive screening for elevation of serum cholesterol was conducted in cooperation with the NHLI Type II Hyperlipoproteinemia Study. Blood pressure screening was offered on an individual basis, and it is hoped that NIH will soon participate along with other Government and private industry employee groups in blood pressure detection programs.

The feasibility of multiphasic screening programs was considered, but no decision was reached as to their medical value.

In our disease prevention efforts, alcoholism and drug abuse rehabilitation programs were successfully carried out. Approximately 100 individuals with alcohol problems were assisted during the year, through group therapy, individual counseling with daily supervised administration of antibuse when indicated, diagnostic work-ups, treatment of complications, referrals to community resources, and close cooperation with Alcoholics Anonymous.

In the area of mental health counseling, although crisis intervention and short-term psychotherapy was made available to approximately 50 employees, the most significant breakthrough came in our efforts to emphasize community-type psychiatry in offering assistance to groups of employees in stressful settings.

We are very pleased to report that four groups of nurses, working in particularly difficult areas of aptient care, requested and received group counsleing to understand better and cope with the stresses of their environment. Supervisory training was also provided to assist management in understanding the nature of "employee problems" as they affect work performance and morale.

An extensive immunization program was offered with emphasis placed upon those immunizations which provide protection for employees who are exposed

to a wide range of biohazards. The use of immune globulin was carefully monitored and we co-sponsored a V.A. study to determine the value of hyper-immune gamma globulin as protection for hepatitis B disease. In addition, family type contacts to hepatitis A were followed, and employees with needle and other instrument punctures or lacerations of either unknown source, or sources known to be contaminated with human blood or blood products, were provided gamma globulin.

Animal caretakers, particularly those individuals staffing the Primate, and Dog and Cat Quarantine programs were offered pre-exposure duck embryo rabies vaccine. Feasibility studies were begun to consider using a newly developed vaccine, a hampster kidney preparation which is reported to be superior to the duck embryo rabies vaccine. Assistance from and cooperation with the Bureau of Biologics, FDA, was sought and received.

The final disease prevention program meriting emphasis is our health education program which included the scheduling of periodic noon-time movies on family and other pertinent health subjects; searching for, ordering, and making available to staff and employees, pamphlets and other health literature; assisting the Personnel Training Branch in the development of training seminars for supervisors on health problems, in particular, seminars on coping with the troubled employee and the alcoholic; and participating in pre-retirement and other seminars in health and hygiene.

Occupational Disease and Biohazards Control

Working with the Safety Officer and his staff, the Radiation Safety Officer, and the staff of the Environmental Services Branch, intensive efforts were initiated to insure that medical surveillance activities related to biohazards control were being developed and implemented effectively. The medical surveillance program for the Emergency Virus Isolation facility (Bldg. 41) was continued and is now considered a model program for the intensive health surveillance and data collection required for employees exposed to oncogenic ciruses. Serum collection for freezing and banking for all patient care employees of the Clinical Center, Bureau of Biologics personnel, FDA, Laboratory personnel of NIAID, and NC I personnle exposed to oncogenic viruses, in addition to animal caretakers and other laboratory workers who are exposed to biohazards, was continued.

Approximately 170 employees received periodic audiometric examinations for excessive noise in the occupational environment. Personal protective devices and health education programs were provided and follow-up steps taken to encourage use of the personally fitted ear plugs given to exposed employees.

The first effects of the new Occupational Health and Safety Act were felt this past year in the requirement that all employees exposed to 14 known oncogenic materials receive medical examinations and other medical surveillance services. Thorough familiarity with OSHA regulations was maintained to enable us to be prepared to meet any new regulations and standards which are likely to be established for scientific research establishments.

5. Clinical and Operational Research

In the early part of the year the study to determine the effectiveness of vitaman C in the prevention and treatment of the common cold was completed. Institute clinicians were assisted in the selection of normal controls from the relatively stable employee population as well as in the recruitment and screening of subjects with disease conditions under study. Recent examples of such collaborative projects are NHLI Type II Hyperlipoproteinemia Study in which over 1000 employees had blood drawn in the Employee Health Service; referral of hypertensive employees to the NHLI Study; referrals to NIAID with fever of unknown origin, infectious mononucleosis, sarcoid and herpes zoster; referral of employees with suspicious breast pathology to the NCI Breast Cancer Study; and referral of individuals with atopic eczema to an NCI Dermatology Study.

Our Tuberculosis Surveillance and Control program was completely revised, consistent with national trends to emphasize the tuberculin test and de-emphasize the chest X-ray as a screening procedure. Careful attention was directed to maintaining adequate protection for patient care employees, caretakers of sub-human primates, and laboratory personnel working directly with the tubercule bacilli. Follow-up of T.B. contacts was strengthened and provisions for treating occupationally related tuberculin converters with isoniozid was continued.

The significant feature of the tuberculosis control program, however, has been the addition of computerized follow-up and data recording, utilizing a sophisticated program developed by EHS staff which is now in its final testing stage. The final program when fully operative will greatly facilitate the scheduling of more than 2000 periodic tuberculin skin tests and chest X-rays each year and should thereby reduce clerical workload significantly. A report on this work has been published in the February 1974 issue of the Journal of Occupational Medicine under the title of AUTOMATED TUBERCULOSIS SURVELLANCE AND CONTROL with Dr. Lawrence Frenkel, Dr. John M. Lynch, Mrs. Catherine Quigley and Mrs. Elizabeth Cox, as co-authors.

6. Liaison with Medical Profession of the Community

As the result of extensive health counseling provided employees, and since EHS has limited responsibility for providing complete medical care, a large number of referrals to private physicians and community facilities was made during the year. Care was exercised to continue the highly favorable liaison with the medical profession in the community that has been well established over the years. Emphasis was placed upon the importance of maintaining good relations with the medical profession in the community since this is of vital importance to NIH in its intramural clinical research. Since the majority of patients in the various intramural clinical research programs of the Institutes live in the metropolitan area and are referred by local private physicians, success of these programs depends on large part of the good will which must be maintained with the local medical community.

Future Objectives

At this time, plans have been formalized to contract the Employee Health Service July 1, 1974, with the month of July serving as the transition period. Over the past year intensive efforts were made to insure that qualified bidders were available and that the Request for Proposal would clearly specify NIH requirements which a contractor would have to meet in order to assure quality services, at least equal to those currently provided. National Health Services, Inc. has been selected and it is anticipated that the contract will be awarded shortly after July 1, 1974. Thus ends another era in Occupational Health at NIH. Only time will tell whether or not the new contractor will enable NIH to retain its national reputation for conducting one of the consistently most outstanding occupational health programs in the Federal Government.

Table 1
Selected Statistics

General	1974	1973	1972	1971
Total visits	24,195	26,835	27,680	25,560
Visits for occupational injuries and diseases	1,945	2,394	3,102	2,475
Immunizations	3,897	4,132	4,300	5,850
Pre-employment physical examinations	1,721	2,015	2,133	1,236
Laboratory examinations	26,290	28,841	30,059	16,652
Referral to personal physicians	890	1,018	1,121	973

Staff				
Physicians	4½	4½	4½	4 2/3
Nurses	11	11	11	11
Clerical	3	3 3/4	3 3/4	3 3/4
Laboratory	2 3/4	2 3/4	2 3/4	2

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

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PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

PROGRESS ACHIEVED

Organization

In compliance with the reorganization of housekeeping activities which occurred April 1973, Mr. Gordon Gamble was appointed Chief and Mr. Augustus Proctor was appointed Assistant Chief to the Environmental Sanitation Control Department. Former Unit Chiefs were reassigned as Section Chiefs. The Sections remained primarily as they had under the old organization, i.e., Patient Area, Day Service, and Night Service Sections. Efforts were initiated and are still under way to develop the Section Chiefs in their new roles. Section Chiefs are continuing to develop in sharing the responsibility of the department's recruitment efforts, training, award and discipline recommendations, and taking necessary corrective actions.

Three positive habitability improvements for ESC employees were remodeling of the employee locker rooms, including air conditioning, converting of four elevator lobbies into employee lounges, and redecoration of the ESC office.

An additional program affecting the department was the entrance of Environmental Sanitation Control Department into the Clinical Center-wide Resource Monitoring System. The department has been on the system since January. At this point we are still evaluating the RMS data with expectations of utilizing the material as a management tool at the section head level in the near future.

Productivity

Efforts within the department to improve productivity continue and have most noticably been effective in utilization of carpet, fountain, and bathroom cleaning compounds; the NIH Carpet Cleaning contract; and a new floor stripping method. With the Carpet-Sheen Method of reconditioning carpets we have been able to increase the productivity of carpet cleaning with less effort while making the carpet accessible to traffic in half the time. The utilization of the NIH Carpet Cleaning contract was just recently begun. We expect to increase the use of the contract to help release departmental staff to carry out other managerial functions of the organization.

Nomad nylon floor surfacing material was installed in place of dirt-stop matting at building entrances and in passenger elevators. This material reduces the number of hours required for cleaning and is more comfortable to walk or stand on than carpet.

Several new cleaning compounds have been introduced throughout the year. Most of these cut down scrubbing and time required by the housekeeping staff. A foaming germicidal cleaner for cleaning wash basins and drinking fountains cut in half the cleaning time for these items and improved appearance with no loss to bacteriological effectiveness. Another new compound used was "Tri-Surf" which removed the residue from bathroom surfaces with a considerable decrease of effort and time.

A new floor stripping method was enthusaistically introduced. This dry stripping method allows one person with a floor buffing machine to strip a tile floor with approximately the same speed and effort as using a buffer to polish a floor. This was a major breakthrough in floor care.

We have effectively used these products, but have not phased them into the department's total cleaning system in order to take advantage of the time "saved." This will be the first priority for the forthcoming fiscal year.

Some of the time "saved," however, has been effectively used in absorbing "lost" time when employees were released to upward mobility training, EEO, and other activities. As pointed out in the statistical data, ESC has expended a total of 5,202 hours for training programs during the last year. Of this total, only 1,474 was department related training programs.

Solid Waste Removal

Discussion with Engineer Design Branch continued with regards to converting existing trash chutes for solid waste removal in the Clinical Center. Engineer Design Branch began designing a compactor system and we are hopefully looking forward to using the chutes in the last quarter FY '75.

We also began discussing with Environmental Services Branch and other organizations at NIH concerned with solid waste removal, a 30-day trial period designed to determine the feasibility of utilizing paper containers for solid waste removal.

PROBLEMS

Discussions of contracting of housekeeping activities within the Clinical Center continued to cause tension and dissatisfaction among employees and required considerable efforts on the part of the supervisory staff to bolster morale. A continuing deterrent to achieving an effective level of cleanliness in the building was the amount of construction underway.

PLANS

1. Fully implement an "Appearance Level Program" to provide an objective numerical index of cleanliness in the Clinical Center.

2. Complete the program of replacing cubicle and shower curtains in patient care areas.

3. Continue to study the feasibility of phasing out manual passenger elevator service and converting to automatic passenger elevators.

4. Phase in staff to provide housekeeping service for new addition 8, 9, 10-D south wings.

5. Coordinate the selection of textiles and fabrics for draperies, furnishings, and wall and floor coverings within the Clinical Center.

6. Support and encourage upward mobility of employees so that they may work to their fullest potential.

7. Strive to upgrade and standardize cleaning performance in all areas.

TABLE 1

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

April 1, 1973 through March 31, 1974

Formal Training - Classroom

Government	Man-hours	
Clinical Center Supervisory Management, Part II	120	
Workshop for ESC Supervisors	15	
Civil Service Commission:		
Basic Labor Management Relations	40	
Collective Bargaining Negotiations	40	
Labor Relations for Supervisors	48	
Modern Techniques in Housekeeping Management	24	
Labor Management Seminars, NIH	46	
Retirement Planning	64	
Behavioral Problems of Employees	24	
Beginning Typing	374	
Time & Attendance Lab	3	
Correspondence Lab	3	
NCI Biological Aid	40	
Basic Adult Education	2,152	
Upward Mobility College	283	
TOTAL		3,276
Non-Government		
11th Annual Institutional Housekeepers Course	444	
Health and Medical Facility Design	8	
TOTAL		452
Within the Department		
Procedures and Orientation	304	
Management Seminars	261	
All Employee Training	909	
TOTAL		1,474
GRAND TOTAL		5,202

TABLE 2

POSITIONS FILLED BY RECRUITMENT

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

April 1, 1973 through March 31, 1974

MONTH	GENERAL SCHEDULE	OTHER WAGE BOARD	WG-03	WG-02	WG-01	TOTAL
April				1		1
May				3	1	4
June				2	1	3
July				6	1	7
August			1	1		2
September						0
October					2	2
November					1	1
December						0
January						0
February				1		1
March					1	1
SUB-TOTAL			1	14	7	22*

*Total includes 10 700-hour appointments and 2 50% part-time, NTE 1 year positions.

TABLE 3

NUMBER OF SEPARATIONS, RESIGNATIONS, ETC., BY MONTH & GRADE

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

April 1, 1973 through March 31, 1974

MONTH	GENERAL SCHEDULE	OTHER WAGE BOARD	WG-03	WG-02	WG-01	TOTAL
April			4			4
May			1		1	2
June						0
July			1		2	3
August			1			1
September	1		3	3		7
October				2	1	3
November			3			3
December	1		4	1		6
January						0
February			1	1	1	3
March			2		1	3
SUB-TOTAL	2		20	7	6	35*

*Total includes 8 700-hour appointments and 2 50% part-time, NTE 1 year appointments.

TABLE 4

REASONS FOR PERSONNEL LEAVING

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

April 1, 1973 through March 31, 1974

RESIGNATIONS	TRANSFERS	RETIREMENTS	TERMINATIONS	DECEASED
Resigned when faced with possible disciplinary action 3	Improved career opportunities 3	Retirement disability 1	Separation during probationary period 2	1
To accept non-government position 3	Day work only 11	Retirement optional 2	Expiration of temporary appointment 7	
To remain at home 1	Better chance for promotion 3			
Health 3	Clerk-typist training 4			
	Higher Pay 1			
SUB-TOTALS 10	12	3	9	1

TOTAL - 35

CHART 1

DEPARTMENT OF ENVIRONMENTAL SANITATION CONTROL

POSITIONS FILLED BY THE MONTH

April 1, 1973, through March 31, 1974

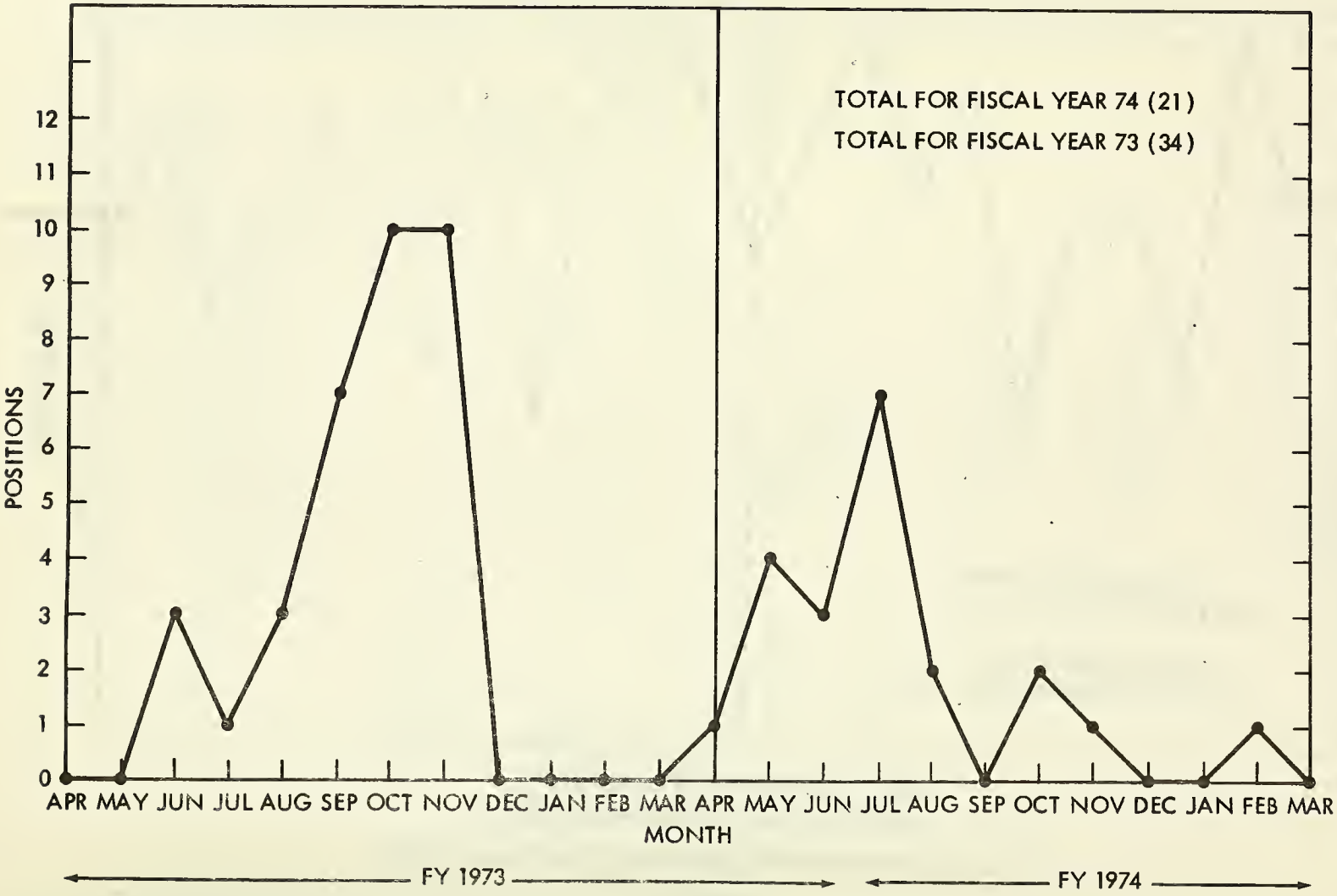


CHART 2

DEPARTMENT OF ENVIRONMENTAL SANITATION CONTROL

NUMBER OF SEPARATIONS BY MONTH
April 1, 1973, through March 31, 1974

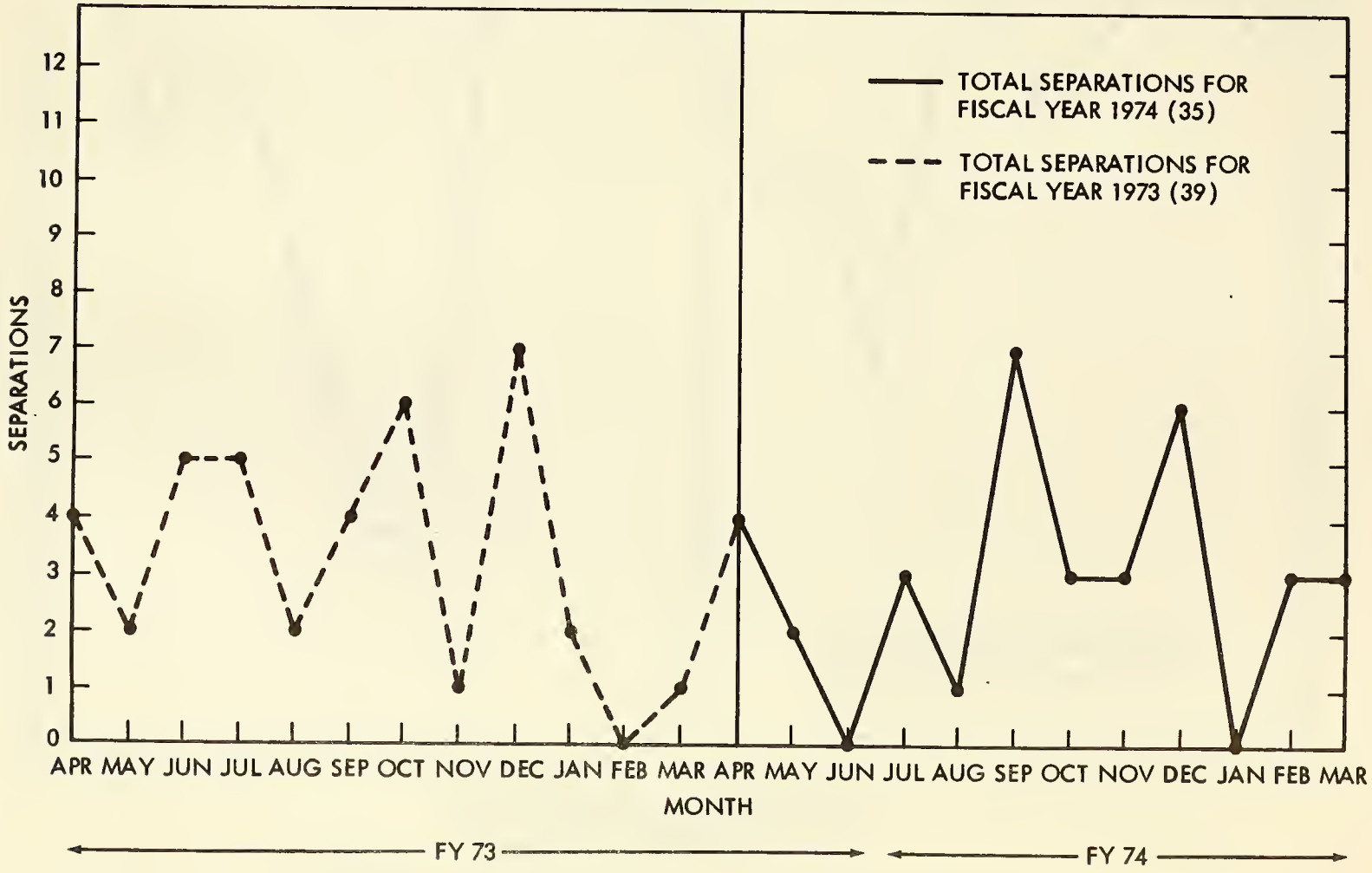


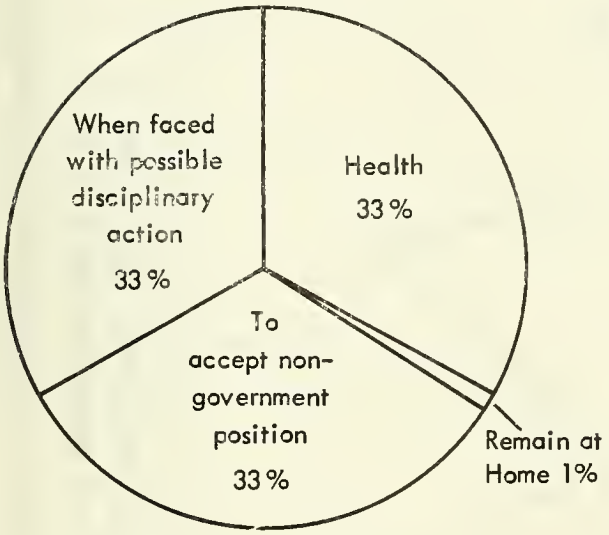
CHART 3

DEPARTMENT OF ENVIRONMENTAL SANITATION CONTROL

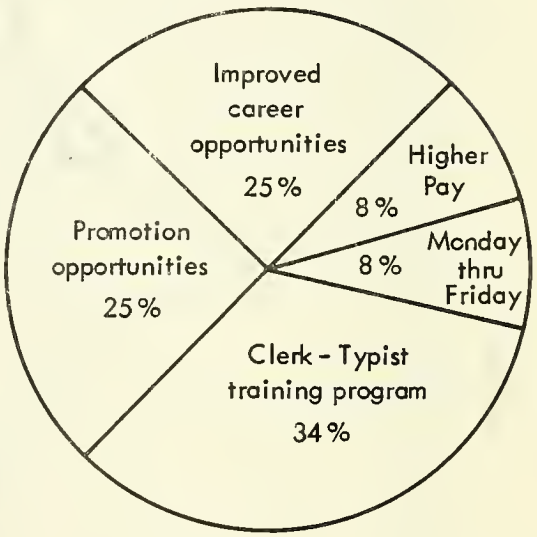
REASONS FOR PERSONNEL LEAVING

April 1, 1973, through March 31, 1974

RESIGNATIONS - 10



TRANSFERS - 12



OTHER SEPARATIONS - 12

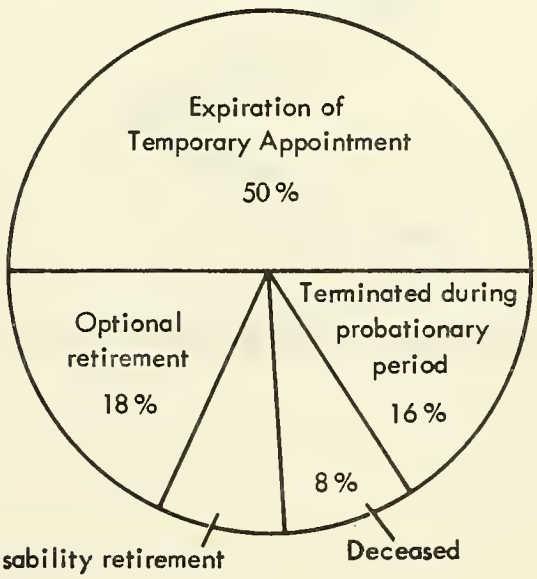
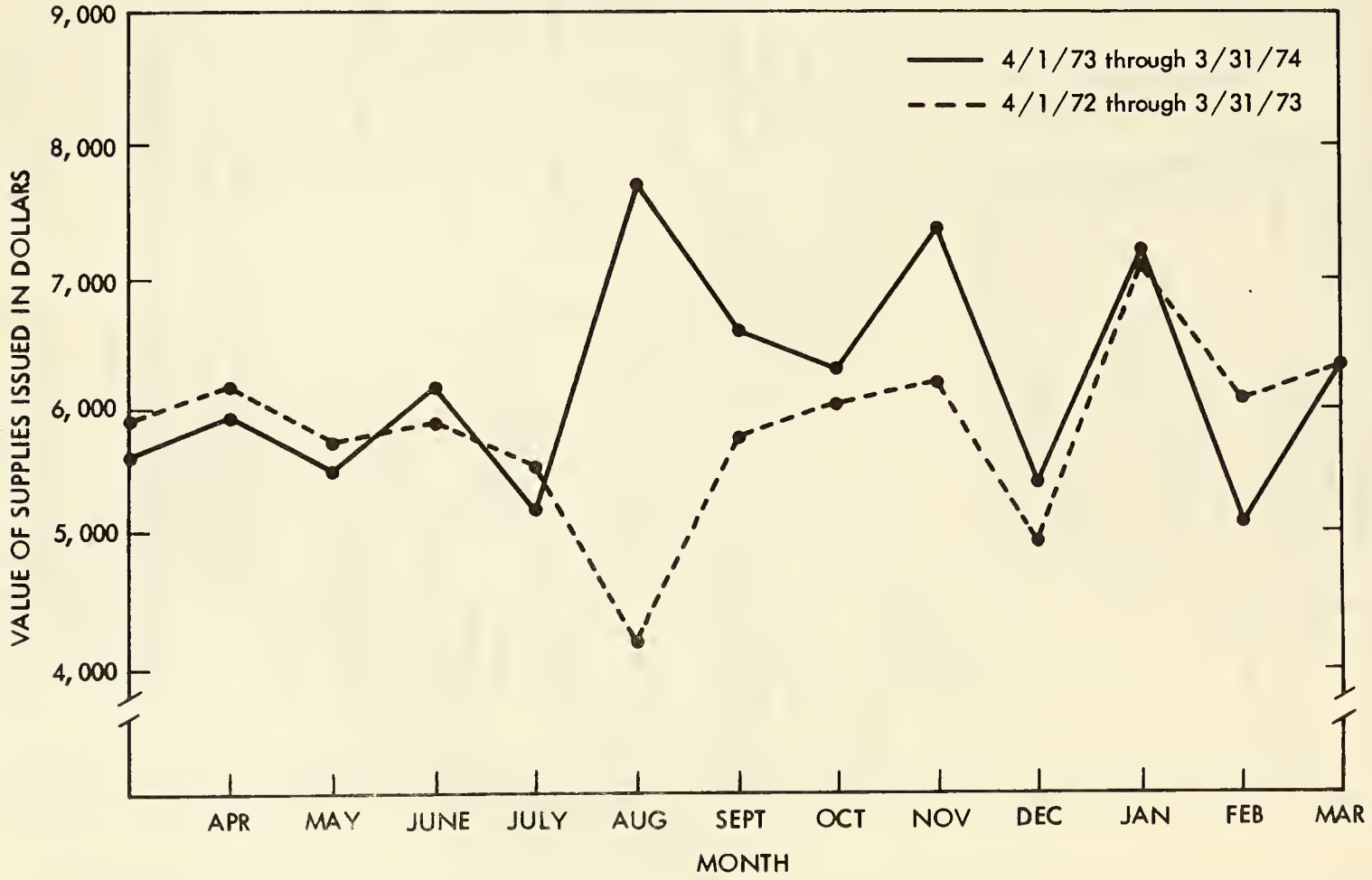


CHART 4

DEPARTMENT OF ENVIRONMENTAL SANITATION CONTROL

VALUE OF SUPPLIES ISSUED BY MONTH

April 1, 1973, through March 31, 1974



July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

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MEDICAL RECORD DEPARTMENT

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On October 9, 1973 revised procedures were implemented for Admissions and Follow-up Clinics and Medical Record Department to simplify methods of obtaining medical records and assuring the availability of the record in clinics at the time of patient visit.

The Medicolegal Section processed a total of 5,070 requests, averaging 20 requests per day.

The number of records processed by the Files Section, resulted in the following statistics:

NIH 293-1	-	Complete Records	-	15,731
NIH 293-2	-	Clinics and Admissions	-	39,628
NIH 293-3	-	Incomplete Record Recall	-	5,562
NIH 293-4	-	Incomplete Records	-	12,287
		TOTAL		73,208

The Record Processing Section reviews and circulates incomplete medical records daily; there are 275 incomplete records as of March 31, 1974.

MAJOR PROGRESS

Education and Training

Orientation of new employees from this and other Clinical Center departments and from the Institutes was accomplished. Lecture tours continued to be given to Public Health Service student medical record administrators and other visitors to the Clinical Center.

Key personnel attended classes, seminars, and meetings on subjects relating to medical record systems and procedures, data processing, office equipment, medical subjects, supervision, and equal employment opportunity.

Professional record administrators and technicians are in rotating assignments on a continuing basis throughout the Department.

The Chief, Medical Record Department participated as a panel member for the National Commission on Hospital Productivity.

Two medical record administrators wrote and successfully passed the national registration examination.

Several employees were honored at the awards ceremony in September 1973 as recipients of individual awards; and, a group performance award was earned by the Files Section.

Personnel

The average number of employees on duty from July 1973 through March 1974 was 47 and, of this number, an average of 11 served on a part-time basis. Additionally, an average of 4 WAE and 2 stay-in-school employees had been utilized.

MAJOR PROBLEMS

Record Quality Review and Timely Documentation

There is and has been difficulty in generating record consciousness among users of National Institutes of Health records. Standards for and follow-up review of Problem Oriented Medical Record approach are needed to help eliminate diffuse and fragmentary documentation in medical records. In addition, National Institutes of Health physicians as well as Medical Care Consultants must complete deficiencies and dictation on a timely basis. Quality control and uniform performance are needed among employees of the Clinical Center Admissions Unit who perform the same tasks because their work affects medical record services such as the release of records on inpatient admission or clinic visit and accurate reporting of hospital statistics.

Transcribing Service

A decision on contracting this service is needed. Although action was taken to compensate for a fluctuating backlog and loss of personnel due to voluntary reassignment, retirement, or resignation, remedies were to no avail as shown in the following status report:

Average # of belts received CY 1973			972.6
Personnel loss			
	From	To	
Fulltime	13	5	61.54% decrease
Parttime	5	3	40.00% decrease
Average monthly belt production based on present staff			785.8
Average monthly carryover belt backlog			186.8
Present actual belt backlog			321
--if this backlog rate continues, by June 30, 1974, the belt backlog will be			1,058.2

Unscheduled Admissions and Clinic Visits

In September 1972 an extensive study was completed and objectives identified for a good appointment and scheduling system. The lack of implementation contributes to an unbalanced work distribution and assignment as demonstrated by the monthly average of 602 unscheduled visits.

PROPOSED FUTURE OBJECTIVES

Consolidation of two work areas and related controls which govern incomplete medical records, medical dictation and transcription will 1) permit greater flexibility in the use of employee skills, 2) eliminate duplicate controls, and 3) provide additional work stations for users of medical records.

If the department's recommendation for the establishment of a policy governing medical record retention, preservation, and microfilming is accepted, a system will be developed to complement Clinical Center use and needs.

Major efforts will be made to participate in team approaches to quality review of medical records and to help establish appropriate system applications affecting the Medical Record Department if the proposed computerized hospital information system is implemented.

Patient Care Statistics

Table 1
Census Analysis, Inpatients
Period Covered, 7-1-73 through 3-31-74

Institute	Admissions	Total Inpatient Days	Percent Bed Occupancy	Average Daily Census
NCI	972	21,548	67	79
NHLI	907	14,983	54	55
NIAID	319	10,652	75	39
NIAMD	386	10,170	58	37
NIDR	10	169	12	1
NIMH	134	10,686	53	39
NINDS	385	8,577	63	31
NEI	92	3,517	49	13
NICHD	201	3,770	69	14
Total	3,406	84,072	60	307

Total number of patients admitted to the Clinical Center from July 1, 1973 through March 31, 1974.....75,089.

Table 2
Statistical Analysis, Discharged Patients
Period Covered, 7-1-73 through 3-31-74

Institute	Number of Patients	Hospital Days	Deaths	Autopsy	Average Length of Stay
NCI	947	19,436	92	85	21
NHLI	886	14,741	19	16	17
NIAID	323	10,442	6	5	32
NIAMD	391	9,656	8	6	25
NIDR	12	238	0	0	20
NIMH	126	9,470	0	0	75
NINDS	381	8,459	6	6	22
NEI	94	3,191	0	0	34
NICHD	200	3,542	3	2	18
Total	3,360	79,175	134	120	24
			4%	90%	

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY OF ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF NUCLEAR MEDICINE

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CLINICAL CENTER

DEPARTMENT OF NUCLEAR MEDICINE

Office of the Chief

Gerald S. Johnston, M. D., Chief, (Chairman, Radiation Committee)
Alfred E. Jones, M. D., Assistant Chief
Roger L. Aamodt, Ph. D., Chief, Whole Body Counter Section
Michael B. Musachio, M. P. H., Chief. Radiation Safety Section
Raymond Farkas, G. S., Pharmacist, Chief, Radiopharmacy Section
Alfred E. Jones, M. D., Chief, Diagnostic Section
Michael V. Green, M. S., Nuclear Physicist
Raymond E. Murphy, Nuclear Electronics Instrumentation Technician
Luella Bentz, Secretary

Review of Departmental Changes FY 1974

Personnel	Position	Arrival	Departure
Steven D. Richman, M. D.	Physician Commissioned Officer	1 Jul 73	
Robert S. Frankel, M. D.	Physician Commissioned Officer	1 Jul 72	30 Jun 74
Gail Miller	Clerk-Typist Radiopharmacy	5 Dec 71	14 Jan 74
Rosie J. Buckles	Nuclear Medicine Technician (Diagnosis) Whole Body Counter Section	23 Apr 73	28 Jun 73
Phyllis E. Kauffman	Secretary (DMT) Diagnostic Nuclear Medicine Section	27 Apr 74	
Robert Slayton	Physical Science Technician Radiation Safety Section	29 Nov 73	

Personnel (Continued)	Position	Arrival	Departure
Mary C. Gradwell	Clerk-Typist Radiation Safety Section	20 Jan 74	

Capital Equipment Acquired

Radiation Safety Section: Multichannel analyzer
Automatic gamma counter

Whole Body Counter Section : Arc type whole body positioner
Automatic gamma counter (refrigerated)

Diagnostic Nuclear Medicine Section: Dual probe rectilinear scanner

Contracts

A contract was initiated to survey laboratory areas at NIH for items of noncompliance with 10 CFR 20. Under this contract all labs at NIH have been surveyed twice anually and problem areas reported to Radiation Safety, NIH.

Other contracts include:

Film badge monitoring service
Lab survey
Radioactive waste pickup and removal from NIH
Meter calibration and repair
Surveillance of x-ray producing devices
Liquid scintillation vial pickup and disposal

Radiation Safety Courses

Courses were held for training of NIH doctors and physicians who expected to work with radioactive materials at NIH. This two week course was offered twice in the past fiscal year. It was a requisite for the investigators who intended to be authorized for the use of radioactive materials at NIH. (A total of 114 persons completed this course.)

"Radiation Safety in the Laboratory," a short one day course was given each month except November and May of the past year. This course was directed to the training of technicians at NIH. It was not a prerequisite to the handling of radioactive materials by technicians at NIH.

Personnel Departures FY 1974

Frank H. Allen, M.D.	Chief, Diagnostic Section
Robert J. Kramer, M.D	Clinical Associate
Michael S. Milder, M.D.	Clinical Associate
Victoria N. Chambers	Clerk Receptionist
Cathy S. Yarrison	Secretary (DMT)

Cathy S. Yarrison, Secretary (DMT) transferred to the Radiopharmaceutical Section of the Department of Nuclear Medicine in March 1974 and her duties in the Diagnostic Medical Section were assumed by Phyllis E. Kauffman in April 1974.

Augmentation of the Section Staff

There was no change in the number of full time employees in the Diagnostic Nuclear Medical Section.

Part time (college student) staff supplemented the secretarial and technical staff.

Patient visits and services have increased 152% since FY 1971 (2380 to 6008) and the increase has been 28% FY 1974 over FY 1973 (see Table 2).

Service to Patients and Institutes

A. New clinical radionuclide procedures FY 1974

1. EKG gated dynamic cardiac function studies utilizing a gamma camera and computer.

2. Scintigraphic breast tumor detection.

3. Indium-111 chloride whole body bone marrow imaging.

4. Gallium-67 detection of occult abscess or infection.

B. Improvement of existing nuclear medical procedures

1. Whole body bone marrow imaging: A new and potentially more valuable agent, Indium-111 chloride, is being used instead of ^{99m}Tc sulfur colloid. The Indium-111 binds to the transferrin and enters bone marrow via the iron metabolism route.

2. Computer marking of thyroid nodules as seen on thyroid scintigrams.

Cooperative Research

Research was carried out almost entirely at the request of an Institute or Division at NIH, i.e., no projects were initiated by the Department of Nuclear Medicine. The Diagnostic and Whole Body Counter Sections conducted clinical research in support of the NCI, NHLI, NIAMDD, NICHD and DCRT.

Summary

All the sections of the Department of Nuclear Medicine have increased their services to the various Institutes. An example of such increase is the bar graph at the end of this report. In the Diagnostic Nuclear Medical Section patient visits were increased by 28% in the past year. The Radiopharmacy Service had 20% increase in expenditures to meet the increased activity of the Diagnostic Section. The Radiation Safety Section increased its lab survey activity and handled over 20% more radioactivity in FY 74 than FY 73.

DIAGNOSTIC NUCLEAR MEDICINE SECTION

Personnel: 1974

Alfred E. Jones, M.D.	Chief
Robert S. Frankel, M.D.	Clinical Associate
*Stanley Levenson, M.D.	Staff Fellow
*Steven D. Richman, M.D.	Clinical Associate
Camille L. Boyce	Nuclear Medical Technician
Jeanne K. Honicker	Nuclear Medical Technician
Bonnie C. Mefferd	Nuclear Medical Technician
Eleanor June Myers	Nuclear Medical Technician (Nurse)
Sybil J. Swann	Nuclear Medical Technician
*Phyllis E. Kauffman	Secretary (DMT)
Paula K. McPherson	Clerk-Receptionist

*New Personnel

Changes in Staff of Diagnostic Nuclear Medical Section

The former Chief of the Section, Dr. Frank H. Allen, resigned from the P.H.S. in July 1973 and is now Chief of Nuclear Medicine, Virginia Mason Clinic, Seattle, Washington. Dr. Jones has taken over as Section Chief and remains Assistant Chief, Department of Nuclear Medicine.

Drs. Robert J. Kramer and Michael S. Milder left in June 1973 and were replaced by Dr. Steven Richman, Clinical Associate. Dr. Frankel will terminate his Clinical Associate position in June 1974. Dr. Stanley Levenson arrived July 1973 as a Staff Fellow.

The technician staff has remained stable throughout FY 1974.

Equipment (Table 3)

A. New Equipment: A whole body dual probe rectilinear scanner was purchased and in operation by March 1974. The device was utilized for whole body surveys to detect soft tissue metastases in cancer patients and also to detect occult areas of infection. The instrument was also useful for whole skeletal evaluation of the disease. This was the third such instrument installed in the Diagnostic Nuclear Medical Section in a period of just over three years. These devices have proven to be exceptionally useful to detect metastatic cancer that is not detectable by any other existing methods. Since the latter half of FY 1972 the number of studies performed on these machines has nearly quadrupled. Studies have increased from 24 patients per month to nearly 100 per month.

   Additional collimators were acquired for the three existing gamma cameras. These collimators have facilitated the handling of patient studies as well as the rapid completion of tests.

B. Projected Acquisitions Over Next Two Years:

   1. Ultrasound device for organ imaging: The technique of ultrasound is under development in several medical centers and is a useful supplement to both Diagnostic Radiology and Nuclear Medicine. Our objective would be to initiate new applications of ultrasound to be combined with nuclear medical techniques.

   2. Gamma Camera: This instrument would be intended to take advantage of the more recent improvements in gamma camera systems. These improvements include higher resolution and possibly whole body imaging plus other refinements.

   3. Upgrade existing gamma cameras: We plan to improve image presentation by using a technique other than Polaroid film.

Area

In the past year arrangements have been made with NCI to exchange existing departmental space on another floor of Building 10 and develop 800 square feet in the previous location of the Van de Graffe accelerator. This space may be available late in FY 1976.

Summary

The number of patient visits increased by 28 percent (Table 2 and Table 4) in FY 1974. The increase was 58 percent in FY 1973. The most frequently ordered procedures are liver, brain, whole skeletal surveys, and gallium-67 whole body tumor surveys. There is an increasing number of diagnostic nuclear medical tests requested by NCI. Although few new radiopharmaceuticals have been introduced into nuclear medicine in the past year there has been no major new radiopharmaceutocal.

RADIOPHARMACEUTICAL SECTION

Personnel

Raymond J. Farkas, M.S.	Chief, Radiopharmacy Section
Edgar H. Adams, M.S.	Staff Radiopharmacist
Cathy S. Yarrison	Secretary (DMT)
Lois M. Ward	Pharmacy Assistant

General

The major areas of responsibility within the Radiopharmaceutical Section were its service functions and quality control efforts. Services consisted of the procurement, receipt, registration, formulation, development, and dispensation of all radiopharmaceuticals intended for use in Clinical Center patients. Quality control efforts consisted of assaying, radiochemical and radionuclidic purity checks, pH determinations, particle sizing, and a host of others necessary to establish the pharmaceutical quality of the products.

The full time personnel complement was reduced in August when Robert Chandler (Staff Radiopharmacist) was transferred to the PHS Hospital, Staten Island, New York.

A pharmacy technician and clerk-typist supported the Radiopharmacy staff. In January, Mrs. Gale Miller, clerk-typist, left the Section on maternity leave and officially terminated her employment in March. Mrs. Ella Williams, a clerk-typist trainee, reported for duty in January and worked approximately 5 hours per day during her training program which was completed in March. Miss Cathy Yarrison, secretary, was transferred from the Diagnostic Nuclear Medicine Section to this Section in March, filling Mrs. Miller's vacancy.

Paul Joe, a graduate student in Radiopharmacy from the University of Southern California, served his Radiopharmacy residency in the Section through October. A Pharmacy costep, Lisa Bower, was called to duty in May and another graduate student in Radiopharmacy from the University of Southern California, Gabriella Hill, began her residency training in June.

The residents and costep positions were beneficial in performing the services of the Section; however, the full time permanent position which was lost and remained unfilled did place stressing demands on the staff, particularly since the workload continued to increase.

Approximately 89% of the total requests processed by the Radiopharmacy directly served the Diagnostic Nuclear Medicine Section and approximately 92% of the total work units were performed on products used in the Diagnostic Nuclear Medicine Section. There was an overall increase of 10% in total requests and a 27% increase in work units as indicated in the statistical data (Table 6) over FY 1973. The future workload is anticipated to be proportional to that of the Diagnostic Nuclear Medicine which is expected to increase.

The increase in radiopharmaceutical drug expenditures was attributed primarily to the procurement of Indium-^{111}In-Bleomycin injection and the increased usage of Gallium-^{67}Ga-Citrate injection. Procurement of ^{67}Ga, ^{111}In, and ^{99m}Tc products comprised approximately 45% of the total radiopharmaceutical expenditure.

Accomplishments

A total of 25 different radionuclides were received which constituted 64 different product formulations (Table 7). Indium-^{111} Bleomycin, Human Serum Albumin-^{99m}Tc Microspheres, ^{99m}Tc Labeled Erythrocytes, Potassium-^{43} Chloride, and ^{133}Xenon Ventillation Study Systems were new products not previously used within the Department.

Consultative functions were rendered to various paramedial personnel in regard to the formulation, and quality control exercised on several radiopharmaceutical products. The Section also participated in the American Society of Hospital Pharmacists Drug Defect Program and reported drug defects on two occasions with regards to Sodium Radioiodide I-131 capsules.

Different formulations were developed in an attempt to increase Copper absorption in children with Kinky Hair Disease (KHD). An attempt was made to reduce the irritant effect of the Copper by using raspberry syrup. In addition, a Copper-EDTA chelate was tried; however, the Copper-EDTA chelate was too strong to allow the Copper to dissociate and be absorbed.

Iodoquinoline-^{125}I was thought to be stable for only about 60 days; however, stability studies done by the Radiopharmacy indicated that the product may be stable for several months.

The feasibility of labeling Streptozoticin (a substituted nitroso urea) was investigated. It was decided that the compound might be labeled with ^{99m}Tc using stannous chloride.

The Radiopharmacy assisted the Radiation Safety Section in verifying calculated radiation exposure hazards to the hands of nuclear technologists by providing the necessary calibration solutions of selected isotopes for film measurements of exposures at the surface of syringes and extrapolation chamber measurements of surface exposures from thin dry sources simulating hand contamination. It is hoped that the experimental data will help resolve the differences in the theoretical presentation appearing in the literature.

Fiscal year 1974 was the first full year that the Radiopharmacy Section was responsible for the assaying and radionuclide purity check of radiopharmaceuticals intended for patient administration. This function occupied approximately 8 man hours per week and no unsurmountable difficulties resulted from this added function.

Future Objectives

The future objectives of the Section are to continue to collaborate with the service and research efforts of the Diagnostic Nuclear Medicine Section and investigations in the Clinical Center with involvement encompassing the formulation, development, and quality control of new and routinely used radiopharmaceuticals.

Future studies will include an investigation of the settling or plating out of colloid particles in the liver scanning agent, ^{99m}Tc sulfur colloid. When the particles precipitate, a larger volume must be withdrawn than the per unit volume assay would indicate in order to obtain the desired dose. While the fact that the product is actually a suspension and not a colloid probably accounts in part for this phenomenon, it does not explain why the product is readily resuspended.

Professional Activities

Raymond Farkas spoke to a group of prospective human use users of radioisotopes in the Radiological Health Training Course regarding the function and services of the Radiopharmaceutical Section at NIH, November 1973.

Edgar Adams attended the International Symposium on Radiopharmaceuticals, Atlanta, Georgia, February 1974

Raymond Farkas attended the Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June 1974

WHOLE BODY COUNTER SECTION

Personnel

Roger L. Aamodt, Ph.D, Section Chief (Biologist-Radiobiology)
Warren F. Rumble, Biologist-Radiobiology
Rosie J. Buckles, Whole Body Counter Technician
*Dianne Miller, Clerk Typist
Paulette Taylor, Clerk-Receptionist

*Part Time

Personnel Changes During FY 1974

During FY 1974, three employees terminated and Mr. Rumble changed status from Guest Worker to full time employee.

Dianne Miller resigned her part time position as Clerk-Typist in the Section in order to take an increased courseload, to complete her graduation requirements.

Rosie Buckles resigned her position as Whole Body Counter technician in order to accept a position at higher pay with her former employer. This change was apparently related to personal considerations, rather than any dissatisfaction with her position here. Miss Buckles performed her duties in an exemplary fashion during her tenure in the Whole Body Counter Section.

Paulette Taylor was reassigned to a new position as Timekeeper, ODA:A:GS, at her own request.

Warren F. Rumble continued to serve the needs of the Whole Body Counter Section in his capacity as Guest Worker from George Washington University. Mr. Rumble joined the Section as a Biologist-Radiobiology on September 16, 1973. He has taken on the duties handled by Miss Buckles, as well as much of the responsitility for Section operations.

The Section is in the process of hiring a full time technical employee to handle much of the routine workload of the Whole Body Counter Section. In addition, a part time (Stay in School Program) employee has been employed starting in mid-April, 1974. Staffing of these positions will increase the ability of the Section to satisfactorily handle our increasing workload.

Equipment

The Whole Body Counter Section has continued to emphasize improving instrumentation and equipment in order to provide increased accuracy and efficiency. During FY 1974 the hemi-cylindrical subject positioner in the Crystal Counter was replaced with an arc-type positioner. The arc geometry has improved the accuracy and reproducibility of our whole-body measurements, as anticipated. A computer terminal was installed in B3B25 and the Section is in the process of developing programs to handle all of our data calculations using the computer. We anticipate the possibility of using computer-

ized record keeping for many of the Section's records, but no records have been maintained this way so far.

New amplifiers and analyzer/scalers have been ordered to replace outdated and poorly functioning equipment used with the Plastic Room and with the Probe Counting system. The automatic data recording system for the Probe Counter will allow much more efficient use of Section personnel during measurements of liver uptake and retention of Zn-69m and Cu-67. All electronics ordered use the AEC NIM-BIN system and thus are interchangable in order to provide flexibility which will optomize their use.

The Whole Body Section requested a small animal and sample counting chamber, which will be used with the Nuclear Data model 180 multichannel analyzer to provide a system for handling small animal metabolism studies (which cannot be made in the human facilities) and for measurement of whole-body retention in humans. This system is expected to increase the availability of the human counting rooms, which are presently being used to measure excreta samples and reduce the risk of contamination of the human facilities.

During FY 1975, the Whole Body Counter Section will continue to update its facilities, as well as concentrating on developing methods which will increase the accuracy of existing techniques and developing new techniques.

Operations

During FY 1974, the number of studies being performed by the Whole Body Counter Section continued to increase. Personnel monitoring measurements increased from 1025 in FY 1973 to 1098* in FY 1974. The Section has continued to emphasize medical research support studies during FY 1974. The following table contains a summary of Whole Body Counter studies carried out in FY 1973 and FY 1974.

Comparison of Whole Body Measurements for Fiscal Years 1973 and 1974

Isotope	1973	1974*
Research Studies		
Zn-65	584	150
Cu-67	302	663
Zn-69m	662	858
Cr-51	4	1
K -40	16	125
P -32	33	0
Ga-67	28	0
I-131	233	329
Thorium	1	0
Tc-99m	0	9
Fe-59	0	108
Cu-64	0	22
	1863	2265

*FY 1974 values estimated from the first three quarters plus scheduled increases.

Personnel Monitoring Studies

I-125, 131	639	673
Whole Body	391	425
	1030	1098

Percentage of Whole Body Counts by Institutes

	FY 1973	FY 1974*
CC+	36.7	32.7
NCI	3.4	2.3
NHLI	32.5	36.9
NINDS	18.9	19.1
NIAMDD	7.3	9.0
NIAID	1.2	0.0
	100.0	100.0

*Fiscal Year 1974 values estimated from first three quarters plus scheduled increases

+Clinical Center measurements consisted of personnel monitoring for the Radiation Safety Section.

A summary of the whole-body measurements made by the section over a seven year period is shown below. In FY 1974, the Whole Body Counter Section exceeded by 21% its previous high year (FY 1973).

Seven Year Record of Whole Body Measurements

Study	1968	1969	1970	1971	1972	1973	1974+
Research Measurements	1102	639	235	317	1168	1863	2265
% of Total	67	60	31	36	71	64	67
Personnel Monitoring	552	427	511	566	467	1030	1098
% of Total	33	40	69	64	29	36	33
Total Measurements	1654	1066	745	883	1644	2893	3335
Yearly % Change	----	36*	30*	19	86	76	15
Yearly % Change from 1968	____	36*	55*	47*	0.6*	75	102

+ Fiscal Year 1974 values estimated from first three quarters plus scheduled increases.

* Decrease

The Whole Body Counter Section continued to emphasize measurements of blood and excreta from patients participating in metabolic studies with radionuclides, in order to assure accurate calibration and consistency with the whole-body measurements. The following is a comparison of measurements other than whole-body and probe studies made during FY 1973 and FY 1974.

Other Analysis Related to Whole Body Metabolism Studies

	FY 1973	FY 1974*
Excreta Studies		
Cu-67	171	252
Zn-65	598	31
Zn-99m	279	320
Blood Studies		
Samples Taken	347	369
Red Cell Washings	479	389
Blood Counts		
Cu-67	414	582
ZN-65	413	73
Zn-69m	780	846

* Fiscal Year 1974 values estimated from first three quarters plus scheduled increases.

Continuing and Completed Research Projects

1. CC/NM73-30 H/I/D
   The Metabolsim of Zn-65 and Zn-69m in Patients With and Without Taste Taste Abnormalities. (Continuing.)

2. CC/NM73-31 C/D/I
   The Metabolism of Zn-65 in Patients with Various Types of Porphyria. (Completed.)

3. CC/NM73-32 C
   Gallium-67 in the Evaluation of Patients with Chronic Granulocytic Leukemia. (Completed)
   Publication: Arseneau, J.C., Aamodt, R.L., Johnston, G., and Canellos, G. P.: Evidence for Granulocytic Incorporation of the 67-Gallium in Chronic Granulocytic Leukemia. J. Lab. Clin. Med. 83:496-503, 1974.

4. CC/NM73 A
   Detection of Functioning Thyroid Carcinoma Metastases by Whole=Body I-131 I Scanning and Metabolic Retention Studies. (Continuing.)

5. See new Individual Project Report attached.

RADIATION SAFETY SECTION

General

The Radiation Safety Section (RSS) continued to implement the safe use of ionizing radiation sources by 686 investigators and approximately 1200 allied personnel at the NIH. The overall objective was to maintain radiation doses as low as practicable, as well as assuring compliance with U. S. Atomic Energy Commission regulation 10 CFR 19 and 20, conditions of A.E.C. licenses granted NIH for use of radionuclides, and other applicable Federal regulations and NIH policies.

The changes in program direction initiated during the latter period of FY 1973 accelerated. Major emphasis was placed on training, surveillance, and appropriate follow-up to insure that significant safety or non-compliance items were satisfactorily corrected, Through increased contact with the radionuclide users by Section personnel, the judicious use of contract services, and an increased awareness among the users regarding their responsibilities, there has been a dramatic increase in the level of compliance in the laboratories. This was reflected in the findings of the Directorate Regulatory Operations of the Atomic Energy Commission, which inspected the activities carried out under the seven licenses which the NIH holds. The specific accomplishments of the Section follow under appropriate headings.

Personnel

Radiation Safety Section Roster

Name	Title	EOD Date
Michael B. Musachio, B.S., M.P.H.	Radiation Safety Officer, NIH	3/15/72
William M. Wagner, B.S., M.S.	Health Physicist	8/1/69
Roger W. Broseus, B.Sc., M.Sc.	Training Officer	12/16/72
Louis M. Rubin, B.S., M.S.	Health Physicist	2/2/73
John R. Howley, B.S.	Health Physicist	2/59
Patricia C. Vacca, M.S.	Health Physicist	2/8/65
Mardalee B. Dickinson, B.A.	Health Physicist	11/30/58
James J. Austin	Health Physicist	2/19/59
Richard Kagan	Health Physicist	10/16/66
Donald W. Driver	Physical Science Tech. (HP)	4/29/56
Samuel Fountain	Physical Science Tech.	3/27/66
Donald Asson	Physical Science Tech.	9/15/69
Cleaorn Wilson	Physical Science Tech.	6/2/63
Robert Slayton	Physical Science Tech (PT)	11/25/73
Harry Clark	Physical Science Aid	4/15/73
Helen R. Keil	Supply Technician	7/8/68
Lillian B. Hudes	Clerk-Typist	8/10/70
Lucille Taslitt	Clerk-Typist (PT)*	10/4/70
Frances Rejevich	Clerk-Typist (PT)	10/1/72
Mary Gradwell	Clerk-Typist	1/20/74
Fay Blakely	Clerk-Typist	12/9/73
Joseph Ford	Custodian	11/12/64

*Changed from full to part-time 1/74

The following individuals arrived and/or left during the year.

Personnel	Position	Arrival	Depature
Yollanda Sullivan	Clerk-typist (Part-time, stay in school)	10-9-73	10-25-73
Donald Woods	(Part-time)	10-23-73	
Robert Slayton	Physical Science Tech. (Part-time)	11-29-73	
Faye D. Blakely	Clerk-Typist (Part-time)	12-9-73	
Mary C. Gradwell	Clerk-typist	1-20-74	

Resource Allocation According to Institute

Manpower and material utilization in RSS was estimated to be as shown in the following table.

NCI	30%	NIMH	7%	FDA-BB	4%
NIAMDD	15%	NICHD	7%	NIDR	4%
NHLI	11%	CC	6%	NEI	2%
NIAID	9%	NINDS	5%		

This data is based upon numbers of authorized investigators, numbers of labortories utilizing radiation, numbers of shipments of radionuclides, and man-days of radiation safety training received -- all on a per institute basis.

Facilities and Equipment

Repairs and improvements were made to the Building 21 parking lot, sidewalk, retaining wall, and surface water diversion ditches during the year.

Charcoal adsorption units were installed in hoods 3, 7 , and 9, and similar units will be installed on the other hoods on a priority basis.

The engineering Design Branch, DRS, completed the design of a hood to serve the liquid waste storage area. It is expected that the project will be completed shortly.

A multi channel analyzer and an automatic gamma counter were purchased and calibrated. The multi channel analyzer will be used primarily for activity determinations and radionuclide identification. The automatic gamma counter is used primarily for counting routine air samples and assaying liquid radioactive waste.

License Activities

Information was provided to the Chief, Department of Nuclear Medicine, in support of the application for the renewal of License No. 19-00296-10. The license was renewed on January 2, 1974 and it expires April 30, 1978.

The Co-60 teletherapy license No. 19-00296-16 was amended to permit the replacement of the AECL model C-1460 source with a 6,259 Ci source. The unit was inspected and serviced during the source replacement as per condition 22 of the license. Additionally, the Radiation Safety Section conducted surveys and tests, and reported the results to the AEC in accordance with condition 18 of the license.

An application was submitted to the AEC for renewal of License SUB-985. Notification of receipt was received and the application is currently under review.

License No. 10-00296-10 was amended to permit the use of H-3 in conjunction with a linear accelerator for the production of neutrons.

During the year a representative of the U.S. Atomic Energy Commission, Regulatory Operations Division, Region I, conducted compliance inspections of licenses 19-00296-10, 11, 12, 16, 17; SNM 1345 and SUB 985. With the exception of license No. 19-00296-10 no items of noncompliance or unsafe conditions were found that required any formal response to the AEC. In regard to license No. 19-00296-10, the most significant finding was that insufficient air sampling was being conducted to clearly establish that several relatively low level thyroid burdens were not the result of exceeding the maximum permissable concentration (MPC) for I-125 in air. Immediate steps were taken to monitor all iodination procedures. In addition, it was recommended that steps be taken to reduce the radioiodine activity discharged to the environment, even through concentrations were well below the appropriate MPC values. As a result, all radioiodine users were encouraged to use the Building 21 facilities which have radiochemical fume hoods equipped with charcoal adsorption units or to have such units installed in their own hoods. Approximately 5 iodinations per week were performed in Building 21 as a result of this effort as compared to an average of 1.5 users per week in the previous fiscal year.

Four incidents occurred during the year which required reporting to the AEC. Upon investigation, one was found to be due to film badge exposure while the badge was not being worn. Two were reportable because the MPC for I-125 in air may have been exceeded. Of these, one was the result of mouth pipetting radioactive materials, and the other was probably the result of poor laboratory technique. None of the individuals involved exceeded the applicable maximum permissable exposure values for radiation workers. The fourth incident involved a reported 13.5 rem beta dose to a film badge. Although the incident was thorougly investigated, no plausible explanation could be determined, as there were no beta sources in the laboratory area. The AEC was notified of our findings and appropriate corrective actions where indicated. They also conducted further

investigations during site visits which resulted in no additional comments or recommendations.

Representatives of the A.E.C.'s Chicago Operations Office and the Germantown, Md. office visited in August, 1973 to observe NIH activities in controlling the special nuclear materials (Pu-239) in cardiac pacemakers used in humans and experimental animals.

As required by license No. 19-00296-10, approximately 200 GM survey meters issued to investigators were picked up, repaired, calibrated, and returned to laboratories in September, 1973 and March, 1974.

In January 1974, a draft contract was submitted to Contract Operations Section, O.D.A. This proposed contract is for calibration and repair of the above survey meters.

Radionuclide Procurement

	FY '73	FY '74	Change
Millicuries*	96,165	118,100	+23%
Cost	1,209,742	1,101,724	-9%
Shipments Incoming	8,800	7,803	-12%
Shipments Outgoing	226	151	33%
Authorized Investigators	689	686	---
T.C.O.'s Placed	6,571	**	---

*Does not include cardiac pacemakers in human and animal studies.

**The procedure to T.C.O. placement was changed to eliminate the need to call the Radiation Safety Section for a clearance number for each T.C.O.

Radioactive Waste Disposal

	FY '73	FY '74	Change
55 Gallon Drums Shipped	415	487	+17%
Curies	24	30	+25%
Cost	$10,080	$9,019	-11%
Counting Vials (Trays Shipped)	26,542	32,390	+22%
Cost	33,290	38,071	+14%
Liquid Waste Returned from Labs			
Volume (liters)	30,423	35,379	+16%

The volume of liquid and solid waste increased significantly and this trend is expected to continue. Efforts were also made to promptly remove radioactive waste from the laboratory so as to lessen the contamination and exposure potential.

The contract to dispose of liquid scintillation vials was amended to include the pickup of the vials directly from the laboratory, rather than the Building 21 loading dock, for packaging and disposal.

A panel truck used for the pickup of radioactive waste was exchanged for a van-type vehicle having a partition between the driver and the cargo area, thereby reducing the driver's exposure to noxious and/or toxic chemical and radioactive vapors.

A request was made to the Employee Health Service and action was taken to routinely monitor the health of the Section's waste handling personnel, as they may be accidently exposed to biological and chemical hazards in addition to their work with radioactive materials.

Patient Therapies and Diagnostic Studies

Health physics support was given to CC staff administering therapeutic dosages of I-131 to fourteen patients. Dosages ranged up to 300 mCi. Aside from routine health physics support, staff provided data on I-131 concentrations in patient excreta to the physicians involved. Support was also given for three therapeutic administrations of P-32. Thirty seven radiopharmaceutical assays were also performed.

Laboratory Surveys

A much greater emphasis was given to laboratory and x-ray surveys during FY '74 to assure compliance with AEC regulations, conditions on NIH's AEC licenses, and NIH policies. The overall goal was to maintain exposure to radiation and radioactive materials at the lowest practicable level.

Laboratory compliance and contamination surveys were conducted by Radiation Safety Section staff and by a private contractor. Specfications for the survey contract were rewritten in May with the objectives of better control and provision for inspections on a priority basis, depending on the potential hazards in the laboratory. This contract will be bid in FY '75.

The radiation Safety Section staff conducted 2,340 laboratory surveys, and 3,264 laboratory modules or other radiation areas were inspected by contract personnel. Staff followed up on problems reported in contractor survey reports.

In March, 1974, a procedure was instituted to require laboratory contamination surveys by the authorized users. The Radiation Safety Section developed a standard contamination survey form and instructions. It was required that the authorized users return the results of these surveys to the Radiation Safety Section by the tenth of each month. Preliminary observations indicate that this procedure has resulted in a decrease in the level of significant contamination in the laboratories and has made the authorized users more aware of their responsibilities for contamination surveillance and

control. Follow-up was made by Radiation Safety Section staff on significant problems uncovered as a result of these surveys. Twenty-seven surveys were made on the 101 medical x-ray, special purpose x-ray, and x-ray diffraction units during FY 74 by Radiations Safety Section staff. A contract was awarded to Applied Health Physics, Inc., in January 1874, and an additional 54 x-ray units were surveyed under contract. The Radiation Safety Section staff coordinated these surveys and conducted the necessary follow-up to correct any deficiencies noted.

Other survey activities included the routine biennial leak testing of 211 sealed sources on campus and the survey of 50 electron microscopes for x-ray emmissions. Follow-up was required to correct three units found leaking above the recommended, 0.25 mR/hr. Two representatives of the Bureau of Radiological Health, FDA, who were interested in studying possible hazards related to electron microscope operations, assisted with these surveys.

As a result of increased emphasis by the A.E.C. on control and monitoring of airborne radioiosines, there was a dramatic increase in the air sampling with approximately 600 actual samples taken; however the annual rate at the end of the FY was 1400 per year. These samples are taken from laboratory air and hood exhausts primarily during radioiodination procedures; a small percentage represents sampling for other potential airborne radionuclides, e.g., H-3, P-32, Cr-51, and C-14.

Personnel Monitoring

The processing of film badges (external radiation personnel dosimeters) has been under contract to Radiation Detection Company since May 1973; the contract was renewed April 1974. Contractor performance has been satisfactory and response has been prompt on special requests for immediate film readings. The number of individuals on film badges increased by 8% from 1650 to 1778. One hundred eighty-one individuals also wear extremity films.

The form memorandum, sent to authorized users to notify them of the need for submission of bioassay specimens or whole body counts, was revised to emphasize the importance of this type of personnel monitoring, and the consequences of failing to comply on a timely basis. The rate of bioassay specimen processing increased from 783 to 1190 per year, an increase of 52%. In addition, approximately 360 whole body counts were performed by the Whole Body Counting Section, at the request of Radiation Safety Section, for personnel monitoring purposes.

The demand for personnel monitoring services is expected to increase due to the continued increase in both the activity used and the number of individuals utilizing radiation at the NIH.

Radiation Safety Training: Courses

Due to increased emphasis on radiation safety training for technicians and other users of radioactive materials not in the Authorized User catagory, there was a large increase in the number of individuals receiving training in FY 74, particularly during the second half. In December 1973, each Authorized Investigator was requested to submit a list of individuals in his area who had not attended the one-day session, "Radiation Safety in the Laboratory." As a result, 439 individuals attended the course in January through March 1974. Follow-up was made in April and May to place "no shows" in April and June courses. The course was conducted in all months of the FY except November and May, with a total of 695 attendees. Other statistics appear below.

The two-week course "Radiological Health for Radionuclide Users" was conducted in November and May, and was completed by approximately 114.

Short one to two hour sessions were presented to groups with specialized needs. One hour presentations were made to CC nurses as part of their orientation program with 104 attending eight sessions. One hundred thirty-three CC housekeeping personnel attended one hour sessions as did 80 shop personnel. A special two-hour presentation was made to 33 DCRT personnel in Building 12. Department of Nuclear Medicine technicians attended a one hour session emphasizing the use of syringe shields while injecting radionuclides into patients. Liquid Scintillation Counting Methodology (a two day course) was presented in August and April with 65 in attendance. This course continued to be presented by the Radiation Management Corporation; because the fees were paid by the Institutes sponsoring attendees, this course is not included in the statistics below.

The following table indicates the training received by each Institute in terms of man-days and as a percentage of the total 1713 man-days of training administered.

Institute	Training Received (man-days)	Percentage of Total*
NCI	404	24
NIAID	199	12
NIAMDD	213	12
NIMH	190	11
NHLI	153	9
NICHD	133	8
CC	111	7
FDA,BOB	97	6
NINDS	83	5
NIDR	64	4
NEI	50	3
DCRT	13	1
Other	3	0.1

*Percentages do not add to 100% because of rounding errors.

Radiation Safety Training: Non-Course Activities

Safe use of radiation depends upon awareness of its hazards. To promote awareness, radiation safety posters produced by the medical arts section of DRS have been posted periodically in research buildings; posting is tied in with articles in the NIH Record for maximum impact. This activity was conducted under the sponsorship of the NIH Biohazards and Safety Committee. Other "awareness" activities included the mailing of informative memos to users of P-32, I-125, and I-131 regarding the hazards and precautions associated with these radionuclides. A memo was mailed to all Authorized Users in August calling their attention to the five most serious and most frequently encountered items of non-compliance with radiation safety practices.

The printing of the latest edition of the NIH Radiation Safety Guide was completed in the Fall of 1973 and 1200 copies were immediately distributed to user areas by mail and by health physicists. Additional copies are distributed during training courses.

In August, two representatives of the NIH Fire Department demonstrated the use of self-contained breathing apparatus to the health physics staff. The use of the radiation safety emergency cart was also reviewed by staff members. In December Dr. Warell of the Radiochemical Centre, Amersham, England, presented a talk entitled "Tritium Trouble Shooting" under the sponsorship of the section. Twelve investigators attended this discussion of tritium applications in research.

On 10 and 11 April, 1974, a staff member presented lectures in one-day radiation safety courses conducted at the NIEHS, Research Triangle Park, N.C. Approximately 65 EHS personnel attended.

Staff Training and Development

Mrs. Vacca attended the Civil Service Commission course, Supervisory Management II. Mr. Broseus attended graduate courses in the Johns Hopkins University Evening School, and the American Board of Health Physics Review Course in preparation for the ABHP certification examination. Mrs. Rejevich attended courses in Filing Management, Clerical Orientation, and Introduction to Wylbur in preparation for improvements to section record keeping methods. Messrs. Ford and Fountain continued attending the Adult Education and Upward Mobility College respectively. Mr. Wagner continued pursuit of his graduate studies in Radiological Science at the Johns Hopkins University through the USPHS Commissioned Corps long term training program. Messrs. Rubin, Howley, and Broseus attended the annual meeting of the Health Physics Society and Mr. Musachio attended the National Enviromental Health Association Education Conferences. Mr. Howley and Mrs. Vacca attended the International Radiation Association meeting in Washington, D.C., September 1973; they also served on the Housing

Committee for the meeting and hosted six Japanese visitors on a tour of the Radiation Safety Section. Mr. Rubin attended the Society of Nuclear Medicine Meeting in Atlanta, 11-18 February, 1974.

Mrs. Patricia Vacca was invited to serve on an American National Standards Institute Subcommittee, which will develop recommended calibration procedures for counting instruments used in nuclear medicine.

PRESENTATIONS

" A New Sterilizable Hand Radiation Monitor for Use in Heart Catheterization Studies and Radiopharmaceutical Preparations." Presented by William Wagner at the 15th annual meeting of the American Association of Physicists in Medicine, San Diego, California, August, 1973.

"Radiopharmaceutical Quality Control: Sterility and Pyrogen Testing." Presented by Edgar Adams at the Annual Meeting of the Mid-Eastern Chapter, Society of Nuclear Medicine, Arlington, Virginia, March, 1974.

"The Quality Control of Radiopharmaceuticals." Presented by Edgar Adams at the Annual Meeting of the Professional Associations of the U. S. Public Health Service, Washington, D. C., April, 1974.

"Control of Radiological Hazard." Presented by Roger W. Broseus at the annual meeting of the American Society of Microbiology, Chicago, May, 1974.

"Scintigraphic Mammography." Presented by Sybil J. Swann at the 21st Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June, 1974.

"Stress Myocardial Scanning with ^{43}K." Presented by Bonnie Mefferd at the 21st Annual Meeting to the Society of Nuclear Medicine, San Diego, California, June 1974.

"Radionuclide Scanning and Microaugeography of Evolving and Completed Brain Infarction in Monkey." Presented by Alfred E. Jones, M.D., at the 21st Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June, 1974.

"Renal Localization of Gallium - 67 Citrate." Presented by Robert S. Frankel, M.D., at the 21st Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June 1974.

"Breast Scintigraphy with ^{99m}Tc Pertechnetate nnd Gallium-67." Presented by Steven D. Richman, M.D., at the 21st Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June, 1974.

"An ECG Gated Scintigraphic Imaging Procedure for Studying Ventricular Function." Presented by Michael V. Green, at the 21st Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June, 1974.

"Monte Carlo Computation of the Energy and Position Dependent Absolute Maximum Detection Efficiency of Cylindrical Gamma Radiation Detectors." Presented by Roger Aamodt at the Annual Health Physics Society Meeting, Houston, Texas.

"Radiation Safety in Nuclear Medicine." Presented by John R. Howley at the Annual Meeting of the Society of Nuclear Medicine, San Diego, California, June, 1974.

PUBLICATIONS

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Frankel, R. S., Jones, A. E., Cohen, J. A., Johnston, G. S., Johnson, K. W., and Pomeroy, T. C.: Clinical correlations of ^{67}Ga and skeletal whole-body radionuclide studies with radiography in Ewing's sarcoma. Radiology 110: 597-603, 1973.

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Frankel, R. W., Johnson, K. W., Mabry, J. J., and Johnston, G. S.: "Normal" bone scintigram in a patient with diffuse skeletal lymphoma. A case report. Radiology 111: 365-366, May 1974.

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Gelrud, L. G., Arseneau, J. C. Milder, M. S., Kramer, R. J., Swann, S. J., Canellos, G. P., and Johnston, G. S.: The kinetics of gallium-67 incorporation into inflammatory lesions: experimental and clinical. J. Lab. Clin. Med. 83: 489-495, 1974.

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Jones, A. E., Larson, A. L., Powell, R. D., Johnston, G. S., and Henkin, R. K.: Localization of ^{99m}Technetium in the region of the nose in Sjogren's syndrome. Oto. Rhinol. Laryngol. In press.

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Vacca, Patricia C., Farkas, Raymond J., and Semler, Mark O.: Quality Control of radioactive products for patient administration at the National Institutes of Health. Journal of Labelled Compounds, Proceedings of the American Chemical Society Symposium on Problems of the Purity of Biochemical Reagents and Compoungs.

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Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Scintigraphic Cardioangiography

Previous Serial Number: None

Principal Investigator: Michael V. Green, M.S.

Other Investigators: Harold Ostrow, B.S.
Margaret Douglas, B.L.
Richard Myers, M.D.
Richard Scott, M.D.
James J. Bailey, M.D.
Gerald S. Johnston, M.D.

Cooperating Units: Computer Systems Lab., DCRT
Laboratory of Applied Studies, DCRT
Cardiology Branch, NHLI
Special Programs and Resources Branch, Lung. Div., NHLI

Man Years:

Total: 1.1
Professional: 1.0
Others: 0.1

Project Description: Non-invasive study of ventricular performance by ECG gated studies.

Publications: Green, M.V., Ostrow, H., Douglas, M.A., Myers, R.W., Scott, R.N., Bailey, J.J., and Johnston, G.S.: Scientigraphic Cardioangiography, To be published with proceedings at MEDINFO 74, Stockholm, Sweden, August 1974.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Localization of ^{99m}Technetium in the Region of the Nose and in Taste and Smell Abnormalities

Previous Serial Number: None

Principal Investigator: Alfred E. Jones, M.D.

Other Investigators: R. I. Henkin, M.D.
Ralph Powell, M.D.

Cooperating Units: Division of Intramural Research, Experimental Therapy Branch, NHLI, and Laboratory of Pathology, NCI

Man Years:

Total: 0.3
Professional: 0.1
Others: 0.2

Project Description: Scintigraphic detection of radionuclide localization in the region of the nose. Its relationship to disease states.

Publications: Jones, A.E., Larson, A.L., Powell, R.D., Johnston, G.S. and Henkin, R.K.: Localization of ^{99m}Technetium in the region of the nose in Sjogren's syndrome. Annals of Otorhinolaryngology. In press.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Monte Carlo Calculation of Absolute and Geometric Efficiencies of Cylindrical Gamma Detectors

Previous Serial Number: None

Principal Investigator: Michal V. Green, M.S.

Other Investigators: Roger L. Aamodt, Ph.D
Gerald S. Johnston, M.D.

Cooperating Units: None

Man Years:

Total: 0.3
Professional: 0.3
Others

Project Description: Theoretical determination of detection efficiencies of gamma radiation detectors.

Publications: Green, M.V., Aamodt, R.L. and Johnston, G.S.: The solid angle subtended by a solid right circular cylinder. Nuc. Inst. and Meth. In press.

Green, M.V., Aamodt, R.L and Johnston, G.S.: The absolute detection efficiency of cylindrical gamma radiation detectors. Submitted to Health Phys.

Serial No. CC/NM 74-3
Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Renal Localization of Gallium-67 Citrate

Previous Serial Number: None

Principal Investigator: Robert S. Frankel, M.D.

Other Investigators: Steven D. Richman, M.D.
Stanley Levenson, M.D.
Gerald S. Johnston, M.D.

Cooperating Units: None

Man Years:

Total: 0.2
Professional: 0.2
Others:

Project Description: Renal localization of gallium-67 citrate has occurred in less than two percent of the total number of gallium whole body scintiscans performed to date. The significance of this finding is not entirely certain but it seems to strongly suggest the presence of tumor or an inflammatory process in the kidneys. Correlative studies between scan, radiology and lab and autopsy findings have been carried out.

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Breast Scintigraphy with ^{99m}Tc and ^{67}Ga

Previous Serial Number: None

Principal Investigator: Steven Richman, M.D.

Other Investigators: Robert Frankel, M.D.
Philip Brodey, M.D.
Douglas Tormey, M.D.
Gerald Johnston, M.D.
Ernest DeMoss, M.D.

Cooperating Units: Surgical Breast Service, NCI
Medical Breast Service, NCI
Radiology Department

Man Years:

Total: 0.5
Professional: 0.3
Others: 0.2

Project Description: Radionuclide breast scintigraphy utilizing ^{99m}Tc and ^{67}Ga is being investigated as a non-invasive tumor localizing technique. The study will compare diagnostic accuracy with conventional mammography and xeroradiography. Computer techniques will be applied to augment abnormalities.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Ultrasound and Radionuclide Imaging in the Diagnosis of Hepatic Neoplasm--A Comparative Study

Previous Serial Number: None

Principal Investigator: Stanley M. Levenson, M.D.

Other Investigators: George S. Flinn, M.D.
A. Eric Jones, M.D.

Cooperating Units: Department of Radiology, Clinical Center

Man Years:

Total: 0.45
Professional: 0.40
Others: 0.05

Project Description: Patients with unknown, suspected, and documented hepatic primary/secondary mass lesions will be evaluated using both ultrasound and scanning techniques. It is hoped that these studies will both supplement and complement each other, raising the diagnostic accuracy in hepatic neoplasm.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Radionuclide Evaluation of Hepatic Cell Carcinoma

Previous Serial Number: None

Principal Investigator: Steven Richman, M.D.

Other Investigators: Richard Adamson, Ph.D.
Sybil Swann, RNT
Stanley Levenson, M.D.

Cooperating Units: Laboratory of Chemical Pharmacology, NCI

Man Years:

Total: 0.4
Professional: 0.3
Others: 0.1

Project Description: Radionuclide accumulation of ^{67}Ga and ^{99m}Tc-sulfur colloid in chemically induced hepatic cell carcinoma is being investigated. The study will compare both isotopes for sensitivity and as complementary procedures.

Serial No. CC/NM -7 8
Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Computer Functional Mapping of Renal Transit of ^{131}I-Iodohippuran

Previous Serial Number: None

Principal Investigator: Harry Agress, Jr., M.D.

Other Investigators: Stanley Levenson, M.D.

Cooperating Units: Division of Computer Research and Technology

Man Years:

Total: 0.2
Professional: 0.2
Others:

Project Description: Renogram interpretation has been previously limited to evaluating each kidney as a whole with little attention paid to regional abnormalities of function. By means of a Fortran computer program data collected on an Anger gamma camera can be processed into functional maps. Each map represents a dynamic parameter of either uptake and/or washout of radionuclide on a regional basis (64 x 64 array). These maps give a more detailed localized evaluation of renal function than is seen on whole kidney renograms and/or sequential scans.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Bone Scintigraphy in Breast Carcinoma

Previous Serial Number: None

Principal Investigator: Robert S. Frankel, M.D.

Other Investigators: Steven D. Richman, M.D.
Alfred E. Jones, M.D.
Stanley M. Levenson, M.D.
Gerald S. Johnston, M.D.
Douglass Tormey, M.D.
James Ingle, M.D.

Cooperating Units: Medical Breast Cancer Service, NCI

Man Years:

Total: 0.5
Professional:
Others:

Project Description: Analysis of usefulness of skeletal scintigraphy in metastatic breast carcinoma relative to skeletal roentgenograms and clinical symptoms.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Bone Dynamics of Labelled Phosphate Polymers

Previous Serial Number: None

Principal Investigator: Alfred E. Jones, M.D.

Other Investigators: Harry Agress, M.D.
Stephen J. Marx, M.D.

Cooperating Units: Laboratory of Applied Studies, DCRT
Metabolic Diseses Branch, NIAMDD

Man Years:

Total: 0.4
Professional: 0.2
Others: 0.2

Project Description: Determination of rate of bone metabolism of radio-tagged phosphates.

Department of Nuclear Medicine
Diagnostic Nuclear Medicine Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: The Value of Liver Scanning in Patients with Carcinoma or the Breast--A Retrospective Analysis

Previous Serial Number: None

Principal Investigator: Stanley M. Levenson, M.D.

Other Investigators: A. Eric Jones, M.D.
Gerald S. Johnston, M.D.
Douglass C. Tormey, M.D.

Cooperating Units: Medical Oncology, Dept. of Cancer Treatment, NCI

Man Years:

Total: 0.90
Professional: 0.70
Others: 0.20

Project Description: Patients with known breast carcinoma are scanned at intervals to determine the optimal scanning frequency, signs of early metastases, correlation of scan changes with laboratory values, response of secondary hepatic neoplasm to therapy, and general sensitivity of this scanning procedure.

Department of Nuclear Medicine
Whole Body Counter Section
Clinical Center

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Effects of Deferoxamine and Ascorbic Acid on Iron and and Calcium Galance in Thalassemia Major

Previous Serial Number: None

Principal Investigator: Arthur W. Nienhuis, M.D.

Other Investigators: Freceric Bartter, M.D.
Ramon Valiz, M.D.
W. French Anderson, M.D.
Roger L. Aamodt, Ph.D.

Cooperating Units: Division of Intramural Research, NHLI

Man Years:

Total: 0.11
Professional: 0.03
Others: 0.08

Project Description: This study is designed to determine the effect of deferoxamine, and iron chelating agent, and ascorbic acid on iron and calcium balance in patients with transfusional hemosiderosis. Balance measurements will be done after a prolonged administration of these agents to allow prediction of their benefit on preventing progressive iron overload, and judgment as to the need for calcium supplements in patients given large doses of deferoxamine. The contribution of dietary iron to the process of iron accumulation in the previously untreated but transfused patient will also be assessed.

Table 1

Distribution of Department of Nuclear Medicine Services

Prorated by Activity by Department Section

Institute	Diagnostic & Radiopharmacy	Whole Body Counter	Radiation Safety	Departmental Services to Institutes
NCI	70%	35%	30%	45%
NEI	1%	___	2%	1%
NHLI	5%	37%	11%	18%
NIAID	3%	___	9%	4%
NIAMDD	6%	9%	15%	10%
NICHD	2%	___	7%	3%
NIDR	1%	___	4%	2%
NINDS	11%	19%	5%	12%
NIMH	1%	___	7%	3%
			10% CC + FDA-BB	

Table 2

Diagnostic Nuclear Medicine Section

Summary of Tests Performed

Tests	FY 71	FY 72**	% Change	Non-Estimated FY 73	% Change	FY 74†	% Change
Brain	548	748	36%	831	11%	1042	25%
Liver	588	645	10%	883	37%	1140	29%
Cisternogram	77	70	10%*	47	33%*	61	30%
Bone (Whole Body)	170	371	118%	645	74%	900	40%
Gallium (Whole Body)	___	267	100%	536	101%	815	52%
Lung	90	133	48%	212	59%	203	1%
Renal	134	110	18%	99	10%*	144	45%
Thyroid Images	180	166	8%	280	69%	313	12%
Thyroid Uptakes	400	215	46%	307	43%	322	1%
Bone Marrow	___	___	___	63	___	12	81%*
^{67}Ga Brain	___	___	___	87	___	95	9%
Salivary	___	___	___	29	___	12	59%*
Ventriculogram	___	___	___	21	___	39	86%
Superior Vena Cava	___	___	___	49	___	21	57%*
^{131}I Whole Body	___	___	___	29	___	25	14%*
AVM	___	___	___	47	___	16	66%*
Miscellaneous	193	225	17%	523	57%	845	62%
Total	2380	2950	24%	4688	37%	6008	28%

*Decrease

**All FY 1972 figures are estimated on data available through March 1972.

†All FY 1974 figures are estimated on data available through February 1974.

Table 3

Clinical Nuclear Medicine Equipment

April 1974

Equipment	Date Acquired	Primary Use
Thyroid uptake assembly (Nuclear-Chicago)	1967	thyroid uptakes
Pho-Gamma III, gamma scintillation camera (Nuclear-Chicago)	1967	quantitative and dynamic studies-rapid static organ imaging (Collimator changers added: upgraded)
Mediac dose calibrator (Nuclear-Chicago)	1969	confirmation of doses
Dual probe whole body scanner (5-inch diameter) (Ohio-Nuclear)	1970	whole body scans (bone, ^{67}Ga citrate, ^{131}I-retention), routine organ scanning of liver, spleen
Pho-Gamma III, (High Performance) gamma scintillation camera (Nuclear-Chicago	1971	quantitative and dynamic studies-rapid static organ imaging (Collimator changers added)
Dual probe whole body scanner (5-inch diameter) (Ohio-Nuclear)	1971	whole body scans (bone, ^{67}Ga citrate, ^{131}I-retention, routine organ scanning of liver, spleen
Renogram dual probe (Nuclear-Chicago)	1971	renal studies and organ counting
WYLBUR (IBM)	1971	process research data and store patient study results

Table 3
(Continued)

Clinical Nuclear Medicine Equipment

Equipment	Date Acquired	Primary Use
Pho-Gamma III, (High Performance) gamma scintillation camera (Nuclear-Chicago)	1972	quantitative and dynamic studies-rapid static organ imaging (collimator changers added)
Film processor (Kodak X-omat)	1972	develop x-ray and 35 mm film
Photomicroscope (Leitz)	1972	autoradiography
Dual probe whole body scanner (5 inch crystal) (Ohio-Nuclear)	1974	whole body scans

Table 4

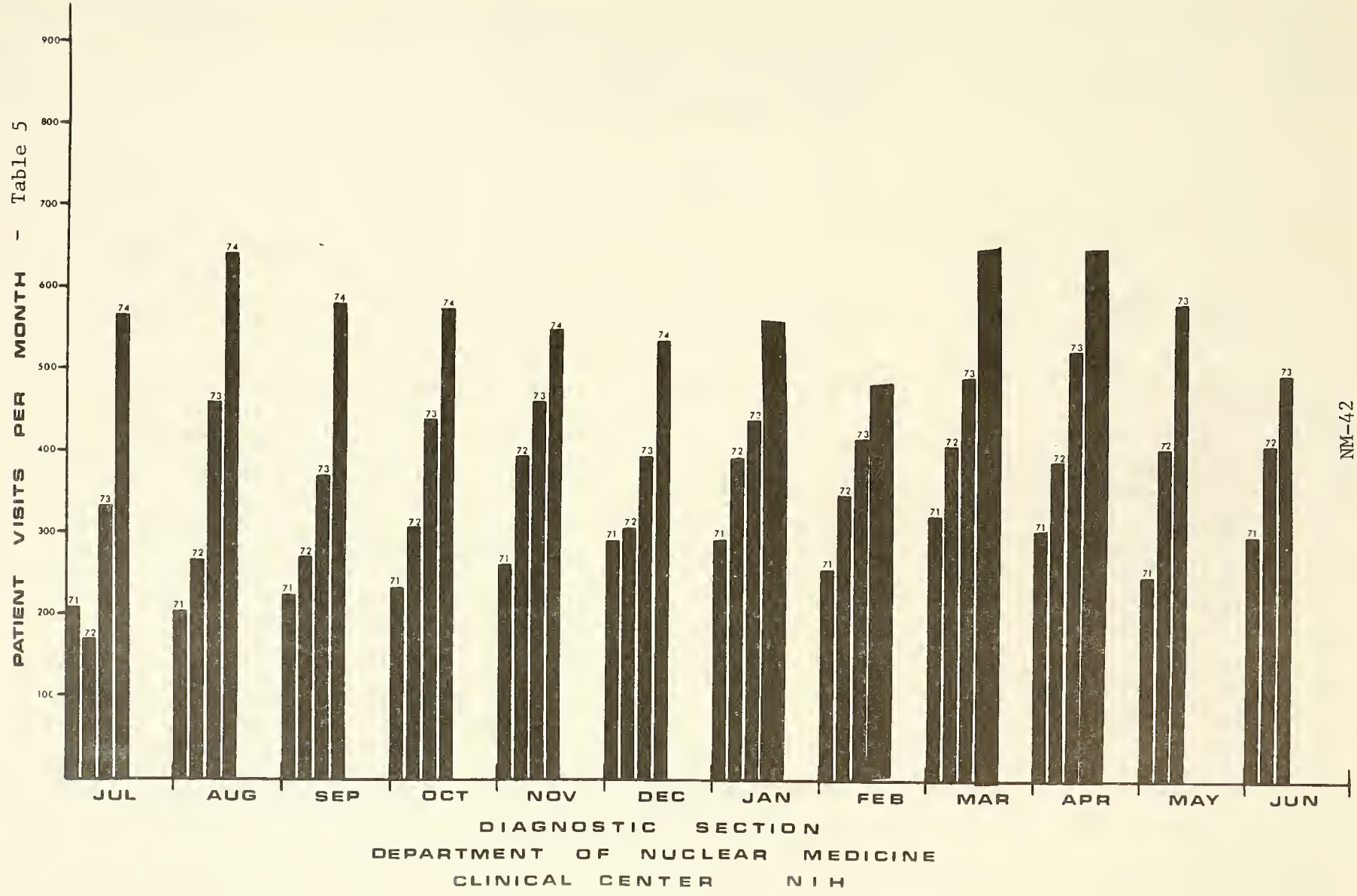
Diagnostic Nuclear Medicine Section

Patient Studies by Fiscal Year

Date	1967	1968	1969	1970	1971	1972	1973	1974
Total	2568	3093	1637	2181	2308	2950	4688	6008†
Yearly % Change		20%	47%*	33%	9%	24%	58%	28%
Yearly % Change from 1967		20%	36%*	15%*	7%*	15%	82%	133%

† Estimated on basis of first 8 months FY 1974

* Decrease


PATIENT VISITS PER MONTH - Table 5
900
800
700
600
500
400
300
200
100
71
72
73
74
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
DIAGNOSTIC SECTION
DEPARTMENT OF NUCLEAR MEDICINE
CLINICAL CENTER NIH

NM-42

TABLE 6

RADIOPHARMACEUTICAL SECTION STATISTICAL DATA

	FY '73	FY '74	% Change
Total Requests	1,854	2,039	+ 10%
Total Work Units	16,117	20,464	+ 27%
Service Requests	313	296	- 5%
Service Work Units	1,149	1,144	------
Quality Control Requests	950	1,023	+ 8%
Quality Control Work Units	7,727	8,945	+ 16%
Research and Development Requests	591	720	+ 22%
Research and Development Work Units	7,241	10,375	+ 43%
Clinical Center Requests	1,629	1,812	+ 11%
Institute Requests	225	227	------
Clinical Center Work Units	14,785	18,856	+ 28%
Institute Work Units	1,332	1,608	+ 21%
RPS Assays	1,901	3,064	+ 61%
Purity Checks	306	639	+109%
Pyrogen Tests	105	105	------
Sterility Tests	865	539	- 38%
RPS Expenditures	$92,522.77	$111,382.11	+ 20%

TABLE 7

ISOTOPES AND PRODUCTS RECEIVED, REGISTERED, AND FORMULATED - FY 1974

	Isotope	Product
1.	^{3}H	Aldosterone BradyKinin Cholecalciferol Cholic Acid
2.	^{14}C	Chenodesoxycholic Acid Cholic Acid Dopamine Methoxy Hydroxy Phenyl Glycol
3.	^{18}F	Sodium Fluoride
4.	^{24}Na	Sodium Chloride
5.	^{32}P	Diisopropylfluorophosphate Sodium Phosphate
6.	^{43}K	Potassium Chloride
7.	^{47}Ca	Calcium Chloride
8.	^{51}Cr	Erythrocytes-^{51}Cr Human Serum Albumin Platelets-^{51}Cr Sodium Chromate
9.	^{52}Fe	Ferrous Citrate
10.	^{57}Co	Cyanocobalamin
11.	^{59}Fe	Ferric Chloride Ferrous Citrate Ferrous-^{59}Fe-Sulfate Elixir
12.	^{64}Cu	Copper Nitrate
13.	^{65}Zn	Plasma-^{65}Zn Zinc Chloride
14.	^{67}Cu	Copper Chloride Plasma-^{67}Cu
15.	^{67}Ga	Gallium Citrate

TABLE 7 (Continued)

16.	^{69m}Zn	Plasma-^{69m}Zn
17.	^{85}Kr	Krypton Gas Cylinders
18.	^{99}Mo	$^{99}Mo/^{99m}Tc$ Generator
19.	^{99m}Tc	Diethylene Triamine Pentaacetic Acid Erythrocytes-^{99m}Tc Diphosphonate Human Serum Albumin Human Serum Albumin Microspheres Macroaggregated Human Serum Albumin Polyphosphate Pryophosphate Sodium Pertechnetate Sulfur Colloid
20.	^{111}In	Bleomycin Indium Chloride
21.	^{123}I	Sodium Iodide
22.	^{125}I	Fibrinogen Gamma Globulin (IgE) Gamma Globulin (IgG) Human Serum Albumin Iodoquinoline Microaggregated Human Serum Albumin Sodium Iodide Thyroxine
23.	^{131}I	Fibrinogen Gamma Globulin (IgE) Human Serum Albumin Macroaggregated Human Serum Albumin Sodium Iodide Sodium-o-Iodohippurate Sodium Rose Bengal
24.	^{133}Xe	^{133}Xenon in Saline ^{133}Xenon Ventillation Study System
25.	^{197}Hg	Chlormerodrin

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES

NURSING DEPARTMENT

CONTENTS

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

NURSING DEPARTMENT

PROGRAM GOALS

The long-range goals of the Nursing Department continued to be:

1. To provide the best nursing care possible with the available nursing personnel.

2. To develop all personnel in the Nursing Department to the fullest extent of their capabilities and the professional nurse as a fully professional individual.

3. To share with the community those accomplishments in the Nursing Department which are appropriate for the full development of nursing as a community service.

The program goals developed by the Administrative Council for FY 1974 contributory to the long range goals are attached. (Exhibit 1).

The arrival of a new Chief of the Nursing Department occurred in September 1973 following a 10 month period in which the Deputy Chief served as Acting Chief of the Department. In addition, a large recruitment effort to increase the registered professional nurse staff primarily was initiated in April 1973 which resulted in the addition of 140 nursing staff members to the Clinical Center Nursing Department in a seven month period. This precipitated stresses and essential crisis reorganization of the department's staffing pattern, as well as reordering of the nursing care activities and priorities to accommodate the massive undertaking. Commendation is due the Nursing Department staff for their untiring efforts in coping with the unusual demands.

PROGRAM ACCOMPLISHMENTS

The most significant accomplishment of this period was the development of the Task Force Statement on the Future of Nursing Practice at the Clinical Center. (Exhibit 2). Through this vehicle the Nursing Department has initiated further exploration and total involvement of the nursing staff and the collaboration of associates in care, primarily physicians, in establishing the scope of responsibilities, authority, and accountability for nursing practice at the Clinical Center. This initial activity resulted in the vigorous involvement of 89 members of the Nursing Department who serve on the following task forces:

1. Task Force for Nursing Practice
2. Task Force for Nursing Education
3. Task Force for Evaluation, Peer Review, Recognition and Reward
4. Task Force for Nursing Research

Dr. Rita Chow, Deputy Chief Nurse Officer, PHS, and Deputy Director, Office of Nursing Home Affairs, PHS, served as an invaluable consultant to the Task Force on Nursing Research.

During April 1974 eight sessions were held on all tours of duty for the entire Nursing Department to hear progress reports from Task Force activity and elicit feedback from Nursing personnel on all levels. The meetings were well attended by over 290 staff members and the directives to the Task Forces clearly have been endorsement of what has been accomplished and the mandate to continue the pursuits.

Interdisciplinary collaboration and more significant involvement of the Nursing Department in program planning and policy development were notable and a cause for great satisfaction, increased motivation, and heightened morale. The Nursing Department was represented on the Medical Board and Clinical Directors Group by the Chief, Nursing Department. In addition, the newly created Joint Physician - Nurse Committee of the Medical Board was chaired by the Chief, Nursing Department (Exhibit 3). Its creation was in response to the original Nursing Department's Task Force recommendation; hearty endorsement by the Medical Board and commitment to its success were encouraging. The Deputy Chief Nurse became a member of the Medical Record Committee while a chemotherapeutic nurse was appointed to membership on the newly created Transfusion Committee of the Medical Board.

Nursing Service personnel were represented on the Clinical Research Review Committees for their institutes:

1. Chief, Psychiatric Nursing Service
2. Chief, Heart and Lung Nursing Service
3. Chief, Cancer Nursing Service
4. Head Nurse, Allergy and Infectious Diseases Nursing Service
5. Head Nurse, Neurology Nursing Service
6. Head Nurse, Eye Nursing Service

A clinical nurse expert on the Cancer Nursing Service served, along with the service chief, on the Ad Hoc Technical Review Committee for the N.C.I. Cancer Control Program, while the clinical nurse expert served on the Clinical Center's Clinical Research Review Committee.

Other significant accomplishments in the Nursing Department included:

1. The appointment of the first outside consultant to the Nursing Department for the Psychiatric Nursing Service.

2. The implementation of Primary Nursing on the Psychiatric Nursing Service.

3. The successful implementation of the clinical nursing program aspect of the Stride Nursing Program with Marymount College was achieved. Two nurses of the Clinical Center Nursing Department, prepared at the master's level, served as adjunct faculty members. Opportunities for these students were offered and guided by our nursing staff in psychiatry, the operating room, and the outpatient department. Of the 20 students, 15 remained, 9 of whom were from the Nursing Department.

4. A short-term continuing education program for the development of a pediatric oncology nurse at the Clinical Center was developed. (Exhibit 4). Six registered professional nurses of the Clinical Center will be provided the learning opportunity for a 5 month period beginning in September 1974. A presentation of this plan was well received at the Ninth Joint Meeting of the Professional Associations, USPHS.

5. A six month unit dose distribution pilot study began on 3 East, Psychiatric Service on April 15. This freed nursing time for more interaction with patients.

6. Adult Red Cross volunteers began moving into the expanded role. Courses were developed in taking blood pressures, feeding, and offering nourishments. Twelve volunteers successfully completed the blood pressure course; their services were initiated. Junior Red Cross volunteers continued to provide services to patients; 19 young volunteers were oriented in October 1973 and performed creditably.

7. Two retreats were held by the Chief Nurse with the Administrative Council of the Nursing Department. As a result, a mode for determining program direction and policy development was established which provides for greater participation from the Council in matters affecting nursing care and staff development.

8. Informal collaborative relationships have been established with the School of Nursing, Catholic University of America.

9. The response from Schools of Nursing with baccalaureate programs to our clinical electives program has exceeded our capability to provide experiences for all requesting them. Thirty-two students participated in the program from July 1973 to April 1974. Reservations for all available openings were committed to Fall 1975.

10. Nineteen senior nursing students from baccalaureate programs completed a ten week Work-Study Program in Cancer Nursing cosponsored by NCI/CC Nursing Department and the American Cancer Society. Student evaluations on completion of the program indicated a degree of high satisfaction with the program. Students of previous summers began to apply for positions with the Clinical Center Nursing Department.

11. Renovations were completed in two patient care areas, the Outpatient Nursing Service and the 7 East Coronary Care Room.

12. Significant personnel accomplishments included:

    A. Miss Alice Duncan, Chief Cancer Nursing Service, began serving on the AD HOC Review Committee of the Cancer Control Program, National Cancer Institute.

    B. Miss Janet Lunceford, Instructor, Education and Training Unit, was appointed nurse consultant, Service and Rehabilitation Board Committee of the American Cancer Society.

C. Miss Vernice Ferguson, Chief, Nursing Department, chaired the Commission on Nursing Services of the American Nurses' Association. She was the Co-chairman of the American Nurses' Association and American Hospital Association Liaison Committee comprised of nursing service directors and hospital directors appointed by the parent organizations. In February, she participated in the Tenth Invitational Conference on Standards for Quality Care at the University of Wisconsin, Madison, and in March, moderated the 2-1/2 day interdisciplinary conference of AHA-ANA on quality assurance for patient care.

D. Publications

Ferguson, V.: Nursing - Annual Administrative Reviews. Hospitals, J.A.H.A. 48: 169-173, 1974.

Miss Susan Hubbard, Chemotherapeutic Nurse with NCI projects - papers presented at American Society of Clinical Oncology, Inc., Houston, March 1974:

CLINICAL ANTITUMOR ACTIVITY AND TOXICITY OF STREPTOZOTOCIN. P. Schein, M. O'Connell, J. Blom, S. Hubbard, I. Magrath, P. Bergevin, P. Wiernik, and V. DeVita (Abstract)

PERITONEOSCOPY (PER): A VALUABLE TOOL FOR THE INITIAL STAGING AND "SECOND LOOK" IN OVARIAN CARCINOMA. S. Rosenoff, R. Young, C. Bagley, T. Anderson, P. Schein, B. Chabner, S. Hubbard, V. DeVita (Abstract)

PROBLEMS

1. Patient escort and messenger services were inadequate to meet the increasing demands resulting in delays in care and often poor utilization of personnel based on level of personnel available to accomplish the task.

2. A significant amount of nursing time was spent in paper - pencil tasks, the majority of which could have been performed through a computerized hospital information system. (Exhibit 5).

3. Telephone service was problematic. Requests were increasing in frequency to correct failures in patient care areas and in Nursing Department offices which receive calls from personnel scheduled for duty who are unable to work. Problems with telephones were a cause for delay in services rendered and a continuing source of irritation due to time spent in corrective action.

4. Space was needed for the storage of equipment in this building which must be readily accessible on call. Storage space on the nursing units seldom accommodated the increasing pieces of apparatus available in recent years and considered essential for nursing care. In addition, space was needed for offices of key personnel such as instructors and clinical nurse experts, as well as conference room and counseling areas within or close to nursing units.

5. Staff with prolonged periods of illness or physical limitations which inhibited their functioning at desired levels during peak work periods was a major concern. Achieving a balance of distribution among services or finding appropriate resolutions for disposition when staff could no longer cope with the stress and physical demands of a clinical research setting was a significant management problem. Personnel ceilings often cause this problem to be recognized. Unit clerk recruitment and retention was of concern. Recruitment and retention were inadequate to maintain a unit clerk per nursing unit.

6. The lack of involvement of Nursing Department personnel in decisions affecting nursing services to patients and normal volunteers in the preliminary discussion and planning stages including program goals, staffing requirements, construction, renovations, and equipment impeded significantly planning, programming, and budgeting in an organized and systematic manner within the department.

RECOMMENDATIONS

1. That endorsement of a centralized Clinical Center patient escort-messenger service be considered or an effective alternate posed.

2. That the Chief and Deputy Chief of the Nursing Department be included in the initial planning, decision making and policy development that affect nursing care to patients and normal volunteers and their related impact on nursing personnel.

3. That favorable consideration be given to the proposal for implementing a Clinical Center-wide computerized patient information system.

4. That heightened effort be directed toward improving communications and more effective working relations between the nursing staff and physicians who conduct research and provide medical care.

TABLE 1

Staffing Data - Nursing Department

	July 1973	March 1974
Total number of positions	523	529
Total number of positions filled	534	522
Total number of vacancies	-11	7
Administrative		
Total number of positions	59	59
Total number of positions filled	57	58
Total number of vacancies	2	1
Nurse Clinicians		
Total number of positions	12	14
Total number of positions filled	10	13
Total number of vacancies	2	1
Staff Nurse		
Total number of positions	209	210
Total number of positions filled	219	229
Total number of vacancies	-10	-19
Practical Nurse		
Total number of positions	80	80
Total number of positions filled	56	56
Total number of vacancies	24	24
Technical Positions		
Total number of positions	9	12
Total number of positions filled	12	13
Total number of vacancies	-3	-1
Nursing Assistant		
Total number of positions	108	108
Total number of positions filled	125	105
Total number of vacancies	-17	5
Clerical		
Total number of positions	46	46
Total number of positions filled	55	48
Total number of vacancies	-9	-2

TABLE 2

Nursing Department Staff In School

Total 66

Position	Full Time	Part Time
RN's	1 - LWOP	17
LPN's	1	9
NA's	11	12
Unit Clerk	4	4
Secretaries	0	3
Others:		
Health Technician	0	1
Heart & Lung Technician	0	1

Total Number of above in:

Stride Program

NA & LPN	9

Upward Mobility

NA & LPN	5
Health Technician	1
Secretary	1

Sub Total 16

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NUTRITION DEPARTMENT

OBJECTIVES

The major objective of the Nutrition Department during FY 1974 was to provide the nutritional requirements for continuing clinical research programs of the various institutes, to adapt and meet the needs of new studies, and at the same time provide quality food service to all patients. Technical and professional dietary services were requested by each of the nine institutes throughout the year.

In addition, the Nutrition Department professional staff continued to provide consultation to dietitians throughout the United States and abroad, in metabolic research and therapeutic research dietetics.

CONTRIBUTIONS TO THE CLINICAL RESEARCH PROGRAM

Because of the research mission of the Clinical Center, the role of its Nutrition Department is necessarily unique. The department contributes to the research programs by control of patient dietary intake as ordered by research investigators and by provision of precise and complete patient intake data to investigators.

It is interesting to note that the majority of the institutes had diet orders that involved the control of one or more nutrients, some in wider variety than others--some used for research purposes and some for therapeutic purposes.

Diet therapy was used to assist the physician in treating the patient for a specific disease or in helping the patient adjust to a disease or poor surgical condition.

Individually calculated diets were provided to meet physicians' orders and patients' cultural and food preferences. New patients were interviewed by dietitians to assure that their food preferences were allowed in their diets. The number of diet changes requested for individual patients continued at a high rate on nearly every institute service. There ranged from 72 to 96 diet changes each day. Very ill patients were visited before each meal by the Nutrition Department personnel and encouraged to eat. The department felt strongly the inherent responsibility of a food service department to boost the morale of the patient, and in so doing, contribute to the success of all research programs.

In addition to direct patient care, other services were provided. The Chief of the Patient Dietetic Service worked with the staff of the National Heart and Lung Institute to revise the Physicians Handbook for the Dietary Management of Hyperlipoproteinemia, and in the publication of the five booklets for patient instruction entitled:

Diet 1 - For Dietary Management of Hyperchylomicronemia
Diet 2 - For Dietary Management of Hypercholesterolemia
Diet 3 - For Dietary Management of Hypercholesterolemia with Endogenous Hyperglyceridemia
Diet 4 - For Dietary Management of Endogenous Hyperglyderidemia
Diet 5 - For Dietary Management of Mixed Hyperglyceridemia

The Chief of the Patient Dietetic Service continued to serve as a consultant to the National Heart and Lung Institute at site visits for evaluating current lipid programs; and also served as a member of the Advisory Board for the Lipid Research Clinic for the National Heart and Lung Institute.

ACCOMPLISHMENTS, CHANGES, AND IMPROVEMENTS

Twelve floor kitchens, a "Laminar Flow" service kitchen, the main kitchen, and 3B (National Cancer Institute) metabolic unit operated the full 12 months of FY 1974. Plans were made to combine into one unit on the 8th floor the three metabolic kitchen units that have been operating in the Clinical Center for a number of years. This unit is being remodeled to service 14 balance studies: 10 for the National Heart and Lung Institute, 2 for the National Cancer Institute, and 2 for the National Institute of Arthritis, Metabolism, and Digestive Diseases. During FY 1974, two of the metabolic units (9 metabolic and 8 metabolic) were closed for one month for staff vacations. This was done to prevent errors in the preparation of balance studies due to the staff changes.

In FY 1974, the Nutrition Department served 297,956 meals, and provided the following services for investigative purposes:

	Per Day	
	Maximum	Minimum
Patients with fluid intakes controlled	45	27
Patients with food intakes calculated	41	22
Patients with food intakes measured and replaced	74	50
Patients with trays held for tests to be completed	84	49

The department gave individual discharge and follow-up diet instruction on 229 occasions.

Operation of a main kitchen to service the research programs required the provision of a wide variety of food items. To assure the validity of the nutrition information furnished the investigators, the main kitchen continued to operate with standardized recipes for each menu item and detailed specifications for each food item purchased.

Limited food items were provided to other departments and sections of the Clinical Center (Blood Bank, Patient Activity, Spiritual Ministry, Admissions and Follow-up, Employee Health, Occupational Therapy, Plasmapheresis Service, and the National Cancer Institute Radiology Service).

The department operated this year for the first time under the terms of the negotiated agreement between NIH and the AFGE Lodge 2419, dated June 1973.

Department personnel actively participated in the NIH Affirmative Action Plan in the following manner:

1. One staff member served as Clinical Center EEO Counselor throughout this year, and a second served four months before she accepted a position with Financial Management.

2. Thirteen staff members participated in the Adult Education Classes.

3. Six staff members participated in the Upward Mobility Program as students in the Federal City College program at NIH.

4. One staff member enrolled for an Associate Degree Program at Montgomery College. Tuition was supported by the Nutrition Department.

5. One staff member was trained in a Laboratory Aide Program, Phase 3, sponsored by the National Cancer Institute.

One trainee position was allocated to the Nutrition Department for the purpose of training a cook in FY 1973-74. The individual was selected and an 18-month cook trainee program was developed and initiated. The department awarded a certificate of completion in May 1974, at which time the individual assumed the responsibility of full cooking duties in the Clinical Center to replace a position vacated by a cook six months earlier.

Small unit meetings were held each month for discussion of employee concerns as well as management concerns. On the advice of the employees, the information meetings for the entire department were continued as a two-way communication program and the entire department met once every other month. The agendas for these meetings were planned by the nonprofessional staff. Each session included a health movie selected by a representative committee of the department.

The department continued to investigate various convenience food items that might be of use in the Clinical Center. A change in menu pattern was initiated. Previously the Nutrition Department operated with four 4-week cycle menus for the year. One cycle each for spring, summer, fall, and winter. Because of the decrease in typing staff and the need to implement a more elaborate menu in preparation for centralized tray service, the department undertook to develop a 4-week set of menus for approximately 14 diets that may be repeated every four weeks throughout the year. Plans were made to put these menus in operation in Fiscal Year 1975.

MAJOR PROBLEMS ENCOUNTERED

Limited staffing and absenteeism due to illness, court leave, jury duty, the NIH program for Upward Mobility, Adult Education Program, EEO responsibilities, and union duties, accounted for the following:

	Maximum	Minimum
Number of meals served per labor hour worked	1.1	.83
Number of meals served per labor hour paid	.91	.70

The figures indicate an average of 21% of scheduled labor hours was not available on a day-to-day basis.

It was determined at the beginning of 1974 that the Nutrition Department would convert from decentralized service to centralized tray food service. Plans for this were announced to the department staff and this in some way lowered the morale of the entire department.

A commitment was made to the AFGE Lodge 2419 to appoint temporary employees to fill any vacancies that occurred before the change was made. This presented considerable problems not only in staffing, but also in maintaining high standards of service.

Total cost figures were not available to the department forthis year due to changes in financial management staff. It is evident that there is considerable increase in patient ration costs. Increases in wage schedules of all employees, as well as generally spiraling costs of raw food and other supplies, were the contributing factors. Limited utilization of two of the three metabolic kitchen units for balance study diets also contributed to some extent.

The fact that the equipment in the Nutrition Department, particularly in the main kitchen, is nearly 26 years old began to present a number of problems. The most recent was in December 1973--the total and complete breakdown of the 2300 cubic ft. deepfreeze unit. About $15,000 worth of food had to be relocated on only three or four hours' notice. Four months elapsed before the Engineering Department was able to get the freezer back into working order.

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PHARMACY DEPARTMENT

OFFICE OF THE CHIEF

The Office of the Chief was responsible for the overall management and administration of the Pharmacy Department, including the procurement of drugs and medical supplies for the individual Services.

Effective July 1, 1973, a monthly reporting of statistical data, for the methods of procurement authorized under the Delegated Procurement Authority for all Decentralized Procurement Activities (Pharmacy Department included) became mandatory. This report required that all purchase documents be sorted into the following types of transactions:

1. Open market orders placed with small business and other than small business for less than and more than $100.

2. Orders against GSA (FSS) and/or VA contracts placed with small business and other than small business and forwarded with a completed report to the Procurement Branch, OAS. The compilation and reporting of this information requires approximately 17 hours per month.

Continued emphasis on indefinite delivery type contracts has served to simplify and reduce paperwork normally required when separate purchase documents are prepared for each order placed.

Purchase documents are currently prepared primarily on a Flexowriter typewriter. This machine is now essentially obsolete from the standpoint of obtaining reliable service and must be replaced. Efforts are now being made to find a more efficient replacement which will likely be a typewriter featuring a memory storage capacity. The most formidable problem to overcome in the anticipated system change will be the conversion of information currently contained on edge punch cards to a new media such as magnetic tape.

The appointment of a new Chief of the Pharmacy Service was accomplished with a minimum loss of supervisory continuity.

PHARMACY SERVICE

Responsibilities

a. Filling drug requisitions for inpatients.

b. Filling prescriptions for both inpatients and outpatients.

c. Extemporaneous compounding of all intravenous additive solutions used in the Clinical Center.

d. Bulk compounding of noncommercially available formulations of drug products.

e. Maintaining investigational drug dispensing records.

Pertinent Statistics

a. Total number of bottles of sterile intravenous additive solutions compounded increased 14.2 percent over the previous year.

b. The number of requests for Officer of the Day service (which included each intravenous solution prepared) increased 23.4 percent over the previous fiscal year.

c. The number of mailout prescriptions increased 20.4 percent over the previous fiscal year.

Major Problems and Changes

The Drug Enforcement Administration transferred Amobarbital, Secobarbital, Pentobarbital, their combinations and salts, from Schedule III to Schedule II of the Comprehensive Drug Abuse Prevention and Control Act of 1970. This transfer required considerable time and effort on the part of Pharmacy Service. Also, the Food and Drug Administration required that all prescription drugs, in oral dosage form, be dispensed in safety containers by April 16, 1974.

Accomplishments and Significant Contributions

The implementation of the duplicate Doctor's Orders form system was expanded to include all of the outpatient clinics. A special tab indicating "Doctor's Orders" was placed in all outpatient charts to facilitate use of these sheets by the clinic physicians.

The intravenous additive unit obtained another IBM magnetic card Selectric typewriter to aid in preparing the labels accurately and efficiently. Workload in the I.V. additive unit increased 14.2 percent over last year and, consequently, the number of labels prepared increased.

The procedure manual was updated and is in the process of complete revision.

Pharmacy Service initiated training of another pharmacy technician trainee in FY 1974.

A new I.V. Additive Drug Information Book was prepared and is in the process of publication.

The data base necessary to compile special drug lists (Drug Product Information file) was completed in FY 1974. The Pharmacy Catalog will be produced from this data followed immediately by other lists such as drugs according to BNDD classification, drugs according to therapeutic class, etc.

A Unit Dose Drug Distribution Pilot Study was initiated for Nursing Unit 3-East. This pilot study was undertaken with the objective of obtaining better patient records for investigational drugs used on a Mental Health Unit. Up to this time the Mental Health Units were the only Units in the hospital that did not receive inpatient medication on an individual patient basis. Hopefully, this pilot program will serve as a model of drug distribution for the other Mental Health Units and, possibly, the entire hospital.

A manual was designed for the implementation of a Drug Information Service. The main objective of the manual was to aid in providing general information on drugs and in recommending specific solutions to patient related problems.

Proposed Future Objectives

During FY 1975 the Service will further expand the Unit Dose Pilot Program to include all of the Mental Health Units. This will provide the Pharmacy with complete records for investigational drugs for every nursing unit in the hospital. Also, we plan to examine the pilot program after a period of time and determine its applicability to other types of nursing units (e.g., Cancer, Neurology, etc.) with the objective of initiating a unit dose distribution system throughout the hospital, if feasible.

We plan to completely redesign the outpatient dispensing area specifically with regards to work flow, drug stocking, distributing drugs to the patient, expansion of the consultant role of the pharmacist, and the use of technicians or clerks to perform nonprofessional tasks (e.g., typing and filing).

The scope of service provided by the Drug Information Service will be increased. Several factors will be considered including staffing, use of a specific phone line, hours of service, etc.

The hospital residency program will be developed and modified using the knowledge obtained from the first year of the program. Further considerations will be the number of residents feasible, types of hospital experience desirable, etc.

The staffing patterns of Pharmacy Service, especially the Intravenous

Additive Unit, will be reviewed and different delivery times and staffing arrangements investigated with the objective of obtaining the most efficient service possible.

PHARMACEUTICAL DEVELOPMENT SERVICE

Responsibilities

a. Registration and control of all investigational drugs.

b. Formulation and development of clinical dosage forms.

c. Assay and Quality Control of investigational drugs and formulated products used for patients.

d. Preparation of Analytical Data Sheets for the FDA and Bureau of Biologics.

Pertinent Statistics

a. 22.2% increase in number of units formulated, developed, and issued.

b. 1.4% decrease in work requests.

c. 7.6% increase in investigational drugs processed and 6.3% increase in new investigational drugs processed.

Major Problems, Changes, and Improvements

The slight decrease in work requests reflects the change in the process of registration of commercially available cancer drugs obtained from the National Cancer Institute. These drugs are no longer handled as investigational drugs and hence are no longer processed. The increase in work units formulated and developed reflects larger batches of capsules being produced on our automatic capsule filling machine for utilization in the taste studies conducted by NHLI.

As anticipated in Fiscal Year 1973, the Cholestyramine Type II Coronary Intervention Study increased to approximately one-fourth of the total number of patients in the study.

Pharmaceutical Development Service had to find additional space to store the drug for this study. This warranted a rearrangement of storage space for investigational drugs and has resulted in the drug being stored in, and retrieved from, two different places. Thus, efficiency had to be sacrificed for the sake of absolute need.

Plans were made to reformulate the drugs used in NIMH single-blind studies into pink, opaque capsules. This change was necessitated by the fact that some of the active drugs could not be easily masked or "blinded" by the usual pink, transparent capsules. This project involved a great deal of time with respect to actual manufacturing, as well as relabeling.

A high-speed liquid chromatograph has been ordered. This piece of equipment will significantly enhance the analytical capabilities of the Pharmaceutical Development Service.

Accomplishments and Significant Contributions

The Pharmaceutical Development Service conducted a pilot study to establish the feasibility of unit-dose drug distribution system on 3-East. The data obtained was then utilized by Pharmacy Service in the final planning of the unit-dose drug distribution project on 3-East.

The Pharmaceutical Development Service prepared a stable parenteral of 6-Hydroxydopamine (a trihydroxy phenethylamine). The previous preparation was more unstable in solution and immediately began to decompose when reconstituted. The Pharmaceutical Development Service was able to overcome this problem by the addition of an anti-oxidant and buffers, and by lyophilizing the formulated product. The freeze-dried new product is stable for two hours after reconstitution. Prior to the development of this formulation, the product required reconstitution and sterile filtration immediately before administration.

Last year, the Pharmaceutical Development Service, working with the National Institute of Child Health and Human Development, reported on the reaction between tryptophan in hyperalimentation solutions and the commonly used antioxidant sodium bisulfite. Six ninhydrin-positive conversion products were detected from this reaction, as evidenced by amino acid analysis. During the fiscal year Pharmaceutical Development Service, working with NCI Surgery Branch and NICHD, conducted animal toxicity studies on these breakdown products. It was noted that patients receiving hyperalimentation therapy had elevated liver enzymes. A possible explanation is that one or more of the breakdown products of the tryptophan-bisulfite reaction may be toxic to the liver. The results of these studies are presently being evaluated and will be published at a later date.

The editor of Drug Intelligence invited the Pharmaceutical Development Service to initiate a column on investigational drug information patterned after the Investigational Drug Fact Sheets used in the Clinical Center for nurses, pharmacists, and physicians.

The Diagnostic Radiology Department, Clinical Center, had requested that the Pharmaceutical Development Service find a suitable replacement for Direct Sky Blue Injection which had been withdrawn from commercial sale by Wyeth Laboratories. This was the only dye for lymphography approved by FDA. The Diagnostic Radiology Department requested preparation of an injection of Alphazurine 2G, a commonly used dye, to be used as a replacement for Direct Sky Blue. The Pharmaceutical Development Service, working with the Laboratory of Chemistry, NHLI, discovered that there was no suitable source for the Alphazurine 2G. It was found that three different compounds and one mixture were available, all labeled as "Patent Blue Violet" (also called Alphazurine 2G). All the dyes contained various impurities rendering them unsuitable for human use. The Diagnostic Radiology Department was

notified of our findings and the data is presently being written up for publication.

A scientific exhibit entitled "Investigational Drug Development" was prepared and shown at the Ninth Annual Meeting of the USPHS Professional Associations.

Proposed Future Objectives

Plans have been made to package all investigational drugs in unit-dose. Such an undertaking is in keeping with the main objectives of the Pharmacy Department--i.e., to move toward a total individual patient medication system which will permit better control and accountability of all drugs.

We also plan to maintain investigational drug records on a Wylber type system which will have memory storage capacity and easy retrieval.

A major effort will be to collaborate with physicians and clinical pharmacologists in evaluating "in-vivo" the dosage forms developed and formulated by Pharmaceutical Development Service in order to improve their bioavailability or therapeutic effectiveness.

CENTRAL STERILE SUPPLY SERVICE

Responsibilities

a. Processing and issuing sterile and clean supplies used to administer medications and treat patients and in research projects and developmental activities in patient care areas.

b. Sorting, cleaning, and inspecting reusable supplies and instruments.

c. Assembling and wrapping trays and sets.

d. Processing linen for use in the preparation of sterile surgical packs and for issue as clean surgical linen.

e. Sterilizing packs, trays, sets, instruments, utensils, etc.

f. Issuing clean and sterile commercially available disposable supplies and reprocessed supplies and instruments.

Pertinent Statistics

a. The number of requisitions filled increased 2%, items issued increased 0.4%, fluids issued increased 13%, and trays and sets prepared increased 32%.

b. Turnover rate of personnel was 6%.

c. Six full-time, permanent employees in Central Sterile Supply Service attended some type of schooling or Upward Mobility program, representing

an average of 118 man-hours lost per month by this Service.

Major Problems and Changes

While the workload increased, the number of employees assigned to Central Sterile Supply Service decreased (28 full-time and one part-time employee) creating an additional burden on the remaining employees. According to a recently conducted resource monitoring study, 31 full-time employees are required to perform the functions of Central Sterile Supply Service.

Serious problems were encountered in the procurement and receipt of supplies for the following reasons:

1. Back orders due to strikes and certain energy crisis related shortages of raw materials used in manufacturing processes.

2. During the height of the energy crisis the lead time in receipt of supplies frequently increased from 2 - 3 days to 10 - 14 days. This was generally due to freight carriers holding and combining shipments to make full capacity truckloads.

The most direct solution to these problems would have been to increase inventory levels to compensate for extended re-supply lead times. This was not possible, however, since no storage space was available for additional inventories.

All intravenous catheters manufactured by Deseret Pharmaceutical Company were recalled during the month of February because of sterility problems. Because Deseret Pharmaceutical Company supplies a major portion of the national market of intravenous catheters, a severe shortage of these catheters developed requiring Central Sterile Supply Service to re-process and re-sterilize all questionable intravenous catheters on hand. This was a major undertaking. However, it was accomplished with minimum interruption of routinely provided services.

Refusal of many physicians to use plastic disposable syringes for arterial blood gas determination created a problem of processing glass syringes for this purpose. The problem was resolved by purchasing an arterial blood gas determination kit containing a disposable glass syringe.

Accomplishments and Significant Contributions

The following operating procedures were either written or revised: Cleaning of dumbwaiters, cleaning of sterilizers, biological indicator testing for both ethylene oxide gas and steam sterilizers, and a "hand-carry" system for issue of expensive needles. The pictorial tray and set catalog was also completely updated and revised.

The use of a color coding system utilizing autoclave tape for quick detection of expiration dates was expanded throughout the Clinical Center.

A feasibility study of an exchange cart delivery system for medical supplies in the Clinical Center was conducted by Hamilton Industries, Two Rivers, Wisconsin.

A report of the study outlined a system operation which included the recommendation that a pilot program be initiated on 9-West and 8-West (both units nave partitions in their utility rooms to separate the clean area from the dirty area). In addition, the report included space utilization drawings, equipment recommendations by specific nursing unit location and use, and an equipment summary list for the total project.

The recommendations made by Hamilton Industries have been accepted by Pharmacy. However, staff shortages prohibit wuch an undertaking at this time. It should be noted that a "modified" cart exchange system does exist on 2 nursing units, 10-North and 10-East, and that the system is being revised to comply with the recommendations for a "true" cart exchange--i.e., all items utilized on the units should be used from carts and no supplies are to be removed and stored elsewhere. (The exchange cart system is a distribution system using mobile carts of modular design and function to receive, transport, store, and dispense all types of supplies. These carts contain 80-90% of the supplies used on the unit and are exchanged, with a totally replenished cart, every 24 hours, 7 days a week.)

Request for a "prime vendor" contract was submitted to the Materiel Management Procurement Branch. Such a contract would enable Central Sterile Supply Service to order most open market supplies from one vendor, thereby eliminating single purchase orders and a tremendous amount of paper work. The "prime vendor" would also be required to store adequate supplies of all contracted items, thus some of the storage space problems in Central Sterile Supply Service would be lessened.

Extensive work was done to implement disposable linen in the operating rooms. If progress continues at the present rate, by the end of next year the use of reusable biopsy packs and gowns will have been eliminated in the operating rooms. At the present time, Central Sterile Supply Service prepares 600 biopsy packs, 684 single gowns, and 180 gown packs per year, representing approximately 500 man-hours of labor.

Proposed Future Objectives

An exchange cart delivery system for all medical supplies used in the Clinical Center will be introduced.

The various job functions in Central Sterile Supply Service will be re-evaluated to improve efficiency and upgrade job responsibility.

Traffic patterns will be studied with reference to contamination control within Central Sterile Supply Service.

Operating procedures manual for all areas within Central Sterile Supply Service will be developed.

Inservice Education and structured curriculum for Central Sterile Supply Service employees will be initiated.

PROFESSIONAL ACTIVITIES

Dr. Joseph F. Gallelli was a member of the United States Pharmacopeia Committee of Revision; the Chemotherapy Contract Review Committee; and the Task Force on Group Purchasing, Maryland Hospital Association, Inc., Baltimore, Maryland. He was also Contributing Editor, Drug Intelligence, and reviewer for the Journal of Pharmaceutical Sciences.

Members of the department attended various professional meetings throughout the year.

Troy D. Ballew attended the Seminar, Sterility and Its Problems, New York City, March 1974, and Intensive Pharmacy Seminar III, College of Pharmacy, University of Oklahoma, Norman, Oklahoma, June 1974. He also attended an Institute on Principles of Hospital Pharmacy Management, sponsored by the American Society of Hospital Pharmacists, Saddlebrook, N. J., May 1974.

Thomas H. Hodges attended an Institute on Principles of Hospital Pharmacy Management, sponsored by the American Society of Hospital Pharmacists, Saddlebrook, N. J., May 1974, and was awarded Public Health Service Commendation Medal, September 1973.

Michael A. Rempfer attended a seminar on hospital pharmacy, sponsored by Eli Lilly & Co., Williamsburg, Virginia, October 1973.

Larry M. Kleinman was named reviewer for the American Journal of Hospital Pharmacy.

Paul K. Hiranaka attended a course on Biopharmaceutics and Bioavailability, University of Wisconsin, Madison, Wisconsin, April 1974.

PUBLICATIONS

Kleinman, L. M., Tangrea, J. A., Gallelli, J. F., "Particles in Parenteral Solutions," Arch Pathol, 96:144, 1973.

Kleinman, L. M., Tangrea, J. A., Gallelli, J. F., Brown, J. H., and Gross, E., "Stability of Solutions of Essential Amino Acids," Am. J. Hosp. Pharm., 30:1054-1057, 1973.

Kleinman, L. M., Tangrea, J. A., and Gallelli, J. F., "Investigational Drug Information," Series 1, Drug Intell. Clin. Pharm., 8:25-26, 1974.

Kleinman, L. M., Tangrea, J. A., and Gallelli, J. F., "Control of Investigational Drugs in a Research Hospital," Am. J. Hosp. Pharm., 31:368-371, 1974.

Pharmacy Department Statistical Data

	1970 (Fiscal)	1971 (Fiscal)	1972 (Fiscal)	1973 (Fiscal)	Est. 1974 (Fiscal)
PHARMACY SERVICE					
Outpatient prescriptions	39,052	41,667	48,642	51,840	54,633
Inpatient prescriptions	2,741	3,068	5,366	3,087	3,093
I.V. additives (bottles)	72,982	*47,258	58,113	79,793	91,102
Drug vials reconstituted by I.V. Additive Unit	62,876	54,110	38,362	34,633	38,277
Other items	256,424	256,998	242,685	240,859	258,459
Prepackaged items	41,191	44,436	39,880	24,658	27,417
PHARMACEUTICAL DEVELOPMENT SERVICE					
Units developed and issued	174,079	381,404	656,912	550,304	672,399
Requests processed	1,146	1,414	1,333	1,193	1,177
Investigational drugs registered	500	412	687	523	563
New investigational drugs processed	101	100	94	96	102
PHARMACY OFFICER OF THE DAY					
Number of requests for service	7,158	4,850	5,761	9,133	11,268
MAIL-OUT PRESCRIPTIONS					
Number of prescription packages mailed	828	779	861	1,067	1,284
CENTRAL STERILE SUPPLY SERVICE					
Requisitions filled			17,996	17,759	18,053
Items issued			-	901,496	905,573
Trays and sets prepared			-	21,566	28,812

*Decrease in number due to the filling of multidose I.V. bottles as opposed to single dose bottles done in previous years.

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

REHABILITATION DEPARTMENT

CONTENTS

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

REHABILITATION DEPARTMENT

INTRODUCTION

During the period July 1, 1973, through June 30, 1974, as in previous years, the Rehabilitation Department performed its basic function of patient treatment, using recognized, effective measures of physical and occupational therapy. Again, a large number and wide variety of tests and measurements were carried out for Institute physicians primarily in evaluation of functional ability and progress, but also in connection with diagnosis and determination of effectiveness of drug and other therapy.

SERVICES PROVIDED BY THE REHABILITATION DEPARTMENT

Physical Therapy Service

1. Tests and measurements
   - Manual muscle evaluation
   - Joint range of motion measurements
   - Electrodiagnostic testing, including chronaxie measurements and strength-duration curves
   - Vital capacity determinations
   - Pulmonary function studies (Collins Respirometer)
   - Progressive resistance exercise evaluation
   - Girth, length, and volumetric measurements
   - Quantitative muscle testing
   - Extremity and spinal joint evaluation
   - Posture evaluation
   - Self-care evaluation

2. Heat, including:
   - Superficial -- hot packs, paraffin bath, whirlpool
   - Deep -- shortwave diathermy, microwave, ultrasound
   - General body heat -- Hubbard tank

3. Therapeutic exercise:
   - General exercise -- passive, active, assistive, and resistive
   - Muscle reeducation and facilitation techniques
   - Joint range of motion and articulation
   - Ambulation training
   - Pre- and postoperative thoracic surgery program
   - Pre- and postoperative orthopedic surgery program
   - Training in self-care activities
   - Breathing exercises

4. Miscellaneous:
   - General and local application of ultraviolet light
   - Bronchial drainage
   - Cervical and pelvic traction
   - Application of splints and casts to maintain joints in good anatomical and functional position
   - Instruction to patients and family in home-care program (application of heat, exercise, use of self-care aids)
   - Fitting and dispensing canes and crutches
   - Prescription and procurement of correct shoes, braces, corsets, splints, and prostheses
   - Measurement for Jobst compression garments

Occupational Therapy Service

1. Physical and functional restoration:
   - Maintain or regain joint range of motion
   - Increase muscle strength
   - Improve coordination
   - Develop work tolerance
   - Train in activities of daily living
   - Train in development of substitute skills (visual loss)
   - Train upper extremity amputee in use of prosthetic device
   - Make splints and provide self-care aids

2. Evaluation and testing:
   - Activities of daily living, including self-care and homemaking evaluation
   - Evaluate children's developmental levels
   - Record patient's behavior patterns for use in evaluation of patient's reactions in specific research studies
   - Pre- and postoperative performance tests for stereotaxic patients
   - Periodic functional activity tests of patients on drug studies
   - Rating scale of function in depressed patients

3. Psychological adjustment:
   - Substitute constructive interests for the insecurity and anxiety which may develop during the research studies
   - Provide normal developmental learning experiences for children
   - Promote relaxation and acceptance of bed rest
   - Aid in resocialization

4. Psychiatric adjustments:
   - Provide activities in relation to needs of research studies and report observations of patient's behavior
   - Aid patient in making acceptable social adjustment
   - Aid patient in preparing for community living and carrying employment and home responsibilities
   - Place patient in industrial therapy program as a step toward post-hospital employment

5. Prevocational exploration:
   Explore skills, interests, and work habits
   Increase work tolerance
   Maintain special skills required by patient's job
   Make recommendations on patient's performance and aptitudes for use in vocational planning

Office of the Chief

1. Evaluation of Institute patients referred for physical medicine and rehabilitation; prescription and supervision of therapy
2. Speech consultation

PROGRAM DEVELOPMENT AND CHANGES

Patients with parkinsonism, dystonia musculorum deformans, Huntington's chorea, and seizure disorders on the L-Dopa study by NIMH were evaluated and treated in Physical and Occupational Therapy Services. Reports of evaluations and treatments were periodically reviewed by the NIMH Senior Investigator.

Members of the Occupational Therapy Service continued to be called as consultants to the nursing staff on NINDS in making adaptations of protective helmets for certain children with cerebral seizures and other items needed for better management and care of individual children with special problems.

Evaluation and treatment of patients with cystic fibrosis included pulmonary function tests, bronchial drainage, breathing exercises, posture exercises, and instruction to parents or patients in a home treatment program. The total program included use of slant boards and hand vibrators which allowed the pre-teen and teenage patients to apply their own treatment at home and to be less dependent on others.

We continued to use plaster of paris casts to correct and/or prevent joint deformities, primarily with the rheumatoid arthritis patients. We also used isoprene to make various types of splints (primarily functional splints) for neurology patients, and cosmetic shoulder splints for patients with fore-quarter amputation.

Pulmonary function tests continued to be performed on patients with a variety of diagnoses. These included myasthenia gravis, muscular dystrophy, Parkinsonism and a number of other neurologic conditions; histoplasmosis, cryptococcal meningitis, fever of unknown origin, and a number of other infectious conditions; and patients who had thoracic and abdominal surgery.

Pre- and postoperative evaluations and treatment of patients with spinal arteriovenous malformations were carried out. The preoperative program included manual muscle evaluation, quantitative muscle testing, and evaluation of functional abilities. Postoperatively, the program involved muscle reeducation and strengthening exercises, joint range of motion exercise, transfer activities, and when feasible, ambulation and gait training with or without assistive devices and braces.

Electromyography, measurement of nerve conduction velocity, and repetitive nerve stimulation have been suspended as services of the Rehabilitation Department due to physician shortage (only one M.D.), but are to be resumed when staffing permits.

Evaluation of effect of knee synovectomy in rheumatoid arthritis (long-term results), pursuant to protocol developed jointly with NIAMD, continued.

Quantitative muscle tests continued to be performed on patients with Sjogren's syndrome prior to and after they were placed on steroids to determine changes in muscle strength.

The Occupational Therapy Service continued to provide supportive programs to aid Laminar Air Flow Room patients in adjusting to their confinement. The longest period that a patient has remained in the Laminar Air Flow Room has been 18 months. Close coordination of Occupational Therapy with the other services was necessary to support the patient through this extended treatment time. Physical Therapy Service provided general exercises to maintain strength, endurance, and joint range of motion while patients were confined.

Both Physical Therapy and Occupational Therapy Services continued testing NINDS patients who had stereotaxic surgical procedures, using the revised abbreviated test forms previously developed.

The collaborative work with the school teacher for NIMH high school age patients continued. The Occupational Therapy staff supervised the home arts studies enabling patients to earn high school credit and integrating the school experience with the hospital milieu therapy.

Attendance by the Rehabilitation Department staff continued in interdisciplinary conferences on NIAMDD and NCI, increasing the effectiveness of the total patient care in these programs.

Mrs. Thelma Armstrong continued with the STRIDE program. On June 30 she was in her sophomore year at American University and will continue to spend 20 hours a week in class and 20 hours a week with the Physical Therapy Service at NIH, where training and work experience in physical therapy are provided.

The clinical affiliation with the University of Maryland has expanded to include junior students for 6-week clinical affiliations with Physical Therapy Service in the summer. Senior Maryland University students continued their 6-week winter clinical affiliation in Physical Therapy Service at the NIH, and a clinical affiliation with Quinnipiac College (Connecticut) was started on 3/25/74. During the past fiscal year, three senior and two junior physical therapy students from Maryland University have served clinical affiliation, plus one senior student from Quinnipiac College.

The Occupational Therapy Student Field Work Experience continued through FY 1973-74 with four students completing their assignment at NIH. The University of Pennsylvania, Wayne University, Boston University, and Columbia University sent students to us.

The STRIDE program had one student working on the Occupational Therapy staff. Miss Julie Ryan completed her summer semester working part-time and attending classes at American University as a full-time student.

The two rehabilitation films purchased by the Occupational Therapy Service, "Homemaker with Arthritis" and "Homemaker with the Use of One Hand," continued to be used for patient education. The film "Functional Anatomy of the Hand" by Dr. Robert A. Chase, purchased last year, was used in student and staff training by Physical Therapy and Occupational Therapy Service.

New Programs

Three members of the Physical Therapy Service staff have studied joint mobilization techniques and have put into clinical practice more effective techniques for evaluating joint dysfunction and for mobilizing joints which have limited range.

There has been a marked increase in postoperative mastectomy referrals, and a program to prevent or control postoperative edema has been instituted as well as an immediate postoperative joint mobilization program to prevent loss of shoulder range of motion.

Improved methods for handling problems of sensitive or painful feet have been instituted by use of thermoplastic molded cushioned innersoles used with high box shoes which have room to accept this inlay.

A general exercise area was set up for Parkinson's disease patients on 2-West nursing unit. In addition to specific therapy prescribed for individual Parkinson's patients, a group are given daily general exercises under the guidance of a physical therapist.

The Occupational Therapy Mental Health program which had to be cut back due to loss of personnel during the past two years, reestablished a program on 3-West. Miss Eleanor Stapin has redefined and rescheduled her program so that she was able to supervise programs on both 3-East and 3-West.

A community dinner was added to the 4-West occupational therapy program two evenings a month. Use of the community resources for shopping or dining was specifically planned to redevelop social skills, ability to pre-plan and decision making to aid the patients in their reentry to life outside the hospital.

A research project designed around a Rating Scale of Function in Depressed Patients drawn up by Mrs. J. Schreiber was started with 4-West personnel. The hypothesis being tested is that objective functioning (non-verbal) demonstrates mood change before effective functioning (verbal). This rating scale and the rating scale previously used by the 4-West personnel are the bases of comparison and correlation.

An occupational therapy student program for Masters level students was established at the request of Columbia University for their students. For a while this was expected to be limited to the occupational therapy mental health program. It will be a 4-month field experience, the weekly schedule being four full days in clinic and one free day for work on their independent studies.

Affiliation with Howard University was proposed for the 1975 occupational therapy student training. Initial planning will begin in the summer of 1974 at which time Mrs. Cynthia Smith will meet with the Howard University Curriculum Advisory Committee.

STAFF TRAINING

For Rehabilitation Department Personnel

1. In-service training for the Rehabilitation Department personnel included weekly viewing of videotapes prepared originally during in-service training for NINDS personnel. These covered a wide variety of subjects dealing with neurological conditions and disorders, testing and treatment of these patients.

2. Ms. Marsha Lampert attended a course in Philadelphia on "Diseases of Intervertebral Discs" from 10/7 to 10/10/73, sponsored by the American Academy of Orthopedic Surgeons.

3. Mr. Joseph Wilson, Medtronic, Inc., gave a lecture and demonstration to the Rehabilitation Department staff on the Neuromod Transcutaneous Nerve Stimulation (NEUROMOD TNS), a battery powered portable device designed to reduce or eliminate pain. The device was purchased by us and used on several patients with dramatic results.

4. Mrs. Mary Duncan attended a course on "Spinal and Extremity Joint Mobilization" in Denver, Colorado, 11/17 to 11/24/73.

5. Mr. Mario Salvanelli attended a 2-day seminar at the U.S. PHS Hospital in Carville, Louisiana, (2/6-7/74) on the "Management of Insensitive and Hypersensitive Feet."

6. Ms. Lampert attended a one-day course, "Helping Relationships with the Physically Disabled," at the Washington School of Psychiatry, Washington, D. C., on 3/22/74.

7. Mr. Lamont Smith talked to the staff on 3/22/74 giving the history of manual therapy and presenting a case history.

8. Mrs. Betty Spungen, occupational therapist, attended a workshop on "Learning Disabilities" at the Churchill School, New York City, 2/23/74. Assessment and treatment of children with perceptual motor dysfunction was demonstration.

9. Mrs. Judith Schreiber, occupational therapist, completed the two-part course, "Leadership Training Institute for Change Agents," presented by the American Occupational Therapy Association 11/29 to 12/1/73 and 3/28 to 3/30/74.

10. Mrs. Louise Bezdek and Mrs. Cynthia Smith attended a workshop, "Evaluation Procedures for Patients with Nervous System Disabilities," presented by the Long Island Occupational Therapy Association 3/30/74.

11. Mrs. Mary Duncan attended a one-day seminar on "Death and the Dying Patient," sponsored by the Metropolitan Mental Health Skills Center, Washington, D. C., 4/23/74.

12. Mr. Mario Salvanelli attended a 3-day seminar, "Rehabilitation Potentials of the Severely Handicapped," in Miami 5/10-12 1974, sponsored by the University of Miami School of Medicine.

13. Mrs. Mary Duncan and Mr. Harold Egbert attended a 3-day seminar, "Neckache and Backache," at Saddle Brook, New Jersey 6/13-15 1974, sponsored by the Committee for Continuing Education on Orthopaedic Medicine.

14. Ms. Marsha Lampert attended a 4-day seminar, "Adult Hemiplegia," in Boston 6/22-25 1974. The seminar was sponsored by the Education Committee, Massachusetts Chapter, American Physical Therapy Association.

By Rehabilitation Department Personnel

1. Monthly tours were conducted for new nursing personnel through the Physical Therapy and Occupational Therapy Service with orientation regarding program function and scope.

2. Several Normal Volunteers assisted in Occupational Therapy and Physical Therapy Service for the purpose of learning more about these professions before deciding to enter training for them.

3. Mr. Lamont Smith lectured to the senior physical therapy students at the University of Maryland on "Functional Evaluation of the Upper Extremity" on 9/25/73.

4. Mr. Lamont Smith, assisted by Mr. Harold Egbert, gave a talk and demonstration on "Mobilization Techniques of the Upper Extremity" on 11/1/73 to the senior physical therapy class at the University of Maryland.

5. Six-week clinical affiliations of senior physical therapy students from the University of Maryland were completed by Kim Skidmore, Karen Greenberg, and Sue Harrell, and by Bruce Klein from Quinnipiac College.

6. Six-week clinical affiliations of junior physical therapy students from the University of Maryland were completed by Kay Ginader and Joel Matuskey.

7. As part of the nursing education program, Mrs. M. Duncan lectured to the nursing personnel on posture and body mechanics, patient transfer techniques, braces, and the use of the Circ-o-lectric bed on 2/13/74.

8. Miss Janet Maynard, Wayne University and Mrs. Janice Sidman, University of Pennsylvania, completed their 3-month Student Field Work Experience in the Occupational Therapy Mental Health program. Mr. Tom Jacobson, Columbia University, began his 3-month affiliation in June, 1974.

9. Mrs. C. Smith was a participant at the conference on The Measurement of Outcome in the Care of Children with Chronic Illness co-sponsored by The Fogarty Internal Center and the NICHD 5/1-2 1974.

10. Ms. M. Lampert and Mr. M. Salvanelli represented the Physical Therapy Service in a series of five STRIDE meetings in which Career Development Seminars were presented to potential trainees 4/15 to 4/23/74.

11. Ms. Maggie Johnson, STRIDE trainee, began training with the Physical Therapy Service on 4/8/74.

PARTICIPATION OF PERSONNEL IN PROFESSIONAL ACTIVITIES OFF THE CAMPUS

1. Mr. M. Salvanelli served as Executive Secretary of the U. S. PHS Therapist Career Development Committee during FY 1974.

2. Dr. David M. Fried presented a paper on "Total Rehabilitation of the Rheumatoid Arthritis Patient" at a meeting of the Association of Military Surgeons in November 1973.

3. Mr. Lamont Smith and Mr. M. Salvanelli attended a meeting of clinical affiliates at the University of Maryland Physical Therapy School, Baltimore, Maryland, 12/14/73. Mr. Smith spoke to the clinical affiliates and faculty on the history of manual therapy and gave a demonstration of evaluation techniques.

4. Ms. M. Duncan made an on-site visit to the Nassau Hospital, NYC, 1/8/74, as a committee member for the Cancer Control Program, Rehabilitation Branch, to evaluate a government contract request.

5. Dr. D.M.Fried and Mr. M. Salvanelli presented a 2-hour lecture to the first year students at Howard University Medical School on 4/3/74 on the subject "Rheumatoid Arthritis" emphasizing the concept of total patient care.

6. Ms. Eleanor Stapin, occupational therapist, attended the Clinical Council Conference of the University of Pennsylvania and Temple University at Elizabethtown, Pennsylvania, 11/16/73.

7. Mrs. J. Schreiber spoke on "Occupational Therapy, Rehabilitation Through Responsibility" at Suburban Hospital Psychiatric Grand Rounds 7/27/73.

8. Ms. Stapin and Mrs. J. Schreiber attended the Columbia University Clinical Council meeting of Occupational Therapy School Clinical Coordination and Clinical Supervisors of affiliated programs in NYC 3/22/74. Representatives from the Clinical Training Centers met with the Directors of the Occupational Therapy curriculum of these schools to coordinate student training experiences.

9. Mrs. J. Schreiber attended the American Occupational Therapy Association meeting in Chicago, October 1973.

10. Mrs. J. Schreiber attended meeting of the American Occupational Therapy Association Registry Examination Committee to assist with framing questions regarding occupational therapy in psychiatry.

11. Mrs. B. Spungen, occupational therapist, attended the meeting of the Association for Care of Children in Hospitals on 2/12/74; the topic presented was "Behavior Modification and Its Application in the Hospital."

12. Mr. L. Smith attended an APTA Congress in Chicago 4/5-7 1974 convened to discuss education, training, and involvement of the emerging field of manual therapy with the American Physical Therapy Association.

13. Mr. L. Smith was a member of a panel discussion on the topic "Treatment of Knee Injuries" at the May monthly meeting of the Maryland Chapter of the American Physical Therapy Association.

14. Mr. H. Egbert and Mr. L. Smith taught a 6-hour lecture and laboratory class on the subject of "Extremity and Spinal Joint Evaluation and Assessment" at the University of Maryland Physical Therapy School on 5/6/74.

15. Mr. L. Smith attended the 5/11-12 1974 annual weekend instructional seminar of the New Jersey Chapter of the American Physical Therapy Association. He was a guest lecturer on the subjects of "Orthopaedic Physical Therapy in the United States to Date" and "Evaluation and Assessment of Joint Dysfunction in the Lumbar Spine."

STAFFING AND PERSONNEL CHANGES

Office of the Chief

1. Appointments: none

2. Retirements:

Dr. David M. Fried retired as Chief, Rehabilitation Department, on 1/24/74. Dr. Roger L. Black was appointed Interim Chief of the department on 1/25/74.

3. Resignations: none

4. FY 1974 Staffing Pattern:

Interim Chief, Rehabilitation Department	1
Assistant Chief, Rehabilitation Department	1
Secretary	1
	3

Physical Therapy Service

1. Appointments: none

2. Retirements: none

3. Resignations: none

4. Maternity leave:

Mrs. Donna Fisher, Commissioned Officer, went on maternity leave 1/31/74; she will return to duty 5/1/74. Mrs. Carol Wood came on duty as a WAE on 3/4/73 as a temporary replacement for Mrs. Fisher.

5. Transfers: none

6. FY 1974 Staffing Pattern:

Chief, Physical Therapy Service	1
Assistant Chief, Physical Therapy Service	1
Staff Physical Therapists	4
Physical Therapy Assistant	1
Secretary	1
	8

Occupational Therapy Service

1. Appointments: none

2. Retirements: none

3. Resignations: none

4. FY 1974 Staffing Pattern:

Chief, Occupational Therapy Service	1
Staff Occupational Therapists	3
Secretary	1
	5

PHYSICAL THERAPY SERVICE

Table 1: Statistical Report, by Month, Fiscal Year 1974 *

	No. of Working Days	No. of Different Patients Treated		No. of Patient Visits		No. of Treatments Given	
		IP	OP	IP	OP	IP	OP
July 1973	21	131	44	722	93	1328	144
Aug.	23	144	48	686	103	1190	206
Sept.	19	127	43	594	126	1022	237
Oct.	21	109	43	622	121	1118	243
Nov.	21	118	47	528	99	878	178
Dec.	18	82	46	453	48	744	98
Jan. 1974	22	131	52	697	107	1057	180
Feb.	19	128	36	621	89	1020	189
Mar.	21	146	36	930	72	1463	149
April	21	124	24	654	43	1233	63
May	22	125	33	709	69	1253	99
June	21	126	40	758	98	1307	139
Subtotal		1491	492	7974	1068	13613	1925
Total	249	1983		9042		15538	

* Estimated for April, May and June

PHYSICAL THERAPY SERVICE

Table 2: Number of Different Patients Treated by Months and Institutes, Fiscal Year 1974 *

MONTH	NHLI	NIAMD	NCI	NIAID	NINDS	NIMH	NIDR	NEI	NICHD	TOTAL
July 1973	10	36	52	12	46	10	2	-	7	175
Aug.	9	43	62	11	50	12	1	-	4	192
Sept.	4	42	45	8	55	11	1	-	4	170
Oct.	12	35	44	5	43	8	1	-	4	152
Nov.	9	34	52	4	51	9	1	-	5	165
Dec.	4	26	46	1	45	4	-	-	2	128
Jan. 1974	13	43	45	7	62	7	1	1	4	183
Feb.	18	32	48	5	47	11	1	-	2	164
Mar.	18	35	61	7	45	10	1	-	5	182
April	12	30	40	11	44	8	-	-	3	148
May	9	37	37	14	47	10	1	-	3	158
June	7	44	39	17	45	8	3	-	3	166
Total	125	437	571	102	580	108	13	1	46	1983

* Estimated for April, May and June

PHYSICAL THERAPY SERVICE

Table 3: Number of New Patient Admissions, by Institute: Comparative Statistics, Fiscal Years 1970-1974 *

Fiscal Year	NHLI	NIAMD	NCI	NIAID	NINDS	NIMH	NIDR	NEI	NICHD	TOTAL
1970	164	236	290	85	322	29	1	-	-	1127
1971	176	252	338	119	415	32	-	10	4	1345
1972	197	250	311	91	439	49	12	-	17	1366
1973	112	272	362	49	349	59	8	3	23	1237
1974	83	278	388	49	403	34	10	1	35	1281

* Estimated for April, May and June

PHYSICAL THERAPY SERVICE

Table 4: Comparative Statistics,
Fiscal Years 1970-1974 *

Fiscal Year	No. of Different Patients Treated	No. of Patient Visits**		No. of Treatments Given***	
1970	1730	11,170	(2084)	21,981	(427)
1971	1909	9,461	(1990)	17,496	(636)
1972	2021	9,904	(2227)	19,049	(654)
1973	1949	9,717	(2416)	17,323	(541)
1974	1983	9,042	(2051)	15,538	(517)

* Estimated statistics for April, May and June

** Visit cancellations in parenthesis

*** One time visits only in parenthesis

PHYSICAL THERAPY SERVICE

Table 5: Consultant Visits,
Fiscal Year 1974 *

Orthotist:	54 visits for 86 patient examinations
Shoe Fitter:	38 visits for 54 patient examinations

* Estimated for April, May and June

PHYSICAL THERAPY SERVICE

Table 6: Number of Patient Evaluations by the Physiatrists, Fiscal Years 1970-1974 *

Fiscal Year	NHLI	NIAMD	NCI	NIAID	NINDS	NIMH	NIDR	NEI	NICHD	TOTAL
1970	81	157	196	64	337	32	1	-	-	868
1971	69	167	204	72	332	27	-	5	1	877
1972	85	166	153	58	397	42	10	-	6	917
1973	68	193	212	40	318	58	2	3	6	900
1974	57	179	159	37	353	39	6	1	8	839

* Estimated for April, May and June

OCCUPATIONAL THERAPY SERVICE

Table 7: Fiscal Year 1974
Number of Different Patients Treated by Months and Institutes including Outpatients and SACP**

	NCI		NEI	NHLI		NIAID	NIAMD		NICHD	NIDR		NINDS		NIMH	TOTALS	
	IP	OP	IP	IP	OP	IP	IP	OP	IP	IP	OP	IP	OP	IP	IP	OP
July 1973	7	43	2	-	-	8	11	1	-	1	1	22	2	33	84	47
Aug.	7	44	1	1	-	7	12	1	-	-	1	26	2	29	83	48
Sept.	8	46	1	3	-	10	16	2	-	-	1	29	2	32	99	51
Oct.	8	26	3	4	-	8	15	2	1	1	1	33	2	40	113	31
Nov.	14	26	1	2	1	2	11	1	2	1	-	33	2	40	106	30
Dec.	8	26	1	-	1	1	11	1	-	-	1	29	4	39	87	33
Jan. 1974	13	26	1	1	-	2	11	3	-	-	1	29	2	44	101	32
Feb.	16	26	1	-	1	3	16	3	-	-	1	25	1	47	108	32
March	9	30	1	-	1	1	22	3	-	-	1	31	2	52	116	37
April	6	46	1	1	-	5	10	-	-	-	1	19	1	41	83	49
May	11	46	1	2	-	6	10	-	-	-	1	31	-	42	103	48
June	6	40	2	-	-	9	13	1	1	1	1	29	3	43	104	45
Totals	113	425	16	14	4	63	150	18	4	4	11	336	23	482	1187	483

*Estimates for April - June 1974

OCCUPATIONAL THERAPY SERVICE

Table 8: Fiscal Year 1974
Patients Admitted to Occupational Therapy including Outpatients and SACP*

	NCI		NEI	NHLI		NIAID	NIAMD		NICHD	NIDR	NIMH	NINDS		TOTALS	
	IP	OP	IP	IP	OP	IP	IP	OP	IP	IP	IP	IP	OP	IP	OP
July 1973	4	3	1	-	-	1	8	-	-	-	11	18	1	43	4
Aug.	3	1	-	1	-	2	8	-	-	-	4	18	1	36	2
Sept.	5	3	1	2	-	4	10	1	-	-	10	18	1	50	5
Oct.	4	4	2	2	-	1	8	1	1	1	11	18	-	48	5
Nov.	7	1	-	-	1	-	3	-	1	-	8	19	1	38	3
Dec.	1	1	-	-	-	-	4	-	-	-	6	13	2	24	3
Jan. 1974	7	-	-	1	-	2	7	3	-	-	10	19	-	46	3
Feb.	8	1	-	-	1	1	7	-	-	-	13	14	-	43	2
March	3	4	-	-	-	1	15	2	-	-	9	21	1	49	7
April	3	1	-	1	-	3	3	-	-	-	4	13	-	27	1
May	6	-	1	1	-	3	6	-	-	-	4	18	-	39	-
June	3	-	2	-	-	5	8	1	1	1	8	14	2	42	3
Totals	54	19	7	8	2	23	87	8	3	2	98	203	9	485	38

*Estimates for April - June 1974
**Combined total Outpatient and SACP

OCCUPATIONAL THERAPY SERVICE

Table 9: Fiscal Year 1974
Summary Report by Institutes of Number of Patients Treated, Number of Treatments and Hours*

Institutes	Number of Different Patients Treated		Number of Patient Treatments		Number of Treatment Hours	
	IP	OP	IP	OP	IP	OP
NCI	113	425	468	182	455	182
NEI	16	-	90	-	93	-
NHLI	14	4	53	16	54	18
NIAID	63	-	175	-	175	-
NIAMD	150	18	733	11	722	12
NICHD	4	-	10	-	10	-
NIDR	4	11	19	9	19	9
NIMH	482	-	7,234	-	11,634	-
NINDS	336	23	1,422	47	1,441	51
Totals	1,182	481	10,204	265	14,603	272

*Estimates for April - June 1974

OCCUPATIONAL THERAPY SERVICE

Table 10: Comparative Statistics
Fiscal Year 1970-74
Patient Treatments and Treatment Hours*

Fiscal Year	Number of Different Patients Treated			Number of Patient Treatments			Number of Treatment Hours		
	IP	OP	SACP	IP	OP	SACP	IP	OP	SACP
1970	5,243	194	466	26,520	230	1,045	21,019	219	1,016
1971	4,654	396	532	21,373	459	1,146	18,938	412	1,049
1972	4,455	388	410	16,948	365	841	15,278	342	856
1973	1,583	**556		10,129	**362		14,121	**365	
1974	1,182	**481		10,204	**265		14,603	**272	

*Estimates for April - June 1974
**SACP and OPD Combined

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

SOCIAL WORK DEPARTMENT

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PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
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SOCIAL WORK DEPARTMENT

GOALS

The purpose and goals of the Clinical Center Social Work Department were to facilitate the hospital's responsibility for the psychosocial aspects of medical and research care through helping patients and families deal more effectively with personal, social, psychological, and emotional problems affecting the course of their illness.

Social, emotional, environmental, and cultural factors can impede or enhance patients' participation in medical/research care. The social work mission was that of collaboration with other professions and disciplines about these factors adding to the understanding of patients' circumstances and needs, thereby increasing the effectiveness of the hospital's total medical, research and social work programs.

Based on knowledge of the effects of health care systems on patients and families, the social work objective was to help identify significant problems created by the system and to help facilitate changes that would make the hospital more responsive to the needs of patients and families. Essentially, this was accepting social work responsibility for patient and family advocacy.

The department had responsibility to utilize social work knowledge of the international/national/local community resources for the continued care of patients and families. Staff members also engaged in community and other professional projects concerned with improved social planning for chronically ill persons.

SOCIAL WORK SERVICES RENDERED

Number of Patients Provided with Service in Various Categories

Each month the department reported on the number of patients and their family members served in four principal categories: (1) Preadmission - services between acceptance for admission to a project and Clinical Center outpatient or inpatient admission; (2) Inpatient - person occupying a bed in the Clinical Center; (3) Clinic - person under outpatient treatment who has never been an inpatient; and (4) Follow-up - outpatient contact with former inpatient.

A summary of monthly totals of patients provided with social work services for the first 9 months of Fiscal Years 1973 and 1974 follows:

SUMMARY OF MONTHLY TOTALS
OF PATIENTS SERVED

SERVICE CATEGORIES	FY 1973 Patients Served July 1972 - March 1973		FY 1974 Patients Served July 1973 - March 1974	
	Number	% of Total	Number	% of Total
Preadmission	47	1.0	74	1.5
Inpatient	3,443	74.0	3,744	76.2
Clinic	243	5.2	268	5.5
Follow-Up	923	19.8	824	16.8
TOTAL	4,656		4,910	

A full-range of social work services was provided each month for an average of 416 inpatients and 236 of their family members (see Table 2, Column 2). Social work coverage was provided to an average of 73 percent of the inpatients present in the hospital from July 1973 through March 1974 (see Table 1). By way of contrast the department had achieved an inpatient coverage figure of 89 percent for the same period of Fiscal Year 1969, 87 percent for Fiscal Year 1970, 77 percent for Fiscal Year 1971, 75 percent for Fiscal Year 1972, and 69 percent for Fiscal Year 1973.

Service was provided to an average of 121 outpatients each month (see Table 2, Columns 3 and 4), a slight decrease from the average of 130 last year. An average of 290 family members of in- and outpatients were provided with social services each month (see Table 2).

Inpatient Coverage by Percentage

There were 157 more inpatients for the first 9 months of Fiscal Year 1974 as compared with the same period of Fiscal Year 1973 (see Table 1, Column 1). It was evident that Cancer Social Work Section which included the Child Health and Human Development Social Work Section had the largest census of 1,837 inpatients with a 64.2 percent of coverage, a 5 percent increase over the previous year. With an increased patient census on the Heart and Lung Social Work Section, there was also a 5 percent increase with a 85.6 percent of coverage with one less staff member for Fiscal Year 1974. The census on Allergy and Infectious Diseases Social Work Section remained about the same for both Fiscal Years 1973 and 1974. The 48 percent of coverage reflected the fact that one staff member carried the entire Section. With two staff members assigned to Athritis, Metabolism, and Digestive Diseases Social

Work Section, the percent of coverage for the first 9 months of Fiscal Year 1974 was 95.8 percent. This high percent reflected a lowered patient census from 617 in Fiscal Year 1973 to 544 in Fiscal Year 1974. The Neurological Diseases and Stroke Social Work Section had an increased census, 846 in Fiscal Year 1974 from 782 in Fiscal Year 1973. Their 69.9 percent of coverage in Fiscal Year 1974 was a slight decrease from 72.3 percent in Fiscal Year 1973.

Indirect Service to Clients

Table 3 presents a summary of staff time not used in providing direct services to clients but essential to the department's participation in the total clinical program. The administrative time of the department chief was not included. The three categories, i.e., "Research Activities," "Social Work Departmental Activities," and "Community and Professional Activities" are self-explanatory. "Practice-Program" activities included the following: Interdisciplinary patient-centered conferences, planning and interpretive meetings within Institutes, medical-research lectures, social work seminars, workshops and lectures. The figure presented in Table 3, representing the first 9 months of Fiscal Year 1974 (July 1973 through March 1974) indicated that the staff spent 3,512 hours in such activities as contrasted with 3,631 hours for the same period the previous fiscal year. The continued emphasis upon excellence in the provision of social work services despite the lowered number of staff positions in the department over the past four years has meant a general reduction in time spent on indirect services to patients, particularly in the areas of "research" and "community and professional activities." During the first 9 months of 1974, however, there was an increase in the percentage of time spent on "practice-program activities" on both the Cancer and Neurological Diseases and Stroke Social Work Sections.

STAFFING

At the close of the fiscal year the department had 12 full-time, two part-time and two intermittent social workers, all of whom, with the exception of the chief, carried heavy clinical responsibility. Clerical staff consisted of three full-time secretaries or clerk-typists, and one intermittent clerk-typist. The department's professional positions were assigned as follows: Office of the Chief - 1; Cancer Social Work Section - 5; Heart and Lung Social Work Section - 4; Arthritis, Metabolism, and Digestive Diseases Social Work Section - 3 (2 full-time and 1 part-time [4 days a week]); Neurological Diseases and Stroke Social Work Section - 2; and Eye Social Work Section - 1 (part-time [3 days a week]).

Miss Roberta Peay, Program Supervisor on Heart and Lung Social Work Section, has continued responsibility for the social services on Child Health and Human Development Social Work Section since November 1, 1972.

Effective July 7, 1973, Mrs. Wilma E. Scheuren, clinical social worker on the Cancer Pediatric Oncology Section, resigned to attend George Washington University to work for a Masters degree in Art Therapy.

TABLE 1
INPATIENT COVERAGE BY PERCENTAGE
July 1973 through March 1974

INSTITUTE	TOTAL IN-PATIENTS CENSUS	IN-PATIENTS SERVED	PERCENT COVERAGE
NCI	1,837	1,180	64.2
NHLI	1,399	1,197	85.6
NIAID	529	254	48.0
NIAMDD	544	521	95.8
NINDS	846	591	69.9
TOTAL	5,155	3,743	72.6

July 1972 through March 1973

INSTITUTE	TOTAL IN-PATIENTS CENSUS	IN-PATIENTS SERVED	PERCENT COVERAGE
NCI	1,833	1,079	58.9
NHLI	1,244	1,001	80.5
NIAID	522	257	49.2
NIAMDD	617	541	87.7
NINDS	782	565	72.3
TOTAL	4,998	3,443	68.9

Miss Phyllis Y. Thomas, secretary to four sections (Arthritis, Metabolism, and Digestive Diseases/Allergy and Infectious Diseases/Eye/Neurological Diseases and Stroke) resiged on September 11, 1973, to complete her college degree.

Miss Eileen M. Holschuh, clinical social worker on the Heart and Lung Social Work Section, was assigned additional casework responsibilities. Coverage included the Heart Hypertensive-Endocrinology Service and the Metabolic Service.

Miss Judith Hagopian, after a 5-month position vacancy, reported on duty January 7, 1974, as an intermittent employee assigned to the Pediatric Oncology Section of the Cancer Social Work Section, Miss Hagopian was formerly a staff member of the Providence Hospital Social Service Department, Washington, D. C.

Mrs. Eleanor M. Anderson, after a 4-month vacancy in the secretarial position, reported for duty as an intermittent employee January 7, 1974, as a secretary to four sections: Arthritis, Metabolism, and Digestive Diseases/Allergy and Infectious Diseases/Eye and Neurological and Stroke.

STAFF DEVELOPMENT AND PROFESSIONAL ACTIVITIES

Coordination of the administrative aspects of the department's work and clinical responsibilities was achieved, in large part, through the chief's biweekly group meetings with the section chiefs. In addition, monthly individual conferences were held with each section chief to review the work of each section since section chiefs provided consultation for all clinical staff regarding their work with patients and families. Also, the chief, in conjunction with the section chiefs, related directly to individual staff members concerning administrative issues.

Monthly staff meetings were held either to keep staff members abreast of administrative matters affecting their work, to share new social work practice trends, or to keep abreast with legislative and other changes affecting Clinical Center patients and families. Under the leadership of Miss Linda E. Nee, Neurological Diseases and Stroke Social Work Section, who was appointed Staff Education Chairperson in September 1973, the monthly meetings more clearly reflected the special interests of staff.

The Staff Education Committee continued to promote Journal Club activities which served as a forum for professional concerns.

The major professional activities of staff members are listed in the appendix. As in previous years, the activities reflected a wide range of professional expertise among the department's staff members and recognition by other professional groups at both a local and national level. These activities not only served to keep staff abreast of new ideas and changes in practice but also generated understanding by others of our own staff's specialized function in a research and treatment center. In addition to serving as speakers, consultants, and leaders at professional meetings for both social work and other disciplines, staff members were

active in work for community philanthropic groups and served on boards and committees of local hospitals and social agencies.

Out-of-town training support was provided for three staff members. Two staff members, Miss Marjorie E. McKinney, Cancer Social Work Section, and Miss Linda E. Nee, Neurological Diseases and Stroke Social Work Section, attended a 10-day graduate seminar at Smith College School of Social Work's Continuing Education Program held in Northhampton, Massachusetts, in July 1973. Miss Eileen M. Holschuh, Heart and Lung Social Work Section, attended weekly "Family Therapy" conferences from January 1974 through July 1974 at Georgetown University, under the direction of Dr. Murray Bowen, Department of Psychiatry, Georgetown University. The chief of the department completed a 5-day Managerial Effectiveness Seminar held in Fredricksburg, Virginia, in April 1974.

Effective leadership in community activities was especially noted. Mrs. Kathryn K. Himmelsbach, Cancer Social Work Section Program Supervisor, contributed to educational endeavors, providing leadership within the Clinical Center and the community to the improved care and understanding of cancer patients. Miss Marjorie E. McKinney, Cancer Social Work Section, effectively contributed to program planning of the Washington Chapter of the Association for Care of Children in Hospitals and also served as the Chairperson, Medical and Health Services Council, Washington Metropolitan Chapter, NASW. Miss Linda E. Nee, Neurological Diseases and Stroke Social Work Section, actively participated in the Washington Metropolitan Chapter, NASW, as Vice-President, Practice and Knowledge, and also served as a member of the Executive Board, Medical and Health Services Council, Washington Metropolitan Chapter, National Association of Social Workers.

The department co-sponsored a 1-day workshop with the Clinical Center Nursing Department. Mrs. Emma Plank, Professor Emeritus in Child Development, Case Western Reserve University, and Consultant, Child Life and Education Program, Cleveland Metropolitan General Hospital, spoke on the topic of "Emotional Care as a Priority: Approach to Implementation." The remainder of the day was devoted to "On-the-Site Consultation" in relation to the care of Clinical Center child patients on the Heart Surgery, Pediatric Oncology, and Medical/Surgical Neurology Services.

The department had its first teaching affiliation with the University of Maryland School of Social Work and Community Planning. Mrs. Carol Harman, enrolled in the second year graduate social work program, was here 2-1/2 days a week in a field work placement, from September 10, 1973, to May 17, 1974. She was supervised by Miss Mary Dean Aber, Cancer Social Work Section, and Mrs. Kathryn K. Himmelsbach provided consultation regarding the supervisory process. Patients and families were assigned from all Institutes.

The department became more involved with the career assignment program of the Clinical Center Normal Volunteer Program. Two normal volunteers provided task-oriented services to a selected group of 12 patients, under the supervision of the clinical social work staff. These normal volunteers

were effective and quite creative in achieving the task objectives and both volunteers considered it not only a productive learning experience but one substantiating their desire to continue with social work graduate education.

Mrs. Lynda Mulhauser was the department's first social work representative from the Commissioned Officer Student Training and Extern Program. Under Miss Evelyn Walker's supervision from June 4th through August 4, 1973, Mrs. Mulhauser had had pre-professional experience in hospitals and came to the department after completing one year of graduate work at Catholic University of America, National Catholic School of Social Service.

Two social work students participated in the "Student Summer Program" of 1974. Miss Cheryl Drozen, having completed the first year of the graduate program at Columbia School of Social Work, New York, with a field work experience at North Shore Hospital in Long Island, New York, was assigned to two Institutes, NIAMDD and NIAID. Mrs. Jane L. Weiner was responsible for supervision, with consultation from the Program Supervisor, Mrs. Lucia M. Atlas (Program Supervisor for NIAMDD and NIAID).

Mr. James Perkins, having completed his third year undergraduate training at George Mason University, Department of Behavioral Sciences, in Fairfax, Virginia, with experience at the Northern Virginia Mental Health Institute, was assigned to the Neurological Diseases and Stroke Institute. Miss Linda E. Nee was responsible for supervision, with consultation from Miss Evelyn Walker (Program Supervisor, NINDS).

This provided our department an opportunity to determine learning differentials as related to a student in a baccalaureate program and to a graduate social work program. It was stressed that the primary task of the summer students was to perform appropriate service activities and the educational objectives were focused towards this goal.

MEDICAL REVIEW BOARDS

In Calendar Year 1972, the NIH Medical Review Boards, established for the purpose of evaluating and recommending approval or disapproval of protocols encompassing patient research, were expanded to include non-medical members. The department has taken considerable pride in having five staff members appointed to these boards. This was a new role for Clinical Center social workers who were appointed with the expectation of bringing particular concern about patient and human rights and a special expertise about the impact of research studies on the social and psychological well-being of patients.

Since 1972, the following staff members have served as board members: Mrs. Libby E. Ely for the Medical Board of the Clinical Center; Miss Barbara A. Murphy for the Clinical Research Review Committee of the Clinical Center; Miss Linda E. Nee for the Intramural Clinical Center Review Committee of NINDS and the NINDS Clinical Research Panel; and Miss Roberta E. Peay for the NHLI Research Review Board. Miss Evelyn Walker was appointed to serve on the NIAMDD Clinical Research Committee effective January 1974.

PRACTICE ORIENTED STUDIES AND PUBLICATIONS

The decreased size of our staff as well as increased service demands and responsibilities again made it necessary to sharply curtail research activity for this fiscal year, as last year. There was no progress on Miss Barbara A. Murphy's project "Does Surgical Success in Children with Heart Disease in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning."

After Miss Mary Dean Aber's transfer from the Heart and Lung Social Work Section to the Cancer Social Work Section in April 1973, Miss Loretta A. Coughlin, Heart and Lung Social Work Section, assumed responsibility for interviewing patients with coronary artery disease, Type II, Hyperlipoprotenemia, who were participating in a "Coronary Intervention Study" with Dr. Robert I. Levy and Dr. John F. Brensike, as primary investigators. This was a slow-moving study and to date only 64 patients of the 200 anticipated patients qualified to remain in the study. Since all patients admitted to the Clinical Center for the initial hospital workup were to be interviewed even though later disqualified, a total of 82 patients have been interviewed by Miss Aber and Miss Coughlin.

Miss Roberta Peay, Heart and Lung Social Work Section, and Dr. Donald Detmar, a former NIH Surgical Clinical Associate, completed the questionnaires of 44 patients. In order to test validity and reliability, Miss Loretta A. Coughlin sent out repeat questionnaires to 17 patients and their spouses. Dr. Donald Detmar, now at the University of Wisconsin, has the data.

For the past 19 years, five successive social workers assigned to the Surgical Neurology Section have made formal contributions at the EKG conferences through presentation of written assessments of the patients' social situations with particular focus on their psychosocial current functioning in their home environment and the probable end result if there were no change in the medical condition. This was used as one of three criteria to facilitate decision making regarding surgery.

This year, as part of the culmination of the temporal lobe seizure project, NINDS conducted a follow-up study of approximately 100 post-surgical seizure patients. Miss Linda E. Nee, Surgery Neurology Section, was involved in interviewing each follow-up patient for the purpose of evaluating the patient's psychosocial adjustment both pre- and postsurgery, with the preexisting social work record providing a reliability check. This work helped advance the research goal of NINDS and the findings will eventually be incorporated in a monograph on the subject of temporal lobe epilepsy.

For the past ten years, Miss Evelyn Walker, Chief, Neurological Diseases and Stroke Social Work Section, has represented the department as a member of the National Association of Social Work Abstract Committee. Abstracts relevant to the overall social work profession were written for the quarterly journal, Abstracts for Social Work from Psychiatry and The Journal of Nervous and Mental Diseases.

PARTICIPATION IN CLINICAL CENTER EQUAL OPPORTUNITY PROGRAM

Miss Evelyn Walker, Program Supervisor, Neurological Diseases and Stroke/Eye Social Work Sections, served a 3-year term as the CC EEO Counselor from September 1971 to September 1974. Related activities were multiple and included attendance at the Council meetings and the CC EEO Advisory Committee meetings. As a Committee member, participation was required in writing the By-Laws. Miss Walker served on the EEO Qualifications Review Board, the CC Educational and Training Committee, and the Counseling Committee of the EEO Council which planned the annual 5-day training conference. Counseling activities involved handling several informal complaints as well as directing persons to the proper resources before complaints became explicit.

Miss Walker made a valuable contribution to the CC EEO Program. The time investment continued to increase and finally amounted to 38 hours a month. There was a conflict of interest with social work demands and the priorities for direct patient care responsibility and the demands and priorities of EEO, particularly when both occurred simultaneously. Participation required relinquishing some professional commitments and aborting a research project.

NIH PATIENT EMERGENCY FUND

This Fund, administered by the department chief, continued to serve a crucial need in providing services and emergency funds for Clinical Center patients and families which could not be paid out of appropriated government funds. This Fund was financed by donations from former patients, family members, friends of patients, and NIH employees. From 1953 to 1969, the Fund was also supported by regular contributions from the Recreation and Welfare Association out of income derived from its profit on vending machines. The Recreation and Welfare Association discontinued its contributions October 1, 1969. In mid-July 1973, a perilously low balance of the Patient Emergency Fund was noted. As of July 31, 1973, the balance reached $2,993.05 -- the lowest level in the history of the Fund. Considering that monthly expenditures were averaging around $3,000.00, it seemed evident that some action was required. Supervisors and staff were requested to monitor even more carefully all expenditures for patients and relatives. Miss Margaret A. Badger requested the Patient Activity Section to reduce expenditures for "Special Programs." The Recreation and Welfare Association was also contacted with the request that it resume support in keeping with a previous agreement that the Association would contribute to the Fund when the balance fell below $8,000.00.

In the endeavor to cope with this problem, it was unexpectedly learned through the NIH Agent Cashier that accumulated money for patient telephone installations had been deposited to the Patient Emergency Fund account. This amounted to a little over $30,000.00; and in August 1973, $30,000.00 was made available to the Fund. The Recreation and Welfare Association was subsequently notified of our new position and the request for their support was withdrawn.

One special source of income was the annual gift from NIH employees at Christmas time under the "Davis Plan" whereby employees donate to the NIH Patient Emergency Fund in lieu of sending Christmas cards to fellow employees. The Christmas 1973 Davis Fund Drive was successful and total gifts to the Fund were $6,874.18, which represented a $400.00 decrease from the previous year.

During the first 9 months of Fiscal Year 1974, the five principal areas of expenditures from the Patient Emergency Fund and the amounts spent were as follows:

Special programs (unit parties, supplies, etc.)	$ 2,407.65
Patient transportation	2,329.21
Patient miscellaneous expenditures (telephones, clothing, special devices)	2,946.14
Basic necessities (small weekly spending allowance for patients without funds)	1,429.00
Allowance to relatives to assist with living costs while visiting Clinical Center patients	17,656.97
TOTAL amount spent (July 1973 through March 1974)	$ 26,768.97

Expenditures from the Fund during the first 9 months of Fiscal Year 1974 amounted to $26,768.97, an increase of $3,550.55 from the previous 9 months of Fiscal Year 1973 (see "Total Withdrawn" Column, Tables 4 and 5). There were increased expenditures for the first 9 months of Fiscal Year 1974 over those in Fiscal Year 1973 in four categories (see Table 4).

	1973	1974	Percent
Patient Miscellaneous	$ 2,558	$ 2,946	13.2
Patient Transportation	$ 1,283	$ 2,329	44.9
Relative Allowance	$ 12,000	$ 17,656	32.0
Total Expenditures	$ 23,218	$ 26,768	13.3

The projected total expenditures from the Fund for the entire 12-month period of Fiscal Year 1974 was $35,691.96.

Several factors were responsible for the continued high expenditures from the Fund. Escalating food costs and the increased cost of renting rooms in nearby homes for family members made it necessary to give relatives without funds a larger allowance to live in this area. In March 1974, there was a revision in the department's policy regarding relatives' allowance. The more traditional basic allowance had been between $45.00 and $50.00 weekly.

With the rising cost of living, a flat $5.00 per day for food was allowed plus the cost of a room which usually varied between $25.00 and $30.00 per week. It was often necessary for funds for local transportation to be added. Reports from the Social Work Department staff indicated that in general the income of many patients had been reduced. Our chronically ill patients were frequently unemployed, and families experienced more difficulty with extra expenses such as travel and the ability to finance care away from home.

During Fiscal Year 1974, 374 patients and family members were assisted by the Fund in meeting emergency situations when carefully documented inquiries indicated that no other source of help was available. This was approximately the same number (353) as last year and as anticipated, the largest number of patients for whom assistance was provided came from the Cancer and Heart and Lung Social Work Sections. The Fund was utilized when there was compelling need. In a number of situations, it was clear that patients would have left the hospital against advice or suffered severe emotional distress had we been unable to support the presence of a family member here during a time of medical crisis.

The benefit to patients and families was clear. The Fund was also equally beneficial to Clinical Center medical/research programs. The largest expenditure "Allowance for Relatives" permitting family members to remain in this area was usually medically indicated, particularly with child patients and those patients undergoing life-threatening surgery. "Special Programs" was another category provided to normalize the hospital environment for groups of patients and/or families. Activities included birthday parties and group programs for child patients; recreational and diversional activities; supplies for normal volunteers and group activities for Clinical Center patients, including those on mental health studies. Generally, these activities were carried out under the auspices of the Patient Activity Program. Other expenditures in this category included beauty and barber shop services, flowers for holiday and chapel services, and upkeep of the aquarium on the Pediatric Oncology Unit.

SECTION REPORTS

Eye Social Work Section

On the National Eye Institute, although some vision was restored to a few of the patients, most were confronted while here with continuing blindness or uncertainty regarding prognoses. This aroused anxiety regarding ability to meet life's demands, and heightened fears of insecurity and feelings of depression and anger. The caseworker's active and informed understanding helped relieve these feelings, lent emotional support to necessary ego functioning.

Cancer Social Work Section

The Cancer Social Work Section continued to have its major focus on work with terminal illness and death. A total of 92 deaths recorded for the first 9 months of this fiscal year averaged about ten deaths per month or

roughly three deaths per week. (It should be noted that a sizeable percentage of these patients died at home or in a local hospital). This was emotionally draining to the staff whose tasks were to help patients live until they died, to ensure family members of environmental and emotional support so they could help the patient to eventually return home without undue impairment of the family constellation, and to work cooperatively with the medical team in understanding the relationship between the medical and the psychosocial aspects of the patients' functioning.

For the first time, psychiatric consultation on a weekly scheduled basis was available to four of the NCI units including: (a) Unit 2-East with Dr. Stephen Hersh for a total of four hours weekly with staff members, one hour of which was devoted to a multidiscipline conference; (b) Dr. Robert Israely of the Employee Health Service for a one hour multidisciplinary conference on Unit 12-West; (c) Dr. Norman Wilson on Unit 13-East for weekly multidisciplinary conference with staff; and (d) Dr. Norman Wilson on 10-East for weekly psychiatric multidiscipline conference. These weekly consultations concern staff morale and the problems which members may have in working with such a patient population, as well as patients' and family members' problems.

There was also the inauguration of valuable bi-monthly meetings with Dr. Harold Greenberg, NIMH, with the Cancer Social Work Section Staff to assist them in their ongoing work with critically and terminally-ill patients and their families. The use of case material as well as general conceptual discussions of a clinical nature in relation to such factors as isolation, loneliness, hospitalization, death and dying proved helpful to all staff members.

Increased referrals by physicians for follow-up of social problems concurrently with medical follow-up to insure the possibility of maximum patient rehabilitation, was noted. This resulted in an increase in contacts with community agencies throughout the country including Visiting Nurse Associations, American Red Cross, American Cancer Society, American Leukemia Society, Homemaker Service, Vocational Rehabilitation, Social Security, Welfare Departments, Veteran's Administration, family agencies, wiggeries, and a host of other facilities appropriate to the particular rehabilitative needs of the discharged patient.

Heart and Lung Social Work Section

The medical units of the Heart and Lung Social Work Section reflected a trend of briefer hospitalizatons from 2 to 10 days duration. Many patients had serious interpersonal and social problems which increased the necessity for follow-up service, apart from their regular return clinic visits, to ensure more complete exploration of the social situation and judicious referrals to community agencies.

The increasing number of patients who were admitted with a psychiatric diagnosis or disabling emotional problems posed serious problems in management. The social workers had a primary role of facilitating the

patient's adjustment, helping the staff to understand and to handle the patients with a more therapeutic approach, assuring psychiatric consultation, and having a close working relationship with the psychiatric consultant.

Allergy and Infectious Diseases Section

Members of the Section continued to assess and aid the patient's adaptation to the long-term disabling effects of chronic illness. Of the 85 adult patients known to the worker in this time period, 65 were substantially disabled, that is to say, they had sustained losses significant to affecting their daily lives.

Most patients did in the long run make some accomodation to illness and disability. The social work input with its focus on the quality of life as well as the resolution of practical problems seemed to have been helpful to a number of these patients.

Arthritis, Metabolism, and Digestive Diseases Section

New studies this year included two different treatment methods for lupus nephritis depending on severity of the presenting illness, and both studies were almost always complicated by side effects of medication.

This year, to help in better understanding the patient, his needs and his hospital course, multidisciplinary weekly rounds were organized including the clinical associate, nurses, physical and occupational therapist, dietitian and social worker. A constructive team approach to overall adjustment resulted, and the patients benefited from a unified plan of action.

Social work activity for patients was often directed outside the Clinical Center milieu. This year, for example, it included a visit to the court with a patient to help correct an abusive, detrimental home situation; locating low rental housing for a family; work with foster placement agency for child care during a patient's hospitalization; referral to agencies for marital and psychiatric help; arrangements for an extensive vocational rehabilitation course for a lupus patient visually handicapped as a result of the disorder; arrangements for the expected hazardous delivery of a baby of a study patient with the cooperation of an obstetrician from another Institute at a nearby hospital; effecting a satisfactory foster home placement in another state for a young rejected hemophiliac patient; arrangement for ambulance and other special transportation facilities in other states; investigation of nursing homes and nursing facilities. These plans were effected only after careful deliberation and collaboration with the patient and often family members in trying to resolve the crisis situation.

PROBLEM AREAS

Although the department has operated with decreased staff, a substantial effort has been made to help maintain the hospital's responsiveness to the social and emotional needs of patients and families.

It is hoped that in the future it will be more possible to make a social work assessment of all patients' needs for social services, and that preventive and rehabilitative interventive approaches will continue to be incorporated in the program.

During Fiscal Year 1974, 24 percent of outpatients, including preadmission, were provided social services. It is hoped that this can be increased.

The increased cost of living adversely affected a considerable percentage of our patients and their families, increasing the need for community resources during hospitalization and following discharge. There was less money available to many Federally supported programs, supportive services were being phased out in many communities, and the social work staff struggled with the difficulties and inadequacies of health insurance systems such as Medicare. It was necessary to work with many fragmented social systems to try to ensure adequate service for our patients and families. Lack of uniformity regarding supplemental security income for the aged, blind, and disabled lead to inequities and there were wide variations among private agencies as to priority in rendering services for patients.

There continued to be a large number of both child and adult foreign patients admitted to NHLI and NINDS. These patients were seldom fluent in English, their relatives required information and support to cope with a strange environment and community, and problems related to separation heightened their fears about their illness and body integrity. Work with these patients who came with high expectations of staff required considerable social work investment, and the time involved with many of these patients was immeasurable.

FUTURE OBJECTIVES

1. The major objective and challenge will be to continue to achieve high quality comprehensive patient care with limited staff resources. Efforts will be made to have social work participation included in various protocols, such as early referral of all patients and families being considered for bone marrow transplants to ensure social work involvement in high risk situations with potential for severe stress. There will be increased utilization of normal volunteers in facilitating patient care through assigned tasks under the guidance of a staff member.

2. There are social components in every clinical care program. With the extensive experience and knowledge of the department's staff in the psychosocial aspects of patient care, social work could make a vital contribution on planning committees of the hospital when patient care plans, policies, and procedures were being developed or reviewed. The department is in a position to help the Clinical Center become more responsive to patient needs and to facilitate the hospital's responsibility for the psychosocial aspects of medical/research care.

3. A long-term objective is to increase the number of professional staff members to enable the department to carry out satisfactorily its full-range of responsibilities particularly as new programs are initiated or expanded.

Examples include the fast growing Medical Breast Service, NCI, which had a total of 80 outpatients during Fiscal Year 1974. The department was advised that there are plans for doubling this Service in the forthcoming year.

Unit 2-B has been renovated for six Laminar Flow Rooms and will soon become operational. Isolation is a serious challenge to an ill child who must continue to master developmental and maturational tasks. It has been our experience that these patients require ongoing casework intervention and support.

The inauguration of a melanoma project on Unit 12-East began August 6, 1973. This protocol began with a six-bed study on malignant melanoma, Stage III and was characterized by the coordinator as "a major event on the Immunology Service." The study was a planned 5 to 7 year study involving a total of 300 patients-- 100 in each of the randomized groups including Immunology, Chemotherapy, and Surgery. These patients were very ill with visceral metastases and were fully oriented as to the experimental nature of their research. Stress was experienced by staff in not biasing patients to one form of treatment or the other.

The multiple implications of this program, i.e., terminal illness, experimentation with drugs used for the first time on man; painful and life-threatening side effects of therapy; inevitable anxiety of randomized research methods, all highlighted the need for social work participation.

Changeover of the Pediatric Leukemia Service on Unit 2-East to Pediatric Oncology Service with implications for inclusion of a greater diversity of pediatric malignancies contrasted with the previous focus on leukemia. There were plans for structural and philosophic reconstruction of the unit in terms of initiating the so-called "parent live-in plan" for the care of pediatric patients, which served to increase the social worker's sphere of involvement.

It was anticipated that the new program of National Institute for Child Health and Human Development with high risk mothers and babies would be opened within the coming year and social work participation has been requested.

STAFF PROFESSIONAL ACTIVITIES

Miss Mary Dean Aber

Member, Staff Education Committee, Social Work Department, Clinical Center.

Program Planning Committee, American Cancer Society, District of Columbia Division.

Miss Loretta A. Coughlin

Member, Staff Education Committee, Social Work Department, Clinical Center.

Mrs. Libby E. Ely

Member, Medical Board of Clinical Center.

Mrs. Kathryn K. Himmelsbach

Social Work Department liaison with Clinical Center Red Cross Volunteers.

Keyman, National Association of Social Workers, Washington Metropolitan Chapter.

Member, Inter-Agency Services Conference
The Health and Welfare Council, Washington, D. C.

Member, Committee on Legal Rights for Children
The Health and Welfare Council, Greater Washington Area.

Member, Ladies Board
Georgetown University Hospital, Washington, D. C.

Member, Program Evaluation Committee
American Cancer Society, District of Columbia Division.

Member, Board of Directors, American Red Cross
Montgomery County Chapter, Silver Spring, Maryland.

Member, Program Committee, Georgetown University Hospital, to develop Symposium on "The Challenge of the Successfully-Treated Cancer Patient," presented January 18, 1974.

Member, Chaplain Certification Committee, American Protestant Hospital Association, February 1974.

Miss Marjorie E. McKinney

Workshop Co-leader on Topic "The Adolescents' Needs in the Hospital" sponsored by the Metropolitan Washington Chapter of Association for Care of Children in Hospitals, April 17, 1973.

Workshop Co-leader on Topic "Grief and Loss" sponsored by Child Welfare League of America, Washington Hilton Hotel, Washington, D. C., May 1973.

Member, Staff Education Committee, Social Work Department, Clinical Center.

Presentation on "The Impact of Childhood Cancer on the Family," to the summer work study nurses assigned to the Clinical Center, sponsored by the American Cancer Society, District of Columbia Division, 1973.

Workshop Co-leader on Topic "Sensitizing Staff to Emotional Needs," sponsored by Washington Chapter of Association for Care of Children in Hospitals, Walter Reed Army Hospital, Washington, D. C., April 10, 1974.

Program Planning Committee, Metropolitan Washington Chapter of Association for Care of Children in Hospitals, on Topic "Emotional Care as a Priority: Approaches to Implementation."

Miss Barbara A. Murphy

Member, Clinical Center Clinical Research Review Committee.

Chairperson, Clinical Center Combined Federal Campaign.

Member, Davis Fund Committee.

Member, Planning Committee, 1975 Tri-State Conference, Metropolitan Washington Chapter of American Society for Hospital Social Work Directors, American Hospital Association.

Miss Linda E. Nee

Member, Clinical Center Review Committee of the NINDS.

Member, NINDS Research Panel.

Vice-President, Practice and Knowledge, Washington Metropolitan Chapter, National Association of Social Workers.

Chairperson, Staff Education Committee, Social Work Department, Clinical Center, since September 1973.

Executive Board member, Medical and Health Services Council, Washington Metropolitan Chapter, National Association of Social Workers.

Miss Roberta E. Peay

Consultant, Social Work Service, Walter Reed Army Hospital, Washington, D. C.

Member, NHLL Clinical Research Review Committee

Mrs. Elizabeth G. Schumann

Chairman, Staff Education Committee, Social Work Department, Clinical Center, July and August 1973. Continued thereafter as member.

Participant at planning meetings of Montgomery County Department of Human Resources, Division for the Visually Handicapped, together with other community representatives working with the blind.

Miss Evelyn Walker

Member, Women's Board, Columbia Hospital, Washington, D. C.

Member, Abstract Committee, National Association of Social Workers.

Equal Employment Opportunity Counselor for a 3-year term, 1971-1974.

Member, NIH EEO Council, and its counselling Committee.

Member, Clinical Center EEO Advisory Committee.

Member, Clinical Center Education and Training Committee until September 1973.

Member, Qualifications Review Board for EEO Counselor, February 1973 to April 1974.

Member, NIAMD Research Review Committee.

Participated in Fifth Annual EEO Training Session, Cockeysville, Maryland, October 1-5, 1973.

Mrs. Jane L. Weiner

Member, Staff Education Committee, Social Work Department, Clinical Center.

Serial No. CC-39
Social Work Department
The Clinical Center
Bethesda, Maryland 20014

PHS-NIH
Individual Project Report
July 1, 1973 through June 30, 1974

Project Title: Does Surgical Success in Children with Heart Disease in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning.

Previous Serial Number: None

Principal Investigator: Barbara A. Murphy

Other Investigators : None

Cooperating Units : Clinical social workers assigned to Cardiology Branch, NHLI

Man Hours:

Total	:	40 Hours
Professional	:	40 Hours
Other	:	0 Hours

Patient Description: Objectives - The purpose of this study is to learn whether children who have been physically improved by cardiac surgery experience concomitant changes in social functioning as measured by their ability to perform age-appropriate tasks before and after surgery.

The project studied the functioning of two groups of children: (1) 67 latency aged (6 through 10 years); and (2) 40 adolescent aged (14 through 17 years), who were admitted to the Clinical Center by the National Heart and Lung Institute between January 1965 and January 1970.

Method - The developmental theories of Freud, Erikson, Josselyn, and Lidz were used as a frame of reference for determining the significant life tasks of childhood. The theoretical developmental tasks were translated into a series of perceivable behaviors. From these a schedule was devised, containing a series of questions concerning life tasks as they related to latency and adolescence.

The children were used as the primary source of data. The schedule was administered in an interview situation at two different points of time--before surgery, and following a medically appropriate period after surgery. A supplementary

schedule for the available parent was also administered in an interview situation at two different points in time--prior to and following surgery.

Schedules to provide medical information related to (1) the patient's functional capacity preoperatively and postoperatively; (2) whether corrective or palliative surgery was performed; and (3) the surgeon's judgment as to those patients whose cardiac status was improved.

Measurement was predicated upon the development of a social functioning scale of sufficient reliability to assess task-behavior in relation to chronological age. Rating Scales were developed to tap four types of behavior: (1) interests and activities; (2) child-family interaction; (3) decision-making autonomy; and (4) the child in relation to self and peers. Conceptual bases for scaling each type of behavior were derived from the psychoanalytic literature, particularly the more recent work of Anna Freud. Gesell and Ilg provided rich sources of behavioral concomitants. Preliminary Testing of these scales on half of the responses of the latency group indicated that these children appear not to have marked problems in social functioning. Reliability on test retest is adequate.

Findings - Analysis of the latency group as a whole at the preoperative time indicated:

These children did not have marked problems in social functioning as calibrated by the scales derived to measure "interests and activities," "autonomy," "child-family relationships" and "child self-peer relationship" levels. The average actual age of the group was 7.8 years; the average social functioning age was 7.0 years. "Interests and activity" level functioning age was 7.2 years; "autonomy" was 7.0 years, "child-family relationships" and "child-self group" functioning ages was 6.9 years.

Differences between groups based on preoperative cardiac status and postoperative social functioning levels are in the process of analysis.

Characteristics of these latency children indicated they were drawn predominantly from Public Health Service Regions II and III (50 out of 67), were equally divided by sex, were Caucasian and Protestant. They were enrolled in grades 1 through 4 where they had lost time from school, "an occasional" (30) to

Does Surgical Success in Children with Heart Disease in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning.

"many days" (19), because of illness. However, only five of these children utilized home-bound tutors. Nearly all of these lived in families where both natural parents were present and in which there were other siblings. The incidence of cardiac disease among nuclear family members was minor. The father's occupation was blue collar and the majority of families had incomes above the poverty line.

Data analysis phase will be continued in fiscal year 1974.

TABLE 2
NUMBER OF CLIENTS PROVIDED WITH
SOCIAL WORK SERVICES
JULY 1973 through MARCH 1974

SOCIAL WORK SECTION	PREADMISSION (1)		INPATIENT (2)		CLINIC (3)		FOLLOW-UP (4)		TOTAL CC PATIENTS	TOTAL FAMILY MEMBERS
	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER		
1973 JULY	9		386		41		59		495	
		2		221		15		27		265
AUG.	8		406		27		62		503	
		2		235		4		47		288
SEPT.	5		400		21		88		514	
		1		203		7		41		252
OCT.	7		414		6		88		515	
		2		202		-		34		238
NOV.	8		422		27		132		589	
		2		280		7		52		341
DEC.	3		345		17		97		462	
		1		229		5		60		295
1974 JAN.	13		449		46		97		605	
		2		221		15		43		281
FEB.	13		442		49		91		595	
		1		249		12		38		300
MAR.	8		480		34		110		632	
		5		282		15		49		351
TOTAL	74		3,744		268		824		4,910	
		18		2,122		80		391		2,611

(1) PREADMISSION - Service between acceptance for project and admission.

(2) INPATIENT - Person occupying a Clinical Center bed at anytime during the month.

(3) CLINIC - Service where patient has never been an inpatient.

(4) FOLLOW-UP - Service to former inpatient.

TABLE 3
GROUP ACTIVITY REPORT
JULY 1973 through MARCH 1974

SECTION	RESEARCH ACTIVITIES		PRACTICE-PROGRAM ACTIVITIES		SOCIAL WORK DEPARTMENTAL ACTIVITIES		COMMUNITY AND PROFESSIONAL ACTIVITIES		TOTAL HOURS
	Hours	%	Hours	%	Hours	%	Hours	%	
NCI	2	-	922	58.3	502	31.7	157	10.0	1,583
NHLI	60	8.8	387	56.4	217	31.6	22	3.2	686
NIAID NIAMDD	29	5.0	443	76.8	97	16.8	8	1.4	577
NINDS	6	.9	360	54.1	236	35.4	64	9.6	666
TOTAL	97	2.8	2,112	60.1	1,052	29.9	251	7.2	3,512

TABLE 4
NIH PATIENT EMERGENCY FUND EXPENDITURES
JULY 1973 through MARCH 1974*

MONTH	SPECIAL PROGRAM	PATIENT TRANSPORTATION	ALLOWANCE TO RELATIVES	PATIENT MISCELLANEOUS	BASIC NECESSITIES	TOTAL WITHDRAWN	TOTAL DEPOSITS
1973 JULY	$ 396.05	$ 344.05	$ 2,137.05	$ 240.10	$ 173.00	$ 3,290.25	$ 986.37
AUG.	257.25	206.25	1,623.25	502.05	158.00	2,746.80	33,306.34
SEPT.	206.25	495.05	1,685.22	364.91	187.00	2,938.43	486.00
OCT.	195.25	401.03	2,321.00	479.15	201.00	3,597.43	3,012.13
NOV.	179.25	116.80	2,380.00	261.24	193.00	3,130.29	2,357.35
DEC.	221.25	175.65	841.25	154.17	84.00	1,476.32	922.86
1974 JAN.	462.50	255.38	2,397.00	360.15	115.00	3,590.03	11,172.26
FEB.	240.25	281.25	2,331.20	199.92	153.00	3,205.62	2,788.06
MAR.	249.60	53.75	1,941.00	384.45	165.00	2,793.80	1,902.30
APRIL							
MAY							
JUNE							
TOTAL	$2,407.65	$2,329.21	$17,656.97	$2,946.14	$1,429.00	$26,768.97	$56,933.67

SW-24

RECAPITULATION

Balance brought forward July 1, 1973	$ 5,296.93
*Fiscal Year 1974 - Deposits	56,933.67
	$ 62,230.60
*Fiscal Year 1974 - Withdrawals	26,768.97
TOTAL	$ 35,461.63

TABLE 5
NIH PATIENT EMERGENCY FUND EXPENDITURES
JULY 1972 through JUNE 1973

MONTH	SPECIAL PROGRAM	PATIENT TRANSPORTATION	ALLOWANCE TO RELATIVES	PATIENT MISCELLANEOUS	BASIC NECESSITIES	TOTAL WITHDRAWN	TOTAL DEPOSITS
1972 JULY	$ 504.50	$ 134.55	$ 1,220.00	$ 152.09	$ 135.00	$ 2,146.14	$ 5,608.27
AUG.	418.75	291.36	2,189.00	125.25	223.00	3,247.36	5,143.73
SEPT.	599.75	121.65	1,620.00	192.12	163.50	2,697.02	1,225.00
OCT.	528.25	137.00	868.00	425.35	203.00	2,161.60	828.00
NOV.	597.50	83.70	907.25	266.65	240.00	2,095.10	2,037.30
DEC.	401.50	135.80	591.00	621.97	223.00	1,973.27	4,824.92
1973 JAN.	571.19	226.75	1,273.00	339.60	333.00	2,743.54	5,963.72
FEB.	818.25	111.50	1,295.00	177.20	155.00	2,556.95	1,398.50
MAR.	969.75	40.85	2,037.00	258.20	291.64	3,597.44	903.96
APRIL	871.67	218.75	1,641.00	475.44	199.00	3,405.86	951.80
MAY	738.75	310.97	1,974.50	358.02	229.00	3,611.24	2,149.70
JUNE	499.25	291.50	1,941.65	1,375.63	170.00	4,278.03	1,306.93
TOTAL	$ 7,519.11	$ 2,104.38	$17,557.40	$ 4,767.52	$ 2,565.14	$34,513.55	$ 32,341.83

RECAPITULATION

Balance brought forward July 1, 1972	$ 7,468.65
Fiscal Year 1973 - Deposits	32,341.83
	$ 39,810.48
Fiscar Year 1973 - Withdrawals	34,513.55
TOTAL	$ 5,296.93

July 1, 1973, through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF SPIRITUAL MINISTRY

July 1, 1973 through June 30, 1974

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF SPIRITUAL MINISTRY

OVERVIEW

The basic task of the department was to provide spiritual ministry to patients and their families who welcomed the ministrations of a clergyman and to hold religious services in the hospital. It also included acting as liaison with religious groups not represented by the staff chaplains, conducting a course in pastoral training for a community clergyman in a doctoral program, consulting with staff, serving on research committees, the Clinical Center EEO Advisory Committee, lecturing, and consulting with other chaplains and clergy.

The major incident involving the staff of the department was the heart attack suffered by Chaplain Kerney on March 15, 1974. He made a good recovery and returned on limited duty June 10. During his absence, Chaplain White was named Acting Chief. The status of Chaplain Stephen Harris was changed from part-time to temporary full-time, and in May Chaplain Robert Wyman was added to the staff on a five-hour per day basis. Chaplain Wyman had just spent ten months in the clinical pastoral training program at St. Elizabeths Hospital, Washington, D.C.

Because of a 42 percent cut in staff in FY 1973 and the illness of Chaplain Kerney in FY 1974, the department was able to give less general coverage and emotional and spiritual support to the patients and their families. One result was that when a crises came there was not the general background and rapport that is developed from general coverage.

Father Eugene Linehan's part-time coverage was augmented by Father Richard Onwuanibe and Father Michael Griffin.

Rabbi Maurice Kleinberg continued to serve following his recovery from a heart attack in the Spring, 1973.

CHAPEL SERVICE

Regular chapel services were held during the year for the major faith groups. These services were:

Protestant: Sunday, 10:00 a.m. Holy Communion Service, the first Sunday of each month.

Catholic: Sunday and weekdays, 11:15 a.m. Daily distribution of Communion to bedridden patients.

Jewish: Friday, 4:00 p.m.

In addition to the regular services, these special services were held:

Protestant: World Wide Communion - 1st Sunday in October
Thanksgiving Day Service
Christmas Carol Service
Christmas Day - bedside visitation
Good Friday Service
(participation by Protestant and Catholic clergy and patients)

Catholic: Holy Days of Obligation Mass
Special Blessing of Throats - February 3
Distribution of Ashes - Ash Wednesday

Jewish: Rosh Hashanan Sukkoth Purim Shavuoth
Yom Kippur Chanukah Passover

All three faiths extended the ministry of the chapel services by broadcasting the services to bedside speakers for those unable to go to the chapel and by visitation to known bedridden patients. Appropriate sacraments were administered as desired.

Unusual incidents sometimes occurred at chapel services that enabled the chaplains to strengthen the mutual support of patients and families to one another, and to clarify and make more meaningful their religious faith in the hospital setting:

> A patient had a seizure of long duration during the sermon in one of the Protestant Sunday services. A nurse was present from the patient's unit. The congregation responded with concern and understanding. Other patients from the same nursing unit were very helpful. The chaplain gave an interpretation that perhaps this type of event was behind some of the biblical stories of demon possession. After the service the chaplain talked with many of the persons in chapel to check to see if they were handling the interruption positively or if they needed help in working the situation through pastorally.

Two months later the same patient suffered a violent seizure in chapel with a different chaplain presenting the service. His approach in helping the congregation deal with their feelings was to allude to the Apostle Paul whom many scholars feel suffered from epilepsy. A week later the chaplain received a letter from the daughter of a patient who had been in the congregation saying: "Thank you for giving a certain calmness to such

trying circumstances." The sermon topic that day had been on the reality of our needing the help of one another and how the experience of illness reminds us of that truth.

Rabbi Kleinberg found it helpful to take Jewish holiday services beyond the confines of the chapel. The Jewish High Holy Days found a number of patients confined to their units. Bedside visitations enabled the Rabbi to provide individual ministrations to them.

PASTORAL MINISTRY TO PATIENTS AND THEIR FAMILIES

The heart of the work of the Department of Spiritual Ministry continued to be the ministry to individual patients and their families. Patterns of ministry varied according to the traditions of the major faiths. Pastor, priest, and rabbi, each had his unique approach to meet the spiritual needs of his patients. Methods in ministry also varied according to the ratio of patients to individual chaplains.

The department attempted, when possible, to have a staff member visit all patients prior to major surgery, patients who were on the seriously ill list, and families of patients who died. All Catholic patients were contacted through the sacramental ministry of the Catholic chaplain. The Jewish chaplain was able to see all the patients of the Jewish faith. Most of the Protestant patients were visited. Priority was given to the terminally ill, the seriously ill, and those scheduled for surgery. All referrals by staff, relatives, pastors, or self were seen. Clergymen from the community were called upon to minister to special patients, e.g., patients requesting special rites from a clergyman of their own denominations. These included several Greek Orthodox priests who were routinely called to minister to the Greek-speaking patients on the Heart Nursing Units.

Pastoral problems which the chaplains encountered included: loneliness, grief, fear, guilt, anxiety, loss of spiritual meaning, boredom, identity crisis, and changes in body-image and body-function. Pastoral methods included pastoral conversations, sacraments, blessings, prayer, scripture, and worship. On occasion, the chaplains were involved in helping patients and their families resolve dilemmas of conscience, conflicts of values, and difficulties in accepting radical therapies.

All members of the staff endeavored to be sensitive to the patient's own understanding of religion for himself, and, in turn, become a resource person for the patient to discover or rediscover his own spiritual strength.

Pastoral ministry continued to be directly related to the flow of patients in and out of the hospital, as well as various personal crises which have religious and spiritual dimensions. The obvious crises were for the family as well as the patient:

1. coming to the hospital
2. leaving the hospital
3. becoming seriously ill
4. anticipating surgery

Statistics for two typical months follow:

		Protestant	Catholic	Jewish
Admissions	Jan.	310 (66%)	128 (27%)	29 (7%)
	Feb.	215	70	26
Discharges	Jan.	203	81	22
	Feb.	225	75	22
Pre-Ops	Jan.	43 (72%)	14 (23%)	3 (5%)
	Feb.	48	12	5
Seriously Ill	Jan.	4	2	2
	Feb.	8	2	1
Deaths	Jan.	5	3	1
	Feb.	7	1	1

ILLUSTRATION OF PASTORAL MINISTRY

One of the chaplains was called to the hospital at 9:30 p.m. to "give some spiritual support" to the wife of a patient. Time was spent with the wife and other family members who arrived at about the same time. After 30 or 40 minutes the family left to go home. They urged the mother to go with them. She declined, saying that she wanted to stay and be with her husband although he was in a coma. In the chapel the chaplain asked the family to kneel at the communion rail and express some of the feelings, fears, and hopes in a prayer.

The family said good-bye and the wife indicated that she wanted to sit and meditate in the chapel for a while. The chaplain offered to stay with her. She responded by saying that this was not necessary. The chaplain asked if he could simply sit with her for a short while and then would leave her. After a long moment of silence a conversation began. The wife shared the history of her family and of her husband's illness. She had promised her husband when he was in another hospital she would not sign for further surgery. Yet she had gone ahead and signed feeling guilty but not wanting to be the person to "take his life."

In the 40 or 50 minutes of conversation she talked about her husband and her relation to him. She was able to see him with strength, integrity, honesty, and as a "good man." She reviewed her children and their response to the illness. The wife and chaplain left together to return to the nursing unit.

Another chaplain who had first contacted her continued to see her from time to time to give her support, to continue to help her deal with her anger, guilt, and frustration. Contacts were made with the doctor, the social worker, and the nurses involved to support and share information. The patient died a week and a half later.

One of the chaplains visited a patient who had had head and neck surgery for cancer. The patient had been in the hospital for a long time. She was unable to talk and therefore communicated with a "magic slate." She wrote answers to the chaplain's questions and explained that she was going through a "long distance divorce" from a man who had totaled her car and was in a hospital for alcoholics. She had had an emergency operation because an artery ruptured in her neck. A nurse applied pressure until the surgical team was ready in the operating room an hour later. The chaplain responded, "You must have been scared." She answered with a nod and then wrote the word "yes" on her slate underlining it twice. She wrote she was to have another operation involving a skin graft. The chaplain responded with the phrase "You must feel very lonely and discouraged at times." She began to tear up and then wrote "I'm sorry I am crying." The chaplain responded that tears are a part of life and it is appropriate at times to cry. The chaplain concluded the visit with a prayer in which the feelings of loneliness, fright, and anger were articulated as the feelings of the moment which leads to an awareness of the continuing gifts from God of faith, hope, love, courage, and patience. The chaplain sensed a feeling of appreciation on the part of the patient as he left the room.

A full and active program of bedside ministry continued to be conducted by all the chaplains. This ministry varied from a simple friendly greeting and a casual conversation to supportive and exploratory dialogues with patients who were frightened, lonely, and spiritually perplexed.

One such patient asked to see a chaplain to explore her feelings of guilt and confusion over having an abortion several months previously. She asked for medical advice on the consequences of having a baby while on steroids. The physician told her there was a good chance that the baby would be affected. Wanting to be a mother but not wanting to bring a malformed baby into the world, she waited for 5 months and then had an abortion. She was in so much turmoil at the time of the abortion she described herself as being almost speechless and rigid as she lay on the table.

This patient described herself as being surprised she was talking to a clergyman about her experience as she was not involved with a particular church and had turned her back on the faith of her parents. Yet she wanted to talk about it in order to find affirmation, forgiveness, and meaning. She had also talked to a psychiatrist about it. Talking with her three times, once for an hour and a half at night, seemed to ease the burden and fright and allow her to move on in her thinking to the present moment and current problems.

One of the chaplains was called in on the Friday night before Christmas to minister to a family whose 20-year-old daughter was terminally ill. The family and the chaplain sat in the solarium for about an hour reviewing the progress of the disease, sharing stories and episodes about their daughter and their relationship with her. The chaplain went home only to be called back a half hour later at the time of death. The chaplain helped the family make some of the arrangements, went to the room with the parents and expressed some of the feelings of the moment in a shared prayer, and helped them to gather up the belongings and leave the hospital. The family told the chaplain

that the last words their daughter spoke late in the afternoon were "Please open the blind, I want to see the sunset." The family was appreciative of all the staff, including the chaplain, for all the care and kindnesses given and for being with them in a hospital away from home.

One of the 4W patients came to the office to leave a note for Father Linehan. She told Chaplain Kerney that several days earlier she had made a "general confession" and in reflecting upon this experience felt that it helped to lift a large part of her depression. She had not done this in 20 years. Anticipating leaving the hospital in a few days, she expressed her appreciation of the help she had received on the nursing unit.

WORK WITH STAFF

Much of the work with staff took place on an informal, routine level when consulting with other staff personnel, exchanging information at the nursing stations, discussing concerns during luncheon periods, occasionally making "rounds" with staff physicians, and attending clinical conferences.

More formal relationships with other staff occurred in group seminars on various nursing units where patient and family emotional and treatment problems were discussed; in the Nursing Department seminars for new employees and summer student nurses; and special problem situations where the chaplain's assistance was sought by the patient, family, or staff. All such situations deepened the team concept, enabled the chaplains to better understand what the other staff does, and helped everyone provide more sensitive care for patients and families.

RESEARCH COMMITTEES

Chaplain Kerney continued to serve on the research review committees of the Mental Health and Cancer Institutes. The Clinical Director requested a staff member for the Child Health and Human Development Institute's research review committee. The Rev. John Gates, a local Baptist minister, was asked to serve on the committee for NIAMDD and at his request Chaplain Kerney assisted him in obtaining some background on the procedures and a general outline of the problems as perceived by a clerbyman serving on research review committees.

EEO

Chaplain White was an elected member of the Clinical Center EEO Advisory Committee. As department head, Chaplain Kerney also attended meetings.

PASTORAL TRAINING FOR CLERGY

Chaplain Kerney and Chaplain White conducted a course in pastoral ministry for a community clergyman, the Rev. Joseph Condro, as a part of his doctoral work. The 15-week course was completed in June. Time was spent in conference, patient visiting, and evaluation of the student's functioning in pastoral ministry.

COMMUNITY CONTACTS

Members of the Department of Spiritual Ministry had numerous contacts with nearby churches, parish clergy, hospital chaplains, visiting doctors, and other professional persons.

Both Chaplain Kerney and Chaplain White served on committees of the National Capital Union Presbytery. Chaplain Kerney finished his term as Chairperson of the Ministerial and Pastoral Relations Committee. Chaplain White served as the Chairperson of a committee to develop a Presbytery EEO and Affirmative Action Policy.

PROFESSIONAL MEETINGS (Chaplaincy)

Annual Fall Conference
Association for Clinical Pastoral Education
St. Louis, Missouri - Chaplain Kerney

Certification Committee
College of Chaplains
American Protestant Hospital Association
Sibley Hospital, Washington, D.C. - Chaplain Kerney

Symposium on Issues in Medical Ethics
Sibley Hospital, Washington, D. C. - Chaplains White, Harris, and Kleinberg

Pastoral Counseling Seminar
National Association of Catholic Chaplains
United States Catholic Conference
San Francisco, California - Father Linehan

PROFESSIONAL MEETINGS (Ecclesiastical)

Attended monthly meetings of the National Capital Union Presbytery - Chaplains Kerney and White

Attended various committee meetings on the Presbytery - Chaplains Kerney and White

LECTURES

Seminar on "Death and Dying"
Graduate School of Education
University of Maryland - Chaplain White

Panel on "Man in the Crises of Illness"
Committee on Science and Values
National Institutes of Health - Chaplains Kerney, White, Kleinberg and Linehan

Lecture on "Euthanasia"
Riverdale United Presbyterian Church
Riverdale, Maryland - Chaplain White

Panel Member - "Care of the Cancer Patient and His Family"
Prince George's General Hospital
Cheverly, Maryland - Chaplain White

Lecture-Seminars (four) on "Pastoral Care"
National Naval Medical Center
Bethesda, Maryland - Chaplain Kerney

Television Interview on "The Care of Children with Leukemia"
Channel 5 TV
Washington, D.C. - Chaplain Kerney

Seminar on "Death and Dying"
Wesley Theological Seminary
Washington, D. C. - Chaplain Kerney

Lecture on "Euthanasia"
All Saints Episcopal Church
Chevy Chase, Maryland - Chaplain White

Lecture - Seminar on "The Hospital Ministry"
Potomac United Presbyterian Church
Potomac, Maryland - Chaplain White

Lectures (two) "Medical Science and Human Values"
German Military and Naval Personnel attached to NATO
Washington, D. C. - Chaplain White

DATE DUE

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