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REPORT ON A STUDY OF ACADEMIC RADIOLOGY

Under the Auspices of the
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PREFACE

Departments of radiology can be a source of pride in academic institutions of medicine, and many deans of medical schools and university hospital administrators find their chairmen of radiology strong allies in the continuing quest to maintain and improve academic standards.

University radiology is also a source of problems to those charged with providing it with the means needed for excellence. These problems (rising costs; recruiting; increasing demands for service to patients, to students, and to science from an academic personnel that cannot grow fast enough under existing circumstances) are common to many fields of medicine, but are especially pronounced in the case of radiology.

Those responsible for the nation's health need facts to make intelligent decisions. The Study of Academic Radiology has sought to provide facts. The faculties of most of the nation's medical schools (70 of 83) provided this information in the course of many meetings arranged over a period of 18 months; 40 medical schools were visited by the members or staff of the Committee for interviews with deans, hospital administrators, and chairmen of departments in addition to radiology.

The resulting body of data constitutes a fair picture of where academic radiology is now, how it got there, and how it compares in some respects with other academic disciplines in medicine. It has been encouraging to see a field grow and help to shape many of the advances in modern medicine. On the other hand, as the 1966 report of the National Advisory Committee on Radiation (NACOR) has shown, and as this Study has documented with evidence independently obtained, university departments of radiology need massive support if their growth (and the growth of American medicine) is not to be stunted.

I wish to thank once more the members of the Committee, its staff, and my many friends at the medical schools we studied for their splendid cooperation. Last but not least, radiologists ought to be congratulated on having taken the initiative for this Study, on having made funds available, and on having sought an independent organization, the National Academy of Sciences-National Research Council, to conduct it.

JOSEPH C. HINSEY, CHAIRMAN
COMMITTEE ON THE STUDY
OF ACADEMIC RADIOLOGY

CONTENTS

Methods of Conducting the Study of Academic Radiology

The aim of the Study of Academic Radiology was to gather facts and thoughts on the condition of university departments of radiology in the United States.

A site-visit program was selected as the principal method of study, and it was complemented by meetings with senior faculty members (mainly department and division chairmen). To check the accuracy of the published data about each institution and to obtain a census of all university radiologists in full-time or geographic full-time positions as of September 1967, we also wrote to the chairman of every department of radiology and to representatives of some departments that have no permanent chairmen. Of the 80 departments to which we wrote, 72 replied and confirmed the accuracy of the data; a few made additions and corrections. We have also assembled published statistical and other data about university departments of radiology for the period 1957-1967.

We visited 40 medical schools, some more than once. These were selected to include schools in different areas and with different modes of support, associated with university hospitals of different sizes, and having departments of radiology with large and small faculties and various degrees of clinical responsibility.

Most of the visits to medical schools were by teams of two—a radiologist and a nonradiologist. The visits were planned to provide an opportunity to interview key members of the faculty and the administration of the medical school and university hospital, in addition to detailed discussions with the chairman of the department of radiology. In nearly all schools, it was possible to talk to the dean, the hospital director, and the chairmen of a few major departments, usually including medicine, surgery, and pathology. The head of each department to be visited received in advance a detailed list of questions of interest to the Committee, and was asked to submit a brief informal description of his department to help the Committee to be better informed. Most of the departments complied.

To obtain more knowledge of the problems and hopes of university radiologists throughout the United States than was possible through visits to 40 institutions, special meetings were arranged for chairmen of departments and divisions of radiology at the time of meetings of national radiology organizations. There were 24 such meetings, each attended by 10-20 persons. Faculty members from 70 university departments of radiology attended one or more of these meetings.

Observations and Conclusions

1. During the last two decades, academic radiology has shown a remarkable growth in the scope and scale of its responsibilities in the care of the sick, in the education of physicians, and in the creation and dissemination of knowledge of man in health and disease. This rapid growth has led to the development in many departments of radiology of three well-defined divisions: diagnostic radiology, radiation therapy, and nuclear medicine.

Diagnostic radiology has, in response to the need for dependable information about the structure and function of inner organs, developed many new methods of examination. Several major subspecialities have emerged within diagnostic radiology, including neuroradiology, cardiovascular radiology, and pediatric radiology.

Radiation therapy has vastly increased our knowledge of cancer and its course when treated by radiation, surgery, chemotherapy, or a combination of them. Technical advances have increased the efficiency and precision of equipment used for radiation therapy, and research in the basic sciences has begun to reveal the nature of the effect of radiation on living tissues. Radiation therapy (incorporated in the training programs of leading institutions) has become a medical specialty with well-defined training requirements.

The growth of nuclear medicine, the application of radioactive materials to the diagnosis and treatment of patients, and the study of human disease, has paralleled developments in diagnostic radiology and radiation therapy. The field has attracted many gifted persons. Technical developments have advanced the efficiency and precision of the methods used, and research has vastly increased the scope of this youngest branch of the radiologic sciences.

2. The rapid growth in the responsibilities of radiologists and of university departments of radiology has created some serious problems. There are large and ever-increasing demands on the time of university radiologists for medical care, teaching, and research. These demands have surpassed not only the supply of trained workers, but also the capacity of existing institutions to train radiologists in the numbers needed under present arrangements.

3. The most important need of academic radiology, and the most important need of radiology in general, is for trained manpower. This has been conclusively documented in the 1966 report to the Surgeon General of the National Advisory Committee on Radiation (NACOR). The findings of this Committee, obtained independently, confirm the findings and conclusions of NACOR in regard to this need.

Recommendations

The shortage of faculty in radiology presents itself as an unusually difficult problem—it cannot begin to improve before it gets better. However, the difficulty will be more apparent than real if a planned effort is made to increase the number of university radiologists. In radiology, as elsewhere, the key to academic excellence is people of ability in sufficient numbers. This Study has revealed that more training positions for radiologists with academic interests could be created at a reasonable cost. Once radiologists become available in sufficient numbers they can be expected to obtain the support needed to achieve academic excellence.

The Committee recommends to appropriate agencies and institutions that steps be immediately undertaken to achieve the objectives set forth in the following pages. The total cost of these recommendations is, by a rough estimate, less than one-tenth of 1% of all the funds spent on health care annually. Good radiology can help enhance the quality of medical care and the lack of it threatens the opposite. Because of its key position in medical practice, medical education, and medical research, it seems reasonable to invest these comparatively small funds.

1. **Increase the number of training positions in university departments of radiology capable of providing well-rounded training.** This increase must be modest in the beginning, because of the shortage of qualified teachers of radiology.

The proposal in the recent NACOR report, to increase the number of graduating trainees with academic qualifications by about 100 per year, seems realistic for a program that could be successful from the beginning. At least 40 university departments of radiology are considered capable of providing excellent training. These departments at present graduate approximately 200 radiologists each year and this Study has shown that they would be capable of increasing the number of their trainees by about 50%, to 300, in the first year. Because such a program would help to meet a national need, and would be national in scope, it would be entirely proper to seek federal support for it.

Training programs specifically in diagnostic radiology, radiation therapy, or nuclear medicine should be supported, but not training programs in "general radiology." Trainees in their third year of training can accept some responsibilities in teaching or research if their training has been concentrated in one branch of radiology. Thus, the training program itself would help to alleviate the manpower shortage in academic radiology.

2. **Establish separate training programs in each of the major divisions of radiology**—namely, diagnostic radiology, radiation therapy, and nuclear medicine—and discontinue at the earliest possible date existing 3-year training programs in "general radiology." By their nature, the latter offer limited learning experience in radiation therapy, minimal training and instruction in nuclear medicine, and only 2 years of training and experience in diagnostic radiology.

3. **Encourage the development of subspecialty training programs.** Persons interested in concentrating their future practice in a subspecialty of diagnostic radiology (such as pediatric radiology, neuroradiology, or cardiovascular radiology) might be offered training in the basic principles of diagnostic radiology for 12-18 months, and devote the rest of their training to the subspecialty they have chosen.

4. **Establish educational and training (or retraining) programs in the allied sciences and professions, including radiation physics, radiobiology, and radiologic engineering.** Radiologists can establish, maintain, and improve academic excellence when they have professionals representing all the radiologic sciences in their departments. Persons with suitable training and background are scarce. Training programs in these fields would help to attract gifted persons and provide them with the necessary experience.

Radiation physics is one field in which it is especially important to establish new training programs. There is agreement among leading radiation physicists in the United States that there is a great shortage of professional and scientific personnel in this field. Suitable training programs might increase the attractiveness of radiology to gifted young physicists and would help to ensure the continuing contributions of physics to clinical radiology.

Medical schools should be encouraged to establish departments of medical physics. Institutions with large departments of radiology ought to have identifiable divisions of radiation physics, whose members have full professional recognition in matters of salary and hospital title, as well as faculty appointments commensurate with their academic credentials and contributions.

To attract more qualified physicists into the field, on-the-job training fellowships ought to be established in university and hospital physics departments that can provide experience and training in various aspects of radiation physics. These could be non-degree-granting programs designed primarily for the physicist with an advanced degree who might consider a career in the health sciences.

The need for scientists and professionals in other allied fields and in professions yet to be created to help radiologists perform their duties is also substantial. These include professional administrators able to take over part of the administrative responsibility for departments with very large budgets, so that senior faculty members can devote a larger proportion of their time to functions that they are uniquely qualified to perform.

5. **Establish programs of research and development in radiologic education.** One reason that more radiologists cannot be trained is that not enough qualified instructors are available. Factors that govern the effectiveness and the efficiency of teaching and learning in the radiologic specialties are not wholly understood. The study of these factors and the application of newly acquired understanding to develop better methods of teaching and learning would reduce the number of additional faculty needed to train more radiologists and increase the effectiveness of learning in the radiologic specialties.

Diagnostic radiology and nuclear medicine, with their cognitive, problem-solving approach to clinical medicine, make the radiologic specialties seem particularly suited to develop methods to study the effectiveness of instruction in medical school and during the postdoctoral stage of training. Such methods could be adapted or adopted by educators in other fields of clinical medicine.

At least one medical school has an active program of educational research in its department of radiology; it is hoped that more such programs will be established. The financial difficulties of most medical schools make it likely that such programs will have to receive extramural financial support. As in other forms of basic and applied research, these programs should be directed by persons with first-hand knowledge of both fields—radiology and education.

6. **Increase the effectiveness of radiologists, as well as their numbers.** As shortages in trained manpower become increasingly evident in various branches of medicine, the questions arise: "Could the time of physicians be used more efficiently? Do all the duties of physicians require the full training of a physician, or could some of their work be delegated to persons trained more quickly and at less expense?"

These questions have been raised in other fields (such as internal medicine and pediatrics), and they are not alarming to radiologists, who are used to working with nonprofessional technical personnel. The question is whether the responsibilities of nonphysicians who now assist radiologists can be extended. Because of the increasing disproportion between the demand for radiological services and the number of trained radiologists available, and because of the practical impossibility of creating sufficient training positions in radiology, the question is not *whether* radiologists can delegate some of their routine duties, but *how soon* they can begin to train the appropriate personnel. Among those who could be useful in radiology are persons with a nursing background.

7. **Establish grants for research facilities.** The needs are great and the usual form of such assistance, matching funds, may have to be replaced by outright grants.

It is generally known, and the findings of this Study confirmed it, that many university departments of radiology that need help must function in institutions that are unable to provide it. At one medical school visited, only about 5% of funds needed by the radiology department can be contributed out of the medical school's funds—an amount sufficient to pay the salaries of about one-seventh of the faculty members in radiology. This makes an institutional grant support program necessary. The usual form of such a program, matching grants, would not be effective, because many institutions in great need of outside assistance do not have the needed funds. The estimated cost of such a program is $10 million a year. In the course of 10 years, this would amount to an average of slightly over one million dollars for each medical school in the United States.

Data Collected in the Study of Academic Radiology

Most of the detailed findings of the Study of Academic Radiology are presented in the following tables and figure. Because of the great mass of data, the diversity of sources (departments of medical schools, hospitals, interviews, and publications), and the variety of subjects involved, the findings are open to endless interpretation. The Committee has used the data as the basis for its general conclusions and recommendations, but does not wish to imply that its interpretation of the Study's findings is the only correct or useful one.

Data on faculty size in Tables 3 and 4 were obtained directly from 72 medical schools. These 72 schools have 78 university hospitals and teaching affiliations with 62 other hospitals, for a total of 140 hospitals (represented in the last three columns of Table 3). The first four columns in Table 3 represent the 78 university hospitals. The data in Table 4 represent the same breakdown—72 medical schools, 78 university hospitals, and 140 affiliated hospitals—and also include "other faculty," mostly unpaid voluntary staff.

In Tables 1 and 16 through 24, the 34 university departments of radiology consist of the 14 departments with large faculties (21 or more full-time or geographic full-time members) and the 20 with small faculties (seven or fewer members). These 14 and 20 departments are the same ones throughout the tables.

In Tables 16 through 24, the 10 "largest" and 10 "smallest" vary from row to row in each table. And in Tables 18 and 20, in the rows giving average numbers of examinations for each faculty member (in diagnostic radiology) and average numbers of treatments and new patients for each faculty member (in radiation therapy), the figures for the last four columns were actually switched, to include in each case in the 10 "largest" the departments with the most favorable ratio of faculty to clinical responsibility.

The various sources of the data in the tables and figure are listed below.

SOURCES OF DATA COLLECTED IN THE STUDY OF ACADEMIC RADIOLOGY

A. Journal of the American Medical Association (special issue—Medical Education in the United States); years that apply:

144: Sep. 9, 1950	161: Aug. 25, 1956	182: Nov. 17, 1962
147: Sep. 8, 1951	165: Nov. 16, 1957	186: Nov. 16, 1963
150: Sep. 13, 1952	168: Nov. 15, 1958	190: Nov. 16, 1964
153: Sep. 12, 1953	171: Nov. 14, 1959	194: Nov. 15, 1965
156: Sep. 11, 1954	174: Nov. 12, 1960	198: Nov. 21, 1966
159: Oct. 8, 1955	178: Nov. 11, 1961	202: Nov. 20, 1967

B. Journal of the American Medical Association (special issue—Directory of Approved Internships and Residencies); years that apply:

165: Oct. 5, 1957	177: Sep. 2, 1961	194: Nov. 15, 1965
168: Oct. 4, 1958	182: Nov. 17, 1962	198: Nov. 21, 1966
171: Oct. 10, 1959	186: Nov. 16, 1963	202: Nov. 20, 1967
174: Oct. 8, 1960	190: Nov. 15, 1964	

C. Information provided by chairmen of university departments of radiology

D. Directory of Medical Specialists, Volume 12, 1965-66

E. Medical-school bulletins

F. Dr. Jerome H. Shapiro, paper presented at the 1968 Annual Conference of Teachers of Radiology, American College of Radiology, using information provided by the American Board of Radiology

G. Science Information Exchange, Smithsonian Institution, Washington, D.C.

H. Public Health Service Grants and Awards, Part I: Research, US Department of Health, Education, and Welfare; years that apply: 1958, 1960, 1962, 1964, and 1966

I. Public Health Service Grants and Awards, Part II: Training, US Department of Health, Education, and Welfare; years that apply: 1960, 1962, 1964, and 1966

J. Cumulated Index Medicus: 1965, Volume 6, Part I; 1966, Volume 7, Part II

K. Radiology, 1963 through 1967

L. American Journal of Roentgenology, 1963 through 1967

M. Population Exposure to X-Rays, US 1964; US Department of Health, Education, and Welfare, Public Health Service; US Government Printing Office, 1966

TABLE 1 Summary Data on 34 Departments of Radiology[a]

	14 Departments	20 Departments
FACULTY (full-time and geographic full-time)		
All fields of radiology		
Total	24.6	5.4
Professors	5.4	1.3
Associate professors	5.4	1.2
Assistant professors	7.4	1.5
Instructors	6.4	1.4
Diagnostic radiology		
All ranks	13.3	3.6
Professors	2.7	0.9
Associate professors	2.6	0.8
Assistant professors	4.5	1.0
Instructors	3.5	0.9
Radiation therapy		
All ranks	3.5	0.8
Professors	0.8	0.2
Associate professors	1.0	0.3
Assistant professors	0.8	0.08
Instructors	0.9	0.2
Nuclear medicine		
All ranks	2.5	0.4
Nonclinical sciences in radiology		
All ranks	5.3	0.6
CLINICAL RESPONSIBILITIES		
Diagnostic radiology		
No. examinations (thousands)	99	56
Average no. examinations for each faculty member (thousands)	7	16
Radiation therapy		
No. treatments, not including radium (thousands)	16	6.5
Average no. treatments for each faculty member (thousands)	4	8
No. new patients	774	377
Average no. new patients for each faculty member	221	471
No. publications, all journals, 1965 and 1966	10	1
GRANTS		
USPHS grants to the medical school		
Research grants, 1966		
Entire school (thousands of dollars)	8771	2478
Department of radiology (thousands of dollars)	114	20
Department of radiology as percent of entire school	1.3	0.8
Graduate training grants, 1966		
Entire school (thousands of dollars)	3614	1124
Department of radiology (thousands of dollars)	115	17
Department of radiology as percent of entire school	3.2	1.5
Grants to the department of radiology		
USPHS grants, 1960, 1962, 1964, and 1966		
Research grants (thousands of dollars)	420	43
Research grants (no.)	12.5	2.5
Graduate training grants (thousands of dollars)	320	37
Research grants, all sources, 1963 through 1967 (thousands of dollars)	1274	92
UNIVERSITY HOSPITAL		
No. beds	926	520
Length of hospital stay (days)	10.5	11
Admissions (thousands)	25	14
Outpatient-clinic visits (thousands)	197	76
Emergency-room visits (thousands)	55	29
Autopsy percentage	65	61
House staff	312	157

[a]All figures in this table are averages.

TABLE 2 Budgeted Faculty Positions in Radiology and Other Fields—All Medical Schools, 1959 through 1967

	Radiology	Pathology	Internal Medicine	Pediatrics	Neurology	Psychiatry	Anesthesiology	Orthopedic Surgery	General Surgery	All Fields[a]
1958-59										
All positions	483	818	1719	743	---	873	332	---	921	11,005
Unfilled	36 (7%)	60 (7%)	48 (3%)	43 (6%)	12	61 (7%)	30 (9%)	4	48 (5%)	655 (6%)
1959-60										
All positions	543	821	1782	808	207	1032	336	107	873	11,319
Unfilled	33 (6%)	84 (10%)	76 (4%)	54 (7%)	16 (8%)	84 (8%)	28 (8%)	13 (12%)	58 (7%)	851 (8%)
1960-61										
All positions	528	831	1925	844	197	1060	370	127	919	11,895
Unfilled	36 (7%)	65 (8%)	72 (4%)	41 (5%)	16 (8%)	74 (7%)	34 (9%)	13 (10%)	43 (5%)	784 (7%)
1961-62										
All positions	588	1014	2079	859	215	1181	399	---	1070	12,876
Unfilled	52 (9%)	77 (8%)	65 (3%)	42 (5%)	15 (7%)	53 (4%)	42 (11%)	---	47 (4%)	836 (6%)
1962-63										
All positions	749	1136	2425	962	257	1366	459	137	1178	14,508
Unfilled	43 (6%)	69 (6%)	67 (3%)	44 (5%)	18 (7%)	57 (4%)	33 (7%)	12 (9%)	62 (5%)	827 (6%)
1963-64										
All positions	787	1177	2543	1104	332	1510	482	149	1201	15,383
Unfilled	48 (6%)	81 (7%)	62 (2%)	58 (5%)	14 (4%)	72 (5%)	40 (8%)	8 (5%)	70 (6%)	915 (6%)
1964-65										
All positions	819	1198	2611	1229	411	1618	510	152	1146	16,469
Unfilled	55 (7%)	86 (7%)	79 (3%)	67 (5%)	18 (4%)	69 (4%)	39 (8%)	21 (14%)	58 (5%)	955 (6%)
1965-66										
All positions	896	1315	2900	1294	563	1680	510	156	1272	18,264
Unfilled	58 (6%)	83 (6%)	93 (3%)	95 (7%)	23 (4%)	75 (4%)	31 (6%)	17 (11%)	79 (6%)	1,115 (6%)
1966-67										
All positions	1069	1471	3396	1522	647	1944	615	194	1462	20,670
Unfilled	78 (7%)	108 (7%)	138 (4%)	83 (5%)	37 (6%)	95 (5%)	60 (10%)	20 (10%)	87 (6%)	1,374 (7%)
Increase 1961-62 to 1966-67	82%	45%	63%	77%	201%	65%	54%	23%[b]	37%	61%

[a]Basic sciences and clinical sciences.

[b]Percent increase 1960-61 to 1965-66.

Source: A

TABLE 3 Faculty Positions in Radiology—72 Medical Schools, 1967

	Instructors	Assistant professors	Associate professors	Professors	All ranks		
					78 university hospitals	62 additional hospitals	All 140 hospitals
Diagnostic radiology:							
Full-time	116	157	105.5	101	479.5	96	575.5
Geographic full-time	14	17	8	5	44	14	58
Radiation Therapy:							
Full-time	25	37	31.5	32.5	126	10	136
Geographic full-time	2	1	2	3	8	1	9
Nuclear medicine:							
Full-time	11	35	22.5	11.5	80	8.5	88.5
Geographic full-time	1	1	2	0	4	0	4
Physics:							
Full-time	24	28	16.5	16	84.5	6	90.5
Geographic full-time	1	2	2	0	5	0	5
Radiobiology and other radiologic sciences:							
Full-time	16	24	26	26	92	3.5	95.5
Geographic full-time	0	2	2	0	4	0	4
Field not known:							
Full-time	18	2	0	3	23	9	32
Geographic full-time	0	0	0	0	0	0	0
Total full-time	210	283	202	190	885	133	1018
Total geographic full-time	18	23	16	8	65	15	80

Source: C

TABLE 4 Radiologists With University Appointments–72 Medical Schools, 1967

	Instructors	Assistant professors	Associate professors	Professors	All ranks
Full-time and geographic full-time faculty:					
78 University Hospitals	228	306	218	198	950
62 Additional Affiliated Hospitals	20	21	61	46	148
140 University Hospitals	248	327	279	244	1098
Other faculty (clinical, part-time):					
140 Hospitals	532	477	156	31	1196
TOTAL	780	804	435	275	2294

Source: C

TABLE 5 Percentage of Faculty Receiving Salary Subsidies from Federal Sources in Radiology and Other Fields–All Medical Schools, 1961-62 vs. 1966-67

	Radiology	Pathology	Internal Medicine	Pediatrics	Neurology	Psychiatry	Anesthesiology	Orthopedic surgery	General Surgery	All fields[a]
1961-62	19%	29%	37%	26%	35%	43%	9%	8%	25%	31%
1966-67	26%	42%	55%	49%	61%	60%	16%	33%	37%	49%
Change	+ 7%	+13%	+18%	+23%	+26%	+17%	+ 7%	+25%	+12%	+18%

[a]Basic sciences and clinical sciences.

Source: B

TABLE 6 Number of Medical Schools Offering Courses and Clerkships in Radiology and Other Fields–Among 80 Medical Schools, 1967

	Radiology	Pathology	Pediatrics	Neurology	Psychiatry	Anesthesiology	Orthopedic surgery
Required instruction:	71	78	78	58	78	47	46
Lecture courses:	74	78	75	58	77	62	45
Required only	30	29	28	20	27	22	21
Required and elective	40	49	39	36	50	20	16
Elective only	4	0	8	2	0	20	8
Clerkships:	26	10	66	43	55	25	28
Required only	9	3	55	28	45	14	18
Required and elective	1	0	10	4	7	1	4
Elective only	16	7	1	11	3	10	6

Source: E

TABLE 7 Research Grants to University Departments of Radiology–All Medical Schools Reported, 1956 through 1967 (amounts in thousands of dollars)

Year	All sources	USPHS		
		All grants	Grants for diagnostic radiology	Diagnostic radiology as % of all radiology
1956	$1150			
1957	$1797			
1958	$2507	$1138	$ 47	4.1%
1959	$3377			
1960	$3980	$1780	$373	21.0%
1961	$4518			
1962	$6213	$3321	$498	15.0%
1963	$6279			
1964	$6325	$4000	$528	13.2%
1965	$7098			
1966	$7511	$3879	$489	12.6%
1967	$9231			

Source: H

TABLE 8 USPHS Graduate Training Grants to University Departments of Radiology—All Medical Schools Reported, 1960, 1962, 1964, and 1966 (amounts in thousands of dollars)

Year	All grants	Grants for diagnostic radiology	Diagnostic radiology as % of all radiology
1960	$ 335	$ 152	45%
1962	$1708	$ 398	23%
1964	$2357	$ 439	19%
1966	$3373	$1034	31%

Source: I

TABLE 9 University Hospitals Included in the Study

Alabama	Medical College of Alabama, Birmingham: University of Alabama Hospitals and Clinics
Arkansas	University of Arkansas School of Medicine, Little Rock: University Hospital
California	Loma Linda University School of Medicine, Loma Linda: Loma Linda University Hospital and White Memorial Medical Center
	University of California (Irvine), California College of Medicine, Los Angeles
	University of California School of Medicine, Los Angeles: University Hospitals
	University of Southern California School of Medicine, Los Angeles: Los Angeles County General Hospital
	Stanford University School of Medicine, Palo Alto: Stanford Hospital Center
	University of California School of Medicine, San Francisco: Herbert C. Moffitt Hospital
Colorado	University of Colorado School of Medicine, Denver: Medical Center
Connecticut	Yale University School of Medicine, New Haven: Yale-New Haven Hospital
District of Columbia	Georgetown University School of Medicine: Georgetown University Hospital
	George Washington University School of Medicine: The University Hospital
	Howard University College of Medicine: Freedmen's Hospital
Florida	University of Miami School of Medicine, Coral Gables: Jackson Memorial Hospital
	University of Florida College of Medicine, Gainesville: Shands Teaching Hospital and Clinics
Georgia	Emory University School of Medicine, Atlanta: Emory University Hospital and Grady Memorial Hospital
	Medical College of Georgia, Augusta: Eugene Talmadge Memorial Hospital
Illinois	Chicago Medical School, Chicago: Mount Sinai Hospital
	Loyola University Stritch School of Medicine, Chicago
	Northwestern University Medical School, Chicago: Passavant Memorial Hospital and Chicago Wesley Memorial Hospital
	University of Chicago School of Medicine, Chicago
	University of Illinois College of Medicine, Chicago: University of Illinois Research and Educational Hospitals
Indiana	Indiana University School of Medicine, Indianapolis: Indiana University Medical Center
Iowa	University of Iowa College of Medicine, Iowa City: University Hospitals
Kansas	University of Kansas School of Medicine, Kansas City: University of Kansas Medical Center
Kentucky	University of Kentucky College of Medicine, Lexington: The University Hospital
	University of Louisville School of Medicine, Louisville: General Hospital
Louisiana	Louisiana State University School of Medicine, New Orleans
	Tulane University School of Medicine, New Orleans: Charity Hospital of Louisiana at New Orleans
Maryland	The Johns Hopkins University School of Medicine, Baltimore: Johns Hopkins Hospital
	University of Maryland School of Medicine, Baltimore: University Hospital

Massachusetts	Boston University School of Medicine, Boston: University Hospital and Boston City Hospital
	Harvard Medical School, Boston: Massachusetts General Hospital and Peter Bent Brigham Hospital
	Tufts University School of Medicine, Boston: The Tufts-New England Medical Center
Michigan	University of Michigan Medical School, Ann Arbor: University Hospital
	Wayne State University School of Medicine, Detroit: Detroit General Hospital
Minnesota	University of Minnesota Medical School, Minneapolis: university-affiliated hospitals
Mississippi	University of Mississippi School of Medicine, Jackson: University Hospital
Missouri	University of Missouri School of Medicine, Columbia: University of Missouri Medical Center
	St. Louis University School of Medicine, St. Louis: St. Louis Group of University Hospitals
	Washington University School of Medicine, St. Louis: The Barnes Hospital
Nebraska	Creighton University School of Medicine, Omaha: Creighton Memorial-St. Joseph's Hospital
	University of Nebraska College of Medicine, Omaha: University Hospital
New Jersey	New Jersey College of Medicine and Dentistry, Jersey City: college-affiliated hospitals
New York	Albany Medical College of Union University, Albany: Albany Medical Center Hospital
	State University of New York at Buffalo School of Medicine, Buffalo: Edward J. Meyer Memorial Hospital
	Columbia University College of Physicians and Surgeons, New York: Presbyterian Hospital
	Cornell University Medical College, New York: The New York Hospital
	Albert Einstein College of Medicine of Yeshiva University, New York: Bronx Municipal Hospital Center
	New York Medical College, New York: Flower-Fifth Avenue Hospitals
	New York University School of Medicine, New York: New York University Medical Center and Bellevue Hospital Center
	State University of New York Downstate Medical Center, Brooklyn: Kings County Hospital Center
	University of Rochester School of Medicine and Dentistry, Rochester: The Strong Memorial Hospital
	State University of New York Upstate Medical Center, Syracuse: New York Upstate Medical Center
North Carolina	University of North Carolina School of Medicine, Chapel Hill: The North Carolina Memorial Hospital of the University of North Carolina in Chapel Hill
	Duke University School of Medicine, Durham: Duke Hospital
	Bowman Gray School of Medicine of Wake Forest University, Winston-Salem: The North Carolina Baptist Hospital
Ohio	University of Cincinnati College of Medicine, Cincinnati: The Cincinnati General Hospital
	Case Western Reserve University School of Medicine, Cleveland: University Hospitals
	Ohio State University College of Medicine, Columbus: The University Hospitals
Oklahoma	University of Oklahoma School of Medicine, Oklahoma City: University Hospital and Out-Patient Clinics
Oregon	University of Oregon Medical School, Portland: University of Oregon Medical School Hospitals and Clinics
Pennsylvania	Hahnemann Medical College, Philadelphia: Hahnemann Hospital
	Jefferson Medical College of Philadelphia: Jefferson Hospital
	Temple University School of Medicine, Philadelphia: Albert Einstein Medical Center
	University of Pennsylvania School of Medicine, Philadelphia: Hospital of University of Pennsylvania
	Woman's Medical College of Pennsylvania, Philadelphia: Germantown Hospital
	University of Pittsburgh School of Medicine, Pittsburgh: Presbyterian-University Hospital
Puerto Rico	University of Puerto Rico School of Medicine, San Juan
South Carolina	Medical College of South Carolina School of Medicine, Charleston: The Medical College Hospital
Tennessee	University of Tennessee College of Medicine, Memphis: City of Memphis Hospitals
	Meharry Medical College School of Medicine, Nashville: George W. Hubbard Hospital
	Vanderbilt University School of Medicine, Nashville: University Hospital

Texas	University of Texas Southwestern Medical School, Dallas: Parkland Memorial Hospital
	University of Texas Medical Branch, Galveston: The Medical Branch Hospitals
	Baylor University College of Medicine, Houston: Ben Taub General Hospital and Methodist Hospital
Utah	University of Utah College of Medicine, Salt Lake City: University Hospital
Vermont	University of Vermont College of Medicine, Burlington: Mary Fletcher Hospital and DeGoesbriand Memorial Hospital
Virginia	University of Virginia Medical School, Charlottesville: The University Hospital
	Medical College of Virginia School of Medicine, Richmond: The Medical College of Virginia Hospitals and Clinics
Washington	University of Washington School of Medicine, Seattle: University Hospital
West Virginia	West Virginia University School of Medicine, Morgantown: West Virginia University Hospital
Wisconsin	University of Wisconsin Medical School, Madison: University Hospitals
	Marquette University School of Medicine, Milwaukee: Milwaukee County General Hospital and Clinics

TABLE 10 Estimated Number of Radiologic Examinations and Procedures, 1964

United States population	187 million
Persons who had radiologic examinations	108 million
Dental	46 million
Medical	74 million
More than one kind	12 million
Radiation treatments	0.6 million

Of 108 million persons who had radiologic examinations (medical or dental):

Number of professional visits	143 million
Number of radiologic examinations and procedures	173 million
Number of exposures	506 million

Of 74 million persons who had medical radiologic examinations:

Number of visits	93 million
Number of radiologic examinations and procedures	119 million
Number of exposures	280 million

Source: M

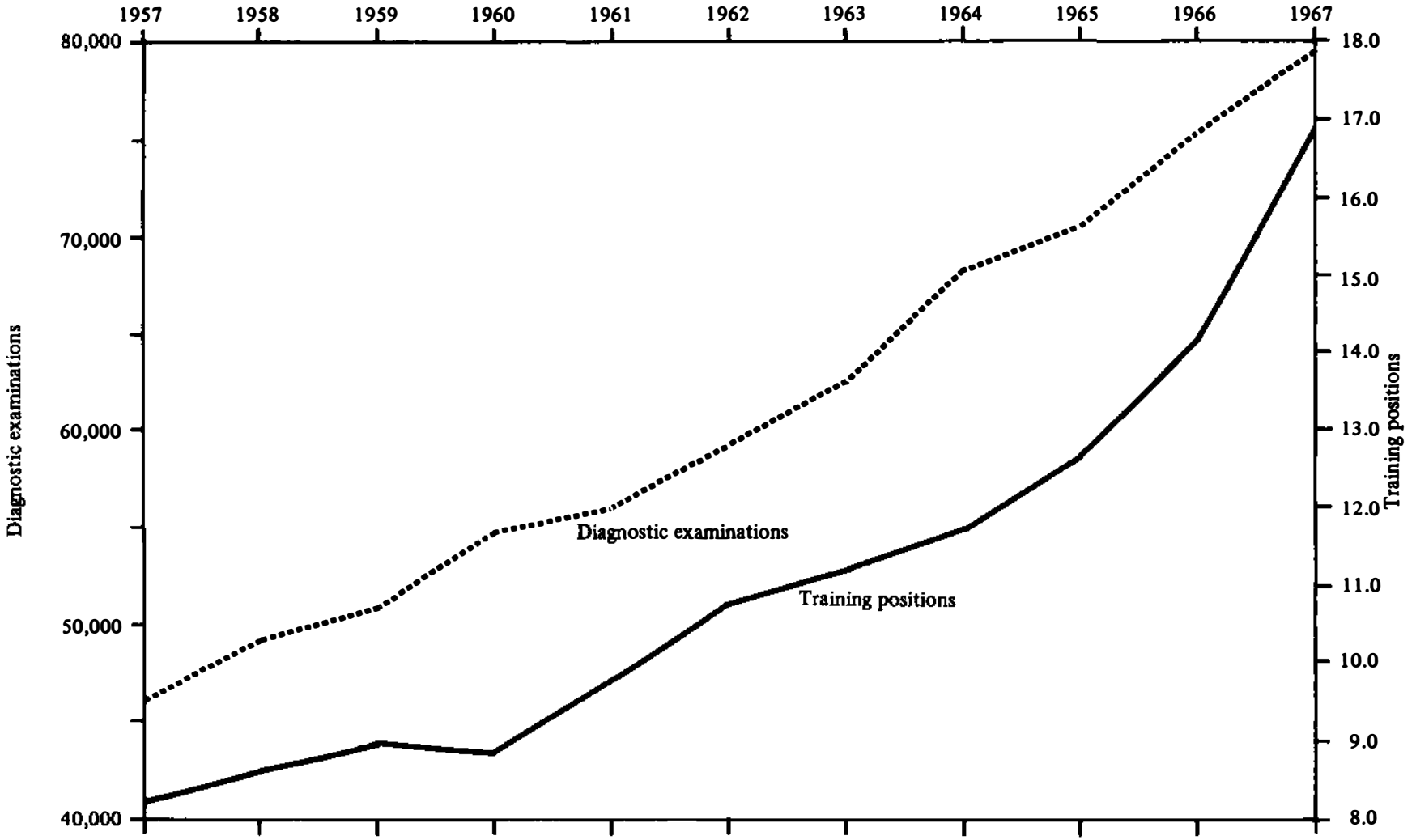

FIGURE 1. Average numbers of Diagnostic Examinations and Training Positions in Radiology at University Hospitals, 1957 through 1967. (Source: B)

TABLE 11 All Approved Programs in Radiology vs. University Hospital[a] Programs–Positions Offered and Clinical Responsibilities, 1957 through 1967

	1st year	4th year	All years	No. diagnostic examinations (millions)	No. radiation treatments (millions)
1957					
University hospitals	205	--	637	3.7	b
All approved hospitals	619	--	1693	11.8	1.7
1958					
University hospitals	233	--	707	4.0	0.6
All approved hospitals	652	--	1744	12.8	1.8
1959					
University hospitals	224	--	694	4.0	0.5
All approved hospitals	661	--	1820	13.1	1.7
1960					
University hospitals	246	35	731	4.5	0.6
All approved hospitals	664	70	1781	b	1.8
1961					
University hospitals	240	52	792	4.5	0.6
All approved hospitals	637	92	1883	13.6	1.8
1962					
University hospitals	260	65	842	4.9	0.7
All approved hospitals	634	97	1920	13.7	b
1963					
University hospitals	273	72	918	5.3	b
All approved hospitals	630	102	1972	14.8	1.8
1964					
University hospitals	284	89	945	5.8	0.7
All approved hospitals	639	120	1971	15.9	2.0
1965					
University hospitals	301	87	1020	5.8	0.7
All approved hospitals	637	124	2067	16.0	1.9
1966					
University hospitals	345	96	1145	6.1	0.7
All approved hospitals	688	131	2048	17.2	2.2
1967					
University hospitals	419	126	1303	6.4	0.7
All approved hospitals	768	168	2155	18.2	2.0

[a]Includes only the main teaching hospital(s) of each medical school. [b]Data were unreliable.
Source: B

TABLE 12 All Approved Programs in Radiology—Affiliated[a] vs. Nonaffiliated Hospitals, 1957 through 1967

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Approved programs	394	361	365	376	376	360	372	378	312	278	266
In affiliated hospitals						205	214	208	155	161	161
In nonaffiliated hospitals						155	158	170	157	117	105
Appointments offered	1693	1744	1820	1781	1883	1920	1972	1971	2067	2048	2155
In affiliated hospitals						1333	1443	1244	1117	1373	1527
In nonaffiliated hospitals						587	529	727	950	675	628
Appointments filled	1259	1306	1389	1435	1537	1591	1537	1490	1560	1631	1717
In affiliated hospitals						1149	1161	986	874	1158	1268
In nonaffiliated hospitals						442	376	504	686	473	449
Percent of appointments filled	74	75	76	81	82	83	78	76	76	80	80
In affiliated hospitals						86	80	79	78	84	83
In nonaffiliated hospitals						75	71	69	72	70	72

[a]All hospitals whose training programs are affiliated with university departments.

Source: A

TABLE 13 All Approved Programs in Radiology and Other Fields—Affiliated vs. Nonaffiliated Hospitals, 1966-67

	Radiology	Pathology	Internal medicine	Pediatrics	Neurology	Psychiatry	Anesthesiology	Orthopedic surgery	General surgery
Approved programs	266	673	450	289	98	258	200	267	621
In affiliated hospitals	161	307	255	162	77	141	132	166	290
In nonaffiliated hospitals	105	366	195	127	21	117	68	101	331
Appointments offered	2155	3431	6549	2430	702	4493	1652	1725	6521
In affiliated hospitals	1527	2016	4324	1750	543	2596	1235	1109	3840
In nonaffiliated hospitals	628	1415	2225	680	159	1897	417	616	2681
Appointments filled	1717	2070	5531	2070	541	3547	1160	1610	5842
In affiliated hospitals	1268	1353	3780	1505	424	2167	870	1040	3502
In nonaffiliated hospitals	449	717	1751	565	117	1380	290	570	2340
Percent of appointments filled	80	60	84	85	77	79	70	93	90
In affiliated hospitals	83	67	87	86	78	83	70	94	91
In nonaffiliated hospitals	72	51	79	83	74	73	70	93	87
Percent of residents trained in affiliated hospitals	74	65	68	73	78	61	75	65	60
Percent of foreign graduates among residents, all hospitals	18	42	30	39	27	27	50	13	35
In affiliated hospitals	17	34	23	33	26	18	48	11	25
In nonaffiliated hospitals	22	56	45	56	32	42	59	17	49

Source: A

TABLE 14 All Approved Programs in Radiology and Other Fields—Affiliated vs. Nonaffiliated Hospitals, 1961-62

	Radiology	Pathology	Internal medicine	Pediatrics	Neurology	Psychiatry	Anesthesiology	Orthopedic surgery	General surgery
Approved programs	360	751	611	315	147	321	261	333	760
In affiliated hospitals	205	270	252	149	106	157	154	171	273
In nonaffiliated hospitals	155	481	359	166	41	164	107	162	487
Appointments offered	1920	3013	6139	2037	527	4026	1579	1423	6395
In affiliated hospitals	1333	1481	3586	1343	421	2204	1091	816	3242
In nonaffiliated hospitals	587	1532	2553	694	106	1822	488	607	3153
Appointments filled	1591	1964	5309	1776	410	3226	1186	1344	5801
In affiliated hospitals	1149	1126	3220	1198	332	1860	837	773	3017
In nonaffiliated hospitals	442	838	2089	578	78	1366	349	571	2784
Percent of appointments filled	83	65	86	87	78	80	75	94	91
In affiliated hospitals	86	76	90	89	79	84	77	95	93
In nonaffiliated hospitals	75	55	82	83	74	75	72	94	88

Source: A

TABLE 15 All Approved Programs in Radiology and Other Fields—Affiliated vs. Nonaffiliated Hospitals, Change from 1961-62 to 1966-67

	Radiology	Pathology	Internal medicine	Pediatrics	Neurology	Psychiatry	Anesthesiology	Orthopedic surgery	General surgery
Change in number of approved programs	-94	-78	-161	-26	-49	-63	-61	-66	-139
In affiliated hospitals	-44	+37	+3	+13	-29	-16	-22	-5	+17
In nonaffiliated hospitals	-50	-115	-164	-39	-20	-47	-39	-61	-156
Change in number of appointments offered	+235	+418	+410	+393	+175	+467	+73	+302	+126
In affiliated hospitals	+194	+535	+738	+407	+122	+392	+144	+293	+598
In nonaffiliated hospitals	+41	-117	-328	-14	+53	+75	-71	+9	-472
Change in number of appointments filled	+126	+106	+222	+294	+131	+321	-26	+266	+41
In affiliated hospitals	+119	+227	+560	+307	+92	+307	+33	+267	+485
In nonaffiliated hospitals	+7	-121	-338	-13	+39	+14	-59	-1	-444
Change in percentage of appointments filled	-3	-5	-2	-2	-1	-1	-5	-1	-1
In affiliated hospitals	-3	-9	-3	-3	-1	-1	-7	-1	-2
In nonaffiliated hospitals	-3	-4	-3	0	0	-2	-2	-1	-1

Source: A

TABLE 16 The Department of Radiology: Faculty, Teaching, and Training

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Faculty, full-time and geographic full-time:								
All fields of radiology, total	21–30	24.6	3–7	5.4	24–30	26	3–5	4
Professors	2–10		0–3					
Associate professors	0–12		0–4					
Assistant professors	2–12		0–3					
Instructors	1–18		0–5					
Nonclinical sciences in radiology, all ranks (included in above total)	3–10	5.3	0–2	0.6	5–10	7		0
Teaching and training:								
Percent of graduates entering radiology								
1950 through 1959	0.5–6	3	0–4.5	2.5				
1961 and 1962	1.5–10.5	4.5	0–10.5	5.5	8.5–11	9.5	0–2	0.8
Number of radiologists trained								
1951 through 1960	2–42	21	0–12	6				
1964 through 1966	9–27	16.5	0–12	6.5	18–27	21	0–5	2.5

Sources: A, C, D, F

TABLE 17 The Department of Radiology: Grants and Publications

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Grants received (amounts in thousands of dollars):								
Research grants, all sources, 1963 through 1967	185–4336	1274	0.5–319	92	1025–4336	2087	0–12	7
Research grants, USPHS, 1960, 1962, 1964, and 1966	28–2036	420	0–202	43	390–2036	769		0
Number of grants	3–24	12.5	0–7	2.5	14–24	19.5		0
Graduate training grants, USPHS, 1960, 1962, 1964, and 1966	9–694	320	0–326	37	298–694	420		0
Number of publications:								
All journals, 1965 and 1966	29–100	62	0–19	7				
Radiology and Am.J.Roent., 1963 through 1967	10–87	46	0–22	6	36–87	68	0–1	0.3

Sources: G, H, I, J, K, L

TABLE 18 Diagnostic Radiology: Faculty and Clinical Responsibilities

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Faculty, full-time and geographic full-time:								
All ranks	8–21	13.3	2–7	3.6	13–21	16	2–3	2.5
Professors	0–6		0–2					
Associate professors	0–5		0–2					
Assistant professors	2–8		0–2					
Instructors	1–9		0–4					
Clinical responsibilities:								
No. examinations (thousands)	47–181	99	19–119	56	133–280	196	19–37	28
Average no. examinations for each faculty member (thousands)	4–13	7	6–48	16	4–6	5	24–48	31
Faculty time spent on "special procedures"								
15% or less	1 department in 12		6 departments in 20		10 departments in 68			
16% to 25%	4 departments in 12		13 departments in 20		53 departments in 68			
26% or more	7 departments in 12		1 department in 20		5 departments in 68			

Sources: B, C

TABLE 19 Diagnostic Radiology: Grants and Publications

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Grants received, USPHS (amounts in thousands of dollars):								
Research grants, 1960, 1962, 1964, and 1966	0–166	59	0–61	10	61–166	103		0
Number of grants	0–7	3	0–4	0.7	3–7	5		0
Graduate training grants, 1960, 1962, 1964, and 1966	0–409	92	0–99	5	59–409	155		0
No. of publications:								
All journals, 1965 and 1966	10–69	32	0–18	5				
Radiology and Am.J.Roent., 1963 through 1967	7–67	33	0–15	4	27–77	52	0–1	0.2

Sources: H, I, J, K, L

TABLE 20 Radiation Therapy: Faculty, Clinical Responsibilities, and Publications

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Faculty, full-time and geographic full-time:								
All ranks	1–6	3.5	0–2	0.8	4–6	4.5	0–1	0.2
Professors	0–2		0–1					
Associate professors	0–2		0–1					
Assistant professors	0–2		0–1					
Instructors	0–3		0–1					
Clinical responsibilities:								
No. treatments, not including radium (thousands)	11–30	16	1–13	6.5	18–30	23	0.01–3	1
Average no. treatments for each faculty member (thousands)	2–12	4	1–13	8	0.01–2	5	9–30	14
No. new patients	300–1300	774	25–1292	377	900–1986	1218	2–284	158
Average no. new patients for each faculty member	75–587	221	173–645	471	2–186	271	455–730	598
No. publications:								
All journals, 1965 and 1966	0–45	10	0–7	1				

Sources: B, C, J

TABLE 21 Nuclear Medicine: Faculty and Publications

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Faculty, full-time and geographic full-time:								
All ranks	0–7	2.5	0–1	0.4	2–7	4		0
Professors	0–2		0–.5					
Associate professors	0–3		0–1					
Assistant professors	0–2		0–1					
Instructors	0–2		0–.5					
No. publications:								
All journals, 1965 and 1966	0–42	11	0–8	0.7				
Radiology and Am.J.Roent., 1963 through 1967	0–9	3	0–3	0.5	4–9	5.5		0

Sources: C, J, K, L

TABLE 22 Physics and Radiobiologic Sciences: Faculty and Publications

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
Physics								
Faculty, full-time and geographic full-time:								
All ranks	1–7	2.5	0–2	0.5	2–7	3.5		0
Professors	0–2		0–1					
Associate professors	0–4		0–1					
Assistant professors	0–3		0–1					
Instructors	0–1		0–2					
No. publications:								
All journals, 1965 and 1966	0–7	3	0–9	0.7				
Radiobiology and other radiologic sciences								
Faculty, full-time and geographic full-time:								
All ranks	1–4	3	0–1	0.1	3–6	4.5		0
Professors	0–2.5		0–1					
Associate professors	0–2		0–1					
Assistant professors	0–2		0					
Instructors	0–1		0					
No. publications:								
All journals, 1965 and 1966	1–16	6	0–1	0.05				

Sources: C, J

TABLE 23 The Medical School: Graduates and Grants

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
No. graduates, 1966-67	48–161	88	37–150	85	136–182	161	37–59	50
Grants, USPHS, 1966 (amounts in thousands of dollars):								
Research grants:								
Entire school	2072–15,163	8771	620–9307	2478	9576–15,163	12,037	268–1221	756
Department of radiology	0–600	114	0–122	20	113–600	246		0
Department of radiology as percent of entire school	0–7	1.3	0–3	0.8	2.5–7	3.5		0
Graduate training grants:								
Entire school	815–5642	3614	109–5069	1124	4225–6548	5256	44–315	211
Department of radiology	0–346	115	0–186	17	118–346	201		0
Department of radiology as percent of entire school	0–8.5	3.2	0–15.5	1.5	5–22	9		0

Sources: A, H, I

TABLE 24 The University Hospital

	34 departments				All departments			
	14 departments with large faculty		20 departments with small faculty		10 "largest"		10 "smallest"	
	Range	Average	Range	Average	Range	Average	Range	Average
No. beds	318–1542	926	172–1142	520	1181–2713	1818	172–318	253
Length of hospital stay (days)	8–15	10.5	8–18	11	14–19	16	6–9	8
Admissions (thousands)	12–39	25	4–43	14	35–90	50	4–10	8
Outpatient-clinic visits (thousands)	86–356	197	22–240	76	288–631	409	15–49	34
Emergency-room visits (thousands)	16–195	55	2–129	29	93–315	156	2–14	11
Autopsy percentage	51–81	65	37–82	61	77–86	81	35–45	41
House staff	210–420	312	31–278	157	357–579	443	30–100	61

Source: B

TABLE 25 Medical Schools that Awarded Most M.D. Degrees to Radiologists, 1935 through 1960–First 25 Institutions in Decreasing Order of Frequency[a]

University of Pennsylvania School of Medicine
Jefferson Medical College of Philadelphia
University of Minnesota Medical School
Northwestern University Medical School
Washington University School of Medicine (St. Louis)
University of Michigan Medical School
Harvard Medical School
University of Illinois College of Medicine
Tufts University School of Medicine
Columbia University College of Physicians and Surgeons
New York University School of Medicine
St. Louis University School of Medicine
Indiana University School of Medicine
University of Iowa College of Medicine
Temple University School of Medicine
University of Tennessee College of Medicine
University of Cincinnati College of Medicine
Ohio State University College of Medicine
Case Western Reserve University School of Medicine
University of Louisville School of Medicine
Tulane University School of Medicine
University of Kansas School of Medicine
University of Texas Medical Branch
University of Wisconsin Medical School
State University of New York Upstate Medical Center (Syracuse)

[a]These 25 medical schools accounted for 47% of all radiologists for whom this information was provided in Source D.

TABLE 26 Estimated Annual Costs of Additional Training and Research Support Needed in University Departments of Radiology (amounts in millions of dollars)

	Year					
	1	2	3	4 through 10	11	12
TRAINING GRANTS						
Professional training grants (Radiologists' assistants):						
Stipends for 300 trainees (100 in 1st yr, 200 2nd yr, 300 thereafter)	0.6	1.2	1.8	1.8	1.2	0.6
Institutional support	0.2	0.4	0.6	0.6	0.4	0.2
Academic radiologists:						
Stipends for 300 trainees (100 in 1st yr, 200 2nd yr, 300 thereafter)	1.0	2.0	3.0	3.0	2.0	1.0
Institutional support	1.0	2.0	3.0	3.0	2.0	1.0
Subtotal, training grants	2.8	5.6	8.4	8.4	5.6	2.8
RESEARCH AND FACILITIES GRANTS						
Predoctoral research training grants	1.2	1.2	1.2	1.2	1.2	1.2
Institutional support	0.3	0.3	0.3	0.3	0.3	0.3
Research and training facilities	10.0	10.0	10.0	10.0	10.0	10.0
Research grants, additional support (specifically including educational research and research on the productivity of radiological care)	10.0	10.0	10.0	10.0	10.0	10.0
Subtotal, research and facilities grants	21.5	21.5	21.5	21.5	21.5	21.5
TOTAL, all grants	24.3	27.1	29.9	29.9	27.1	24.3